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Eleventh Technical Meeting  
Onzième Réunion Technique

Papers and Proceedings

Rapports et Procès-verbaux

NEW DELHI, INDIA

25-28 November 1969

VOLUME IV

Fifth Session; Commission on Education

"Education Workshop"

ENVIRONMENTAL CONSERVATION EDUCATION  
AMONG POPULATIONS OF RURAL AND WOODLAND AREAS



*Published with the assistance of UNESCO*

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

International Union  
for Conservation of Nature  
and Natural Resources

Morges, Switzerland, 1971

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 co-operation 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 has headquarters near those of 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 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.

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 safe-guarding of animal and plant species threatened with extinction.

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



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Volume IV

**Fifth Session: Commission on Education  
"Education Workshop"**

ENVIRONMENTAL CONSERVATION EDUCATION  
AMONG POPULATIONS OF RURAL AND WOODLAND AREAS



*Edited by*  
J. Čeřovský & T. Pritchard  
*Published with the assistance of UNESCO*  
International Union  
for Conservation of Nature and Natural Resources  
Morges, Switzerland, 1971.



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## Preface

The Ninth and Tenth Technical Meetings of IUCN held at Nairobi (1963) and Lucerne (1966), were concerned with identifying and assessing some of the more important ecological considerations affecting conservation of nature and natural resources in tropical and temperate regions, respectively. The Eleventh Technical Meeting, held at New Delhi on 25-28 November 1969, adopted a somewhat different approach. Although much of the material presented was appropriately drawn from experience of conservation problems and scientific research in southern Asia, the aim was to use this material, supplemented by a limited number of comparable studies from other parts of the world, to illustrate the activities and interests of each of the five Commissions on which IUCN relies for technical advice, the formulation of its policies and the promotion of its projects.

Thus, with the exception of the Commission on Legislation, whose specialized field of work does not lend itself to this kind of approach, each Commission undertook the organization and supervision of a Session of the Technical Meeting. In addition, reflecting the close community of interests between IUCN and the International Biological Programme, a full Session of the Meeting was devoted to IBP activities and this was also organized by the Commission on Ecology by virtue of its special liaison responsibilities.

The Papers and Proceedings of the Eleventh Technical Meeting are, therefore, being published in five parts. Volume I contains those pertaining to the Commission on Ecology, including the IBP Session material; Volume II has been prepared by the Survival Service Commission; Volume III by the International Commission on National Parks; Volume IV by the Commission on Education and Volume V by the Commission on Landscape Planning.

Two points concerning the arrangement of material in the five volumes call for comment. First, certain of the topics dealt with in Volume I, under the heading of wildlife utilization and management (e.g. 'the role of zoos') and also the problems concerned with the identification and conservation of undisturbed islands, are very much the concern of the Survival Service Commission and of its specialist groups. That they were nevertheless dealt with at the first two Sessions of the Technical Meeting, under the auspices of the Commission on Ecology, was mainly due to the large number of papers on endangered species presented for discussion at the Survival Service Commission's half-day Session. It is, however, also an indication of the interdependence of conservation of habitat and species survival, which closely links the work of the two Commissions.

Secondly, a novel feature of the Eleventh Technical Meeting was the presentation and discussion of the reports on what came to be known as the 'pre-Conference Study Tours'. These were in effect six short-term research projects, designed to provide an up to date assessment of a variety of conservation problems of current importance in the host country of India, but typifying problems which frequently come to IUCN's attention. The projects were made possible by the generous financial support of the Smithsonian Institution and were carried out during the week immediately preceding the General Assembly by small groups of experts, representing the appropriate Commissions, working in collaboration with their Indian counterparts, appointed by the Inspector-

General of Forests, who were responsible for all the local arrangements. Two of the studies were mainly concerned with endangered species, two with National Park development and management, and one each with problems of general ecological and landscape planning significance. The resulting reports were dealt with accordingly at various Sessions of the Technical Meeting, but for ease of reference and because, with one exception, all the studies were sited in existing National Parks or equivalent reserves, it has been deemed convenient to include all the reports and summaries of the discussion on them in Volume III of the Proceedings.

Finally, in connection with the present volume, Vol IV of the Proceedings, special mention should be made of another 'pre-Conference' initiative, namely what was in effect a preparatory session for the 'Education Workshop' organized by the IUCN Commission on Education for its session of the Technical Meeting programme. This took the form of a working party on environmental conservation education problems in India and it was held at the Forest Research Institute and Colleges, Dehra Dun, on 21 and 22 November 1969. The full Proceedings of the Working Party have been published separately as IUCN Supplementary Paper No. 25, but the summary report which was presented and the references which were made to it in discussion during the fifth session of the Eleventh Technical Meeting are included in this volume.

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## Introduction to the Fifth Session

The fifth session of the XIth Technical Meeting of the International Union for Conservation of Nature and Natural Resources took place in New Delhi between 09.30 and 13.00 hours on Friday, 28 November 1969. It was organized by the IUCN Commission on Education as an 'Education Workshop' and its special concern was with problems of conservation education in rural and woodland areas.

The Chairman of the Commission, Dr. L. Shaposhnikov (U.S.S.R.), was unfortunately prevented by illness from attending the Session and the Chair was taken in his place by Dr. Tom Pritchard, (U.K.), a Vice-Chairman of the Commission. Another of the Vice-Chairmen and Executive Officer of the Commission, Dr. Jan Ceřovsky (Czechoslovakia), acted as rapporteur.

The agenda for the Session was divided into two parts and was also classified regionally. The first part, under the regional heading 'India' consisted of a short report by the Secretary of the Commission, Mr. J. Goudswaard, on the results of the Working Meeting on problems of environmental education in India which had been held at Dehra Dun on 21 and 22 November, immediately before the opening of the IUCN General Assembly. This was followed, secondly, by the remainder of the papers and the discussion relating to the Indian situation and by all the other papers contributed for the Session grouped under their appropriate regional headings.

Papers had for the most part been distributed to participants in advance and, in view of the limited duration of the Session, authors were asked in presenting their papers to restrict themselves to a 5-10 minutes summary of the main contents and ideas, so as to allow at least some time for discussion. In two cases neither the author nor his representative was able to be present and the papers concerned (Nos. 4(c) and 5(d) in the Table of Contents of the Proceedings) could only be referred to very briefly by the Chairman.

In these proceedings each group of papers is prefaced by a report on their presentation and discussion and, in some cases, comments or additional material which, due to lack of time, could only be submitted in writing, are added at the end. Otherwise, except for some rearrangement of material for ease of reference and some minor or formal editorial changes, the full texts of papers and contributions to the discussions are set out in the order and form in which they were presented.

Morges, 9 September, 1970.

J. Čeřovský,  
Executive Officer,  
Commission on Education.



## Section 1: INDIA

### REPORT OF THE PROCEEDINGS

*Dr. Tom Pritchard* (the Chairman, U.K.), formally opened the Session and, after explaining the agenda and the procedure he proposed to follow in dealing with it, called on the Secretary of the IUCN Commission on Education to present the report of the pre-Assembly working party of the Commission which had been held at the Forest Research Institute and Colleges in Dehra Dun and in which several of the specialists present had participated.

*Mr. Johannes Goudswaard, ing.* (Netherlands) introduced briefly his *Final Report from the Working Meeting on Problems of Environmental Conservation Education in India* held at Dehra Dun on 21 and 22 November 1969 (paper 1(a)). The Chairman thanked Mr. Goudswaard for his presentation and asked the next speaker to present his paper.

*Dr. S. Doraiswami* (India) introduced the paper prepared by him in conjunction with Dr. Vladimir M. Galushin (UNESCO) on *Environmental Conservation Education in Indian Schools* (paper 1(b)).

The Chairman congratulated Dr. Doraiswami and Dr. Galushin for the splendid work they were achieving under the auspices of the National Council of Educational Research and Training (NCERT) and, because the author of the next paper in the programme was still detained at a meeting of IUCN Executive Board, threw the meeting open for a general discussion of Indian problems.

*Mrs. H. Spurway* (Habshinguda 16, Hyderabad 7, India): If we wish to bring about improvements in environmental education we will have to popularize our methods. I suggest that nature study, and the more sophisticated concepts, will appeal more to young people if they realize that these are interests of the outside world. Indian children and students too often regard their own village and its environment as a boredom or a prison, from which formal education and training is the means of escape.

It is unfortunate that shooting is still regarded as snobbish. This is the main motive for poaching in some parts of the country and village people cannot be persuaded that a townsman with a rifle may be a thief, and not a gentleman. We must hasten the day when conservation is regarded as 'snobbish'.

*Prof. R. Misra* (Banaras Hindu University, Varanasi, India): The school and university courses should be developed primarily around field work. I find that schoolchildren are taught through books and this does not make much headway. It is necessary to impress upon children the environmental features of vegetation and animals and to teach them to see this in the field. Boys should be taken to the field and subjects should be demonstrated in the context of field visits. But we experience great difficulties concerning field work at various levels of education; I myself have some experience of these at university level.

Wooded areas should be placed by the state forest department at the disposal of the educational institutions for observations and experimentation. Further, since these institutions do not have the resources to maintain a forest study area, the state should continue to shoulder the responsibility but permit the experimenters to manipulate the ecosystem and provide them with necessary facilities, such as fencing of areas, whenever needed.

*Prof. J. D. Ovington* (Australian National University, Canberra, Australia): Since the Forest Service has the responsibility for looking after National Parks and Wildlife Sanctuaries, it is essential that conservation and wildlife management constitutes an important part of the forestry curriculum. When the Commission on Education met at Dehra Dun, did they look at the curriculum of the forestry course to see whether this type of training was adequate? Dehra Dun has a fine reputation for its high academic standards and it can play an important part in this field.

*Mr. R. C. Kaushik* (Forest Research Institute and Colleges, Dehra Dun, India): In our forestry education courses at Dehra Dun, based on ecological and biological knowledge, a wildlife conservation course equivalent to three quarterly credits in U.S.A. universities is given. For specialization, an exclusive wildlife management course of six months duration is starting on the 1 January 1970.

*Dr. K. Kishor* (University of Lucknow, India): May I draw your attention to the Dehra Dun resolution, particularly that one of the Committee on University Education, Clause 1, that the universities should establish M.Sc. interdisciplinary courses on environmental sciences, natural resources, etc., which is vital for the future of conservation and environmental education in India.

We at the university are willing to open up B.Sc., M.Sc, and Ph.D. courses in conservation and relevant subjects, but would like to be reassured that job opportunities would exist for the graduates. Only then would conservation education receive encouragement. At present the question is, what will the students do when they get their degrees in conservation? The employment opportunities in India are already limited. Much thought should be given to this aspect of the problem.

Secondly, Parks and Wildlife management is at present entirely in the hands of the Forest Department. I would therefore like to ask the IUCN to request its Member Countries to set up special, separate conservation services and to draw upon university trained personnel to execute these services. It does not really concern us whether such conservation services fall under separate departments or continue to be a branch of the Forest Department. All we want is to be sure that a university trained conservation man shall be given an opportunity of a job, where he can be useful to society. Only then will universities be able, and even encouraged, to conduct and continue conservation courses.

*Mr. J. Holliman* (President, International Youth Federation for Environmental Studies and Conservation, 7A Glazbury Road, London W. 14, U.K.): I would like to draw your attention to a paper produced by the Indian Ministry of Education and Youth Services which says that the most serious challenge concerns the future of the unemployed educated people in India. A conference on this issue was held in May this year (1969). According to the latest available data, the number of educated job seekers registered in Employment Exchanges as on the 31 December 1968, was 1, 309, 000. It has been proposed that the unemployed young men should go out in the rural areas to take up community development programmes; mentioned in the Ministry's report are conservation projects, such as soil erosion, forestry, etc. I feel this development is an important one, not only in India, but in other countries with similar problems. We should help to make sure that in such programmes the correct attitude towards the environment is adopted and the right technical advice is given in carrying out practical conservation projects.

*Dr. S. Doraiswami*: Very often there are no facilities such as special laboratories or class rooms in which students' activities in biology can be properly

carried out. We do encourage the teachers to take the students out into the field. But it will take a long time before even this comes into effect on a widespread basis. The NCERT has begun its project for improvement of science teaching as a package programme. It includes (i) preparation of syllabus, (ii) preparation of teaching materials, (iii) effecting improvements in methods of teaching which would include students' activities and teachers' demonstrations, and (iv) in-service teachers training. All this involves a dialogue between the Central Government ministry and the State Departments of Education which are allowed to adopt, or to adapt, the materials.

*Mr. Thomas L. Kimball* (National Wildlife Federation, Washington D.C, U.S.A.): I am Executive Director of the National Wildlife Federation in the U.S.A. This is a private non-governmental organization, with approximately 2½ million members. We have found that even when States have enacted laws requiring teaching courses in natural resources and conservation, they sometimes could not be implemented because we did not have sufficiently qualified teachers and because of lack of funds. Hence the National Wildlife Federation's environmental education programme, on which I have prepared a memorandum for this Session (see supplementary note to Section 4 below).

*Prof. Dr. Michel Maldague* (University of Laval, Quebec, Canada): I have been very impressed by these discussions. There are two questions I would like to ask Dr. Doraiswami. First, when did you establish this new programme and how long has it been fully operational? Secondly, what means are you using in convincing the authorities of the various States that it is important to implement this programme; in other words, have the States welcomed your proposals or not?

*Dr. S. Doraiswami*: The programme actually started three years ago. We introduced it in the 6th class. The books have been in use in 500 schools in Delhi and 120 central schools spread all over the country. As mentioned earlier, we are having talks with State Education Departments and State Institutes of Science Education, where the syllabuses and teaching materials are adopted or adapted and translated into the regional languages. Under the UNESCO/UNICEF Scheme, key institutes, training colleges and schools are supplied with equipment on condition that the materials prepared by NCERT will be used. The teachers will receive training in using the new materials and several schools will be used as experimental ones. After this system has been operating for some time, the feedback received will be used to revise and improve the materials. The books are published in the regional languages of the States concerned. Three or four States have already promised to translate. The new teaching has already started in the State of Andhra Pradesh in the 6th class, it is starting now in Kerala, and in June 1970 it will start in Madras. Translation of materials has been started in Manipur and has been completed in Gujarat. I hope other States will join too.

*Mr. Yuvraj Digvijay Singh* (The Palace, Wankaner, Gujarat, India): Nature education should begin at the primary and middle school level. There are hundreds of thousands of such schools in India and none of them have teachers who know anything about nature. Distribution of nature guide-books among school children is meaningless unless there are teachers able to interpret them. The teachers must have at least some rudimentary knowledge of nature and nature conservation.

In India, the Federal Government as well as the various State Governments have teachers' training refresher courses and it is at such training courses that teachers can be introduced to this knowledge. This has to be done at government level.

Therefore, I hope it will be possible for various organizations to assist, either technically or financially, in executing this scheme. This would be invaluable help.

*Prof. O. A. Høeg* (University of Oslo, Norway): I would like to emphasise the importance of taking pupils and students at all levels out into the field, even if it is only a park, a yard or ditch. The students should not be just told and shown things, but stimulated to self-activity by being given tasks. Preferably they should be divided into groups of three, working together. An essential difficulty often is the fact that the teacher himself has not the necessary training in arranging such work. Therefore, it is important that the teacher training colleges give their students such training.

*Chairman*: It really is extremely important that in teachers' training colleges students are taught how to undertake field work. Learning the techniques of teaching their pupils in the field is a vital part of teachers' training. This knowledge should enable the teacher to conduct environmental studies in the out of doors at any time of the year—in a field, a backyard, a ditch, a pond or a tank as you call it in India. Where the latest techniques are featuring in teachers' training it is, as expected, having a marked effect on the quality of environmental education in the schools.

Professor Høeg has already referred to one cardinal issue, that is, the importance of ensuring that the pupil is not a passive recipient of knowledge imparted by teacher and textbook. It is very important that questions are asked and problems diagnosed by the pupils, and individually or in groups they should participate in finding the answers by conducting original work whether by way of observation or experiment.

The Chairman then said he was pleased to see that the last speaker in Section 1 of the programme had now arrived and asked him to introduce his paper.

*Mr. Zafar Futehally* (Member, IUCN Executive Board and Hon. Secretary Bombay Natural History Society, India), apologizing for his absence from the Dehra Dun meeting and for his delay attending the present Session, briefly introduced his paper *Conservation Education in India*.

The Chairman warmly thanked Mr. Futehally for his presentation and expressed the hope that there would be time for further discussion at the end of the Session. Meanwhile, however, it was time to pass to the next section of the agenda, but before doing so he would like to thank, once again, Mr. Kaushik of the Forest Research Institute and Colleges at Dehra Dun for being the host to the Commission on Education's pre-assembly specialist meeting on the problems of environmental education in India. He was particularly glad to say that, as a results of discussions at Dehra Dun, a special Indian committee on environmental education was likely to be set up to develop this kind of work in India. The proceedings of the Dehra Dun meeting would be published soon as an IUCN supplementary paper.

India 1(a)

## Final Report from the Working Meeting on Environmental Conservation Education Problems in India

JOHANNES GOUDSWAARD

*Jan van Loonslaan 20A, Rotterdam, Netherlands*

The Commission on Education organized a pre-Assembly Working Meeting on Problems and Programmes of Environmental Conservation Education in close cooperation with the Forest Research Institute and Colleges at Dehra Dun, on 21 and 22 November 1969.

The aim of the meeting was to have a discussion on environmental conservation education problems at different levels in India. Indian specialists were accordingly invited to deliver the background papers. Experts from IUCN's Commission on Education, gave their views in this field during the discussions and helped in preparing the conclusions and recommendations. There was also an opportunity for local teachers to attend as observers at the Working Meeting. Representatives from State Education Departments, responsible for school education, were invited also and the fact that they could not attend was a matter of great disappointment, but it was not due to lack of perception of the need of nature conservation education.

None the less, at the opening session the Chairman, Mr. R. C. Kaushik, President of the Forest Research Institute and Colleges at Dehra Dun, was able to welcome 40 delegates, composed of Indian specialists together with 8 members of IUCN's Commission on Education, as well as 3 UNESCO experts.

In his introduction, Mr. Kaushik said that he was pleased to have the Forest Research Institute and Colleges, Dehra Dun, as the venue for the Working Meeting. The Institute and Colleges, founded in 1870, when the Forestry School was established, have contributed substantially to the cause of nature conservation in the fields of forest resources management and related activities of soil and water conservation and wildlife management. The Institute wants to play a special role in spreading the concept of nature conservation.

Messages of good wishes for the meeting were received from Mr. R. C. Soni, Inspector General of Forests of the Government of India, and also presented by Dr. G. Budowski on behalf of the Director General of UNESCO and by Dr. S. Doraiswami on behalf of the Ministry of Education of the Government of India. Dr. J. Čeřovský, Executive Officer and Vice-Chairman of the IUCN's Commission on Education, announced that the Chairman of the Commission, Dr. L. K. Shaposhnikov, was unfortunately unable to attend, but had sent his warmest personal greetings and his best wishes for the success of this Working Meeting. Dr. Shaposhnikov nominated Dr. Čeřovský to replace him and had also nominated Mr. J. Goudswaard, Secretary of the Commission, to act as Rapporteur of the meeting. After introducing the delegates, the Chairman proposed to divide the Working Meeting into two parts, one dealing more particularly with School Education and the other with University Education and Nature Conservation Education in Professional Courses.

After a general report entitled 'Environmental Education—an Urgent Challenge

to Mankind' had been presented by Dr. J. Čeřovský, the following papers were therefore presented:-

### **Part I—School Education:**

*Conservation Education in Schools in India* by Mr.R. C. Kaushik and Mr.O.N. Kaul.

*Problems of Conservation of Nature in the School Curriculum in India* by Dr.S.Doraiswami (the National Council of Educational Research and Training at New Delhi) and Dr. V.M.Galushin (UNESCO expert).

*Chemistry and Conservation of Nature* by Prof. S. A. Balezin.

*Some Suggestions for Promoting Education in Nature Conservation in India* by Mr. P. D.Stracey.

### **Part II—University Education:**

*Forestry Education primogenitor of the Nature Conservation Concept* by Mr.R. C.Kaushik.

*Nature Education in India* by Mr. Zafar Futehally.

*University Education and Training in Nature Conservation in India* by Mr.P.V. Rajamannan.

These papers evoked lively discussion in which delegates from the host country as well as from North and South America, Europe and UNESCO took a full part. In response to the remarks of the UNESCO expert who had presented the paper on the subject of training in chemistry in relation to nature conservation, an American specialist laid emphasis on the dangers of pollution of the environment. European experts, especially from the Netherlands, stressed the importance of integrating the approach to the problems involved with the approach used in the social sciences, stressing the value of the techniques these sciences have developed. Representatives from the U.K. gave some striking examples of applied conservation education in regard to modern developments.

The general introductory paper by the Executive Officer of the Commission on Education drew attention to the special relevance to conservation education of the principles and projects now being established in the course of developing UNESCO's 'Man and the Biosphere' (MAB) Programme.

It was generally agreed that IUCN has an important and clear role to play in this context, since its structure enables it to maintain contact with and encourage private organizations active in this field as well as governments and local authorities.

At the end of the meeting the following resolutions were unanimously adopted:

#### **A. SCHOOL EDUCATION**

The Working Meeting on conservation education held at Dehra Dun on 21/22 November 1969—

*Considering* the deterioration of the human environment in India and the world as a result of disturbance of nature and depletion of the natural resources;

*Recognizing* the urgent need for introducing an intensified appropriate method of conservation education at all levels:

*Considering* that conservation education should become a part of the curriculum of all schools of the national system of education; and

*Being aware* of the pressing need for an ecologically oriented method of education in the teaching of biology and other subjects;

*Recommends* to the Plenary Session of IUCN's Xth General Assembly that the appropriate National Authorities on Education, Educational Organizations and other similar bodies engaged in the revision of curricula and syllabi should be urged to undertake or support the

1. Setting up of an Indian Committee of IUCN for Conservation Education to maintain activities and follow-up in this field;
2. Giving due consideration to the importance of conservation education and including concepts of these topics in the syllabi in biology, physics, chemistry, geography, social sciences and other related disciplines;
3. Preparation of and research into teaching aids, including suitable textbooks, teacher-guides, supplementary materials based on the syllabi and audio-visual aids such as charts, film-strips and films;
4. Achieving these objectives by inducing teaching in the classrooms to follow methods involving environmental studies, so that awareness of the role of nature is created in the pupil;
5. Training a core of teachers through short courses in conservation and environmental concepts to become leaders in their respective areas and act as resource-persons to train further batches of teachers;
6. Urging the appropriate authorities to develop systems of incentives for teachers in in-service courses on conservation education;
7. Organizing workshops, seminars, and other training activities for teachers who are responsible for environmental education;
8. Organizing out-of-school activities through such organizations as Youth Naturalist Societies which should be encouraged to undertake excursions and summer camps to study nature and nature conservation;
9. Setting up a working group or Action Committee to guide workers on conservation education, comprised of university teachers and representatives of central educational organizations, State Departments of Education and voluntary organizations engaged in nature conservation activities; and
10. Making full use of available assistance offered by inter-governmental and non-governmental organizations for those nature conservation education programmes that would gain in strength and scope through so doing.

## **B. UNIVERSITY EDUCATION AND NATURE CONSERVATION EDUCATION IN PROFESSIONAL COURSES**

The quality of the human environment, and thus of human life, in India is threatened by the accelerating rate of depletion of natural resources arising from the population explosion, the growing demands to meet material needs, and pollution from industrial and other sources. The economic and social problems relating to the management of natural resources are particularly serious in India where indigenous industries and agrarian life make society very dependent upon the condition of the environment. Hence, it is most urgent for universities to assure leadership in education, vocational training and research

relevant to the wise use of natural resources of vegetation and animal life, and of the soil, water and air upon which they depend. The subject of central importance in this context is ecology which, hitherto, has been a component part of some botany, forestry, geography and zoology courses. However, an inter-disciplinary approach is now required in order to relate broadly-based ecological science to the needs of the nation with respect to the management of natural resources.

The Working Meeting on conservation education held at Dehra Dun on 21/22 November 1969, therefore recommends to the Plenary Session of IUCN's Xth General Assembly that universities and other higher institutes, including the Forestry Research Institute and Colleges in India should be urged to—

1. Establish inter-disciplinary courses of study and research to train students for vocations in the natural resources field, such as M.Sc. courses in environmental sciences;
2. Provide facilities for more widespread dissemination of ecological knowledge in liberal studies for all students;
3. Ensure that ecology and related environmental sciences form a part of the courses in the training of teachers;
4. Review their scope for initiating research into ecological problems which have a direct relevance to serious environmental issues;
5. Encourage greater communication with each other and with institutes outside India, especially through the media of UN, UNESCO, FAO, IUCN, IBP and other governmental and non-governmental agencies; and
6. Institute chairs and fellowships at selected centres and arrange for the exchange of scholars.

India 1(b)

## Conservation Education in the New School Syllabus in India

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The problem of introducing the concept of nature conservation into the school curriculum, covering the entire field of biology, can be considered by no means simple. The problem acquires deeper significance when the concept has to be dispensed to children of primary, middle and high schools (secondary schools).

The bulk of the population in India is in the villages and their main occupation is agriculture. The raising of the crops is still done according to the age-old traditional manner. But with the extension of the impact of agricultural research farmers are slowly getting enlightened and they are adopting modern methods of cultivation. Still in many respects the practices are tradition-bound. Many of the rural folk are not even aware of the impact of human society on the balance of nature. One cannot explain, otherwise the thoughtless destruction of plants and animals, the removal of green cover, the cutting away of bark from avenue trees and the burning of cow dung as fuel, which could otherwise be used as manure to enrich the soil. The rapid industrial and allied developments that have taken place in India since the days of independence and the rapid rate of urbanization of rural areas have all led to the decrease in the number of many flourishing species of flora and fauna. Many projects undertaken by man have pushed away further the natural jungle barriers. The uncertain monsoons and the need to divert all available resources of water to food production has made inroads into what was once a luxuriant natural biome in many parts of India. In such a context, it is not surprising that many of the Indian children are not even aware today of the vast potential both of animals and plants in our country. The gradual disappearance of animals which were once well known in this country, like the cheetah, the black buck, the rhinoceros, the tiger and even the lion is an eye-opener. Intensive measures undertaken by various agencies to promote an increase in the vegetative cover of the land and conservation of wild life have had very little impact on the minds of the younger children, except during slogan-catching weeks celebrated once every year.

Man has a special responsibility for developing methods and techniques for using the resources of nature. Conservation education to be effective must be given to all sections of the population and it is best begun when they are young, and in schools. This paper describes how this problem has been tackled by the Department of Science Education in the National Council of Educational Research and Training, which has been entrusted with the task of preparation and implementation of new syllabuses and other materials. This has been achieved to some extent by laying enough emphasis on conservation education in the science syllabuses, particularly in biology. Two sets of curricula materials have been prepared, one by the biology group in the Department of Science

Education covering Class I to Class XI and the other by the Biology Study Groups set up by NCERT, consisting of Professors and others at university centres. In the following pages an attempt will be made to show how this problem has been tackled by these two groups.

## **CONSERVATION EDUCATION IN THE SCHOOL SYLLABUS**

In the majority of States in India, the existing General Science syllabuses for middle schools and biology syllabuses for higher secondary schools contain some elements and topics regarding conservation of plants, animals and soil, and the prevention of air and water pollution.

## **CONSERVATION EDUCATION IN THE NEW SCHOOL SYLLABUS PREPARED BY THE DEPARTMENT OF SCIENCE EDUCATION**

It was felt that a better impact of the need to conserve natural resources could be made on the minds of the school children by placing a greater emphasis on the abounding natural resources available in the country and how these resources are gradually diminishing due to intervention by man. In following these topics the child learns to love and respect the things that surround him.

The syllabus for the school has been prepared for three levels; for primary schools (classes 1-5, 5+ to 10+ age group), middle schools (classes 6-8, 10+-13+) and high (secondary) schools (classes 9-11, 13+-16+). Topics concerning conservation of plants, animals, soil, air and water are included also as a special section completely devoted to conservation of nature. An environmental approach runs through the entire biology course for the middle schools and special chapters on ecology for the high schools. These give the students a basic knowledge of the close interrelationships and interdependence in nature.

### **PRIMARY SCHOOL**

The biology sections of the general science course for primary schools contain elements of conservation of water, atmospheric air and soil, and some facts about plants and animals in the environment. When dealing with 'Rocks, soils and minerals', concepts about erosion and man's attempts to control their action are included. The pupils are made aware of the diversity of plants and animals and their adaptations to environment and to each other. The importance of plants and animals is also stressed.

### **MIDDLE SCHOOL**

The textbooks, teachers' guides and other materials prepared for the three years deal mainly with a systematic study of plants, animals and man. These materials contain some concepts and topics regarding conservation. Each chapter of the biology syllabus for classes 6 and 7 has some reference to conservation of plants and animals. For instance, in the botany course (class 6), the chapters on 'Plants and their environment' provide pupils with definite ideas of the rational and careful use of plants. In the zoology course (class 7) the chapters on 'Arthropoda', 'Fishes', 'Birds', and 'Mammals' include special

topics concerning the natural and economic significance of these groups and the care of useful species. In the last chapter of the zoology course special stress is laid on the interrelationship of the living and non-living things in nature and on the dynamic equilibrium in nature. On this basis pupils would understand the necessity for conservation of nature as a whole and would cultivate a sense of responsibility for a careful treatment of natural resources. The material for this is mostly provided in the teachers' guide, particularly in the concluding chapter of the zoology course.

In class 8 the biology course concludes with an important section on 'Man and his Environment'. This is a summary of the entire biology course from the ecological angle, and also serves as a bridge between middle school biology and high school biology. The last part of this section is entitled 'Man and Conservation of Nature'.

Thus, conservation education runs through the entire syllabus and also forms a part of the final section of the biology course of the middle school. Pupils at the end of the 8th class—many of whom go to agriculture, industry, forestry, commerce, etc.—get the main ideas about the careful treatment of nature. They can and, we hope, will use this knowledge in everyday work and life.

### **HIGH SCHOOL (SECONDARY SCHOOL)**

The course of biology at the high school includes topics at different levels of biological organization, such as—

1. Molecules and cells
2. Organisms
3. Populations and natural communities.

Part V of this course is entirely devoted to Ecology (85 periods). The chapter on 'Natural Communities' (56 periods) in the first year of high school (d.g.) consists of four sections: 1. Populations (12 periods); 2. Ecosystems (16 periods); 3. Biosphere (12 periods); and 4. Conservation of Nature (16 periods). The last section on conservation of nature deals with conservation of plants and animals, conservation of air, water resources and soils. It also includes an analysis of the causes of disturbance of normal processes in the biosphere and such topics as conservation of natural landscapes and the history of the nature conservation movement and of Indian and international efforts in the field of conservation of nature. Based on the theory of the entity of the biosphere, this section, 'Conservation of Nature', contains an analysis of man's inter-relations with nature as well as a consideration of the ways of maintaining our environment in the days to come. The normal balance in nature and consequently the guarantee that life will exist on the earth depends not only on our understanding of this principle, but above all on our energetic action in promoting nature conservation.

### **CONSERVATION EDUCATION IN THE SCHOOL CURRICULUM IN INDIA AS SPELT OUT BY THE BIOLOGY STUDY GROUPS OF THE NCERT**

The biology syllabus for classes 5-10 has been prepared by the Study Groups under the supervision of Prof. T.S. Sadasivan of the Madras University. How the problems relating to 'Conservation of Nature' were tackled in the school curriculum is described below.

Finding the situation to be as described in the introduction of this paper, the Biology Study Groups felt that a better impact of the need to conserve natural resources could be made on the minds of the present generation. Therefore, in the curriculum developed by the Study Groups, a greater emphasis is placed on the abounding natural resources available in the country, how these resources are gradually diminishing due to human intervention, and how even day-to-day needs like agricultural production are inter-connected with natural resources conservation. In this scheme, an emphasis on an enquiry approach to the learning of biology, to fulfil the two basic needs viz., of stimulating an interest in the minds of young students and also arousing a sense of curiosity, has been given. This has the advantage of bringing about an appreciation of the availability of a vast array of natural resources in the form of flora and fauna in our country. For instance, in Book I a wide account of plants and animals has been provided as well as an account of how living things are dispersed from one area to the other. In the chapters on 'Finding out about Plants and Animals' (i.e. adding the presently available facts) are provided, as background material to children, many salient features of the life, structure and physiological facts about animals and plants. In Book II attempts have been made to indicate how vital processes take place in living things, and how animals and plants feed. In Book III, which has an emphasis on the human species, the relationship of microbes and man is dealt with extensively, leading on to personal hygiene and the various aspects of agriculture in our country.

It has been considered by this group that emphasis is best placed up to the age of 12+ (for which books have now been produced for use in the Middle Schools in this country) on the array of facts about the availability of vast natural resources and yet the great limitations that are placed upon such resources as are available to all of us in the country. With the enquiry approach being emphasized to teach biology, it is not too much to expect that young minds will ponder a little more and think more clearly of what is available in the country now in the way of natural resources of fauna and flora and how best one can keep it intact.

Taking advantage of the basic structures so built up, covering the children of age groups 10+ to 12+, a more detailed approach to conservation is attempted in Stage II of the curriculum material now being prepared, for children of age groups 13+ to 15+. In this stage, *the emphasis is shifted from an indication of the vast area of resources, to a study of the detailed factors of the environment and interactions of various types of organisms.* Book IV in the second stage is developed progressively from a study of ecology of life in water, through land, through forests, leading to an understanding of the web of life and the natural cycle of materials, culminating in a chapter on conservation of biological and natural resources including wild life preservation. The whole series ends in Book VI where the last chapter entitled 'Man and Nature' will help to focus attention on man's fight against hunger, disease and death and on certain ethnological factors. To reinforce these ventures the Study Groups have also invited contributed publications (to be published as a series of ancillary background reading booklets), to serve as adjuncts to the Biology Texts and also for simple reading by ordinary people of many vital facts of biology. Of the 19 titles projected, 8 cover one aspect or other of our natural resources of plants and animals, including predators that diminish our resources. The contributors to the background series are distinguished men of science in this country in their respective fields.

In contrast to the traditional pattern of presenting a set of facts as *obiter dicta* on conservation of natural resources and wild life preservation etc. (which will

have no meaning if it is conveyed essentially by a textual process), a study of ecology vis-a-vis organisms as a whole and as groups in relation to the different environments in this country, would better high-light both the potentialities of natural resources that exist and enable constructive thinking to follow. With this in view the need to conserve such resources as are still left with us, in spite of human depredation and encroachment on the natural environment, has been emphasized. It should, however, be mentioned that one of the basic aims of the course would be to develop an influence on the mind of the young child to indicate the social implications of biology, in relation to every day human needs and the present impact of human activities on the life of other organisms and, how far, a study of physiological ecology could bring about a better balance in nature than what exists at present.

Instead of attempting to suggest answers to many of the unknown facts of biology, the curriculum developed by the Study Groups could better foster, even as it is, an understanding of the interactions between nature and living beings and inculcate in the younger generation the need and the urgency to face the inevitable choice involved in conserving fast diminishing natural resources, if the balance of nature is not to be seriously upset and if the environment is to be kept in a state of balance (both in the physiological and ecological aspects), by stressing the need for conservation of natural resources in the interests of the well-being of the ever increasing human species.

As was mentioned earlier, conservation education is taking root in Indian schools. New textbooks and teachers' guides have been published by the NCERT, with assistance from UNESCO experts. The books for middle school classes are ready and they are being used in about 500 schools in Delhi, and 120 Central Schools all over the country. Besides these some states like Andhra Pradesh, Gujarat, Kerala, Mysore, Manipur and Madras have shown interest and have adopted or adapted these materials for experimental teaching. Work is now in progress on the textbooks and teachers' guides for the high schools. The Study Groups have also completed work on middle school materials which have been published and they are now working on high school materials.

All these efforts give us hope that conservation education in Indian Schools will be practised on a wider scale. If this process proceeds with faster speed the majority of children in India will have an opportunity to be acquainted with the ideas and practice of nature conservation. Within about 10-20 years the new generation should be able to prevent the destruction of Nature.

## **SUMMARY**

It is obvious that conservation education to be effective must be given to schoolchildren. The National Council of Educational Research and Training has achieved this objective by laying emphasis on conservation of natural resources at several places in the biology syllabus for classes I through X/XI.

There have been two variants of the syllabus in middle school, but in both, as well as in the syllabus for primary and high schools, special efforts have been made to include topics concerned with conservation of plants, animals, soil, air and water. An environmental approach runs through the entire biology course for middle schools and the syllabus concludes with an important section on 'Man and his environment', which is a summarized ecological perspective of the entire biology course.

The high school biology course comprises such important chapters as those on 'Populations', 'Ecosystems', 'Biosphere', and 'Conservation of Nature', which include an analysis of man's interrelations with nature as well as consideration of the ways of maintaining our environment in future. The normal balance of nature and consequently the guarantee that life will exist on the earth depends not only on our understanding but even more upon our energetic promotion of nature conservation.

The alternative syllabuses prepared by the Study Groups for classes 5 through 10 lay emphasis on the vast array of facts about available resources and students are made to think, through the enquiry approach, how best to keep these intact. In the high school the emphasis is shifted to a study of the environment and interactions to the various types of organisms. Pupils are led to an understanding of the web of life, the natural cycle of materials, culminating in the topic of conservation of biological and natural resources including wildlife preservation. The Study Groups have also planned a series of background books to support the textbooks.

One of the basic aims has been to develop in the minds of the school children an appreciation of the social implications of biology and to emphasize the imperative need to study physiological ecology in order to bring about a better balance in nature than what exists at present.

## RÉSUMÉ

Pour être efficace, une formation en matière de conservation de la nature doit être donnée au niveau scolaire. Le 'National Council of Educational Research and Training' a réalisé cet objectif en introduisant des chapitres sur la protection des ressources naturelles dans tous les programmes de biologie des petites aux grandes classes (Ière à XIe).

Dans les classes du second cycle (10 à 13 ans), on a enseigné deux variantes du programme scolaire, mais dans celles-ci comme dans les programmes des petites et des grandes classes, on s'est efforcé d'inclure des thèmes touchant à la protection des plantes, des animaux, du sol, de l'eau et de l'air. L'ensemble du cours de biologie du second cycle est abordé sous l'angle écologique, et dans les cours des classes supérieures, des chapitres particuliers sont consacrés à l'écologie.

Le programme de biologie du second cycle se termine par une importante section consacrée à 'l'homme et son milieu', qui résume l'ensemble du cours de biologie vu sous l'angle écologique.

Le cours de biologie des écoles secondaires (de 13 à 16 ans) comporte des chapitres importants, tels que 'les populations', 'les écosystèmes', 'la biosphère' et 'la protection de la Nature'. Ces différents thèmes contiennent une analyse des relations entre l'homme et la nature ainsi que des réflexions sur les façons de préserver le milieu naturel dans l'avenir. L'équilibre de la nature et par conséquent la garantie d'une vie future sur notre terre dépendent non seulement de notre appréhension du principe de la conservation mais encore et surtout de l'action que nous entreprendrons dans ce but.

La seconde variante du programme préparée par les Groupes d'Etudes et destinée aux classes de la 5<sup>e</sup> à 10<sup>e</sup> (de 10 à 16 ans) met l'accent sur toutes les ressources disponibles dans le pays et amène les élèves à s'interroger sur la façon de garder intactes ces ressources. Dans les classes supérieures, le programme est centré sur l'étude du milieu naturel et des interactions avec

les différents types d'organismes. Les élèves sont ainsi progressivement amenés à comprendre la trame de la vie, le cycle naturel des matériaux et enfin la nécessité de la conservation des ressources naturelles animales et végétales. Le Groupe d'Etudes a également prévu la publication d'une série de livres et brochures qui viendront illustrer les manuels scolaires.

Ce programme cherche essentiellement à développer dans l'esprit des enfants l'idée des implications sociales de la biologie et à leur faire comprendre la nécessité de l'étude de l'écologie physiologique pour rétablir dans la nature un équilibre meilleur que celui qui existe actuellement.

## Nature Education in India

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Nature Education in India is among the easiest and the most difficult things to deal with. It is easy because here, like everywhere else a living laboratory is around one for study and continuous observation. There is no square mile of Indian territory which is bereft of plants, birds, butterflies and insects. Dr. Salim Ali started his ornithological career by observing the common house sparrow nesting in the walls of the stables. He found that when the cock bird was shot the female immediately acquired a new mate, and this process apparently continued almost indefinitely. This simple observation fired his imagination and led him to a detailed study of the bird life of India. There are innumerable situations of this kind which a student can study and acquire a life long interest in. However, guidance and stimulation of the right kind is absolutely necessary, and this is what is not available.

But Nature Education in this country is a difficult subject in another way, because it does not promise to open up any careers for naturalists. The concept of a liberal education where a student is expected to cultivate his mind and sharpen his sensibility purely for the sake of doing so is being abandoned and specialization now commences right from the 9th class of school, where children of 14 have to select the long and narrow road at the end of which they are supposed to obtain the careers of their choice. Specialization has become such a limiting and narrowing factor that graduates who have done their B.Sc. in avian biology are unable to name more than half a dozen birds of their surrounding areas, and the excitement of bird watching and of being in touch with the living environment has never found a place in their lives.

Natural history can only be successfully taught if a beginning is made with the very young. Nature study and conservation education must really go hand in hand, as one would only be concerned about conserving the things one has learned to recognize, understand and respect. It must be admitted with regret that apart from the dry fundamentals of botany or biology, no natural history as such is taught in any of our schools. As far as I am aware only the Bombay Natural History Society runs a Nature Education course of this kind, and here too it is a sort of extra-curricula activity, which is taken up only if the persons concerned in particular schools respond to the opportunity.

The scheme was started in 1948 with the financial assistance of the then Government of Bombay, now Government of Maharashtra, with the object of creating interest in nature among children and teachers. A special Nature Education Organizer was appointed, and he was expected to make full use of the natural history section of the Prince of Wales Museum which has a fine collection of animals and birds. Parties of children are taken round the museum, and they are told the basic facts about our commoner birds, mammals, and reptiles. Then, they have to note the field characters themselves from the observations they make in the Museum. The life histories of birds, like the common Baya *Ploceus philippinus* and hornbills are described to them, and on

the whole the children become very interested in these subjects, and look forward to the field visits which follow.

The Nature Education Organizer gives talks on allied subjects, for example, insect life, locomotion in vertebrates, respiration in animals, dispersal of seeds, evolution, colour of butterflies, bird migration, migration of European eels, devices of climbing plants, etc.

From time to time, there are outings organized for school children in parties of 15 to 25 each. Each outing is focused around a particular topic. In the monsoon field-trips are arranged for a study of aquatic life, or to study nesting colonies of birds like the Baya or to study the monsoon plants and insects which abound at this time. In winter the group studies bird migration and sea-shore animals. In summer interest is focused on such things as flowering trees and perennial shrubs.

During these outings attempts are made to collect specimens of aquatic animals and plants including tadpoles, insects and their larvae, worms, molluscs, Crustacea and even minute animals like cyclops. The children get an opportunity to observe and study the metamorphosis in frogs and toads often from the spawning stage, and keep records of the development of insect and other forms of life. The collection of plants including both floating and submerging varieties, covers a number of algae and unicellular forms. For studying the life history of moths and butterflies, eggs are collected and for the silk-worm larvae are collected.

There is as I said a regrettable lack of emphasis on the teaching of natural history and conservation, in our schools. That is the reason why even educated Indians are not really interested in their natural surroundings. This short-coming has often been pointed out to the authorities and has been partially corrected in the revised syllabus for science for standards 5, 6 and 7, which includes the study of natural history. The revised science syllabus followed by schools in Bombay includes the study of trees, shrubs, mammals, birds, insects and some other invertebrates. Children in the 5th standard are expected to study and observe, throughout the year, at least 5 trees and record their observations; they are also expected to observe at least 5 species of birds, two of which should be migratory. At the end of the year a practical test is arranged for the children to see whether they can recognize a tree from its leaves and flowers and can identify birds and insects in the field. This revised science syllabus is now being followed by about 20 schools in Bombay with the approval of the Director of Education.

One of the problems about teaching natural history arises from the fact that teachers themselves know very little about the subjects. Very few of them are in a position to identify the commonest plant or bird or animal. Therefore a number of seminars, workshops, etc., are arranged for teachers so that they can get to know the basic facts about their environment.

If interest in natural history is to be sustained it is of course necessary to have suitable literature. In this field the Bombay Natural History Society has played an important part and published several booklets in a series called 'Glimpses of Nature'. Two are on birds, one on flowering trees and one on wild animals. Each book has several colour plates and black-and-white photographs to illustrate the text. Another publication of interest in this connection is a set of plant study-sheets. These contain general instructions for the observations of a plant throughout the year. There are several line drawings of trees and shrubs together with a questionnaire for each species and instructions about preservation of plant specimens.

With the aid of the Nature Education Organizer and its publication programme, the Bombay Natural History Society is trying to do what it can with its limited resources to arouse an interest in nature among young people.

I said above that natural history and conservation education should go hand in hand. But conservation education needs to be imaginatively initiated, for it involves new ideas which come into conflict with our traditional attitudes. When man first came on the planet he was essentially an exploiter, and all that he did was to cut a tree, hunt an animal, catch a fish or mine a mineral. Nature was vast and men were few, and his depredations had little effect on the environment as a whole. Because of this past background even the most sophisticated minds find it difficult to change the emphasis from exploitation to conservation. The problem becomes vastly more difficult when dealing with rural populations where these ideas are still firmly entrenched and where instinct and tradition are still far more important than science and innovation. To infuse a scientific outlook into the population is therefore the first requirement. At the Conference on the Application of Science and Technology to the Development of Asia held at New Delhi in August last year it was emphasized that science should be an integral part of the primary and secondary education. 'At the primary stage the emphasis should be on inculcating a scientific outlook rather than memorization of facts and teaching of science be centred on the direct experience of the pupils and related to their environment; the learning experiences should be broad-based and particular attention should be given to themes related to conservation of natural resources, nutrition and health.' If this can be done everything else will follow easily and automatically. If this cannot be done, conservation education, like other forms of book learning, will lead to no material change, either in the minds or in the environment of the people.

Most Indians, at their death, are cremated on the pyre, which consumes 400 kgs of wood, and this takes a heavy toll of our depleting forest resources. In the cities electric crematoriums are now becoming fashionable, and in the countryside, too, alternatives to the pyre must be found. The sanctity of cattle is another stumbling block to conservation practices, for large numbers of unproductive cattle prevent the regeneration of forests and vegetation and lead to soil erosion and over-exploitation of the countryside in every way. It is obvious that human and bovine over-population is the main cause of our deteriorating natural assets and if this fact is clearly understood it may lead to some significant change in our attitudes to family planning and to our over-sentimental regard for our bovidae. It is really a battle between education and ignorance and there is very little time to be lost.

As we stated above there is practically no conservation teaching in India today, and a start must be made from scratch. What should the aim be? It must obviously be to make every person understand the importance of our natural assets and to teach them to harvest them in such a way that they are not permanently impaired. We must learn to live on the income and not on the capital of the land. Every student must first of all be taught the importance of our forests and of our trees. Before a child is old enough to hold an axe he must have developed such a respect for trees that he would not ever wantonly lop off a living branch. To a large extent, I understand, this has been achieved in Germany where there are severe penalties for unauthorized cutting of trees. There is then the very important concept of the balance of nature, which few people have even heard about. In an age when pesticides and herbicides are getting so popular for pest and weed control, it is odd that no one appears to be aware of the role of birds in keeping insects under control. A young sparrow eats almost its own weight in insects and the vivid examples of what happens

when birds are removed from the scene are available from the happenings in Holland in the 1930s, and in China more recently. In an agricultural country like India, students in the rural areas have a fine opportunity to see for themselves the variety of birds in their different ecological niches and, by observing their dependence and inter-dependence on one another, can learn the basis of ecology and natural history in a most interesting manner; and they would then become ardent votaries of conservation.

If there is any single factor which will make a difference to the health and prosperity of rural India it is the availability of fresh water for irrigation and other uses. The dependence of ground water on forests is not properly appreciated and the need to prevent pollution of our rivers, lakes and ponds must be emphasized. An increasing number of cases of water pollution is being reported and rural communities must be alerted to the dangers involved.

Above all, the inhabitants of the countryside must be made aware of the priceless asset which they have in their natural environment. The great longing of the multi-millionaires who spend their lives in the artificial environments of New York, London or Bonn is to see unspoilt country and this longing will grow with the increasing urbanization of the world. The Indian village will of course evolve and progress and acquire new amenities made possible by modern technology—good roads, fresh water, electricity, and comfortable housing. But it must retain its natural appeal, by continuing to blend with the landscape as it does today. This will only be done if the rural population is taught to take pride in their environment from the earliest days. For all these reasons, therefore, nature education and conservation must be woven into our school curricula as soon as possible.

## SUMMARY

Nature Education in India is easy, thanks to the Indian natural environment, which is a living laboratory suitable for anyone to study nature and make continuous observations. At the same time it is difficult because it does not promise to open up any careers for naturalists. Specialization has become a limiting and narrowing factor.

Natural history can only be successfully taught if a beginning is made with the very young. The Bombay Natural History Society runs a Nature Education course as a kind of extra-curricula activity taken up only if the persons concerned in particular schools respond to the opportunity. The scheme was started in 1948 with governmental financial assistance and a special Nature Education Organizer was appointed. He conducts visits to the Prince of Wales Museum, gives talks and organizes field trips for schoolchildren.

There is a regrettable lack of emphasis on the teaching of natural history and conservation in the Indian schools. This is the reason why even educated Indians are not really interested in their natural environment. This shortcoming has often been pointed out to the authorities and has been partially corrected in the revised science syllabuses which are now being followed by about 20 schools in Bombay with the approval of the Director of Education.

One of the big problems about teaching natural history and conservation arises from the fact that teachers themselves know very little about the subject. Very few of them are in a position to identify the commonest plant or bird or animal. Therefore a number of seminar workshops are arranged for teachers.

Further, it is essential to have suitable literature available. The Bombay Natural History Society has published several booklets in a series called 'Glimpses of Nature'.

With the aid of the Nature Education Organizer and with its publication programme, the Bombay Natural History Society is trying to do what it can with its limited resources to awake an interest in nature among young people. Conservation education needs to be imaginatively initiated, for it involves new ideas which come into conflict with our traditional attitudes. The problem becomes vastly more difficult when dealing with rural populations where instinct and tradition are still far more important than science and innovation. Some of the real problems causing a critical battle between education and ignorance are the cremation on the pyre of most Indians after their death (taking a heavy toll of our depleting forest resources) and the sanctity of unproductive cattle preventing the regeneration of forests and vegetation, leading to soil erosion and over-exploitation of the countryside in every way.

There is practically no conservation teaching in India today. Nature education and conservation must be woven into our school curricula as soon as possible.

## RÉSUMÉ

Le milieu naturel indien constitue un laboratoire idéal pour l'étude et l'observation continue de la nature et facilite ainsi la tâche de l'initiation à la conservation. D'autre part, l'éducation dans ce domaine pose certains problèmes, car elle n'assure pas de débouchés aux naturalistes. La spécialisation de l'enseignement est devenu un facteur limitant.

Il faut commencer par apprendre l'histoire naturelle aux enfants, si on veut que cette discipline soit enseignée avec succès. La Société d'Histoire Naturelle de Bombay organise un cours d'initiation à la nature, mais cette activité en quelque sorte hors programme n'est suivie que par quelques personnes concernées. Ce projet a été inauguré en 1948 avec l'appui financier du gouvernement et un poste de Moniteur Spécial pour l'Initiation à la Nature a été créé. Il organise des visites au musée 'Prince of Wales', des conférences et des sorties pour des groupes scolaires.

Il est regrettable de constater combien l'enseignement de l'histoire naturelle et de la conservation est peu poussé dans les écoles indiennes. C'est la raison pour laquelle les Indiens même évolués ne portent pas un intérêt profond au milieu naturel qui les entoure. Cette lacune a été signalée maintes fois aux autorités et a été partiellement comblée dans les programmes révisés de sciences qui sont maintenant adoptés par environ 20 établissements scolaires de Bombay, avec l'accord du Directeur de l'Enseignement.

Un des grands problèmes de l'enseignement de l'histoire naturelle et de la conservation vient de ce que les enseignants eux-mêmes sont trop peu informés dans ce domaine. Peu d'entre eux seraient capables d'identifier les plantes, oiseaux ou animaux les plus communs. Afin de pallier à cette ignorance, on a donc organisé des sessions de travaux pratiques pour les instituteurs et professeurs.

Il est en outre nécessaire de disposer d'un fond bibliographique approprié et suffisamment étoffé. La Société d'Histoire Naturelle de Bombay a publié plusieurs fascicules d'une collection intitulée 'Aperçus sur la Nature'.

Aidée par le Moniteur pour l'Initiation à la Nature et par son programme de publications, la Société d'Histoire Naturelle de Bombay fait son possible avec

des ressources limitées, pour éveiller l'intérêt des jeunes à la nature. L'enseignement de la conservation doit être conduit avec beaucoup de doigté, car il apporte de nouvelles idées qui se heurtent à nos attitudes traditionnelles. Le problème devient infiniment plus complexe quand cet enseignement s'adresse à des populations rurales chez lesquelles l'instinct et la tradition sont beaucoup plus forts que les notions de science et d'innovation. Certains problèmes actuels suscitent une critique entre éducation et ignorance, ainsi la crémation sur le bûcher, coutume observée par la majorité des Indiens et qui appauvrit considérablement nos ressources forestières déjà faibles, et le tabou sur un bétail improductif qui empêche la régénération des forêts et de la végétation, entraînant ainsi l'érosion du sol et une surexploitation générale.

Actuellement, il n'y a pratiquement pas d'enseignement de la conservation en Inde. Les disciplines d'éducation et de conservation de la nature doivent être inscrites à nos programmes scolaires le plus rapidement possible.

## COMMENTS SUBMITTED IN WRITING

As was to be expected the papers and discussions falling within section 1 evoked lively interest and it was unfortunate that time precluded any resumption of the discussion. Instead, written comments were invited and a considerable number were submitted, of which in the alphabetical order of their authors the following are slightly summarized versions.

*Mr. Bhagwat P. Bhalchandra* (National Institute of Design, Paldi, Ahmedabad 7, India): With reference to the resolutions adopted by the Dehra Dun working party (paper 1(a)), specific mention could well have been made to the fact that conservation of natural resources or human environment studies should become part of the regular training of civil engineers, architects and town or regional planners. This could be done, for example, by including Landscape Planning among the subjects of the relevant university courses.

*Mr. S. R. Choudhury* (Forest Research Institute, Dehra Dun, India): Family Planning for population control is being frustrated in its aim by the neglect of reference to nature and natural resources. Yet the latter are basic to the achievement of family planning objectives, because if there is a continuing shrinkage of the benefits yielded by land and its renewable resources, the purpose of population control cannot be fulfilled. Advantage should be taken of the mass dissemination of information on family planning to promote conservation education in popular language and pictorially. We must get the message to the people for, up till now, we have not done enough to stimulate the thinking of the man living near the forest, so that he can see the disaster which faces future generations if he is not more careful of his resources.

*Mr. Naresh B. Joshi* (Town & Country Planning Organization, Vikas Bhawan, I. P. Estate, New Delhi, India): the suggestions I would make are that more scholarships should be offered by Governments for exchange of students to study conservation, that refresher courses should be offered, open for the general public, and be fully recognized by the Governments and Universities and that there should be a separate Conservation Service for the management of wildlife including flora. The courses might take the form of 'education camps' outside city limits and special leave and if possible some monetary incentive should be given to Government servants and employees of private organizations to enable them to attend.

*Mr. Pushp Kumar* (Nehru Zoological Park, Rajendra Nagar, Andhra Pradesh, India): Modern-style Zoological Parks can serve as training laboratories and schools for nature conservation education, especially in the underdeveloped countries like India, where large numbers of people, largely from rural areas, come to such parks not only for sightseeing but also from curiosity in the wild animals on display. Judicious measures can turn this curiosity into a subtle process of education in the first steps towards nature conservation. The modern trend is also for Zoos to be repositories of plant life, simulating natural habitats and maintaining a good variety of vegetation. For all these reasons every encouragement should be given not only to include theoretical and practical lessons about conservation in all classes in schools, but to make it obligatory for pupils to be taken on visits to nature reserves and Zoological parks.

*Mr. K. L. Mehta* (State Wildlife Warden, Himachal Pradesh, Simla, India): About one hundred years ago, Agriculture and Forestry used to be treated as one subject. Now they are recognized as entirely separate and everywhere in the world are supervised by separate services. The wildlife case is similar: conservation and management of wildlife are now specialized subjects, with their own subject matter, which includes the study of biological characteristics

of species, sex ratios and breeding potential, evaluation of food and habitat requirements and other ecological factors, such as the carrying capacity of a range, migration and the part played by migratory birds in carrying diseases, research management techniques, wildlife project-planning, mass conservation education, etc. For the execution of these tasks a separate organization and trained technicians in Biological Management of Wildlife are required. Each Government must recognize this fact, in India as elsewhere.

In India, in the light of the national construction programme, Forest Officers have a long list of works to be carried out in the field of forest conservation and management and should concentrate on this and not be involved in all sorts of other responsibilities, such as those for a specialized subject like wildlife conservation.

If we have failed in India in conservation of wildlife, it is only due to the fact that we are lacking in technicians properly trained in wildlife management or conservation. Now, with the rising tide of human population, we must create new professions for coming generations and this is one of them. In order to achieve efficiency in conservation of wildlife, it is imperative to create a Wild Life Service. It is a pity that although a number of persons are selected by Union and State Public Services Commissions as suitable candidates for a wildlife service and have the right to obtain training accordingly, yet they are still deprived of this training in the Forest Research Institute in Dehra Dun. It is true they are now permitted to take the short six-months course, for which they could well prove better qualified than the average Forest Officers, but this is really quite inadequate: what is needed in a country where wildlife is as varied and widely distributed as in India, is training equivalent to that given in the U.S.A.

In most of the States in India the wildlife wing of The Forest Service is treated as a wastepaper basket, to which misfits or other unsuitable persons are relegated, with the result that the work suffers and the wildlife wing tends to get a bad name.

In these circumstances it is imperative to create a separate wildlife wing in each State, for the staffing of which each university in the country should establish a wildlife degree course. For this purpose it may be necessary for a few years to employ foreign professors and technicians until our own qualified teaching staff has been trained.

*Dr. S. N. Mitra* (Indian Botanic Garden, Botanical Survey of India, Calcutta, India): Reference has been made to the importance of taking students into the field for practical study. In the case of schools and colleges situated in urban areas accessible rural areas may be far away, a problem that does not affect schools situated in rural areas. But can we not ask our town planners to earmark certain areas as near as possible to educational institutions as Green Belt or Rural Park where everything natural is to be preserved? Similar steps should also be taken even in rural school areas, otherwise sites now available may be lost in future due to population expansion.

*Dr. G. S. Nathawat* (Department of Botany, University of Rajasthan, Jaipur, India): Dr. Doraiswami and Dr. Galushin mentioned that they have added another nature study textbook to the syllabus at primary level. I am afraid this may increase the burden on students at this level, when they are still learning the languages. Professor Misra advocated more field study for these students. This is an ideal suggestion, but in our conditions it does not appear practicable, since all our primary as well as secondary schools are getting much larger numbers of students than they can accommodate and some of them are running in double

shifts. Secondly there are often no natural reserves in close vicinity and even where they exist, it involves financial and administrative problems to take students to visit them. I suggest that Nature can be brought to these students through films, slides and exhibitions of the fauna and flora of their own area.

This will create and promote interest in conservation and the children will get to know something about nature and natural systems without the strain of learning through books. Federal and State Governments should provide or subsidize such audio-visual aids to schools.

*Mr. D. Nanjundappa* (C.C.F., Nrapunga Road, K.R. Circle, Bangalore-1, India): It has been suggested, during discussions, that if governments employ M.Sc. and Ph.D. degree holders in wildlife parks and sanctuaries, universities would establish M.Sc. and Ph.D. degree courses in nature conservation. But wildlife parks and sanctuaries constitute a negligible percentage of reserved forests under the management of the Forest Department. Recruitment to the Forest Service is made by the Public Service Commission and the candidates selected are trained at Dehra Dun, where the curriculum includes 'Wildlife Management' and there is also a special six months course on the subject. Forest Officers manage all the forest areas under their control and so have prospects of promotion to the rank of conservator or even chief conservator.

If, however, M.Sc. and Ph.D. degree holders in nature conservation were to be appointed to manage wildlife parks and sanctuaries, they would have very limited promotion opportunities and might therefore well become disappointed, which could adversely affect the standard of administration. After all Forest Officers are trained in nature conservation too and should be sufficiently qualified to manage wildlife parks and sanctuaries. I believe, therefore, that M.Sc. and Ph.D. courses in nature conservation in universities ought not to be introduced with the hope that the graduates will have employment opportunities in wildlife parks and sanctuaries.

*Mr. T.N.Srivastava* (C.C.F. Uttar Pradesh, Lucknow, India): The delegate from New Zealand mentioned that a Conservation Week has been celebrated in his country for the past few years. In this connection it may be of interest to record that we in India, with the same objects in our view, have been observing the following two occasions annually throughout the country for the last 10 to 15 years:

(1) 'Vana Mahotsava', or the festival of planting trees, held in July annually, when large scale planting of trees is done in colleges, schools, institutional campuses and rural areas. Lectures and film shows are arranged in educational institutions to educate students and others in the benefits of conserving trees and forests. Shields are awarded by the Government of India to the organizations which established the best plantations during the previous year.

(2) 'Wildlife Week', observed throughout India during the month of October as a result of recommendation from the Indian Board of Wildlife. During this week, educational programmes are arranged through lectures, film shows, etc. School-children are asked to compete in writing essays on wildlife and prizes are awarded. Wildlife painting competitions are organized.

*Mr. A. R. Wani* (Game Warden, Jammu and Kashmir, Srinagar, India): In India we should not only stress the need to educate children, but must do something to generate conservation education among adults as well.

There is a need for—

- (1) the creation of organizations like the English 'Naturalists Trusts' and 'Council for the Preservation of Rural England';

- (2) the promotion of nature tours for children and adults. These tours could be sponsored in collaboration with Forest, Agriculture and Education Departments and subsidized from funds raised by voluntary contributions;
- (3) contributions by Industry towards the financing of field education programmes, exhibitions, films and displays of posters on conservation education, as well as conservation study tours. Industrialists should be given the incentive of tax rebate on amounts they contribute for this purpose;
- (4) painting and essay competitions among students;
- (5) opportunities for officials of Departments other than Forest and Agriculture to take paid holidays to attend nature study tours and thus learn and study conservation values in the field.

## Section 2: NORTH-WEST EUROPE

### REPORT OF THE PROCEEDINGS

*Dr. Tom Pritchard*, the Chairman, introduced his own paper *Environmental Education, its Relevance to the Problems of Rural Areas in North-West Europe* and then opened the topic for general discussion.

*Dr. N. W. Moore* (The Nature Conservancy, Monks Wood Experimental Station, Abbots Ripton, Huntingdon, U.K.): One very important point in regard to the new environmental situation is pollution.

Pollution affects everyone today and so it should be considered in all educational curricula. Also, discussion on pollution is an excellent way of introducing everyone to ecology and to the importance of an ecological approach. For example work on persistent pesticides has done much to emphasize the reality of food chains in nature.

Pollution studies are also remarkable as a linking theme, which can integrate studies of chemistry, physiology and ecology and other subjects. I suggest that the study of pollution should become an integral part of all school science and civics courses.

*Dr. Daniel H. Henning* (Political Science Department, Eastern Montana College, Billings, Montana 59101, U.S.A.): Is there any emphasis given to political participation in the various conservation education programmes? It is my observation that, in the final analysis, almost all decisions on conservation of natural resources are essentially political and administrative decisions regardless of the scientific and other knowledge available. Having a conservation attitude is not enough with the pressing demands on natural resources. It would appear reasonable that aspects of the political and administrative process of conservation should be encompassed. Personal involvement of citizens should also be encouraged as another way of extending environmental education.

*The Chairman*: There is a great deal being done in this direction nowadays. I have addressed meetings and conferences in the U.K. of many different groups of industrialists, legislators, planners and administrators, and experienced a growing demand for greater ecological knowledge in such circles. There is also, of course, much communication developing between industrialists, such as chemical manufacturers, and ecologists specially concerned with the control of pollution and related aspects of conservation. What has been said by Dr. Moore, Dr. Henning and others is of universal significance—ecological philosophy, and ecological attitudes must be introduced into those circles of influence where policies and programmes that may pollute or otherwise damage the environment, are being formulated and executed. This is one of the highest priorities in environmental education, throughout the world. Those of us concerned with promoting the work of the IUCN's Commission in Education have attended several meetings of governmental and intergovernmental agencies, and approached educational institutions, in an attempt to highlight the urgency of this task.

## **Environmental Education—Its Relevance to the Problems of Rural Areas in North-West Europe**

DR. TOM PRITCHARD

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### **INTRODUCTION**

The first regional committee of the Commission on Education was established nearly ten years ago and covers 10 countries in North-West Europe, namely, Belgium, Denmark, Federal Republic of Germany, Finland, Great Britain, Iceland, Ireland, The Netherlands, Norway and Sweden. One of its tasks is examining the significance of environmental education in furthering greater understanding of the countryside by adults and young people in this part of Europe.

Several of these countries have environmental and educational problems which are similar, but wide diversity is also encountered; some, such as the Scandinavian states, have relatively small populations and environments that are predominantly semi-natural whilst others, such as Germany, Great Britain or the Netherlands are densely populated and industrialized and with only small areas of landscape that have not been greatly modified from their natural condition.

### **CONTEMPORARY RURAL PROBLEMS**

The problems facing rural communities can best be understood if viewed against a historical background of social and environmental changes that have occurred over many centuries, but particularly since the Industrial Revolution of the eighteenth and nineteenth centuries. In the lowlands of western and northern Europe, the evolution of the landscape has, in the simplest of terms, taken the course of forest denudation leading to a pastoral and cultivated landscape, interspersed with human settlements and diminishing remnants of natural forest (Darby, 1956). Before the advent of the urban-industrial environment, much of the European continent was a mosaic of natural features and environments not violently modified from their natural condition, supporting a self-sustaining agrarian economy based on the utilization of natural resources by small local communities. There were enough remnants of prehistoric landscape to enable native animals and plants to survive in fair abundance. Human beings were still closely governed by natural forces and obliged to recognize and respect the limitations these placed upon them.

The industrial revolution and the growth of large urban centres (especially in the lowlands of northern Europe) were the most violent and far-reaching impact the landscape has ever suffered from mankind. The urban-industrial impacts were threefold.

First, they changed the basis of the rural economy over wide areas; agrarian settlements could no longer survive as self-sustaining communities but became obliged to provide the food and to exploit other natural resources, such as timber, for the urban populations. The agricultural improvements—some-

times called the agricultural revolution—of the eighteenth and nineteenth centuries were a direct result of pressures from the urban areas for food, timber and other products of the land.

Even in the Scandinavian peninsula, where urban-industrial growth occurred only on a small scale in comparison with, say, Germany and Great Britain, heavy demands on timber for export and charcoal for local industries, such as smelting of iron ore, resulted in exploitation of natural forest. In the lowlands further south (Denmark, Netherlands and parts of Germany, Britain and Belgium) forest was usually replaced by fields used for diversified, rotational agriculture. Large stretches of marshland and peat bog also disappeared when drainage became possible with the spectacular advances in mechanization. In the Netherlands, civil engineering not only transformed the landscape but created entirely new lands from the sea.

Secondly, there were population increases due to socio-economic factors, and particularly as a result of progress in medicine leading to prolongation of the life span and decrease of infant mortality. These intensified the demand for food and living space.

Thirdly, industrialization led to massive exploitation of natural resources and to physical damage to the landscape, either through operations such as coal-mining and quarrying or by pollution of land, water and air arising from the need to dispose of the solid, liquid and gaseous waste products of industry.

Soil erosion, as a consequence of these impacts and those of deforestation, over-grazing and other practices, has accelerated rapidly during the last two centuries. Regulation of water courses and creation of reservoirs to provide water supplies and to generate electricity have caused radical changes to the physical (including hydrological) and biological features of the landscape. Some streams and waterfalls have disappeared and the character of water catchment areas has changed.

The process which began in the eighteenth century is still accelerating and urban-industrial developments nowadays have an overwhelming influence on much of the European environment even in very remote rural areas. Urban populations are growing, while those of the rural areas are in many places decreasing. For example, at the end of the seventeenth century, 95% of the people of Britain lived in rural areas and were engaged in agrarian work. Today, 95% of the British live in towns and cities; only the remaining 5% are concerned directly with producing food and they, in spite of being aided by exceptionally advanced agricultural techniques, are able to produce only half the country's total requirements (Stamp, 1955). Similar changes in the social pattern have occurred in the other countries also. The growth of population and raised standards of living, both of which have become particularly pronounced in the last quarter of a century, are creating unprecedented demands for space. Agricultural land has to be covered with houses and factories and the value for recreation of the less productive areas is rising annually, with the result that more and more of what remains of natural or semi-natural areas is being utilized in one way or another. More prosperity means more leisure, and leisure is closely linked to obtaining more facilities for travelling, usually by car. For various reasons, it is the more attractive, uncultivated places which draw the majority of people, and rural areas largely ignored in the past are now penetrated by the public. The growing number of automobiles require new highways and existing ones are also having to be improved. Furthermore, people from the urban centres are travelling much longer distances for recreation and tourism, reaching as far as northern Scandinavia and the Mediterranean. Even on day visits, natural frontiers are often crossed.

The demand for land and water, especially mountains, lakes and coastal areas, for recreation affects each of the countries, but means of providing this need, as well as the pressure of urban and industrial development, agriculture, forestry and other traditional land uses, vary considerably. Furthermore, rapid changes are taking place in the status of agriculture. Multi-purpose use is becoming widely accepted as a basis for land utilization policies. In Sweden, the area of agricultural land is being reduced by extension of forests which are developed also for outdoor recreation. In Britain, marginal agricultural land in the uplands is often afforested, and new measures are being adopted, such as by Rural Development Boards, for a more integrated approach to land use, including provision for landscape conservation and recreation as well as for agriculture and forestry, while in the lowlands intensive and highly efficient agriculture still dominates. In the uplands of the Federal Republic of Germany and Belgium, similar opportunities exist for creating new patterns for the development of the countryside. Iceland, Norway, Finland and northern Sweden are still predominantly forest, peat bogs, lakes and tundra, where utilization of natural resources in terms other than kilos or calories is a major challenge. They are the major 'natural areas' in northern Europe, still with enormous potential for tourism and recreation.

Quite apart from the effects of the leisure-seeking public, other major changes have been brought about by urban and industrial development. Pollution is still a prominent problem. Although remarkable progress has been made to devise techniques to minimize its effects, many rivers are virtually devoid of life, fertile fields have been converted into deserts by toxic industrial wastes, and landscape and people affected by air pollution. In the larger industrial countries pollution is a long-standing problem; but it is increasing alarmingly in areas previously little affected, such as the far north. For example, in Sweden and Finland there has recently been severe public reaction to mercury pollution from timber industries which has had very visible effects in water courses in these countries with a strong angling tradition. Pollution from industry sewage and oil spillages are also seriously affecting the marine environment, particularly the Baltic and the North Sea. The wreck of the giant oil tanker, 'Torrey Canyon', off the south coast of England, has highlighted the disastrous consequences of marine pollution.

Even in those rural areas, where industry has no direct physical effects, the progress made in the use by farmers of chemicals as fertilizers and pesticides has brought about irreversible changes in the environment. Water courses and lakes have been enriched with highly soluble chemicals in fertilizers, changing, probably for ever, their chemical and biological composition. Wildlife populations in some places have been modified radically by the selective effects of pesticides which have penetrated their ecological system. Modern forestry is often monocultural, plantations of exotic trees uniformly covering large areas which were previously clothed with varied woodlands rich in native species.

## **THE CHALLENGE TO EDUCATIONALISTS**

These patterns of change in the human environment and the underlying sociological, economic, physical and biological factors have been the subject of much study during this century, and techniques for improving the management of natural resources developed for a wide range of circumstances, especially in Europe and North America. However, there is still widespread dissatisfaction among natural resources experts (and, increasingly, the public at large) with the extent of environmental mismanagement which is reflecting the fact that the

knowledge available is not, in many circumstances, being applied to the solution of the problems. The reasons for this are manifold, and familiar probably throughout the world. In some instances, they are of a financial nature; in others, they are political or administrative. But it is fairly obvious that the basic problem is insufficient public awareness of the relationships between man and his environment, arising from inadequacies in education systems. Misuse of natural resources occurs largely because people have been inadequately educated to realize the need for environmental care. Communities have been uncaring and unprepared to demand high standards of environment. Their leaders have been unable, or unwilling, to recognize the problems; or they have been ill-equipped to secure expert advice towards finding the solutions. Nevertheless, some communities have demanded high standards and assistance from trained environmentalists. Thus, there are examples of achievement to provide a basis for the extension of sound practices on a wider scale.

It is hardly necessary to stress the importance of environmental education as a key to open the door to an understanding of the political, economic and technological power which the highly developed nations of Europe can wield, to their benefit or otherwise, in the process of wresting their basic needs from diminishing natural resources. Such education should go further than to create an awareness, or even an understanding, of man's relationship to his environment. It should indicate how to conserve natural resources, remembering that conservation involves matching the use of such resources to the changing demands of human populations. In other words, the concept of the use and care of the environment should become an integral part of modern culture. This is brought out very effectively in the Council of Europe's recent report on 'Regional Planning, a European Problem' (Council of Europe, 1968).

Those concerned about the conservation of natural resources believe that relevant educational progress has been insufficiently rapid. Until recently, there has been inadequate communication between environmentalists and educationalists, and few efforts have been made to define the need in precise educational terms and to relate educational objectives to environmental matters. In the last decade, encouraging progress has been made in diagnosing the elements in education programmes that are relevant to the environment and in analysing the principal features of this environmental education and its function in a modern society. Enquiries and discussions by interdisciplinary groups such as by the British Study Group on Education and Field Biology (1963) and the IUCN's North-West Europe Committee (Pritchard, 1968, unpublished) have helped to clarify the needs in practical terms. The phrase 'environmental education' is now finding a place in the educational vocabulary, and some educationalists are recognizing its fundamental precepts and consequently their cognate responsibilities.

The impetus for environmental education springs from a recognition of two important issues. First, young people seem to have a latent interest in their environment, and especially in its natural features, which, if cultivated, can develop into an understanding of natural phenomena and an appreciation of cultural and aesthetic values which will bring personal enjoyment and satisfaction in later life. Secondly, since human beings inevitably exploit natural resources, they require an understanding of the means of doing so without unnecessary wastage; conservation, although in practice entailing technical and scientific disciplines, is essentially a wise attitude towards the use of the human environment. Those guided towards such an attitude can be expected, individually and collectively, to have more concern about the use of the resources of the earth to improve their living conditions in cultural and aesthetic, as well as material, terms.

There is a danger in all developed countries that technological education to sustain and improve material standards of living will not be matched by sufficient preparation for the appreciation of cultural and aesthetic values. Vigorous technological advance in Europe, coupled with the streamlining of marketing techniques for rapid consumption of mass-produced goods, is bringing about unprecedented economic and social changes, and the majority of people seem likely to continue to have wealth and time to spare for leisure and recreation. Although training to prepare people for work must continue to be one objective in education, a second one, surely of equal importance, should be to prepare people to make creative and enjoyable use of their leisure time. Much of this leisure is intricately related to pursuing outdoor activities in the countryside.

The relentless, and formerly unorganized and unplanned, growth of industrialization in Europe has created a most complicated urban-based society, with an urban culture far removed in attitude and behaviour from that of previous centuries. Until recently, few people in towns and cities have had either the time or the inclination to think about, let alone appreciate, the qualities of the human environment. Thus the need to respect the environment has just begun to be accepted as a major factor in modern living. It may be supposed that this has been brought about by increased opportunities for people to experience different and better environmental conditions than they had previously been accustomed to. The mass exodus of people from townscapes of brick, concrete and tarmac into the countryside is giving birth to popular demands for national parks and conservation of the countryside and its wildlife. Urban people are showing concern about the management and development of rural areas for their own benefit as well as that of the country dwellers. Thus, some of the traditional barriers between town and country are breaking down. This will surely lead to greater interaction of urban and rural cultures, provided these trends are recognized in educational circles and allowance made for them in education programmes.

Regardless of the extent to which integration of these cultures will proceed, some people will continue to live and work in the countryside and the urban dwellers will continue to have their effects, directly and indirectly, on the life of rural communities and on the form of the landscape. Educationally, there are some specific objectives to be met for the two groups, over and above the creation of environmental awareness in society as a whole. But these objectives involve emphasis rather than subject-matter and methods of teaching or other means of imparting knowledge. Few educationalists would contemplate creating a sharp distinction between their basic educational objective in urban and rural areas. It is for this reason that, while this paper is specially concerned with the problems of rural areas, it would be unrealistic to concentrate exclusively in it on the education of people who live in the countryside. Nevertheless, certain special points about the needs in the two communities can be distinguished and these are referred to below.

## **EDUCATIONAL NEEDS OF COUNTRY COMMUNITIES**

Education can extend the scope for a greater participation in countryside planning and development by the rural community as a whole, and encourage a deeper understanding of the economic significance of conservation to the people who live and work in the countryside. Protecting natural features and consciously developing an aesthetically acceptable countryside results in a higher monetary value on individual properties and in maintaining a flow of tourists and others from the towns who contribute to the rural recreation economy. This

is particularly important in upland areas along the coast and near to or in National Parks, where tourism and recreation are contributing an ever growing income, supplementing agriculture and helping to arrest rural depopulation in many parts of Europe.

Agricultural and silvicultural technology is changing rapidly and influencing the environment often in obscure but far-reaching ways. For example, use of pesticides and chemical fertilizers calls for education and training of farmers and their staff to reduce accidental or ill-considered actions such as pollution of water courses and to indicate the reasons why special care should be exercised near to vulnerable areas of importance for the conservation of wildlife, such as nature reserves. Then, the consequences of drastic reshaping of the landscape, such as by removal of hedgerows, drainage of wetlands, afforestation without due regard to visual amenity, and the design and siting of farm buildings, often need more informed consideration by the farming community.

### **THE EDUCATION OF URBAN DWELLERS**

This is a much more complex problem because urban dwellers constitute a much larger, more varied part of the European population. They affect the countryside directly by their individual behaviour when they visit rural areas for recreation, and indirectly through the pressure which their political, legislative, industrial, technological and commercial activities bring to bear on natural resources.

Regarding their recreational needs, much of the education and information required is provided by various official and voluntary bodies connected with conservation. There are nature trails, information leaflets, talks, films, television and radio programmes and other means of enabling young and old to appreciate landscape, farming, forestry, wild life and its conservation, and rural life generally. There are also codes of behaviour, wardening schemes, bye-laws, planning techniques and other means to develop patterns of human behaviour compatible with countryside conservation.

Incorporating knowledge about rural problems into the decision-making processes of urban society is a much longer-term task and has to be undertaken largely in the educational institutions. Statesmen and civil servants, planners, landscape designers, technologists and scientists, and several other professional groups need to be informed of the changing problems and the impacts they are potentially able to have on them. (The stroke of a civil servant's pen, a decision in a boardroom, or a drawing on a desk, are known to have had devastating repercussions in places never seen, let alone understood, by the people concerned.) This is recognized by leading educationalists as one of the vital functions of environmental education. In some cases, such education forms a part of the liberal studies of professional people; in others, such as for planners and landscape designers, it is becoming an integral component of their training, usually in the form of applied ecology.

### **ACKNOWLEDGMENTS**

In the preparation of this paper the author has liberally drawn on the knowledge and experience gained by the North-West Europe Committee of IUCN, and particularly on the report on environmental education he submitted to the Council of Europe in 1968. Special thanks are due to Mr. P. H. Oswald, the Secretary of

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## **SUMMARY**

Examining the significance of environmental education in furthering greater understanding of the countryside by adults and young people in North-West Europe is one of the tasks of the first regional committee of the Commission on Education established nearly ten years ago and covering 10 countries in this part of Europe.

The industrial revolution and the growth of large urban centres (especially in the lowlands of northern Europe) constituted the most violent and far-reaching impact mankind has ever inflicted upon the landscape. They changed the basis of the rural economy over wide areas, population increased owing to socio-economic factors, industrialization led to massive exploitation of natural resources and to physical damage to the landscape. The process which began in the eighteenth century is still accelerating and urban-industrial developments have an overwhelming influence on much of the European environment even in very remote rural areas. The leisure-seeking public penetrates attractive uncultivated places and also rural areas largely ignored in the past. Quite apart from the effects of the leisure-seeking public, other major changes have been brought about by urban and industrial development. Pollution is still a prominent problem. Even in those rural areas, where industry has no direct physical effects, the progress made in the use by farmers of chemicals, fertilizers and pesticides has brought about irreversible changes in the environment. Modern forestry is often monocultural.

In spite of some profound study of these patterns of change in the human environment during this century, there is still widespread dissatisfaction with the extent of environmental mismanagement which is reflecting the fact that the knowledge available is often not being applied to the solution of the problems. Apart from the financial, political or administrative causes of this it is fairly obvious that the basic problem is insufficient public awareness of the relationships between man and his environment, arising from inadequacies in education systems.

It is hardly necessary to stress the importance of environmental education as a key for opening the door to an understanding of the political, economic and technological power which the highly developed nations of Europe can wield, to their benefit or otherwise, in the process of wresting their basic needs from diminishing natural resources. Such education should go further than to create an awareness, or even an understanding, of man's relationship to his environ-

ment. It should indicate how to conserve natural resources, remembering that conservation involves matching the use of such resources to the changing demands of human populations. In other words, the concept of the use and care of the environment should become an integral part of modern culture.

Hitherto, educational progress has been insufficiently rapid. In the last decade, however, there has been an encouraging leap forward and the phrase 'environmental education' is now finding a place in the educational vocabulary, and some educationalists are recognizing the fundamental precepts and consequently their cognate responsibilities. Young people seem to have a latent interest in their environment, which, if cultivated, can develop into an appreciation of cultural and aesthetic values. Since human beings inevitably exploit natural resources, they require an understanding of the means of doing so without unnecessary wastage. Conservation, although in practice entailing technical and scientific disciplines, is essentially a wise attitude towards the use of the human environment.

With the huge urban development, the need to respect the environment in Europe has just begun to be accepted as a major factor in modern living. Some of the traditional barriers between town and country are breaking down. This will surely lead to greater interaction of urban and rural cultures. Few educationalists would contemplate creating a sharp distinction between their basic educational objectives in urban and rural areas.

In rural communities, education can extend the scope for greater participation in countryside planning and development by the community as a whole, and encourage a deeper understanding of the economic significance of conservation to the people who live and work in the countryside.

The education of urban dwellers is a much more complex problem because urban dwellers constitute a much larger, more varied part of the European population.

## **RÉSUMÉ**

Un des buts du 1er Comité Régional de la Commission d'Education, crée il y a bientôt 10 ans et touchant 10 pays d'Europe Occidentale est d'étudier l'importance de l'éducation en matière d'écologie dans le développement d'une plus grande compréhension à l'égard du facteur 'espace rural' chez les jeunes et les adultes de ces pays.

La révolution industrielle et le développement des grands centres urbains (particulièrement dans les plaines du Nord de l'Europe) ont été, pour le paysage des épreuves d'une violence et d'une portée sans précédents. Elles ont amené la transformation des bases de l'économie rurale dans de très vaste régions; la population s'est accrue sous l'influence de facteurs socio-économiques; l'industrialisation a déclenché l'exploitation massive des ressources naturelles et la détérioration physique du paysage. Ce processus qui débuta au XVIII<sup>e</sup> siècle s'accéléra de plus en plus et l'évolution urbano-industrielle a une influence prépondérante sur une grande partie du milieu naturel européen, même dans des zones rurales écartées. Le public, avide de détente et de loisirs, pénètre toujours plus avant dans des régions sauvages et attrayantes et même dans des campagnes autrefois largement délaissées. Mais indépendamment de l'influence d'un public en quête de loisirs, d'autres transformations ont été suscitées par le développement urbain et industriel. La pollution est toujours un des problèmes majeurs. Même dans les zones rurales où l'industrie n'intervient pas directement, l'emploi croissant de produits chimiques, engrais et pesticides, en agriculture a provoqué des transformations irréversibles du

milieu naturel. La pratique de la monoculture est fréquente en sylviculture moderne.

Malgré une étude approfondie des schémas de ces transformations dans l'environnement humain au cours du siècle, il règne encore une insatisfaction généralisée parmi les experts des ressources naturelles (et de plus en plus au sein du grand public) au sujet de la mauvaise exploitation très fréquente du milieu naturel. Ceci révèle que dans de nombreux cas, les connaissances acquises ne sont pas utilisées à résoudre ces problèmes. Indépendamment des causes financières, politiques ou administratives de cet état de choses, il semble évident qu'à la base, il y a un manque d'éveil du public aux problèmes des relations entre l'homme et le milieu naturel, dû aux lacunes du système éducatif.

Il semble peu nécessaire de souligner que l'éducation dans le domaine de l'environnement fournit la clef d'une meilleure compréhension des forces politiques, économiques et techniques que les nations évoluées d'Europe peuvent exercer à leur profit ou à leurs dépens en puisant dans les ressources naturelles apauvries ce qui leur est nécessaire. Cette forme d'éducation ne doit pas se borner à éveiller la conscience, ou même la compréhension des individus, au sujet de leurs relations avec le milieu qui les entoure. Elle devrait aussi indiquer comment conserver les ressources naturelles, compte tenu du fait que la conservation implique une adaptation de l'utilisation de ces ressources aux exigences changeantes des populations humaines. En d'autres termes, le concept d'utilisation et d'aménagement du milieu naturel devrait devenir partie intégrante de notre civilisation.

Jusqu'ici les progrès dans le domaine de l'éducation ont été trop lents. Toutefois, au cours des dix dernières années on a observé un bond en avant très encourageant, et le terme 'd'éducation en relation avec le milieu naturel' s'inscrit maintenant au vocabulaire éducatif; certains membres de l'enseignement en admettent les principes fondamentaux et par conséquent les responsabilités impliquées. Il semblerait y avoir chez les jeunes un intérêt latent pour le milieu environnant, intérêt qui s'il est développé peut se transformer en une réelle appréciation des valeurs esthétiques et culturelles. Comme il est inévitable que les hommes exploitent les ressources naturelles, il faut qu'ils apprennent à le faire sans gaspillage inutile. Bien qu'elle comporte en fait des disciplines scientifiques et techniques, la conservation est essentiellement une attitude mesurée à l'égard de l'utilisation du milieu naturel où vit l'homme.

Parallèlement au prodigieux développement des villes on a tout juste commencé à admettre que le respect du milieu naturel en Europe constituait un facteur indispensable et primordial de la vie moderne. Certaines barrières traditionnelles entre villes et campagnes se sont effondrées, ce qui amènera sûrement un resserrement des échanges entre les cultures rurales et urbaines. Peu de responsables de l'éducation auraient l'idée d'établir une distinction nette entre leurs objectifs éducatifs fondamentaux pour les villes et les campagnes.

L'éducation des communautés rurales peut les amener à participer plus activement à l'aménagement et au développement de l'espace rural dans son ensemble et promouvoir une compréhension plus profonde de l'importance économique de la conservation chez ceux qui vivent et travaillent dans les campagnes.

L'éducation des citoyens se présente de façon beaucoup plus complexe, car ceux-ci constituent une fraction bien plus importante et mêlée de la population européenne.

### Section 3. EAST EUROPE

#### REPORT OF THE PROCEEDINGS

The Chairman said that three papers had been contributed for this section and he would call upon their authors in turn to introduce them. Unfortunately the author of the third paper, Prof. Dr. Ludwig Bauer (German Democratic Republic) had not himself been able to come to Delhi due to serious illness, from which everyone hoped he would make a good recovery, but his paper would be introduced on his behalf by Dr. Eberhard Niemann.

Prof. Dr. Kh. P. Mirimanian (U.S.S.R.) then introduced his and Prof. N. Gladkov's joint paper on *Conservation Education among Rural Populations of the U.S.S.R.*

He was followed by Dr. T. M. Szczesny (Poland) who explained the principal ideas contained in his paper, written in French and entitled *Le travail éducatif en matière de conservation de la nature dans les régions rurales en Pologne* and expressed the hope that the experience gained in his country could have useful general applications.

Finally, Dr. E. Niemann (DDR) gave a summary of Prof. Dr. Bauer's paper on *Conservation Education of the Rural Population by the Nature Conservancy in the German Democratic Republic.*

The Chairman thanked the three speakers for their valuable contributions and, in the absence of questions, adjourned the Session for a brief interval.

## Conservation Education in Rural Districts of the USSR

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The education of the general public, including the rural districts of the country, plays an especially important role in the fight for the conservation of nature, development and wise use of natural resources. The Society for Nature Conservation which is the leading organization of the USSR, is active in all of the Union's Republics and carries out an extensive work in the field of conservation education among the rural population. Its principal task is to educate adults and youth to love nature and to foster the feeling of concern for its wealth; to educate them in a spirit of love for nature, in developing a sense of nature's beauties which are of scientific, cultural and aesthetic significance. By means of instructive education we have succeeded in stimulating youth's keen interest in a comprehensive appreciation of nature and its laws and in developing the feeling of love of nature, which are so necessary to ensure the justified rational use of natural resources of the country.

The teaching practices of conservation education adopted in the USSR involve the application of quite different forms and methods and so we would like to say a few words about it and share the experience which is already obtained in this field.

First of all, we must draw attention to the activities of our public or peoples' universities of nature conservation. In the Russian Soviet Federated Republic, only, their number exceeds 52. Tens of thousands of students follow their courses. Among them are secondary school teachers and nature-lovers. The subjects of lectures delivered at the peoples' universities include the main problems of ecology: forestry, soil and water resources, preservation of fauna, pest control in rural economy and forestry, planting of greenery, air pollution control, conservation of landscape, and so on. Specialists and scientists engaged in the study of the relevant problems are invited to deliver lectures. They come not only from local and district centres but also from regional centres and capitals of the Union's Republics. The work of peoples' universities is directed by public Rectors. The syllabus and topics for discussion are published and distributed to students. Fairly often the university lectures are accompanied by film projections according to the subject of the lecture.

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\* When preparing this report, use was made of materials provided by Voinstvensky, Timchuk, Gulisashvili, Aliev, Kamaev, Bergas, Luik, Bruno and some other representatives of the Union's Republics.

Moreover in hundreds and thousands of villages and regional centres of the USSR there are permanent lecture bureaux. Lectures are also delivered to the general public by invited local and regional intellectuals in conformity with the detailed outline of the study programme, which is in many cases published beforehand. Last year, for example, the number of lectures delivered in Bielorussia was 7,000; in Uzbekistan 17,000; in Kazakhstan 2,500; in Armenia 4,000; in the Russian Soviet Federated Socialist Republic nearly 200,000. These lectures are also accompanied by film projections which attract a large public and awake a considerable interest.

Dissemination of the principles of nature conservation is also carried out by means of film shows and television programmes. For instance, more than 24,000 films illustrating the main problems of nature conservation were projected in the Russian Soviet Federated Socialist Republic and 13,000 in the Ukrainian S.S.R.

Among the formulas enjoying great popularity in the field of information and dissemination of nature conservation matters are the radio courses on conservation of forests, game, soil and water resources, etc., broadcasted systematically. Nature conservation centres and clubs established in a number of regions and territories organize regular talks, discussions and consultations on the methods of planting vegetation in villages, protection of nature monuments, health education, conservation of useful birds and other animals etc. There are more than 32 clubs of this type in the R.S.F.S.R.

To raise the standard of educators within nature conservation, organizations of the R.S.F.S.R., Byelorussia, Georgia, Lithuania and Armenia have organized scientific seminars, symposia, local conferences, schoolchildren assemblies and youth rallies where the principal problems of nature conservation and re-production of natural resources, as well as results of practical work carried out by combined public efforts, are discussed. Such seminars are held at the permanent USSR Exhibition of the National Economic Achievements (in 1967 a special pavilion on nature conservation was created within the Exhibition). Its educational work enjoys great popularity and attracts the attention of many people.

Popular science magazines, booklets, posters and leaflets dealing with nature conservation are published in all of the Union's Republics. For example, Estonia, Lithuania, Georgia and Armenia have special magazines on conservation of nature. Many popular scientific booklets are issued in the R.S.F.S.R., Byelorussia, the Ukraine, Kazakhstan and other Republics. Books by Gladkov, Shaposhnikov, Armand, Fedorov, Mirimanian, Issakov and others appear in separate editions. Substantial and comprehensive articles on the most acute problems of nature conservation are published in periodicals of the R.S.F.S.R., Moldavia, the Ukraine, Estonia and Lithuania. Numerous reports appear in local newspapers: for example, about 900 articles on conservation topics were published in Byelorussia. Numerous editorial boards of newspapers and broadcasting corporations provide methodical courses on neighbourhood nature.

There are over a hundred of such public editorial boards operating in the R.S.F.S.R. Short films dealing with the problems of nature conservation are produced in a number of the Union's Republics, such as the R.S.F.S.R., Uzbekistan, Kazakhstan and Azerbaijan. Envelopes, postage stamps and matchboxes with pictures of animals, birds, plants and areas protected by law and deserving proper care and attention of the general public are widely used in all of the Union's Republics.

In the Armenian S.S.R. we organize 'expeditionary scientific sessions' in remote rural areas. At these sessions, half a dozen scientific reports prepared by prominent specialists are presented and deal with the local problems concerning the region where the lectures are given; they cover the actual state of natural resources, such as soils, forests, game, green spaces, recreational areas as well as problems of water and air pollution control. The programme of these sessions, including topics of the reports, are published and distributed well in advance. These sessions are attended by most of the active residents, including representatives of local government, teachers, local specialists and intellectuals. The reports are actively discussed and concrete resolutions are adopted with precise recommendations on practical measures that are to be taken. Sometimes these resolutions are submitted for consideration by the local council and, when approved, become legal regulations and in force. The subject matters of the sessions are usually published in the local press and broadcast.

Numerous competitions organized in all of the Union's Republics are very popular in rural districts and regional centres of the USSR. For example, every year we organize competitions for colourful decoration with flowers and greenery of doorways, streets, balconies, windows and buildings—by means of planting wild vines twining up to the roof. Other competitions, such as: attracting song-birds to breed; literature to educate the young generation in the spirit of sensible attitude towards nature—its conservation and the wise use of natural resources; models of valuable nature monuments and coloured photography of interesting landscapes. These competitions stimulate artistic skills. In the Ukrainian S.S.R. alone there were 600 organized in 1967. Many visitors are attracted by nature conservation exhibitions resulting from these various competitions.

Our exhibitions of flowers, aquarium fish, and song-birds have become a popular festivity. The number of such exhibitions organized in the R.S.F.S.R., Moldavia, Lithuania, Uzbekistan and Armenia amounts to several thousands every year. District centres, factories and plants, schools and hospitals, flower-lovers and flower-growers, painters and writers, photographers, research institutes, collective and state farms—all of them take part in the organization of these exhibitions. The whole has a great educational and aesthetic significance.

In the rural areas of the USSR particular attention is paid to conducting mass campaigns on the occasion of the 'Bird Day', the 'Forest Week' or 'Forest Month', the 'Golden Autumn' and school literary evenings dedicated to the topics of nature conservation.

School literary evenings prove to be especially joyful and interesting. Teaching staff and parents participate in these evenings. Schoolchildren perform scenes making a scenic newspaper, recite poetry dedicated to nature conservation, sing songs and produce remarkable plays which are often written by their teachers. Children dressed up like birds, animals, nature friends and nature enemies act in plays which have a great educational value. In the villages the 'Bird Day' is a gay holiday. It is celebrated by thousands of pupils accompanied by the teachers and a band. After the festive procession in the streets they make their way to the neighbourhood woods, parks, orchards and hang out their nesting-boxes to attract the birds which are a necessity for pest control in agriculture and forestry. In the R.S.F.S.R., thousands of such nesting-boxes are placed out-of-doors each year. A lot of nesting-boxes are also made and placed in the trees in the other Union's Republics.

At schools in the USSR great attention is paid to the mass organization of the 'green patrol'. In the Russian Federation, Byelorussia, Estonia, Georgia, Azerbaijan, Moldavia and Armenia, as well as in some other Union's Republics schoolchildren organize special working groups with their own leaders and working plans. They produce posters relating to problems of nature conservation, listen to lectures and arrange discussions about animal and plant species. The 'green patrols' are responsible for growing flowers, planting green spaces on school grounds and protecting public areas. With a green armband, they walk up and down the streets gathering fodder which can be used for winter-feeding of wild animals. Besides that they breed pets, such as aquarium fish and song-birds; nature lovers paint pictures and hang them in schools thus establishing 'nature study corners'. The number of schoolchildren participating in the 'green patrols' in the R.S.F.S.R. amounts to two millions; in the Ukraine—225, 000; in Kazakhstan—50, 000; in Uzbekistan—9, 000 and so on. In a number of rural districts of the USSR we have established school forestry centres, where pupils are taught how to conserve forests, exercise fire control, gather wind-fallen wood and brushwood, etc. There are several hundred school forestry centres in Byelorussia. Their number in the R.S.F.S.R. and particularly in Siberia and in the Far East is also significant.

In some of the Union's Republics, schoolchildren carry out large scale fertilization and grafting of cultured varieties of apple, pear and plum trees on wild trees of the same species in the woods, and in this way they set up 'forest orchards'. For example, in Armenia and in the Carpathians, a great number of the fertilized apple trees last year yielded the first tasty fruit which proved to be of the same quality as the fruit from the corresponding cultured varieties.

In many regions of the USSR, especially in the Ural-Mountains, we have organized at industrial plants some monitoring posts which help—like school organizations—with water and air pollution control with the active participation of the workers.

They also inspect the sewage-clearing systems. The number of such monitoring posts on the territory of the Ukraine alone is more than 35, 000. Technical committees, controlling the implementation of measures improving the sanitary conditions of the area, were also organized at plants in some regions of the R.S.F.S.R.

Special sections of nature conservation are being established in some regional museums. In Georgia and Estonia special nature conservation museums have been established and the same are to be found in Armenia and in some other Union's Republics.

To improve the educational work in the rural areas, sections on nature conservation studies were introduced in cultural palaces, clubs, and in rural and factory libraries.

In R.S.F.S.R. and in a number of other Republics, youth study and work camps have been set up and have proved to be one of the best forms of conservation education. Among the general public, extensive use is made of field-excursions and hiking in the woods, fields, mountains or to water sources, where youth gets acquainted with the charm and beauty of their great country and studies its nature.

During the 'Forest Week' or 'Forest Month', the most active countryside residents in all of the Union's Republics help the general public to plant decorative fruit-trees and shrubs, construct new parks and other green-spaces, plant trees and shrubs along the water courses, irrigation channels, streets and public

gardens. For example, in 1967 in Ukraine, schoolchildren established 8,000 orchards and planted trees and shrubs in 7,500 school grounds and around hospitals. In Byelorussia they set up 660 parks and planted trees and shrubs on the territory of 9,000 factories; in Moldavia the pupils set up 40 parks and planted 1.5 million trees. In spring 1969 the schoolchildren of Armenia planted 25,000 vine-shrubs for vertical shading of schools and hospitals.

We have introduced new traditions into the life of some rural districts of the USSR; each person plants a tree and we advise those who get married or newly become parents to plant a tree too. By doing so, we help to build up new public parks. In Armenia they are known as 'Parks of Happiness'.

In all of the Union's Republics there is a network of public inspectors—controlling conservation practices. In some Republics as, for example, Byelorussia, the principles of nature conservation are introduced into the school curriculum of rural areas. But the main topics of nature conservation have been incorporated into scientific courses at all schools throughout the USSR. At the present time measures are taken to provide students of teachers' colleges, the future teachers of countryside schools, with necessary knowledge and skill in nature conservation by introducing the relevant course of studies into the programme of their college. This will help in raising the standard of conservation education in rural regions of the country.

All the conservation organizations of the USSR, starting from republican societies down to the local groups established at all factories and schools, hold competitions for the best conservation work and projects. At the end of each year, results of these competitions are considered and winners as well as the factories are awarded, receiving prizes such as the challenge of the red banner, diplomas and cash. Finally, our social organizations together with research institutes hold regular scientific meetings and conferences at which they discuss the main problems of nature conservation; this is of considerable importance in the field of conservation education.

In most instances, these are the forms and methods of conservation education used in rural areas of the USSR. When carrying out this work we always take into account information on corresponding work accomplished in other countries. We are very interested in obtaining positive, valuable results of activities and achievements in Poland, Czechoslovakia, the German Democratic Republic, Bulgaria, Hungary, Roumania, and Yugoslavia, countries that are represented together with us in the East-Europe Committee of the IUCN Commission on Education. We are greatly interested in the most significant work carried out in the countries of North-West Europe, North America and Latin America, where Regional Committees of the IUCN Commission on Education are established and are developing their efforts.

Taking into consideration that the aim of the IUCN Commission on Education is to stimulate, strengthen and improve conservation education in all countries of the world, we recommend that establishment of Regional Committees in South-East Asia, Africa and Australia be urgently considered.

The integration of efforts of all countries and continents will contribute to the cause of nature conservation. By sharing the experience obtained in our country in the field of conservation education we are trying to contribute as much as we can to this noble cause. At the same time we are quite conscious of the fact that everything that we have done is only the beginning of a more extensive and responsible operation. We have only started to fulfil the great tasks that face us, and we shall work and strive for their realization to the benefit and in the interests of all the countries and peoples of the world.

## SUMMARY

In the U.S.S.R., an extensive work in the field of conservation education among the rural population which is considered as an important component of the environmental education of the general public, is carried out mainly by the Society for Nature Conservation active in all of the Union's Republics.

Very important forms of education are the public or peoples' universities of nature conservation, where tens of thousands of students, secondary school teachers and nature-lovers among them, follow their special courses. Moreover in hundreds and thousands of villages and regional centres of the USSR there are permanent lecture bureaux. Dissemination of the principles of nature conservation is also carried out by means of film shows and television programmes. Very popular are the systematic radio courses on conservation of forests, game, soil and water resources etc. Nature conservation organizations in some of the Soviet Republics have organized scientific seminars, symposia, local conferences, etc., mainly to raise the standard of educators. In 1967 a special conservation pavilion was created at the permanent USSR Exhibition of the National Economic Achievements in Moscow, where seminars are being held as well. Popular science magazines, booklets, posters and leaflets dealing with nature conservation are published in all of the Union's Republics. Numerous editorial boards of newspapers and broadcasting corporations provide courses on neighbourhood nature and films dealing with the problems of nature conservation are produced in a number of the Union's Republics. Envelopes, postage stamps and matchboxes with pictures of animals, birds, plants and areas protected by law and deserving proper care and attention from the general public are widely used in all the Union's Republics.

In the Armenian S.S.R. so called 'expeditionary scientific sessions' in remote rural areas are organized: 5-6 scientific reports are prepared by prominent specialists; local politicians, teachers, specialists and intellectuals attend, discuss the reports and local situation of natural resources and accept conclusions with recommendations on practical measures to be taken. The proceedings and results are published in the local press and broadcast.

Numerous competitions (flower decoration, attracting song-birds to breed, providing educational literature for children and youth, photo-competitions, etc.) are organized in all the Union's Republics and are very popular in rural districts. Exhibitions have a great educational and aesthetic significance.

In rural areas particular attention is paid to conducting mass campaigns, such as 'Bird Day', 'Forest Week', or 'Forest Month', 'Golden Autumn', etc. School literary evenings prove to be especially joyful and interesting and are attended by staff and parents. In the villages the 'Bird Day' is a gay holiday celebrated by thousands of pupils.

In many of the Union's Republics special conservation working groups of schoolchildren are active within the 'green patrol'. They produce posters, organize meetings and discussions, plant green spaces, protect birds, wild animals and plants, breed pets, organize school 'nature study corners', etc. In a number of rural districts of the USSR school forestry centres have been established, where the children learn how to conserve forests, exercise fire control etc. The 'forest orchards', spread especially in Armenia and in the Carpathians, are forests of wild fruit trees and shrubs fertilized and grafted on cultural varieties by schoolchildren.

In many regions of the USSR, especially in the Ural-Mountains, monitoring

posts at factories were organized to help water and air pollution control, with the active participation of the workers.

Special sections on nature conservation are being established in some regional museums. Youth study and work conservation camps are organized.

Into the life of some rural districts of the USSR a new tradition has been introduced: those who get married or newly become parents are encouraged to plant a tree. Thus new public parks (in Armenia they are called 'Parks of Happiness') are built up.

Voluntary public inspectors help to control conservation practices. The main principles of nature conservation have been incorporated into scientific courses at all schools throughout the USSR.

Conservation groups of the USSR hold competitions for the best conservation work and projects. The best groups and individuals are rewarded for their achievements.

For satisfactory progress of our work, an extensive international exchange of experience through the Commission on Education of IUCN is very helpful.

## RÉSUMÉ

En URSS, l'éducation du public en général et des populations rurales en particulier, dans le domaine de la conservation de la nature, est assurée en bonne partie par la Société de Conservation de la Nature dont l'activité s'exerce dans toutes les républiques de l'Union.

L'enseignement de cette matière est diffusé par divers établissements. En premier lieu, il convient de citer les universités populaires pour la Conservation de la Nature, où étudiants, professeurs du secondaire et amis de la nature assistent par dizaines de milliers aux cours donnés par des spécialistes et des scientifiques.

Dans des milliers de villages et de centres régionaux, on trouve des bureaux permanents d'information. La diffusion des principes de la protection de la nature est également assurée par la télévision, le cinéma et la radio dont les émissions régulières sur la protection des forêts, du gibier, du sol, de l'eau, etc.... jouissent d'une grande popularité. Dans certaines Républiques Soviétiques, les associations pour la protection de la nature ont organisé des séminaires scientifiques, des réunions et conférences locales, etc. essentiellement dans le but d'élever le niveau de connaissances des éducateurs.

En 1967, un Pavillon consacré à la Protection de la Nature a été ouvert à l'Exposition Permanente des Réalisations de l'Union Soviétique à Moscou. Ce thème est également traité par des revues de vulgarisation scientifiques, des brochures, des livres, des affiches et évoqué sur les timbres, boîtes d'allumettes et enveloppes.

En République Soviétique d'Arménie, des 'sessions scientifiques missionnaires' sont organisées dans les zones rurales isolées. Quelques spécialistes connus préparent des rapports sur la situation locale qui sont ensuite discutés par des personnalités politiques, éducatives, intellectuelles de l'endroit pour aboutir à l'élaboration de recommandations pratiques. Les débats et résultats de ces discussions sont ensuite diffusés par la presse locale et la radio.

Dans toutes les républiques de l'Union, des concours et des expositions sont organisés autour du thème de la Conservation de la Nature. Ces manifestations

jouissent d'une grande popularité auprès des populations rurales et présentent une grande valeur éducative et esthétique. Les autorités ont également lancé des campagnes de propagande dans les districts ruraux, telles que la 'Fête de l'Oiseau' où les écoliers vont en bandes accrocher les nichoirs dans les forêts, la 'Semaine de la Forêt', le 'Mois de Forêts', etc.

Dans plusieurs républiques de l'Union, les écoles organisent des soirées littéraires sur le thème de la Protection de la Nature. 'Patrouilles Vertes' sont également formées d'écoliers qui dessinent des affiches, organisent des réunions et des débats, créent des espaces verte, protègent les oiseaux, animaux et plantes sauvages, élèvent des animaux et arrangent dans leurs classes des 'coins d'étude de la nature'. En outre, les jeunes participent à des camps d'étude et de travail sur les problèmes de la conservation.

Dans un certain nombre de districts ruraux, on a créé des centres scolaires forestiers où les écoliers apprennent à protéger la forêt, à lutter contre l'incendie etc. En Arménie et dans les Carpathes, les enfants ont constitué des 'vergers de forêt' en greffant avec succès des variétés cultivées d'arbres fruitiers sur des variétés sauvages de forêt.

Dans l'Oural et dans d'autres régions, on a créé dans les usines des postes de moniteurs qui, avec la participation active des ouvriers, s'efforcent de lutter contre la pollution de l'air et des eaux.

Certains musées ont inauguré des sections spéciales consacrées à la Conservation de la Nature. Enfin, une nouvelle tradition est née dans certaines régions: les jeunes mariés ou les parents d'un nouveau né plantent un arbre pour célébrer l'événement; il se crée ainsi de nouveaux parcs (en Arménie, on les appelle les Parcs du Bonheur).

Sur le plan officiel, des inspecteurs sont chargés de la surveillance des pratiques de conservation. De plus, les principes fondamentaux de la conservation de la nature ont été inscrits aux programmes de sciences de toutes les écoles d'URSS.

Nous aimerions ajouter que la Commission d'Education de l'UICN nous apporte une aide efficace en contribuant au développement des échanges d'information sur le plan international.

## **Le Travail Éducatif en Matière de Conservation de la Nature dans les Régions Rurales en Pologne**

TADEUSZ SZCZESNY

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Le travail éducatif dans le domaine de la conservation de la nature devrait être adapté, du point de vue du contenu et des formes, aux problèmes caractéristiques de la conservation propres à la région donnée. De même, il devrait considérer le niveau général du milieu humain où il est effectué.

Dans ce travail entrepris dans les régions rurales, il convient de considérer le fait que les conditions du milieu naturel ont une double importance. D'une part elles déterminent le contenu du travail éducatif et indiquent les problèmes de la conservation les plus essentiels et les plus pressants, d'autre part, les conditions de vie de l'homme influent sur la formation de la conscience des campagnards. Ce dernier facteur décidant du choix des programmes éducatifs et de leur efficacité, c'est là un élément psychologique et sociologique de notre travail méritant une attention particulière.

Les types de paysages des milieux de vie dans les régions rurales par rapport aux espaces industrialisés et urbanisés présentent une prépondérance de paysages naturels, ou de cultures. Ces choses influent respectivement sur la formation de la conscience des habitants des régions urbanisées et rurales. L'homme qui, par sa vie quotidienne et par son travail, est davantage en contact avec la nature, ressent bien plus les attaches naturelles le liant à elle que l'homme élevé dans le milieu citadin, détaché de la nature. Ce facteur influe sur l'efficacité du travail éducatif mené auprès de personnes liées au milieu naturel par leurs conditions de vie.

L'importance de l'action éducative dans le domaine de la conservation de la nature, entreprise au sein de la population rurale, n'est pas limitée uniquement à ces facteurs. La migration de la population des campagnes vers les villes, surtout des personnes jeunes, résulte du développement social général et n'est qu'une conséquence de l'industrialisation du pays. Elle touche chaque année un nombre important de personnes qui élisent définitivement domicile dans les centres urbains. Dans les pays qui développent leur industrie, ce phénomène est caractérisé par une tendance à l'augmentation. La migration des campagnards vers la ville devrait favoriser chez les habitants des villes une prise de conscience et une compréhension approfondies de la nécessité de la conservation des éléments naturels du milieu.

Les problèmes de la conservation de la nature sont largement pris en considération dans les programmes d'enseignement en Pologne, aussi bien dans l'enseignement primaire que secondaire. Certains problèmes particuliers sont soulignés dans les cours de matières telle que la géographie, zoologie et botanique. Les programmes d'enseignement sont les mêmes pour les écoles des villes et de la campagne. Cependant le maître dispose d'une certaine liberté pour la réalisation de ces programmes, grâce à quoi il leur est

possible dans les écoles de la campagne d'insister sur les problèmes caractéristiques de ce milieu. Dans les écoles situées dans les localités à proximité des parcs nationaux ou des réserves naturelles, la connaissance pratique des phénomènes sur le territoire protégé complète l'enseignement théorique en matière de conservation de la nature. Ceci est possible grâce à la facilité avec laquelle des excursions peuvent être organisés dans le cadre des travaux scolaires obligatoires. Les excursions dans les forêts environnantes assurent les mêmes avantages en permettant non seulement de prendre connaissance des éléments protégés de la biocénose comme, par exemple, les espèces rares de plantes ou d'animaux, mais encore des éléments naturels ayant le caractère de monuments de la nature. Pendant ces excursions, la jeunesse devrait apprendre à regarder la nature sous l'angle des rapports écologiques liant tous les éléments de la nature en une unité. Tout cela dépend bien sûr du niveau des connaissances et de la préparation du maître. De telles excursions créent aussi une occasion spéciale pour faire connaître à la jeunesse les problèmes de la conservation des ressources naturelles. Aménagés à côté des écoles, des jardins placés sous la protection des élèves, fournissent un terrain aux travaux pratiques, tels que la culture des plantes protégées, l'alimentation des oiseaux, etc.

Dans le travail éducatif en matière de conservation de la nature, les écoles profitent de l'aide d'une organisation sociale, la Ligue pour la Conservation de la Nature, 'Liga Ochrany Przyrody (LOP)', qui, grâce à l'appui des autorités scolaires, montre une grande activité dans le milieu de la jeunesse. Ce travail est organisé sous forme de cercles scolaires de la Ligue, surveillés par les professeurs de biologie. Nous attachons une grande importance aux effets de cette action. Elle représente un élément d'éducation d'une grande portée, formant la conscience de la jeunesse et son rapport avec la nature.

Les programmes de travaux scolaires des cercles de la conservation de la nature sont établis par les jeunes eux-mêmes, grâce à quoi ils approfondissent leur intérêt pour les problèmes de la conservation de la nature.

Depuis plusieurs années, on organise un concours annuel intitulé 'Le meilleur cercle scolaire de la Ligue pour la conservation de la nature'. Il consiste à apprécier l'ensemble du travail fourni par le cercle. L'appréciation est effectuée par les commissions qui procèdent à l'élimination préliminaire à l'échelle des districts et des *voivodies* (départements). Ce concours, qui jouit d'une forte popularité parmi les jeunes, consacre une grande attention à l'appréciation de l'activité des cercles groupant la jeunesse des écoles situées dans les campagnes et villages. L'appréciation est formulée en considérant les différentes espèces d'écoles.

Actuellement, on a introduit l'appréciation spéciale du travail de ces cercles en faisant une distinction entre 5 groupes d'écoles: I—écoles primaires de la campagne; II—écoles primaires de la ville; III—écoles primaires professionnelles; IV—écoles secondaires professionnelles d'agriculture, d'horticulture, forestières et lycée pédagogiques pour les maîtresses d'écoles maternelles; V—lycées.

Les écoles primaires de la campagne ont été séparées dans les cadres de ce concours depuis l'année en cours. Grâce à cela, l'appréciation du travail de ces élèves et l'analyse de leurs succès seront nettement facilitées.

D'après les conditions locales, les travaux suivants sont soumis à l'appréciation:

—organisation annuellement par les jeunes de la 'Semaine de la Conservation de la Nature' et de 'Jours de la Forêt et du Boisement du Pays';

- participation à la plantation d'arbres et arbustes, au verdissement des terrains scolaires et urbains, à la protection des squares;
- protection du gibier et des oiseaux, construction et entretien des caisses d'incubation ou alimentation des oiseaux;
- organisation d'expositions, d'affiches, de coins de la conservation de la nature;
- organisation d'excursions dans les parcs nationaux, réserves naturelles, protection des monuments de la nature;
- choix des créations de la nature méritant d'être conservées;
- simple observations de la nature.

Plusieurs de ces travaux remplissent le programme d'activité des jeunes des écoles de la campagne.

Le concours précité fournit chaque année un matériel précieux témoignant l'augmentation de la compréhension par la jeunesse de la conservation de la nature, et la concentration de plus en plus grande de l'attention de la jeunesse scolaire rurale sur les problèmes de l'économie des ressources de la nature. De plus en plus fréquemment parmi les problèmes qui intéressent la jeunesse habitant dans les régions où l'économie agraire a la prépondérance nous constatons que le problème de la conservation du sol, de l'eau et de l'air et de sa protection vient en tête, bien que ce problème ne se présente pas avec une telle intensité que dans les régions plus urbanisées et plus industrialisées. Une telle formation de la conscience de la jeunesse des campagnes est un phénomène nettement positif. C'est une garantie que, lorsque cette jeunesse se trouvera dans les conditions du milieu urbanisé et industrialisé, conséquence de la migration vers les villes, elle sera déjà sensibilisée aux problèmes de la conservation des éléments naturels de ce milieu.

Un rôle très utile est assuré par une action d'une grande portée éducative intitulée 'Chaque enfant—ami d'animaux'. Cette action a été initiée il y a 7 ans par la 'Société Polonaise des Chasseurs', et elle est menée de concert avec les autorités scolaires. Depuis deux ans, cette action a été reprise par la Ligue de la Conservation de la Nature et elle est continuée dans les cadres du concours cité précédemment. L'action englobe surtout les travaux ayant trait à l'alimentation du gibier en hiver, et elle exerce une grande influence sur la formation des rapports de l'homme avec la nature en général. Par ce moyen nous inculquons aux enfants et aux jeunes le respect de toute la nature vivante. Il se forme ainsi une attitude bienveillante envers les animaux et une résistance à tous les stimulants négatifs qui pourraient faire naître un penchant au braconnage. Cette action a beaucoup d'importance éducative à une grande échelle car elle réagit contre les effets éthiques des guerres. La jeunesse des campagnes participe activement à la lutte contre le braconnage par les recherches et la liquidation des pièges.

Du point de vue de l'action éducative dans le domaine de la conservation de la nature et des méthodes employées dans ce travail mérite la vulgarisation et la propagande des buts de la conservation parmi les jeunes des écoles secondaires agraires, forestières et d'horticulture, dont les élèves travailleront à la campagne. Les écoles qui préparent les spécialistes de l'agriculture surtout représentent le secteur important de ce travail. Les connaissances obtenues dans les programmes de l'enseignement de la biologie et certaines matières professionnelles sont complétées et approfondies grâce à l'activité des cercles scolaires de la Ligue.

Les élèves de ces écoles dans leur travail ultérieur pratiquent les principes de la conservation de la nature. Lors des concours précités les élèves des écoles d'agriculture obtiennent souvent des prix.

Une grande valeur éducative possède l'action ayant pour but la limitation de l'abattage des jeunes sapins destinés à servir d'arbres de Noël. On diffuse la propagande dans le but de remplacer les arbres naturels par les arbres artificiels ou en matière plastique.

Dans tout le travail d'éducation et de vulgarisation concernant les problèmes de la conservation contemporaine de la nature, entrepris dans le milieu rural, nous nous efforçons de consacrer toute notre attention aux problèmes de la bonne utilisation des ressources de la nature. Cela concerne entre autres une pratique correcte et raisonnable d'effectuer les améliorations des terrains cultivés. On éclaire adéquatement les problèmes de la 'chimisation' des milieux vivants présentement si actuels. Il s'agit de lutter contre l'emploi abusif des herbicides et des pesticides dans l'agriculture, l'horticulture et dans l'économie forestière. Les moyens chimiques employés pour la protection des plantations contre les animaux ou les plantes nuisibles, se révèle très souvent être une arme à double tranchant. On souligne donc la nécessité d'appliquer largement des méthodes biologiques de la protection. Nous essayons de convaincre tous les intéressés que les méthodes chimiques devraient être limitées au strict minimum.

La société de la Jeunesse Rurale participe à notre travail éducatif et organise différents cours de perfectionnement pour ses instructeurs. Dans les programmes de ces cours sont pris en considération les problèmes actuels de la Conservation de la nature. Les publications concernant ces problèmes, éditées par la Ligue pour la Conservation de la Nature et destinées particulièrement aux membres actifs de la Société de la Jeunesse Rurale servent au même but.

Un problème distinct qui, dans d'autres pays, a différents degrés d'actualité, mais qui est particulièrement important en Pologne, c'est le problème de l'augmentation du boisement du pays. La surface boisée de la Pologne, bien que visiblement améliorée après la dernière guerre, représente actuellement 26%, ce que nous considérons comme nettement insuffisant. Pour cette raison, parmi les travaux socialement utiles effectués avec l'idée de la conservation des ressources naturelles du pays, nous considérons comme économiquement important le reboisement de nouveaux terrains. La jeunesse rurale participe aussi à ces travaux. Sa participation forme son estime des effets de son propre labeur.

La fonction des points de vue de l'économie, du paysage, et du climat des forêts est complétée par les boisements effectués au milieu des champs, au bord des rivières, des ruisseaux, des retenues d'eau, des routes, des chemins de fer et des terrains dans les villages. L'introduction du boisement en tant que facteur régularisant du climat local est un problème actuel dans plusieurs pays et surtout là, où l'on observe le phénomène de l'évolution vers le climat de la steppe ou désertique à la suite de l'émaciation des forêts. A l'occasion du Millénaire de l'existence de l'état polonais, on a entrepris une action sociale générale, visant à compléter le boisement par la plantation en six ans de 100 millions d'arbres et 60 millions d'arbustes. Ce plan a été réalisé, mais l'action du boisement du pays continue. Les jeunes et les adultes habitant la campagne y participent en masse.

Le travail éducatif mené avec l'idée de la conservation de la nature est également sous d'autres formes parme les adultes habitants de la campagne. Dans les cadres des 'Universités Populaires' qui existe en Pologne au nombre de

neuf, on organise des actions spéciales comprenant les cours donnés par les instructeurs de la conservation de la nature et consacrés aux sujets choisis, comme par exemple le boisement du pays, les méthodes biologiques dans la protection des cultures, les parcs nationaux, la protection des animaux, etc. A la fin de cette action, on choisit les ensembles se distinguant par la meilleure connaissance du sujet et on leur accorde des prix.

L'un des éléments du travail éducatif dans le domaine de la conservation de la nature effectué en Pologne dans les régions rurales est le boisement des terrains des villages. On le réalise sous le titre de 'boisement complexe des villages' et il y a à la base des plans élaborés par les spécialistes. Les travaux du boisement jouissent de l'appui du Ministère des Forêts et de l'Industrie du Bois, du Ministère de l'Agriculture ainsi que de la Société des Travailleurs Agricoles.

Il faut encore mentionner que dans l'une des *voivodies* (départements) on a organisé un concours très intéressant pour le 'village le mieux boisé'.

L'action du boisement du pays constitue une excellente occasion de mettre en valeur l'importance économique et le rôle des arbres et du boisement en tant que facteur façonnant les traits caractéristiques du paysage.

Dans l'action éducative menée à la campagne nous avons incorporé le problème de la protection des parcs ruraux constituant les alentours des résidences des anciens propriétaires. Dans les conditions de l'économie agraire réformée, ces parcs constituent le bien culturel de toute la communauté et sont considérés comme le précieux élément naturel dans le paysage campagnard qui est de plus en plus menacé par l'expansion de l'industrie et de l'urbanisation.

En présentant les formes de notre travail éducatif en matière de la conservation de la nature dans les régions rurales, appliquées en Pologne, nous reconnaissons bien qu'elles ne sont pas parfaites. Les effets positifs, que nous obtenons, dépendent des conditions locales et d'autres circonstances, mentionnées au commencement de ce rapport. Pour cette raison, on pourrait considérer nos renseignements seulement en tant qu'une contribution à la méthodologie de notre travail éducatif qui, à cause de ses buts composés, doit être différencié, presque comme la richesse de la personnalité de l'homme.

Les recommandations de la Conférence mondiale de la biosphère, convoquée à Paris du 4-13 septembre 1968 concernant l'homme et la biosphère, nous obligent à améliorer les méthodes de notre travail, en prenant en considération l'extension continue de la connaissance des principes écologiques de la conservation du milieu naturel pour assurer une voie vers l'éducation mésologique.

## RÉSUMÉ

Le travail éducatif dans le domaine de la conservation de la nature devrait considérer le niveau général du milieu humain où il est effectué.

Le rapport envers la nature des paysans diffère de celui des citoyens. Un facteur important qu'on doit considérer est la migration des campagnards vers les villes.

Les problèmes de la conservation de la nature sont largement pris en considération dans les programmes d'enseignement et d'éducation en Pologne.

Ils sont soulignés dans les programmes d'enseignement de cours de la géographie, zoologie et botanique dans les écoles primaires et secondaires. Dans les écoles rurales l'enseignement théorique est complété par les exercices pratiques surtout dans les régions protégées.

L'organisation sociale 'Ligue pour la Conservation de la nature' (Liga Ochrony Przyrody) organise et supporte le travail extrascolaire. On a créé beaucoup de cercles scolaires de la Ligue. Ces cercles participent au concours annuel intitulé 'Le meilleur cercle scolaire de la Ligue'. L'appréciation considère les différentes espèces d'écoles et elle distingue les cercles des écoles de la campagne de ceux de villes. Les résultats de ce concours prouvent l'augmentation de la compréhension de la jeunesse rurale des ressources naturelles.

La 'Société Polonaise des Chasseurs' organise depuis 7 ans une action intitulée, 'Chaque enfant—ami d'animaux'. Cette action est reprise par la Ligue.

La vulgarisation et la propagande des buts de la conservation de la nature est souligné aussi dans des écoles secondaires qui préparent les spécialistes de l'agriculture, d'horticulture et des forestiers. On s'efforce de consacrer l'attention aux problèmes de la bonne utilisation des ressources de la nature.

La Société de la Jeunesse Rurale organise différents cours de perfectionnement pour ses instructeurs.

On apporte des soins à la réforestation du pays, qui est particulièrement importante en Pologne. La jeunesse rural participe à ces travaux.

Le travail éducatif pour la conservation de la nature parmi les adultes est mené dans les 'Universités Populaires'.

On a développé dans les régions rurales une action pour le boisement des terrains des villages. Ces travaux jouissent de l'appui du Ministère des Forêts et de l'Industrie du Bois, du Ministère de l'Agriculture ainsi que de la Société des Travailleurs Agricoles.

On sait que les formes du travail éducatif en conservation de la nature en Pologne ne sont pas parfaites. Ainsi il est possible de considérer ces enseignements en tant qu'une contribution à la méthodologie de travail éducatif.

Les recommandations de la Conférence mondiale de la Biosphère à Paris en 1968 obligent à améliorer les méthodes du travail.

## SUMMARY

Nature conservation education should take into account the general state of development of the human environment to which it is applied.

The relationship between country people and nature differs from that of townspeople. The migration of the rural population to towns and cities is an important factor which should be duly considered.

In Poland, nature conservation problems are generally included in the educational and teaching syllabuses. These are emphasized in the geography, zoology and botany programmes of primary and secondary schools. In rural schools, theoretical teaching is supported by practical classes in the field and especially in protected areas.

The 'League for the Conservation of Nature' (Liga Ochrony Przyrody) organizes and sponsors out-of-school work and has also founded a number of school clubs. These clubs take part in an annual competition for the 'Best School Club of the League'. The prizes are awarded according to the type of school and distinguish between town and country schools. The results of this annual competition show an increasing awareness among rural youth of natural resources problems.

The Polish Hunting Society has organized for seven years a campaign entitled 'Every Child is a Friend of Animals', which has also been taken up by the League.

Popularization and diffusion of nature conservation aims is also emphasized in secondary schools which train specialists for agriculture, horticulture and forestry. The rational utilization of natural resources is particularly stressed.

The Rural Youth Association has instituted various courses for its educators.

Great attention is paid to the reforestation of the country, a particularly important problem in Poland. Rural youth also takes part in this work.

Nature conservation education for adults is provided in the Peoples' Universities.

In rural districts, a campaign for the reforestation of village common lands has been undertaken. This is supported by the Ministry of Forestry and Wood Industry, the Ministry of Agriculture and by the Agricultural Labourers' Association.

It is recognized that the different forms of conservation education in Poland are far from perfect. However, the information given in this paper should contribute to the improvement of educational work methods, as was recommended by the World Biosphere Conference held in Paris in 1968.

## **Conservation Education of the Rural Population by the Nature Conservancy in the German Democratic Republic**

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At the 'Workshop' of the Commission on Education of IUCN, held in Lucerne in 1966, I was given the opportunity to report on the 'Nature Conservation Education in the German Democratic Republic'. My report was dealing mainly with the questions concerning conservation education at colleges and the university level.

Since then, a special East-Europe Committee of the Commission on Education has been established. In October 1968, in Berlin and at the Central School for Nature Conservation's 'Muritzhof, belonging to the Institute for Research in Geographical Regions and Conservation of Nature in Halle, members of the East-Europe Committee, guests from other countries and Mr. E. J. H. Berwick, IUCN's Secretary-General, had the opportunity to see that strenuous efforts are made in the German Democratic Republic for disseminating ideas on nature conservation and wise use of natural resources.

A comprehensive law on conservation and rational use of all natural resources of the country (soil, area, water, air, fauna and flora, forests, recreation areas, disposal of industrial and municipal waste products, etc.) is presently under discussion and will probably be enacted during 1969. This law will go far beyond the spheres of our present legislation which controls nature conservation in a narrower sense. This law will regulate the systematic development of healthy and fully exploited cultivated areas and regions within a densely populated socialist industrial state. Concern for the conservation of natural resources, riches and beautiful landscapes (natural monuments, reserves, protected animals and plants) is duly considered.

The new law is based on article 15 of our new constitution which came in force after the plebiscite in April 1968. The constitution says in this article that 'The state and society are responsible for the protection and conservation of nature in the interest and for the welfare of its citizens. The keeping clean of waters and the air, and the conservation of fauna and flora and of the beautiful landscapes of our country, have to be assured by the responsible authorities, and are furthermore the obligation and duty of every citizen.' Such a clear obligation has never before been laid down in any German constitution.

The organization with regard to nature conservation in our Republic is as follows:

Practical work concerning nature conservation is carried out by official, scientific and cultural organizations:

1. The administration of nature conservation, i.e. the state organizations responsible for nature conservation. The Central Administration for Nature Conservation in the State Committee for Forestry is responsible

for the sovereign and territorial rights. The County Nature Conservation Administrations are active at the county council level and equivalent administrations are cooperating with district and community councils. It is the task of all these administrative bodies to promulgate and explain the national task of nature conservation, to see that the regulations on nature conservation are observed, and to act as a link between other administrative bodies and the mass organizations.

2. Nature conservation consultation in counties, districts and communities is effectively carried out by unpaid personnel placed in charge. Appointed by the respective authorities, they assist the nature conservation administrative bodies in their work regarding the promotion and popularization of nature conservation and in controlling the observation of the regulations concerning nature conservation. The ideological and professional training of persons placed in charge of nature conservation is carried out by the Institute for Research in Geographical Regions and Conservation of Nature, Halle (Saale), of the German Academy for Agricultural Science. Furthermore it is the task of this institute to cooperate closely with the Central and the County Administrations for Nature Conservation, to coordinate scientific work in the field of nature conservation and to keep connections and relations with foreign and international nature conservation institutes and organizations.
3. The cultural organization is indispensable for carrying out effectively the conservation of nature. The 'Friends of Nature' of the German League of Culture were of great assistance in working out the State Cultivation law, and the work of nature conservation in the German Democratic Republic is hardly possible without the aid and assistance of thousands of these Friends.

These three bodies carrying out the work of nature conservations, the administrative, the scientific consultative and the cultural organizations, are also closely connected with each other. A great number of persons placed in charge of nature conservation, co-workers in the nature conservation administrations and in the Institute for Research in Geographical Regions and Conservation of Nature, are active among the Friends of Nature. Mutual contact between the three bodies is thus greatly strengthened.

Problems regarding conservation education and dissemination of conservation ideas are also solved in close cooperation. A number of excellent results have been achieved in this way during recent years. We are aware of the fact, however, that the possibilities are still far from having been fully utilized.

An intensive publicity campaign for the education of the general public is undertaken every year in May during the 'Forest Week' and the 'Nature Conservation Week', by means of press conferences, public addresses and speeches of ministers and other high party and state officials, film matinées, radio and television interviews, publications and articles in newspapers, public excursions, lectures, special postage stamps and postmarks with topics and subjects concerning nature conservation, posters, nature conservation exhibitions (for instance in museums, fair pavilions, railway stations, shop-windows, etc.). Compared with rural communities, such cultural events can easier be arranged by organizations in cities due to the fact that the number of active experts is much greater there because of the greater population and consequently higher concentration of educational and cultural establishments in cities. On the other hand, more and more so-called 'village academies' or 'qualification centres', modern club houses and similar establishments, are being created in

our villages with the rapid development of large-scale technology and industrialized production in agriculture. The nature conservation authorities and popular scientific organizations in these villages are utilizing all possibilities and means mentioned above for Training and education of adults and young people in the field of nature conservation.

In addition to in-school conservation education—we have compulsory education lasting for 10 years—, which at the moment is initiated in modern central schools attended by pupils drawn from several villages, we also pay great attention to out-of-school education in nature conservation. The education of youth for better understanding of nature and thus for the love of their country and for patriotism laid down in the Law for Youth of 1964 and in the decree of the State Council of the German Democratic Republic 'Youth and Socialism', dated March 1967, is our special concern.

Groups interested in nature conservation are also established in many country schools by the Young Pioneers' Organization. Groups specializing in forestry, bird protection, game preservation are also active. Nature conservation has become either the main concern of such groups or forms a basic principle. Thus their typical activities include the building and taking care of nest-boxes for birds, planting of woods for bird protection, reforestation of waste and barren land, collecting of fruit for winter feeding, etc.

Stations established by the Young Pioneers' Organization for young naturalists have developed themselves under favourable guidance into centres of active nature conservation amongst the school children. Minor research projects are carried out and observations pertaining to natural science and the protection of sites are included in their programme. Numerous nature-trails have been developed by young naturalists who take care of them.

Pupils and Young Pioneers in special camps are trained in practical conservation work. No doubt they will become in future assistants and cooperative experts in nature conservation. Biology 'Olympic games,' prize competitions and quizzes in holiday camps under the slogan 'Protect our country' have proved to be very effective.

Education of the country population in ecological understanding of nature is now of greatest importance. The agriculture of our Republic is developing systematically into a highly industrialized production. The aim is to increase productivity and crops by improving the fertility of the soils. Industrialized production in agriculture requires the use of modern machinery and chemical products. Highly mechanized and partially automatic farming and cultivation implements require, however, large units of land or fields, which should be as uniform as possible in regard to structure, type of land and soil conditions, which means the homogenization of arable land. Our farm land will, therefore, be reformed and remodelled within the next few years by extensive field-system improvements. People engaged in agriculture, and especially in this improvement work are for this reason, and in cooperation with the representatives of territorial and landscape planning and nature conservation bodies, looking for the best ways to effect the necessary reorganization of rural areas in such a way as to harmonize the development of long-term productivity with the maintenance of natural treasures. It is the task of this land reorganization to obtain maximum use of the entire territory under consideration, consonant with all social and economic requirements (secondary exploitation). Only a few comparable experiences gained in other countries are so far available with regard to large-scale reorganization of densely populated and highly cultivated areas. The creation of huge tracts set aside exclusively for

intensive agricultural production, as has been done in the USSR or the USA, is not possible in the particular conditions applying to our country. Only sensible multi-purpose use of our territory will solve the problem, which implies that one has to decide carefully on the main function that a certain area has to fulfil now and in future. All secondary utilizations have to be adjusted to the economically important main function.

Economic measures in any particular region always have to be harmonized and adjusted to requirements for recreation, so that when a region is to be developed the particular recreation characteristic of such region will be maintained and promoted. This does not exclude rationalization measures which fall within scope of development for agricultural use. As an example, I might mention the extensive and complex land improvements (affecting the field systems and the relief, including removal of stones and rocks from the surface soil, irrigation and draining, building of roads, etc.) carried out in the region of Waren-Robel. In planning the necessary works it has been decided that the nature reserve 'Muritz-Seenpark' around the Muritzsee and the adjacent wooded Kleinseenplatte will develop into one of the most important recreation areas in the GDR. The diversified and beautiful recreation scenery of the Muritz is especially characterized by century-old oak trees which have grown individually or in groups around the *Sölle* (little lakes). Felling of these trees is only permitted where it is absolutely necessary, because they have been classified not as obstructions to cultivation but rather as a characteristic feature of the landscape in this recreation area.

In case of fertile loess regions, on the other hand, in which it has been decided that the main function will be intensive agricultural use, it is possible to achieve a high degree of mechanization and automation by applying large-scale agricultural and land-reform systems based on 200-400 ha fields. Nevertheless it has been laid down that even in these areas community centres must provide for the secondary function of recreation, which means that gardens and parks have to be established and maintained or cultivated.

The authorities of our Republic engaged in nature conservation are therefore, doing their very best to educate the rural population, co-operative farmers and all land-reform and land improvement workers and planners, so that reorganization of the countryside is carried out by people who will consider it their bounden duty to safeguard beautiful regions and landscapes of their native land.

## SUMMARY

In the German Democratic Republic, a new comprehensive law on the conservation and rational use of all natural resources of the country is presently under discussion and will probably be enacted by the end of 1969. It is based on article 15 of the new 1968 constitution which says, for the first time in any German constitution, that 'The State and society are responsible for the protection and conservation of nature'.

The organization of practical conservation work in GDR is briefly reviewed. This leads to a consideration of conservation education, which seems to be much more easily provided in the cities. On the other hand the activities of 'village academies', club houses and similar establishments in the countryside are playing an increasing role. Great attention is paid to out-of-school education and youth activities.

The education of the rural population towards an ecological understanding of nature has now become of the greatest importance, since the agriculture of the German Democratic Republic is being systematically developed into a highly industrialized process. With the use of modern machinery and chemical products, farm land will be reformed and reorganized within the next few years by extensive field improvements. The nature conservancy authorities in GDR are therefore doing their very best to educate the rural population, cooperative farmers and all land-reform and land-improvement workers and planners, so that the reorganization of the countryside is carried out by people who will consider it their bounden duty to safeguard beautiful regions and landscapes.

## RÉSUMÉ

En République Démocratique Allemande, une nouvelle loi concernant la conservation et l'utilisation rationnelle de toutes les ressources naturelles du pays fait actuellement l'objet d'un débat et passera probablement dans le courant de l'année 1969. Cette loi est fondée sur l'article 15 de la nouvelle constitution de 1968, qui pour la première fois dans l'histoire des constitutions allemandes dit que 'l'État et la Société sont responsables de la protection et de la conservation de la nature.'

Une analyse rapide de l'organisation du travail pratique dans le domaine de la conservation est ensuite présentée.

L'éducation du public en matière de conservation de la nature semble pouvoir être assurée plus facilement dans les villes. D'autre part, les activités des 'académies villageoises', clubs et autres organisations du même genre jouent un rôle croissant dans ce domaine. En outre, on accorde une grande importance à l'éducation et aux activités extra-scolaires de la jeunesse.

Il est maintenant essentiel de donner aux populations rurales des connaissances en matière d'écologie du milieu naturel, car de plus en plus l'agriculture de la RDA tend à devenir une forme d'exploitation hautement industrialisée. Avec l'emploi des machinisme agricole moderne et des produits chimiques, on assistera dans les années à venir à une réforme et une refonte des terres à vocation agricole. En conséquence, les autorités responsables de la conservation de la nature en RDA portent tous leurs efforts sur l'éducation des populations rurales, agriculteurs et des agronomes, afin que la réorganisation des territoires et zones agricoles soit effectuée par des gens qui tiennent pour leur devoir de sauvegarder la beauté des paysages de leur patrie.

## Section 4: THE AMERICAS

### REPORT OF THE PROCEEDINGS

Reopening the Session after the interval, the Chairman called first on Prof. Dr. Michel Maldague (Canada) to introduce his paper entitled *Education en conservation de la nature au Quebec*.

Professor Maldague's presentation was followed by that of Professor Arturo Eichler (Venezuela) of his paper on *Conservation Education and Extension in Tropical Rural America, with special reference to Venezuela*.

The Chairman expressed great regret that the author of the third contribution in this group of papers, Mr. Wayne Miller (U.S.A.) had been unable to attend the Session and he drew the attention of participants to Mr. Miller's paper on *Environmental Education in relation to National Parks and Rural Education in an Urbanizing Culture*, which had been distributed in Cyclostyled form and would be published in the Proceedings. He then opened the meeting to discussion of the American contributions.

Dr. Maria Buchinger asked leave to present a written comment on Professor Eichler's paper, which had been submitted because of the writer having been called away to other business.

*Ing. Italo N. Costantino* (Member, IUCN Executive Board: Joaquin V. Gonzales 446, Buenos Aires, Argentina): We are sorry that Professor Eichler did not verify the remarks of his Argentinian correspondent, because he would have found that there is in fact a *Licenciatura Sobre Conservacion de los Recursos Naturales Renovables* in the Facultad de Ciencias Naturales of the University of la Plata, and also that conservation as a subject is taught in the Faculty of Forestry of the same university, in the Faculty of Forestry of the University of Buenos Aires, the Faculty of Natural Sciences of the University of Cordoba and the Faculty of Natural Sciences of the University of the South—to mention but a few. Moreover, in teacher training courses, conservation is included in the curricula at all grades in several subjects.

*Dr. Maria Buchinger* (Executive Secretary, Latin American Committee of IUCN's International Commission on National Parks, 1101 New Hampshire Ave. N.W. 410, Washington D.C. 20037, U.S.A.): I would like to contribute an example of how good conservation teaching can influence decisions of a government. In Nicaragua, fifth grade students of the Instituto Nacional Central Ramirez Goyena prepared, for the Third National Science Fair, a project to maintain a certain area as a combined Forest Reserve and 'Chiltepe National Park.' They asked the Forest Service of the Department of Agriculture for data, advice and other assistance. The mutual cooperation resulted in two happy endings: the project was awarded first prize and, secondly, members of the Forest Service became so enthusiastic about the project that measures are now being taken to implement it in reality. As a matter of fact the Nicaraguan authorities have asked ICNP's Latin American Committee to give them technical help to establish a network of national parks. I have photographs of the project and aerial photographs of the region, available, as well as the text of the project as prepared by the students, which those who are interested can look at and judge the achievement for themselves.

May I add that a good way to spread conservation education has been recommended by Dr. Cespedes, Director of the Department for Education of the

Pan-American Union. He suggested that primary school teachers should have conservation included in their routine summer training programmes. This is already done in Costa Rica, Colombia, Panama, and Peru. Teachers in small communities influence not only their students but, through them, also the parents.

*Mr. U.I.Dave* (Ministry of Education, Nairobi, Kenya): From experience gained over ten years, I believe conservation education is essential. But we are continually being asked by educationalists and others—Why is this type of education necessary? Will this kind of education prepare the pupil to earn a living? To this we have no answer. Teachers have to teach other subjects too, and often we come across competition between subjects and arguments put forward about the ultimate value of different subjects to the individual in terms of finding a job. High priority should be given to educating parents in these matters. It is also essential that officials in all the departments are thoroughly briefed and informed of the aims of the educationalists. Finally, there should be the closest relationship between sociologists and anthropologists so that before the issues are presented to a certain community the likes and dislikes of that community are known to the educationalists. Very often, too, it is wrongly assumed that because a community does not know the scientific or English name of a plant or animal it is not 'conservation minded' and no trouble is taken to find out whether it has its own name for a species. I hope that in future much more effort will be made to discover the complete social background of a community before instituting any programme in conservation education.

*Mr. Sheldon R. Severinghaus* (3761 Park Avenue, Coconut Grove, Florida, U.S.A.): One universal educational problem in every country is that there are always those who get no education. They do not attend school. The percentage of such people varies, of course, from country to country. Furthermore, it is so often these very people who live in rural areas and who are most intimately related to conservation problems. Just how do we educate this group of people to enlist their support and understanding for conservation?

*Mr. Thomas L. Kimball* (U.S.A.): The principal problem of conservation education revolves around disseminating knowledge and information about nature conservation to the community, particularly to the youth. In this objective the private organization can, and should, play a prominent part. In the U.S.A. the part played by the National Wildlife Federation is described in my supplementary note to this group of papers. Unless we can inform and educate the majority of the citizens in our conservation problems we cannot hope to have any influence on basic decisions, made by government and industry, which greatly affect the quality of our environment. The National Wildlife Federation recently engaged a public opinion survey organization which found that 4 out of 5 citizens in the U.S.A. are either deeply concerned or somewhat concerned about the deterioration of the quality of the U.S. environment. What was even more significant was that 3 out of 4 people were willing to pay something in addition to their normal tax burdens to improve environmental quality. It was not until we had this overwhelming public understanding and support that progress has been made in conserving nature in America. Private conservation and educational organizations have had an important role in developing this public understanding which I hope can be duplicated in other nations.

*Mr. R.J. Maclachlan* (The Nature Conservation Council and National Parks Authority of New Zealand and Director General Lands and Survey Department, P.O. Box 8003, Wellington, New Zealand): As another method of stimulating

youth interest and participation, the Boy Scouts Association in New Zealand this year sponsored a Conservation Week which was actively supported financially and otherwise by the Government. It was aimed at interesting children in conservation and a booklet 'This precious land' set out simply the various aspects of conservation. A lapel badge was issued to children subscribing to a pledge which read—'I give my pledge as a New Zealander to save and to defend from waste the natural resources of my country—its soil and minerals, its forests, waters and wildlife'. The Nature Conservation Council has decided to have a Conservation Week on an annual basis.

After thanking all those who had spoken the Chairman then closed the discussion on the group of papers in Section 4.

## Education en Conservation de la Nature au Québec

DR. MICHEL MALDAGUE

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### 1. INTRODUCTION

Le territoire du Québec est vaste, couvrant près de 600, 000 milles carrés (1, 500, 000 km<sup>2</sup>) et riche en ressources naturelles renouvelables. Cette grande superficie ainsi que la faible densité de population (10 habitants/mille carré; 3. 8/km<sup>2</sup>) constituent des facteurs qui ont contribué à préserver une importante partie des équilibres naturels. Le couvert forestier atteint 58% de la superficie, soit 350, 000 milles carrés (906, 000 km<sup>2</sup>); le réseau hydrographique représente 12% du territoire. Le gros gibier est encore, dans l'ensemble, abondant; la population d'Orignaux (*Alces alces americana*/Clmton) est estimée à quelque 70, 000 têtes, celle des Caribous (*Rangifer tarandus*/Linné) à 90, 000; le Cerf de Virginie (*Odocoileus virginianus* Boddaert) est un autre Cervidæ bien représenté.

Ici, comme ailleurs, ces ressources ne sont cependant pas à l'abri des dégradations et des pollutions.

On s'accorde d'autre part généralement sur le fait qu'il n'y a pas grand chose à attendre des mesures de conservation des milieux naturels et des ressources renouvelables, si une action n'est pas simultanément entreprise sur le plan éducatif. Ce qu'il convient de tenter, à défaut de pouvoir éveiller la conscience, c'est de créer des réflexes et des habitudes qui seront des garanties d'un comportement approprié vis-à-vis de la nature.

Considérant des perspectives à moyen et à long terme, il apparaît clairement que c'est au niveau de l'éducation des jeunes qu'il faut entreprendre une action concertée.

L'importance à accorder à la biologie et la nécessité d'introduire dans les programmes d'enseignement des cours de Conservation de la nature et de ses ressources devraient être considérés par les responsables de l'éducation et de la culture avec la plus grande attention. Le Professeur Duvigneaud disait au Colloque de l'O.C.D.E., en 1962: 'Son importance (N.D.L.R.: l'importance de l'écologie) est telle que son enseignement ne doit pas être pris à la légère... L'intérêt de l'enseignement de l'écologie est qu'elle inculque aux hommes une façon de penser qui est le respect des choses et des êtres qui les entourent'.

Afin de connaître la situation de l'éducation en conservation de la nature au Québec, nous avons entrepris, en 1969, une enquête par sondage, dans les écoles de la Province. C'est une partie des résultats, concernant les niveaux pré-élémentaire et élémentaire, qui sera exposée dans la présente communication. Il est en effet nécessaire de disposer de bases solides et précises avant de pouvoir proposer l'amélioration d'une situation dont on peut soupçonner la faiblesse.

A l'occasion d'une enquête, effectuée dans la région de Québec, en 1968, sur la récréation dans la nature (Maldague et Lindeckert, 1968), nous avons observé

que le grand public estime: (1) que l'éducation des enfants aux choses de la nature est utile (96% de réponses positives), (2) que la conservation de la nature est l'affaire de tout le monde et pas seulement des spécialistes (99% de réponses +), (3) que la conservation de la nature doit être enseignée dans les écoles (98% de réponses +).

## **2. METHODOLOGIE**

Nous ne nous étendrons pas sur la méthodologie de l'enquête, celle-ci ayant été développée dans un numéro de 'Newsletter', Bulletin de la Commission d'Education de l'UICN.

Nous insisterons cependant sur quelques aspects essentiels. Afin d'obtenir des données permettant de juger de l'enseignement dans le domaine considéré, il va de soi que l'interrogation directe des maîtres sur la 'Conservation de la nature', le 'milieu naturel', les 'ressources naturelles', n'aurait pas permis d'obtenir des données satisfaisantes par suite de l'imprécision des questions et du caractère complexe de l'objet de telles questions. Il suffit de penser aux significations diverses qui sont données à ces termes, pour s'apercevoir qu'il convient de procéder par une voie détournée. Celle-ci consiste à faire appel à une méthode basée sur des 'centres d'intérêt' (CI).

### **Centres d'intérêt**

Des questionnaires comprenant 46 CI ont été mis au point; la liste de ces CI se trouve en annexe. Les centres d'intérêt concernent les ressources naturelles, les milieux, les phénomènes naturels, la pollution, les sciences naturelles ainsi que des activités apparentées; le maître, ayant sous les yeux une liste, où les CI se trouvent classés par groupes, n'a plus qu'à se rappeler s'il a été question en classe, au cours de l'année, de l'un quelconque des CI considérés.

### **Intensité accordée à l'information**

Nous devons connaître également l'intensité avec laquelle cette information est donnée. Le critère 'temps' s'avère d'application difficile et n'a pas été retenu. On s'est adressé à une échelle d'intensité comportant 3 niveaux. Il peut arriver en effet, qu'à l'occasion d'un événement d'importance majeure, un maître décide de donner quelques informations à ses élèves, se limitant peut être à souligner l'événement; prenons comme exemple la catastrophe du 'Torrey Canyon', qui peut être l'occasion de sensibiliser les élèves à la question de la pollution des eaux. A côté d'informations de ce type, dites occasionnelles, on peut avoir le cas de centres d'intérêt qui reçoivent une plus grande attention, tel serait p.ex. le cas d'une classe où l'on demanderait aux élèves de réaliser eux-mêmes quelques plantations afin d'observer la croissance des plantes.

Les 3 niveaux d'intensité sont: (1) enseignement occasionnel, (2) développement de la notion, (3) enseignement structuré.

### **Manière de donner l'information**

Reste à connaître, à côté de la nature de l'information et de l'intensité avec laquelle elle est donnée, la manière par laquelle elle parvient aux élèves; cet aspect est important à explorer à une époque où l'utilisation de techniques audio-visuelles ne cesse de prendre de l'extension. Nous avons prévu les

9 moyens suivants: (1) leçons traditionnelles, (2) recherches par les élèves, (3) travaux imposés aux élèves, (4) observations personnelles, (5) ateliers, (6) sorties dans le milieu, (7) techniques audio-visuelles, (8) activité occasionnelle, (9) télévision éducative.

### 3. RESULTATS

#### Dimensions de l'enquête

L'enquête a porté sur 772 classes, comportant en moyenne 27 élèves, soit sur une population globale de 21, 000 élèves. La répartition des classes par année de cours, ainsi que l'âge moyen par classe figure dans le tableau I.

TABLEAU I. Répartition des classes et âge moyen par année de cours.

Année	Age moyen	Nombre de classes
Maternelle (Mat.)	5 ans	62
1 <sup>e</sup>	6 ans	96
2 <sup>e</sup>	7 ans	103
3 <sup>e</sup>	8 ans	104
4 <sup>e</sup>	9 ans	101
5 <sup>e</sup>	10 ans	109
6 <sup>e</sup>	11 ans	101
7 <sup>e</sup>	12 ans	96
Total: 772		

Parmi ces classes, 79. 5% sont mixtes, 12. 9% sont des classes de filles et 7. 6% des classes de garçons.

#### Étude des centres d'intérêt

Les 46 centres d'intérêt ont été répartis en 5 groupes, comme suit: groupe I: explications de phénomènes naturels; groupe H: ressources naturelles; groupe III: végétation; groupe IV: faune; groupe V: activités diverses. Les tableaux II à VI, correspondant aux 5 groupes, donnent, pour chaque année, le nombre de classes où il a été question de CI considéré (voir les colonnes 'O') et celles où il n'en a pas été question (voir les colonnes 'N'), ainsi que les pourcentages correspondants.

Nous synthétisons dans le tableau VII l'ensemble des résultats pour les 5 groupes.

On observe que c'est le groupe I qui fait le plus l'objet de l'enseignement; 70. 7% des classes ont eu des activités touchant les centres d'intérêt de ce groupe; il est suivi par le groupe II (58. 8%), où l'on peut encore dégager un intérêt marqué; moins d'attention est accordée au groupe IV (50.1%) et surtout au groupe III (40. 6%). Quant aux activités diverses concernant les ressources ou l'histoire naturelle, elles sont manifestement délaissées; c'est le cas du groupe V, où 22. 8% des classes seulement ont de telles activités.

Nous examinons dans le tableau VIII la situation des 9 activités dont les indices sont les plus élevés (voir plus loin).

### **Importance relative des centres d'intérêt**

Il importe à présent de connaître quels sont, parmi les 46 CI, ceux qui reçoivent le plus d'attention. Nous avons dressé pour cela les tableaux IX à XIII, correspondant aux groupes I à V, où les centres d'intérêt sont classés par ordre décroissant de leur indice. Nous rappelons, au bas de chacun de ces tableaux, l'importance accordée au groupe considéré globalement (Cf. tableau VII). Ce classement permet de saisir immédiatement l'importance relative des thèmes examinés au cours de l'année. C'est ainsi que dans le groupe I (Tableau IX), ce sont les 'saisons' qui viennent en tête, dans le groupe II (Tableau X), les 'cours d'eau', dans le groupe III (Tableau XI), 'l'étude des arbres', dans le groupe IV (Tableau XII), 'l'étude des animaux' et dans le groupe V (Tableau XIII), la réalisation d'expositions sur la nature.

De plus, afin d'obtenir une vue d'ensemble de la position relative des 46 CI, dans les différentes années d'étude, nous avons préparé le tableau XIV; dans chaque colonne figurent le numéro du CI, d'après le questionnaire ainsi que l'indice.\*

Nous donnons dans le tableau XV, la liste des dix premiers centres d'intérêt de chaque année d'étude ainsi que leur fréquence pour l'ensemble des années d'étude du niveau scolaire considéré. Trois CI, se détachent tout spécialement, arrivant dans les 10 premiers, pour chaque année d'étude (fréquence 9); ce sont l'étude des animaux (CI No 27; indice général: 100. 0), 'l'étude des arbres' (CI No 16; ind. gén.: 80. 7) et les 'saisons' (CI No 6; ind. gén.: 91. 9). Quatre centres d'intérêt ont une fréquence de 8: la 'formation des précipitations' (CI No 1; ind. gén.: 81. 7), les 'poissons du Québec' (CI No 29; ind. gén.: 66.8), 'l'observation de la température' (CI No 2; ind. gén.: 71. 1) et les 'cours d'eau' (CI No 7; ind. gén.: 58. 8). Trois ont une fréquence de 7: les 'moeurs des animaux' (CI No 32; ind. gén.: 72. 0), 'l'air et le vent' (CI No 9; ind. gén.: 63. 2), l'étude du 'relief' (CI No 11; ind. gén.: 78. 8).

Compte tenu de ce que l'examen des divers centres d'intérêt dépend quasi exclusivement de l'initiative des maîtres, il ne faut pas s'étonner des choix—très homogènes—qui sont faits; on remarque en effet que les 10 sujets les plus communément et fréquemment abordés concernent soit des ressources auxquelles il est facile d'intéresser les élèves (les animaux terrestres, les poissons, les arbres, les montagnes, les cours d'eau), soit des phénomènes naturels dont chacun, si jeune soit-il, possède une certaine connaissance (les précipitations atmosphériques, la température, l'air et le vent).

Quant aux centres d'intérêt, plus directement rattachés à la conservation de la nature et de ses ressources, tels que la pollution des eaux (CI No 8), la pollution de l'air (CI No 10), le respect des paysages (CI No 13), la beauté de l'habitat urbain (CI No 14), le respect des milieux naturels (CI No 15), la protection des arbres (CI No 17), la protection contre les incendies de forêt (CI No 19), la protection de la faune (CI No 31), ils ne reçoivent qu'une attention beaucoup plus faible, comme le montre le tableau XVI.

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\* L'indice pour un CI. donné est calculé, à partir du pourcentage de l'indice dans le groupe, après un changement d'échelle, en ramenant à la base 100 le pourcentage le plus élevé obtenu pour le groupe. Dans le tableau XIV, l'indice est calculé par rapport à l'ensemble des 46 CI.; c'est l'indice général.

Une homogénéité assez grande apparaît à nouveau dans le classement des dix derniers centres d'intérêt, comme le montre le tableau XVII; c'est le cas notamment de 9 centres d'intérêt dont la fréquence va de 7 à 9.

### **Intensité de l'information donnée**

Les 3 chiffres suivant résument très bien cet aspect de l'enquête; ils sont calculés pour l'ensemble des années d'étude et l'ensemble des centres d'intérêt:

enseignement occasionnel: 71. 58%

développement de la notion: 19. 32%

enseignement structuré: 9. 10%

Pour les 10 centres d'intérêt auxquels le plus d'attention est accordée, l'analyse du critère d'intensité conduit aux résultats du tableau XVII. On observe que ces dix centres d'intérêt font l'objet d'une information plus poussée; ceci est surtout le cas pour le niveau intermédiaire d'intensité (i.e. développement de la notion) qui atteint, pour ces matières, 28. 24%, alors que le % moyen est de 19. 32%.

### **Manière de donner l'information**

Nous donnons dans le tableau XIX, la manière choisie pour transmettre l'information aux élèves; nous nous limitons au cas des centres d'intérêt les plus étudiés. On observe que ce sont les moyens 1, 2, 4 et 8 qui dominent.

## **4. CONCLUSION**

### **Nécessité de structurer l'enseignement de la conservation de la nature**

Il est clair, à la suite de la présente analyse, même si nous n'avons pas, pour des raisons de place, pu donner l'ensemble des résultats, que l'enseignement donné actuellement dans les écoles de la province se caractérise par une grande faiblesse; certains aspects sont touchés, d'une manière généralement superficielle et sans intégration dans un ensemble coordonné.

Nous avons d'ailleurs profité des questionnaires pour demander aux maîtres eux-mêmes d'une part s'ils estimaient que l'enseignement actuel était suffisant ou s'il convenait d'en améliorer la structure (voir tableau XX) et d'autre part s'ils souhaitaient disposer pour l'enseignement de ces notions de manuels ou d'autres moyens de transmission des connaissances (voir tableau XXI).

## **RÉSUMÉ**

L'étendue de la Province du Québec et sa faible densité de population ont permis jusqu'à un certain point aux équilibres naturels de se maintenir. Cette situation ne pourra toutefois pas subsister indéfiniment. Pour parer à la dégradation de la nature et des ressources naturelles, il convient donc de prendre certaines mesures qui, pour être efficaces, doivent surtout toucher les jeunes générations du pays. L'introduction de leçons d'écologie et de conservation de la nature dans les programmes scolaires serait d'une grande utilité à cet égard.

Une enquête effectuée dans les écoles primaires du Québec sur l'enseignement dans le domaine de la conservation de la nature a fourni des indications importantes sur la diffusion de cet enseignement et des points d'appui solides pour l'améliorer. Les questionnaires comportaient 46 Centres d'Intérêt (CI) (ressources naturelles, milieu, pollution, sciences naturelles etc.) répartis entre 5 groupes: I. Explication des phénomènes naturels, II. ressources naturelles, III. végétation, IV. faune, V. activités diverses; 9 moyens de diffusion de l'information: 1. leçons traditionnelles, 2. recherches par l'élève, 3. travaux imposés aux élèves, 4. observations personnelles, 5. ateliers, 6. sorties dans le milieu, 7. techniques audio-visuelles, 8. activités occasionnelles, 9. télévision éducative; et 3 niveaux de diffusion: information occasionnelle, développement de la notion, enseignement structuré.

Les résultats montrent que dans les CI., les groupes I et II viennent en tête avec respectivement 70.7% et 58.8% de réponses positives, et que les sujets les plus fréquemment évoqués sont ceux qui touchent à la vie quotidienne des enfants, animaux, arbres, saisons, poissons de Québec etc. Quant à l'enseignement relatif à ces thèmes, il est le plus souvent occasionnel (71.58% de réponses positives). Ces résultats mettent en évidence les lacunes existant dans le système éducatif, certains sujets étant abordés d'une manière généralement superficielle et sans intégration dans un ensemble coordonné.

## SUMMARY

In the province of Quebec, the natural balance has been maintained up to a certain degree owing to the low population density and the size of the province. However this situation may not last forever. In order to prevent destruction of nature and natural resources, it would be wise to take up some form of action, especially amongst the younger generations. Including ecology and conservation lessons in the curricula of lower schools may prove very effective.

A survey on conservation education, which was carried out amongst the primary schools of Quebec gave valuable information as to the way this education is at present being given and provided a strong basis for its further improvement.

The questionnaires included 46 Centers of Interest (CI) (natural resources, environment, pollution, natural science, etc.) divided into 5 groups: I. explanation of natural phenomena, II. natural resources, III. vegetation, IV. fauna, V. other forms of activity; nine different means of imparting information (1. normal classwork, 2. research work carried out by the pupil, 3. homework, 4. personal observations, 5. workshop or studio activities, 6. field trips, 7. audio-visual techniques, 8. miscellaneous activities, 9. educational television); and finally three levels of dissemination or instruction: casual, discussion and development of the general ideas involved, and comprehensive methodical instruction.

The results gave 70.7% and 58.8% respectively of positive answers for groups I and II, and the subjects in which interest was most frequently aroused were those pertaining to the children's everyday life, such as animals, trees, weather, seasons, fish of Quebec, etc. The level of teaching or dissemination fell largely into the casual category (71.58%). These results stress the shortcomings in the educational system, subjects being approached in a rather superficial way and without being integrated into any formal and coordinated system.

## ANNEXE

### CENTRES D'INTÉRÊT

#### **Groupe I: Explications de phénomènes naturels**

- 1 Formation des nuages—pluie-neige
- 2 Observation de la température
- 3 Variations barométriques
- 4 Cycle de l'eau
- 5 Cycle de la matière
- 6 Saisons

#### **Groupe H: Ressources naturelles**

- 7 Rivières—ruisseaux—lacs
- 8 Pollution des eaux
- 9 Air-vent
- 10 Pollution de l'air
- 11 Relief—montagnes—rochers
- 12 Etude des roches
- 13 Intérêt et respect des paysages
- 14 Beauté de l'habitat urbain
- 15 Respect des milieux naturels

#### **Groupe III: Végétation**

- 16 Etude des arbres
- 17 Protection des arbres
- 18 Plantation d'arbres
- 19 Protection contre les feux de forêt
- 20 Croissance des végétaux
- 21 Préparation d'un herbier
- 22 Classe verte
- 23 Visite de jardin botanique
- 24 Visite d'arboretum
- 25 Potagers ou jardinets
- 26 Plantation de plantes

#### **Groupe IV: Faune**

- 27 Etude d'animaux
- 28 Faune terrestre du Québec
- 29 Poissons du Québec
- 30 Chasse au Québec
- 31 Protection de la Faune
- 32 Vie des animaux (moeurs...)
- 33 Collection d'animaux (insectes...)
- 34 Récolte de coquillages
- 35 Visite à un aquarium
- 36 Visite d'un jardin zoologique
- 37 Entretien d'un aquarium
- 38 Elevage d'animaux en classe
- 39 Métamorphoses (chenille-papillon)

#### **Group V: Activités diverses**

- 40 Préparation d'albums d'histoire naturelle
- 41 Conférences sur la nature et ses ressources
- 42 Télévision éducative sur la nature
- 43 Exposition sur la nature dans l'école
- 44 Echanges divers avec correspondants sur la nature ou les ressources naturelles
- 45 Excursions guidées dans la nature
- 46 Visite de musée d'histoire naturelle

Tableau II. - Importance accordée aux centres d'intérêt du groupe I dans les différentes années d'étude.

Explications de phénomènes naturels	1		2		3		4		5		6	
	Pluie-Neige		Température		Baromètre		Cycle de l'eau		Cycle de la matière		Saisons	
	0	N	0	N	0	N	0	N	0	N	0	N
Années												
1	Nb %	6 5.31	77 93.91	5 6.09	12 19.36	50 80.64	57 70.38	24 29.62	9 14.29	54 85.71	112 95.73	5 4.27
2	Nb %	17 85.35	88 81.49	20 18.51	11 11.35	86 88.65	45 42.88	60 57.14	4 4.17	92 95.83	125 93.19	9 6.71
3	Nb %	16 87.10	96 82.09	21 17.94	24 22.23	84 77.77	45 42.06	62 57.94	8 7.70	96 92.30	145 96.03	6 3.97
4	Nb %	6 96.00	111 86.72	17 13.28	32 29.36	77 70.64	100 75.76	32 24.24	19 17.76	88 82.24	147 94.24	9 5.76
5	Nb %	6 95.78	124 91.86	11 8.14	61 53.05	54 46.95	108 80.56	21 19.44	25 23.81	80 76.19	149 98.03	3 1.97
6	Nb %	8 94.33	136 97.15	4 2.85	53 44.92	65 56.08	95 81.20	22 18.80	29 26.13	82 23.87	143 95.34	7 4.66
7	Nb %	18 85.49	96 83.48	19 16.52	35 33.34	70 66.66	92 74.20	32 25.80	37 34.26	71 65.74	114 88.38	15 11.62
8	Nb %	21 81.58	78 72.23	30 27.77	24 24.75	73 75.25	78 69.65	34 30.35	24 25.00	72 75.00	98 81.00	23 19.00
TOTAL	-	98	806	127	252	559	620	287	155	635	1,033	77

\* 1: mat; 2: 1<sup>e</sup>; 3: 2<sup>e</sup>; 4: 3<sup>e</sup>; 5: 4<sup>e</sup>; 6: 5<sup>e</sup>; 7: 6<sup>e</sup>; 8: 7<sup>e</sup>.

Tableau III. — Importance accordée aux centres d'intérêt du groupe II dans les différentes années d'étude.

Année d'étude*	Cours d'eau			Pollution eau			Air, vent			Pollution air			Relief			Roches			Respect des paysages			Habitat urbain			Respect milieux naturels		
	7	8	9	8	9	10	11	12	13	14	15	12	13	14	15	13	14	15	13	14	15	14	15	15	15		
1	N 69 % 85.19	12 14.81	9 87.66	53 14.52	71 12.34	12 19.05	51 80.95	21 71.63	37 49.34	38 50.66	23 32.40	48 67.60	23 67.15	48 32.85	38 67.60	47 67.15	23 32.85	15 80.77	48 67.60	47 67.15	23 32.85	23 67.15	48 67.60	23 67.15	15 80.77		
2	N 97 % 85.09	17 14.91	68 64.16	82 14.59	38 35.84	11 14.46	85 88.54	35 63.55	8 8.25	89 91.75	22 20.76	84 79.24	50 49.51	51 50.49	28 72.82	51 49.51	28 72.82	28 72.82	84 79.24	50 49.51	51 50.49	28 72.82	28 72.82	28 72.82	28 72.82		
3	N 119 % 96.48	14 10.52	87 17.15	87 82.85	45 41.28	23 21.91	82 78.09	29 76.43	12 11.43	93 88.57	14 12.73	96 87.27	55 49.08	43 50.92	43 60.56	55 49.08	43 50.92	43 60.56	96 87.27	55 49.08	55 49.08	43 60.56	43 60.56	43 60.56	43 60.56		
4	N 135 % 91.22	13 8.78	79 26.17	79 73.83	41 34.45	24 22.23	84 77.77	21 84.10	27 24.55	83 75.45	28 24.35	87 75.65	53 56.56	30 74.79	30 25.21	53 56.56	30 74.79	30 25.21	87 75.65	53 56.56	53 56.56	30 74.79	30 74.79	30 74.79	30 74.79		
5	N 147 % 96.72	5 3.28	77 27.36	77 72.64	12 9.30	29 34.49	76 65.51	7 95.49	38 33.93	74 66.07	22 20.38	86 79.62	35 70.84	23 19.32	23 80.68	35 70.84	23 19.32	23 80.68	86 79.62	35 70.84	35 70.84	23 19.32	23 19.32	23 19.32	23 19.32		
6	N 160 % 98.16	3 1.84	62 45.56	62 53.44	17 12.31	84 46.56	62 53.44	11 93.21	50 42.38	68 57.62	40 24.60	92 75.40	32 74.81	23 81.00	23 19.00	32 74.81	23 81.00	23 19.00	92 75.40	32 74.81	32 74.81	23 81.00	23 81.00	23 81.00	23 81.00		
7	N 139 % 93.92	9 6.08	56 48.63	56 51.37	17 85.84	50 44.65	62 55.35	7 95.37	60 13.05	55 86.95	24 22.23	84 77.77	45 58.56	22 80.00	22 88	45 58.56	22 80.00	22 88	84 77.77	45 58.56	45 58.56	22 88	22 88	22 88	22 88		
8	N 121 % 90.30	13 9.70	43 43.00	57 57.00	31 24.60	37 37.38	62 62.62	14 90.35	54 50.95	52 49.05	18 17.83	83 82.17	51 52.34	21 19.44	21 80.56	51 52.34	21 19.44	21 80.56	83 82.17	51 52.34	51 52.34	21 19.44	21 19.44	21 19.44	21 19.44		
TOT:	—	86	248	553	717	211	564	893	145	286	191	660	346	205	662	346	205	662	660	346	346	205	205	205	205		

\*1: mat; 2:1<sup>e</sup>; 3:2<sup>e</sup>; 4:3<sup>e</sup>; 5:4<sup>e</sup>; 6:5<sup>e</sup>; 7:6<sup>e</sup>; 8:7<sup>e</sup>.

Tableau IV. - Importance accordée aux centres d'intérêt du groupe III dans les différentes années d'études.

Année d'étude	Etude des arbres			Protection arbres			Plantation d'arbres			Feux de forêts			Croissance végétaux d'un herbier			Préparation d'un herbier			Classe verte <sup>1</sup> jardin bot.			Visite d'arboretum			Potager ou jardinnet			Plantation de plantes					
	O	N	%	O	N	%	O	N	%	O	N	%	O	N	%	O	N	%	O	N	%	O	N	%	O	N	%	O	N	%			
	16			17			18			19			20			21			22			23			24			25			26		
1	N 117	9	56	20	19	47	34	33	73	19	11	57	16	50	16	8	57	0	62	18	48	69	20	22	0	62	18	48	69	20	0	62	18
	92.86	7.14	73.69	26.31	28.79	71.21	50.75	49.25	79.35	20.65	16.18	83.82	24.25	75.75	12.31	87.69	0.00	100.00	0.00	100.00	27.28	72.72	77.53	22.47	0.00	100.00	27.28	72.72	77.53	22.47			
2	N 82	39	61	37	9	87	49	58	62	46	3	94	3	93	3	2	94	0	96	12	85	38	66	66	0	96	12	85	38	66			
	67.77	32.23	62.25	37.75	9.38	90.62	48.52	51.48	57.41	42.59	3.10	96.90	3.13	96.87	2.09	97.91	0.00	100.00	0.00	100.00	12.38	87.62	36.54	63.46	0.00	100.00	12.38	87.62	36.54	63.46			
3	N 97	29	64	44	10	94	63	46	70	53	1	102	3	100	5	98	0	102	18	87	26	83	83	83	0	102	18	87	26	83			
	76.99	23.01	59.26	40.74	9.62	90.38	57.80	42.20	56.92	43.08	0.08	99.02	2.92	97.08	4.86	95.14	0.00	100.00	0.00	100.00	17.15	82.85	23.85	76.14	0.00	100.00	17.15	82.85	23.85	76.14			
4	N 110	30	88	29	22	84	65	46	79	46	0	105	1	102	11	96	2	103	41	72	43	70	70	70	2	103	41	72	43	70			
	78.58	21.42	75.22	24.78	20.76	79.24	58.56	41.44	63.20	36.80	0.00	100.00	0.08	99.02	10.29	89.71	1.91	98.09	36.29	63.71	38.06	61.94	61.94	61.94	1.91	98.09	36.29	63.71	38.06	61.94			
5	N 122	22	87	30	27	81	69	41	86	42	6	99	13	93	13	93	4	98	27	77	117	56	56	56	4	98	27	77	117	56			
	84.73	15.27	74.36	25.64	25.00	75.00	62.73	37.27	67.19	32.81	5.72	94.28	12.27	87.73	12.27	87.73	3.93	96.07	25.97	74.03	54.48	45.52	45.52	45.52	3.93	96.07	25.97	74.03	54.48	45.52			
6	N 146	7	113	18	53	67	94	29	97	34	10	102	7	102	15	97	3	106	41	75	62	62	62	62	3	106	41	75	62	62			
	95.43	4.57	86.26	13.74	44.17	55.83	76.43	23.57	74.05	25.95	8.93	91.07	6.43	93.57	30.40	86.60	2.76	97.24	33.63	66.37	50.00	50.00	50.00	50.00	2.76	97.24	33.63	66.37	50.00	50.00			
7	N 115	20	93	25	39	68	82	29	87	36	4	97	9	92	17	89	10	94	15	87	37	71	71	71	10	94	15	87	37	71			
	85.19	14.81	78.82	21.18	36.45	63.55	73.88	26.12	70.74	29.26	3.97	96.03	8.92	91.08	16.04	83.96	9.62	90.38	14.71	85.29	34.26	65.74	65.74	65.74	9.62	90.38	14.71	85.29	34.26	65.74			
8	N 126	15	96	18	44	58	84	23	92	35	10	90	20	83	22	81	8	89	25	27	32	69	69	69	8	89	25	27	32	69			
	89.37	10.63	84.22	15.78	43.14	56.86	78.51	21.49	72.45	27.55	10.00	90.00	19.42	80.58	21.36	78.64	8.25	91.75	24.51	75.49	31.69	68.31	68.31	68.31	8.25	91.75	24.51	75.49	31.69	68.31			
TOTAL	915	171	658	221	223	586	540	299	646	311	45	746	72	715	93	705	27	750	197	608	424	497	497	497	27	750	197	608	424	497			

\* 1: mat; 2: a; 3: 2; 4: 3; 5: 4; 6: 5; 7: 6; 8: 7.

Tableau V. - Importance accordée aux centres d'intérêt du groupe IV dans les différentes années d'étude.

Année d'étude*	Etude d'animaux		Faune terrestre Québec		Poissons Québec		Chasse au Québec		Protection Faune		Vie des animaux		Collection d'animaux	
	O	N	O	N	O	N	O	N	O	N	O	N	O	N
1	N 143	2	74	22	79	12	47	26	44	27	15	7	37	39
	% 98.63	1.37	77.09	22.91	86.82	13.18	64.39	35.61	61.98	38.02	93.73	6.25	48.65	51.31
2	N 128	15	62	51	77	34	42	59	39	60	76	36	13	87
	% 89.52	10.48	54.87	45.13	69.37	30.63	41.59	58.41	39.40	60.60	67.86	32.14	13.00	87.00
3	N 111	20	52	57	74	38	43	63	35	72	68	45	29	84
	% 85.08	14.92	47.71	52.29	66.08	33.92	40.57	59.43	32.72	67.28	60.68	39.32	25.67	74.43
4	N 143	15	77	49	90	37	53	60	83	52	77	44	40	71
	% 90.30	9.20	61.12	38.88	70.87	29.13	46.91	53.09	61.49	38.51	63.64	36.36	36.04	63.96
5	N 157	11	87	38	115	23	56	55	60	52	112	25	48	70
	% 93.46	6.54	89.60	30.40	83.33	16.67	50.46	49.54	53.58	46.42	81.76	18.24	40.68	59.32
6	N 163	8	118	28	117	22	89	42	79	41	139	15	66	58
	% 95.46	4.54	80.83	19.17	84.18	15.82	67.94	32.06	65.84	34.16	90.26	9.74	53.23	46.77
7	N 135	10	90	26	104	25	58	51	68	42	115	20	44	66
	% 93.11	6.89	77.59	22.41	80.63	19.37	53.22	46.78	61.82	38.18	85.19	14.81	40.00	60.00
8	N 140	7	107	22	101	20	74	42	84	27	124	12	35	70
	% 95.24	4.76	82.95	17.05	83.48	16.52	63.80	36.20	75.68	24.32	91.18	8.82	33.34	66.00
TOTAL	1133	88	667	293	757	211	462	398	492	373	816	204	312	545

\* 1: ma; 2:1e; 3:2e; 4:3e; 5:4e; 6:5e; 7:6e; 8:7e.

Tableau V (cont.)

Année d'étude*	Récolte coquilles		Visite aquarium		Visite jardin zool.		Entretien aquarium		Élevage animaux		Métamorphose	
	O	N	N	O	N	O	N	O	N	O	N	O
	34		35		36		37		38		39	
1	N 43	22	8	59	19	48	41	32	59	25	51	30
	§ 57.34	42.66	11.95	88.05	28.36	71.64	56.17	43.83	70.24	29.76	62.97	37.03
2	N 18	80	6	90	14	86	16	84	11	88	23	76
	§ 18.37	81.63	6.25	93.75	14.00	86.00	16.00	84.00	11.12	88.88	23.24	76.76
3	N 39	80	6	98	15	91	7	96	3	100	66	62
	§ 32.78	67.22	5.77	94.23	14.16	85.84	6.80	93.20	2.92	97.08	51.57	48.43
4	N 39	74	10	97	20	90	10	95	8	99	54	67
	§ 34.52	65.48	9.35	90.65	18.19	81.81	9.53	90.47	7.48	92.52	44.63	55.37
5	N 63	65	14	91	26	83	10	92	12	94	32	75
	§ 49.22	50.78	13.34	86.66	23.86	76.14	9.81	90.19	11.33	88.67	29.91	70.09
6	N 50	67	20	94	30	85	13	97	14	97	81	52
	§ 42.74	57.26	17.55	82.45	21.09	78.91	11.82	86.18	12.62	87.38	60.91	39.09
7	N 32	74	10	93	19	85	11	92	10	93	53	59
	§ 30.19	69.81	9.71	90.29	18.27	81.73	10.68	89.32	9.71	90.29	47.33	52.67
8	N 20	81	11	87	21	80	16	84	9	89	66	49
	§ 19.81	99.00	11.23	88.47	20.80	79.20	16.00	84.00	9.19	90.81	57.40	42.60
TOTAL	304	553	85	709	164	648	124	672	126	685	426	470

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Tableau VI. - Importance accordée aux centres d'intérêt du groupe V dans les différentes années d'études.

Année d'étude <sup>a</sup>	Préparation album 40			Conférences 41			TV éducative 42			Exposition sur la nature 43			Echanges correspondants 44			Excursions guidées 45			Visite de musée 46		
	O	N		O	N		O	N		O	N		O	N		O	N		O	N	
1	N 16	53	14	52	10	54	47	38	0	62	58	26	1	61							
§	23.19	76.81	21.22	78.78	15.63	84.37	55.30	47.70	0.00	100.00	69.05	40.95	1.62	98.38							
2	N 3	93	12	89	8	89	30	77	0	96	28	78	0	96							
§	31.30	96.87	11.89	81.11	8.25	91.75	28.04	71.96	0.00	100.00	26.42	73.58	0.00	100.00							
3	N 15	95	9	95	6	98	37	75	1	102	26	84	0	103							
§	13.64	86.36	8.66	91.34	5.77	94.23	33.04	66.96	.98	99.02	23.64	76.36	0.00	100.00							
4	N 22	89	7	95	14	91	51	78	1	104	23	89	0	105							
§	19.82	80.18	15.18	84.82	13.44	86.66	39.54	60.46	.96	99.04	20.54	79.46	0.00	100.00							
5	N 46	80	25	83	71	46	66	66	1	101	32	82	6	99							
§	36.51	63.46	23.15	76.85	60.69	39.31	50.38	49.62	.99	99.01	28.08	91.92	5.62	94.28							
6	N 41	77	43	77	66	48	45	77	4	105	30	86	3	106							
§	37.75	65.25	35.85	64.16	59.33	40.67	36.89	63.11	3.67	96.33	25.87	74.13	2.76	97.24							
7	N 45	66	33	73	26	82	52	62	9	94	21	84	10	94							
§	40.55	59.45	31.14	68.86	24.08	75.92	45.62	54.38	8.74	91.26	20.00	80.00	9.62	90.38							
8	N 32	73	41	68	25	79	50	62	4	92	34	75	13	88							
§	30.48	69.52	37.62	62.38	24.04	75.96	44.65	55.35	4.17	95.83	31.20	68.80	12.88	87.12							
TOTAL	220	626	194	632	230	587	378	535	20	756	252	604	33	752							

\* 1: mat; 2:1<sup>e</sup>; 3:2<sup>e</sup>; 4:3<sup>e</sup>; 5:4<sup>e</sup>; 6:5<sup>e</sup>; 7:6<sup>e</sup>; 8:7<sup>e</sup>.

Tableau VII.- Importance accordée à l'étude des centres d'intérêt des différents groupes.

		Total (+)	Total (-)	Total
Groupe I (6CI) Explications phénomènes naturels	N 0/0	3792 70.7	1783 29.3	5575
Groupe II (9CI) Ressources naturelles	N 0/0	4744 58.8	3322 41.2	8266
Groupe III (11 CI) Végétation	N 0/0	3840 40.6	5609 59.4	9449
Groupe IV (13 CI) Faune	N 0/0	5868 50.1	5849 49.9	11717
Groupe V (7CI) Activités diverses	N 0/0	1327 22.8	4492 77.2	5819

Tableau VIII.- Importance accordée à l'étude des principaux centres d'intérêt.

CI*		Total (+)	Total (-)	Total
N° 27	N	1133	88	1221
	0/0	92.8	7.2	
16	N	915	171	1086
	0/0	84.3	15.7	
6	N	1033	77	1110
	0/0	93.1	6.9	
1	N	926	98	1024
	0/0	90.4	9.6	
29	N	757	211	968
	0/0	78.2	21.8	
2	N	806	127	933
	0/0	86.4	13.6	
7	N	987	86	1073
	0/0	92.0	8.0	
32	N	816	204	1020
	0/0	80.0	20.0	
9	N	717	211	928
	0/0	77.3	22.7	
11	N	893	145	1038
	0/0	86.0	14.0	

CI: 27: études des animaux - 16: étude des arbres - 6: saisons -  
 1: formation des précipitations - 29: poissons du Québec - 2: obser-  
 vation de la température - 7: cours d'eau - 32: moeurs des animaux -  
 9: air et vent - 11: relief.

Tableau IX.- Importance relative (% et indice) des centres d'intérêt du groupe I (explications de phénomènes naturels) pour l'ensemble de l'élémentaire.

CENTRE D'INTERET		% *	Indice
N°	Titre		
6	Saisons	27.2	100
1	Nuages, pluie, neige	24.4	89.6
2	Température	21.2	78.0
4	Cycle de l'eau	16.3	60.0
3	Baromètre	6.6	24.4
5	Cycle de la matière	4.1	15.0

\* % calculé par rapport au total (+).

	Nombre	%
Réponses positives: total (+)	3792	70.7
Réponses négatives: total (-)	1783	29.3
Total des réponses	5575	

Tableau X.- Importance relative (% et indice) des centres d'intérêt du groupe II (ressources naturelles) pour l'ensemble de l'élémentaire.

CENTRE D'INTERET		% *	Indice
N°	Titre		
7	Cours d'eau	20.7	100
11	Relief, montagnes, rochers	18.8	90.5
9	Air, vent	15.1	72.6
15	Respect des milieux naturels	13.9	67.1
14	Beauté de l'habitat urbain	10.9	52.7
12	Etude des roches	6.0	29.0
8	Pollution des eaux	5.2	25.1
10	Pollution de l'air	5.0	24.3
13	Intérêt et respect des paysages	4.0	19.3

\* % calculé par rapport au total (+).

	Nombre	%
Réponses positives: total (+)	4744	58.8
Réponses négatives: total (-)	3322	41.2
Total des réponses	8066	-

Tableau XI.- Importance relative (% et indice) des centres d'intérêt du groupe III (végétation) pour l'ensemble de l'élémentaire.

CENTRE D'INTERET		% *	Indice
N°	Titre		
16	Etude des arbres	23.8	100
17	Protection des arbres	17.1	71.9
20	Croissance des végétaux	16.8	70.5
19	Protection - incendies de forêt	14.0	59.0
26	Plantation de plantes	11.0	46.3
18	Plantation d'arbres	5.8	24.4
25	Potagers ou jardinets	5.1	21.5
23	Visites de jardins botaniques	2.4	10.2
22	Classe verte	1.9	7.9
21	Préparation d'un herbier	1.2	4.9
24	Visite d'arboretum	0.7	2.9

\* % calculé par rapport au total (+).

	Nombre	%
Réponses positive: total (+)	3840	40.6
Réponses négatives: total (-)	5609	59.4
Total des réponses	9449	-

Tableau XII.- Importance relative (% et indice) des différents centres d'intérêt du groupe IV (faune) pour l'ensemble de l'élémentaire.

CENTRE D'INTERET		% *	Indice
N°	Titre		
27	Etude d'animaux	19.26	100
32	Vie et moeurs des animaux	13.9	72.0
29	Poissons du Québec	12.9	66.8
28	Faune terrestre du Québec	11.3	58.8
31	Protection de la faune	8.4	43.4
30	Chasse au Québec	7.9	40.7
39	Métamorphoses	7.2	37.6
33	Collection d'animaux	5.3	27.5
34	Récolte de coquillages	5.2	26.8
36	Visites de jardins zoologiques	2.8	14.5
38	Elevage d'animaux en classe	2.1	11.1
37	Entretien d'un aquarium	2.1	10.9
35	Visites à un aquarium	1.4	7.5

\* % calculé par rapport au total (+).

	Nombre	%
Réponses positives: total (+)	5868	50.1
Réponses négatives: total (-)	5849	49.9
Total des réponses	11717	-

Tableau XIII.- Importance relative (% et indice) des différents centres d'intérêt du groupe V (activités diverses) pour l'ensemble de l'élémentaire.

CENTRE D'INTERET		% *	Indice
	Titre		
43	Exposition sur la nature	28.5	100
45	Excursions guidées	19.0	66.7
42	TV éducative	17.3	60.8
40	Préparation d'albums	16.6	58.2
41	Conférences	14.6	51.3
46	Visites de musées	2.5	8.7
44	Echanges avec correspondants	1.5	5.3

\* % calculé par rapport au total (+)

	Nombre	%
Réponses positives: total (+)	1327	22.8
Réponses négatives: total (-)	4492	77.2
Total des réponses	5819	-

Tableau XIV - Classement par ordre d'indice décroissant des 46 centres d'intérêt dans les différentes années de cours.

Matern.		1 <sup>e</sup>		2 <sup>e</sup>		3 <sup>e</sup>		4 <sup>e</sup>		5 <sup>e</sup>		6 <sup>e</sup>		7 <sup>e</sup>		Ensemble	
No	Ind	No	Ind	No	Ind	No	Ind	No	Ind	No	Ind	No	Ind	No	Ind	No	Ind
27	100.0	27	100.0	6	100.0	27	100.0	27	100.0	27	100.00	11	100.0	27	100.0	27	100.0
16	81.8	6	97.7	7	82.1	6	99.3	6	94.9	7	95.2	7	96.5	11	93.6	6	91.1
6	78.3	1	77.3	27	78.6	1	97.3	11	94.3	11	89.9	27	93.7	16	90.0	7	87.1
1	74.8	7	75.8	1	74.5	7	91.2	7	93.6	16	86.9	16	79.9	32	88.6	1	81.7
32	73.4	2	68.7	16	66.9	2	75.0	1	86.6	6	85.1	32	79.9	7	86.4	16	80.7
29	55.2	16	64.1	2	66.2	11	75.0	2	79.0	32	82.7	6	79.2	28	86.4	11	78.8
2	53.8	29	60.2	11	64.8	16	74.3	16	77.7	2	80.9	1	73.6	29	72.1	32	72.0
28	51.7	32	59.4	29	51.0	4	67.6	9	74.5	1	79.2	29	72.2	6	70.0	2	71.11
20	51.0	15	58.6	20	48.3	29	60.8	26	74.5	9	72.0	9	71.5	17	68.6	29	66.8
9	49.7	9	53.1	32	46.9	15	60.1	29	73.2	28	70.2	2	66.7	9	67.8	9	63.2
7	48.3	20	48.4	15	45.5	17	59.5	32	71.3	29	69.6	17	64.6	1	66.4	28	58.8
26	48.3	28	48.4	39	45.5	31	56.1	4	68.9	17	67.3	4	63.9	20	65.7	15	58.4
15	44.1	11	47.7	9	44.1	20	53.4	15	61.1	15	58.3	28	62.5	15	62.1	17	58.0
38	41.3	17	47.7	17	44.1	9	52.7	17	55.4	20	57.7	15	61.2	19	60.0	20	57.0
45	40.6	19	38.3	19	43.4	28	52.0	28	55.4	4	56.5	20	60.4	31	60.0	4	54.7
4	39.9	14	38.1	14	36.5	32	52.0	20	54.8	14	56.5	19	56.9	2	55.7	19	47.6
17	39.2	4	35.2	28	35.9	14	46.6	14	54.1	19	55.9	31	47.2	4	55.7	14	45.9
11	37.1	30	32.8	4	31.0	19	43.9	42	45.2	30	53.0	14	45.1	30	52.9	31	43.4
39	35.7	31	30.5	30	29.7	39	36.5	19	43.9	39	48.2	12	41.7	39	47.1	30	40.7
14	32.9	26	29.7	34	26.9	30	35.8	43	42.0	31	47.0	30	40.3	14	40.0	39	37.6
30	32.9	43	23.4	43	25.5	43	34.5	34	40.1	42	41.7	8	36.8	12	38.7	26	37.4
43	32.9	45	21.9	31	24.1	26	29.1	3	38.9	33	39.3	39	36.8	43	35.7	43	33.3
31	30.8	39	18.0	33	20.0	25	27.7	31	38.2	26	36.9	43	36.1	18	31.4	33	27.5
34	30.1	13	17.2	26	17.9	33	27.0	30	35.7	8	32.1	10	34.7	8	30.7	34	26.8
37	28.7	34	14.1	45	17.9	34	26.3	33	30.6	10	32.1	40	31.2	41	29.3	12	25.2
12	25.9	37	12.5	3	16.6	3	21.6	40	29.3	3	31.5	33	30.6	10	26.4	3	22.2
33	25.9	8	10.9	10	15.9	8	18.9	12	24.2	18	31.5	18	27.1	3	25.0	45	22.2
19	23.8	36	10.9	8	12.4	13	18.9	39	20.4	12	29.8	5	25.7	45	24.3	8	21.9
13	16.1	33	10.2	25	12.4	12	18.2	45	20.4	34	29.8	26	25.7	26	22.9	10	21.2
18	13.3	25	9.4	36	10.3	10	16.2	8	18.5	43	26.8	3	24.3	40	22.9	42	20.3
36	13.3	41	9.4	40	10.3	45	15.5	10	18.5	41	25.6	41	22.9	25	17.9	18	19.7
25	12.6	3	8.6	13	9.7	18	14.9	18	17.2	25	24.4	34	22.2	42	17.9	40	19.4
25	12.6	3	8.6	13	9.7	18	14.9	18	17.2	25	24.4	34	22.2	42	17.9	40	19.4
22	11.2	10	8.6	12	8.3	40	14.9	25	7.2	40	24.4	42	18.1	3	17.1	25	17.4
40	11.2	38	8.6	18	6.9	36	13.5	36	16.6	13	28.8	13	16.7	5	17.1	41	17.1
41	9.8	18	7.0	41	6.2	5	12.8	5	15.9	36	17.9	45	14.6	23	15.7	13	16.8
3	8.4	12	6.2	5	5.5	41	11.5	41	15.9	45	17.9	36	13.2	36	15.0	36	14.5
10	8.4	42	6.2	37	4.8	42	9.5	13	14.0	5	17.3	23	11.8	22	14.3	5	13.7
21	7.7	35	4.9	35	4.1	23	7.4	35	8.9	35	11.9	25	10.4	34	14.3	38	11.1
42	7.0	5	3.1	42	4.1	35	6.8	22	8.3	23	8.9	37	7.6	13	12.9	37	10.9
5	6.3	21	2.3	23	3.4	37	6.8	23	8.3	38	8.3	24	6.9	37	11.4	23	8.2
8	6.3	22	2.3	22	2.1	38	5.4	38	7.6	37	7.7	35	6.9	46	9.3	35	7.5
23	5.6	40	2.3	38	2.1	24	1.4	37	6.4	21	6.0	38	6.9	35	7.9	22	6.4
35	5.6	23	2.6	21	0.7	22	0.7	21	3.8	22	4.2	46	6.9	21	7.1	21	4.0
46	0.7	24	0.0	44	0.7	44	0.7	46	3.8	44	2.4	22	6.2	38	6.4	46	2.9
24	0.0	44	0.0	24	0.0	21	0.0	24	2.5	24	1.8	44	6.2	24	5.7	24	2.4
44	0.0	46	0.0	46	0.0	46	0.0	44	0.6	46	1.8	21	2.8	44	2.9	44	1.7

Voir en annexe, la liste des centres d'intérêt.

Tableau XV.- Distribution des dix premiers centres d'intérêt de chaque année d'étude (les nombres représentent la valeur de l'indice).

C.I. N°	ANNEE									f
	Matern.	1e	2e	3e	4e	5e	6e	7e	Pour l'ensemble	
27	100.0	100.0	78.6	100.0	100.0	100.0	93.7	100.0	100.0	9
16	81.8	64.1	66.9	74.3	77.7	86.9	79.9	90.0	80.7	9
6	78.3	97.7	100.0	99.3	94.9	85.1	79.2	70.0	91.1	9
1	74.8	77.3	74.5	97.3	86.6	79.2	73.6	-	81.7	8
29	55.2	60.2	51.0	60.8	73.2	-	72.2	72.1	66.8	8
2	53.8	68.7	66.2	75.0	79.0	80.9	66.7	-	71.11	8
7	-	75.8	82.1	91.2	93.6	95.2	96.5	86.4	87.1	8
32	73.4	59.4	46.9	-	-	82.7	79.9	88.6	72.0	7
9	49.7	53.1	-	-	74.5	72.0	71.5	67.8	63.2	7
11	-	-	64.8	75.0	94.3	89.9	100.0	93.6	78.8	7
28	51.7	-	-	-	-	70.2	-	86.4	-	3
20	51.0	-	48.3	-	-	-	-	-	-	2
15	-	58.6	-	60.1	-	-	-	-	-	2
4	-	-	-	67.6	-	-	-	-	-	1
26	-	-	-	-	74.5	-	-	-	-	1
17	-	-	-	-	-	-	-	68.6	-	1

Tableau XVI - Importance accordée dans les différentes années aux centres d'intérêt qui concernent la conservation des ressources et des milieux naturels.

CI*		Mat.	1 <sup>e</sup>	2 <sup>e</sup>	3 <sup>e</sup>	4 <sup>e</sup>	5 <sup>e</sup>	6 <sup>e</sup>	7 <sup>e</sup>	Ensemble
8	Rang	41	27	28	27	30	24	21	24	28
	Indice	6.3	10.9	12.4	18.9	18.5	32.1	36.8	30.7	21.9
10	Rang	37	33	27	30	31	25	24	26	29
	Indice	8.4	8.6	15.9	16.2	18.5	32.1	34.7	26.4	21.2
13	Rang	29	24	32	28	37	34	34	39	35
	Indice	16.1	17.2	9.7	18.9	14.0	23.8	16.7	12.9	16.8
14	Rang	20	16	16	17	17	16	18	20	17
	Indice	32.9	38.1	36.5	46.6	54.1	56.5	45.1	40.0	45.9
15	Rang	13	9	11	10	13	13	14	13	12
	Indice	44.1	58.6	45.5	60.1	61.1	58.3	61.2	62.1	58.4
17	Rang	17	14	14	11	14	12	11	9	13
	Indice	39.2	47.7	44.1	59.5	55.4	67.3	64.6	68.6	58.0
19	Rang	28	15	15	18	19	17	16	14	16
	Indice	23.8	38.3	43.4	43.9	43.9	55.9	56.9	60.0	47.6
31	Rang	23	19	22	12	23	20	17	15	18
	Indice	30.8	30.5	24.1	56.1	38.2	47.0	47.2	60.0	43.4

\* Centres d'intérêt: 8, pollution des eaux - 10, pollution de l'air - 13, respect des paysages - 14, beauté de l'habitat urbain - 15, respect des milieux naturels - 17, protection des arbres - 19, protection contre les incendies de forêt - 31, protection de la faune.

Tableau XVII - Distribution des centres d'intérêt venant aux dix dernières places dans les différentes années de cours. Les nombres représentent l'indice.

CI * NO	ANNEES									f
	Matera.	1e	2e	3e	4e	5e	6e	7e	Ensemble	
21	7.7	2.3	0.7	0.0	3.8	6.0	2.8	7.1	4.0	9
35	5.6	4.9	4.1	6.8	8.9	11.9	6.9	7.9	7.5	9
46	0.7	0.0	0.0	0.0	3.8	1.8	6.9	9.3	2.9	9
24	0.0	0.0	0.0	1.4	2.5	1.8	6.9	5.7	2.4	9
44	0.0	0.0	0.7	0.7	0.6	2.4	6.2	2.9	1.7	9
23	5.6	1.6	3.4	7.4	8.3	8.9	11.8	-	8.2	8
22	-	2.3	2.1	0.7	8.3	4.2	6.2	14.3	6.4	8
37	-	-	4.8	6.8	6.4	7.7	7.6	11.4	10.9	7
38	-	-	2.1	5.4	7.6	8.3	6.9	6.4	11.1	7
42	7.0	6.2	4.1	9.5	-	-	-	-	-	4
5	6.3	3.1	-	-	-	17.3	-	-	13.7	4
13	-	-	-	-	14	-	-	12.9	-	2
10	8.4	-	-	-	-	-	-	-	-	1
8	6.3	-	-	-	-	-	-	-	-	1
25	-	-	-	-	-	-	10.4	-	-	1
40	-	2.3	-	-	-	-	-	-	-	1
34	-	-	-	-	-	-	-	14.3	-	1

\* Centres d'intérêt: 21, préparation d'herbiers - 35, visite d'aquarium - 46, visite musée d'histoire naturelle - 24, visite d'arboretum - 44, échanges avec correspondants sur la nature - 23, visite de jardin botanique - 22, classe verte - 37, entretien d'un aquarium en classe - 38, élevage d'animaux en classa - 42, TV éducation sur la nature - 5, cycle de la matière - 13, intérêt et respect des paysages - 10, pollution de l'air - 8, pollution des eaux - 25, potager ou jardinet - 40, préparation d'album d'histoire naturelle - 34, récolte de coquillages.

Tableau XVIII. - Intensité accordée S l'étude des dix centres d'intérêt les plus touchés (en % ) .

CI. *	Enseignement occasionnel	Développement notion	Enseignement structuré
27	54.43	28.20	17.34
16	62.85	27.93	9.20
6	43.51	38.56	17.90
1	60.32	31.09	8.56
29	77.20	18.52	9.26
2	73.11	22.54	4.30
7	47.31	33.13	19.52
32	61.55	27.23	11.22
9	66.00	24.62	9.38
11	51.05	30.60	18.33
Moyenne	59.73	28.24	12.50

CI.: 27: études d'animaux - 16: étude des arbres - 6: saisons -  
 1: formation des précipitations - 29: poissons du Québec  
 2: observation de la température - 7: cours d'eau -  
 32: moeurs des animaux - 9: air-vent - 11: relief.

Tableau XIX. - Manière dont l'information est donnée dans le cas des centres d'intérêt les plus touchés

* C I	Manière de donner l'information **								
	1	2	3	4	5	6	7	8	9
27	20.7	28.6	12.2	16.4	0.7	2.1	9.3	8.6	1.4
16	19.8	27.0	14.3	15.9	0.8	7.1	4.0	9.5	1.6
6	38.8	19.4	9.2	21.4	0.0	1.0	1.0	9.2	0.0
1	34.4	14.0	5.2	25.8	0.0	1.1	4.3	15.1	0.0
29	24.8	27.7	10.0	14.9	0.0	1.0	6.9	12.9	2.0
2	29.5	15.4	6.4	34.6	0.0	1.3	3.9	9.0	0.0
32	19.4	25.8	12.9	18.6	1.6	0.8	8.1	9.7	3.2
9	34.7	11.6	6.3	17.9	0.0	1.1	2.1	5.4	0.0
11	38.9	16.0	17.6	6.9	3.8	2.3	6.9	7.6	0.0

\* C I: 27: études d'animaux - 16: étude des arbres - 6: saisons -  
1: formation des précipitations - 29: poissons du Québec - 2: obser-  
vation de la température - 32: vie des animaux - 9: air-vent -  
11: relief.

\*\* Manières de donner l'information: 1: leçons traditionnelles - 2: re-  
cherches par les élèves - 3: travaux imposés aux élèves - 4: observa-  
tions personnelles - 5: ateliers - 6: sorties dans le milieu - 7: tech-  
niques audio-visuelles - 8: activité occasionnelle - 9: télévision éduca-  
tive.

Tableau XX.- Avis exprimé par les maîtres concernant la nécessité de structurer, au niveau élémentaire, l'étude de la conservation de la nature et des ressources naturelles.

	Développement nécessaire		Développement suffisant		Total
	Nb	0/0	Nb	0/0	
Mat	56	91.80	5	8.20	61
1	87	94.57	5	5.43	92
2	98	98.00	2	2.00	100
3	98	96.08	4	3.92	102
4	94	94.00	6	6.00	100
5	102	94.44	6	5.55	108
6	96	96.97	3	3.03	99
7	93	96.88	3	3.13	96
Total	724	95.51	34	4.49	758

Tableau XXI.- Souhait des maîtres de disposer de manuels et d'autres moyens d'information en conservation de la nature.

	Réponses +		Réponses -		Total
	Nb	0/0	Nb	0/0	
Mat.	49	85.96	8	14.04	57
1	74	87.06	11	12.94	85
2	91	92.86	7	7.14	98
3	89	93.68	6	6.32	95
4	84	93.33	6	6.66	90
5	91	91.00	9	9.00	100
6	82	93.18	6	6.82	88
7	88	95.65	4	4.35	92
Total	648	91.91	57	8.09	705

# Conservation Education and Extension in Tropical Rural Latin America, with Special Reference to Venezuela

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## 1. PRESENT CONDITIONS

### Introduction

As a geographical unit Latin America is the southern half of the Americas; but perhaps more than any physical or cultural factor it is the historic background of early colonization by Latin peoples that establishes a link among the 22 mostly Spanish or Portuguese speaking countries. The influence of a Mediterranean civilization is evident from the Mexican frontier to Patagonia. Still, in vast parts of Latin America there exist habits and institutions which combine European, Indigenous, African and Asiatic civilizations. Part of the population of Trinidad-Tobago, for instance, came from India.

Today, to the rest of the world (and to itself) Latin America is a rich source of news about development problems, population explosion, and other events of a sometimes rather violent character. Some of these are political, others originate in natural forces—earthquakes, floods, droughts—which can shake national economies.

One important common geographic denominator is the tropical or subtropical climate, which conditions natural resources from northern México to great parts of Chile and Argentina, although within this vast region and all along the Andean Cordillera there are high mountains and Sierra plains of temperate and cold climate. There are snow and glaciers on the equator.

### (a) Agricultural and Forest Resources

Soils and forest resources can still be considered as more than adequate to produce food and raw materials for the needs of existing populations. The proverbial poverty which continues for most people in Latin America is rooted in social and political conditions rather than in resource shortage. Potentially the year-round growth period offers production possibilities of exceptional economic importance in the raising of crops such as leguminous grains, corn, bananas, sugar, cassava (tapioca), coffee, cacao, and a variety of other foods and spices for domestic consumption and for export. Most of Latin American countries can harvest their bordering seas.

Great differences in rainfall and other climatic conditions result in a variety of forest formations, from dry or semi-dry tropical forests to exuberant rain

forests. Despite forest clearing on a vast scale mainly for extending agricultural areas, forest resources in part of the region are still abundant. Exceptions are some Central American countries where forest cover has been reduced critically.

Deforesting in watersheds, and soil erosion usually go hand in hand, especially in the tropics with its marked annual rainy and dry seasons. Depleted soils as a result of erosion and poor treatment result in average crop outputs which in many cases are extremely low. Even artificial irrigation is in some cases becoming a source of soil erosion and of salinization, thus upsetting production plans based on heavy investment.

It is becoming evident that the extending of agricultural land at the cost of forest cover is nearing tolerable limits. The usual demand for 'more acreage for production' will have to be changed into a policy of 'more production per acreage'.

### **(b) Population increase**

The present total population of Latin America is over 250 million people. Actual population growth rates in some countries seem to be increasing, and they vary from less than 2% (Argentina, Uruguay) to 4% in several countries of the Caribbean area. At an average growth rate of 2.7% Latin America's population will reach some 585 million within three decades, and 1,140 million within five decades. Such estimations are rather conservative. At present most of Latin America's population is under 19 years old (in Venezuela 53%).

National governments are facing very serious problems with regard to future requirements of food, working facilities and the rising of living standards of several hundred millions of people. Putting the population factor into relation with the use of the land for food production, in the specific case of Venezuela (population increase 3.6%) the present 2.6 million hectares or 6.5 million acres of tilled land will have to be increased within the next fifty years to 8 million hectares or 20 million acres, and production per acre must be improved. The actual 13.5 million hectares (34 million acres) producing forage will have to be increased to 45 million hectares (112 million acres) within the same period.

### **(c) Trends in rural and urban populations**

While on the whole economic structures continue to be mainly agricultural, the population flow from rural to urban zones increasingly results in situations which are similar to those existing in highly industrialized countries. While in 1955 Venezuela's rural population was still over 40% of the total population, there are now less than 30% left in rural areas. Since major towns are but few, too many people live in reduced areas, with hundreds of thousands of men and women without any productive occupation.

Thus in Latin America all hopes are in rapid industrialization. However, it is very likely that industrialization and rationalization will not solve the population problem.

In view of these facts in Venezuela a new movement to resettle displaced families from towns back to the country is getting under way. This policy is closely connected with natural resources conditions, especially with regard to agricultural land and water supply.

## II. CONSERVATION EXTENSION IN VENEZUELA

### (a) Organization of the work

During recent years, and in some cases for decades, extension work has been furthered in all Latin American countries. Basically it is being carried out in the form of agro-technical advice, mainly to small farmers and in connection with Agrarian Reforms being furthered in different ways in parts of Latin America.

Here again, Venezuela may be cited for reference because of being one of the leaders in this field. One of the executive units of Venezuela's Ministry of Agriculture and Livestock is the Extension Service or 'Direccion de Extension'.

The general policy of the service is to improve the economic and social conditions of peasant populations. Furthermore, extension work is strongly aimed at raising agricultural production and, in some cases, like Venezuela, eliminating food imports and building up an export trade.

Through methods of informal teaching, peasants—in many cases illiterate—are taught new skills, habits and attitudes in organizing their own life. More specifically extension services assist peasants by way of practical instruction, leading them to adopt better production techniques according to modern agricultural knowledge. Work is directed towards better utilization of lands, better organization of production processes and of the commercialization of agricultural and domestic animal products.

According to the official policy established, extension work is being carried out mainly among those peasant sectors involved in national agrarian reform plans. This requires coordination with the work of other official agencies, such as the Agrarian Reform Institutes, or other specific development and aid programs in Latin American countries.

The extension service pays special attention to the education and practical instruction of peasant youths through organizations such as the 'V-5' Clubs in Venezuela, which have been in existence for many years. Peasant boys and girls from under ten years up to the age of eighteen years are being educated in a spirit of responsibility as members of a supporting sector of the country's progress. At present in Venezuela some 700 such local groups are operating. Each year thousands of youths gather on 'Peasant Youth Days'.

Finally, extension programs include the training of advisers and medium level experts in agriculture, soil conservation, the use of fertilizers and herbicides, pest control, plant nurseries, etc. Many of these trained people come from the Youth Clubs, and they are given facilities to visit and exchange experience in other countries. Training of this personnel is carried out through 10 Agricultural Schools run by the Ministry of Agriculture and Livestock in the principal agricultural zones of the country.

### (b) Specific Extension Tasks

#### (i) *Technical programs:*

The extension service of Venezuela supports permanent technical programs in order to raise production of a series of important farm items. There are special program agencies for coffee, cacao, bananas, rice, corn, grains, forage, fruit, cotton, oleaginous seeds, fibrous plants, sheep and hog raising. These programs are being operated in connection with experimental stations and investigation centers, and they are coordinated with the agrarian reform and with government production

objectives. Technical production supervision, depending on the crop, may include such farming practices as mechanical soil preparation, timing, fertilization, seed density, cultivation, irrigation, chemical and manual weed control, disease control, crop rotation, harvesting and storing.

(ii) *Domestic (family) economics:*

Besides agricultural extension work and youth education, the government extension services in Venezuela are directed towards peasant women's education. Young girls showing vocation, and usually of peasant origin, are being trained in special schools in order to disseminate through 'Peasant Housewives' Clubs' the knowledge and skills for a better rural life. The corresponding extension programs cover the following activities: food and nutrition including infant nutrition; better house-keeping; home improvement, hygiene, clothing, poultry raising, and home industries in the form of manual work and crafts, and fruit preserving.

Two things deserve being pointed out in connection with the foregoing: -

The described extension work reaches only part of the rural population, that is those peasant families established in specific agricultural zones and in settlements supervised by Agrarian Reform and related authorities. Extension benefits do not reach the majority of peasants living dispersed in the country or leading a precarious existence as 'nomad tillers' in the mountains of the watersheds.

Secondly, the main goal of extension work is to push production in order to meet pre-established economic objectives, produce exports being one of them. While this may be considered as a legitimate economic policy, it does not always benefit the peasants, that is the producers. There is no real guarantee that this policy leads to long term 'rational use' of natural renewable resources and to their safeguarding for the peasants' children and their children's children.

### **III. CONSERVATION EDUCATION**

#### **(a) Attitudes towards Environmental Education**

Differing from agricultural extension as it has been outlined above, conservation education is aimed at the widest and most complete education of individuals of all ages and conditions as to their true relation to environment and to the sources of their very existence, including material as well as non-material values derived from nature. It concerns also, and perhaps primarily, the population majorities which live in urban centers, where conservation policies are made and environmental changes are decided about.

While this is a matter of such vital importance in the present stages of development of Latin American countries, it is apparent that on the whole there is little progress. On the other hand, there is awareness about natural resources problems, a public concern stimulated by frequent calamities such as food shortage and high prices, forest and savanna fires, floods and droughts, which in some cases are severe enough to shake national economies.

Slow progress in the cultural conservation movement has its explanation in certain mental attitudes which are typical of the present development trends of Latin American countries. As a background there still exists the fatalistic

belief of natural resources being inexhaustible, notwithstanding the visible fact of vast destruction of forests, soils, animals and water resources. The 'unconquered earth' legend is still in full vogue, in children as well as in grown-ups, and is now being enriched by hopes of new land and resource discoveries in other planets.

Public and official attitudes towards nature conservation are further influenced by the technical outlook, in that civil engineering concepts and methods are dominant in the urge for fast and spectacular modern development, in such a way that nature protection and concepts of environmental conservation on an ecological basis are presented as 'backward'.

Development projects are also based on economic concepts. Our economists are the principal advisers of political leaders. Leaving entirely aside environmental and human conservation, the economist regards the exploitation of natural resources, soils, forests, etc., as a success if the product of the 'sales' is greater than the investment plus operational costs; such calculations do not take into account the possibility or probability that a renewable resource sooner or later may be left exhausted or destroyed. Scientific conservation aimed at safeguarding renewable resource potentialities for future use is of no concern to economic advisers, who even maintain that conservation methods are anti-economic. Thus, to politicians the conservationist's demands are 'inopportune'.

Of at least the same influence on public and official opinion are the concepts widely sustained in Latin American countries by most of the technicians directly working with renewable resources, as in the case of forests and land. In keeping with prevailing economic principles, they advocate the 'rational use' concept as a modern equivalent of nature protection and environmental conservation. While this is an extremely dubious concept, the fact remains that as a result of this technical viewpoint official and public opinion tends to believe that everything is being taken care of and that there are no problems to think about, thus considering conservation science and conservation education as 'superfluous'.

### **(b) Official action in Conservation Education**

Reliable reports from experts and educators of different Latin American countries show that nowhere is conservation education being included formally and systematically in school programs of different levels. One of the many letters received by this author is revealing; it comes from Argentina, the writer is a geologist, and he says as follows:

'In the daily newspaper "La Nacion" of Buenos Aires I read about the publication of your book "Conservation Teaching in Venezuela". I would very much like to get a copy of it... Here in Argentina practically does not exist the least notion about conservation. Neither in our Universities nor in teacher's training colleges or in our public schools is there any instruction on natural resources conservation. We are very ignorant in this field, and it can be said that our many development problems and our unstable political situation are due to the fact that the authorities as well as the broad public ignore entirely how to take care of our natural resources...'

In Venezuela repeatedly during recent years official announcements have been made about the inclusion of conservation teaching in school programs at primary and secondary levels. So far nothing of the kind has materialized.

The main reason for this lack of initiative lies in the concepts and tendencies which have been explained above which are responsible for the confusion prevailing in these matters in Latin America.

### **(c) Private initiatives**

As is natural, individuals or small groups acquainted with or interested in conservation and environmental problems are actively trying in several Latin American countries to spread knowledge about man and the basis of his existence—fighting against all odds, as Don Quixote did in his time.

Perhaps one of the most successful attempts has been made in Venezuela by introducing conservation knowledge to youth groups from Secondary schools and Universities, guiding them to carry on conservation teaching themselves, through series of informal talks in Primary schools and even in Teachers Colleges. In the course of five or six years this experiment has resulted in a snowball action, with several thousands of youths learning each year about the fundamentals of conservation.

Lately special attention has been directed towards rural zones which do not get the benefit of the official extension services, especially in the poor and forgotten areas of the Andean region, where shifting cultivation on steep hill sides causes severe resource destruction.

## **SUMMARY**

Latin America is a rich source of news about development problems, the population explosion, and other events of a sometimes rather violent nature.

Soil and forest resources can still be considered as more than adequate to produce food and raw materials for the needs of existing populations. The proverbial poverty which continues for most people in Latin America is rooted in social and political conditions rather than in resources shortage. The usual demand for 'more acreage for production' will have to be changed into a policy of 'more production per acreage'. Actual population growth rates seem to be increasing; at present most of Latin America's population is under 19 years of age. While economic structures continue to be mainly agricultural, the population flow from rural to urban zones increasingly results in situations which are similar to those existing in highly industrialized countries. All hopes in Latin America lie with rapid industrialization. However, it is likely that industrialization and rationalization will not solve the population problem.

During recent years, and in some cases for decades, extension work has been furthered in all Latin American countries. Through methods of informal teaching, peasants—in many cases illiterate—are taught new skills, habits and attitudes in organizing their own life. More specifically extension services assist peasants by way of practical instruction, leading them to adopt better production techniques according to modern agricultural principles. Work is directed towards better utilization of lands, better organization of production processes and of the commercialization of agricultural and domestic animal products. According to the official policy established, extension work is being carried out mainly among those peasant sectors involved in national agrarian reform plans.

Peasant boys and girls from under ten years up to the age of eighteen are being educated in a spirit of responsibility through organizations such as the 'V-5'

Clubs in Venezuela (700 local groups at present). Finally, extension programmes include the training of advisers and medium level experts in agriculture, soil conservation, the use of fertilizers and herbicides, pest control, plant nurseries, etc.

In Venezuela, the extension services include, especially, technical programmes for crop production and women's education for an improved rural life. This work, however, reaches only a part of the rural population and there is no real guarantee that this policy leads to long-term 'rational use' of natural renewable resources and to their safeguarding for the peasants' children and children's children.

Differing from agricultural extension, conservation education is aimed at the widest and most complete education of individuals of all ages and conditions. They are shown their true relation to the environment and to the sources of their very existence, including material as well as non-material values derived from nature. On the whole there is little progress in this field. Slow progress in the conservation movement has its explanation in certain mental attitudes which are typical of present development of Latin American countries. As a background there still exists the fatalistic belief that natural resources are inexhaustible. The 'unconquered earth' legend is still in full vogue. It is even being enriched now by hopes of new land and resource discoveries on other planets. Public and official attitudes towards nature conservation are further influenced by the technological outlook, in such a way that concepts of environmental conservation on an ecological basis are even presented as 'backward'. To the economists who are the principal advisers to political leaders, the exploitation of natural resources is a success if the products of the 'sales' is greater than the investment plus operational costs. As a result of dubious technical arguments, official and public opinion tends to believe that everything is being taken care of and that there are no problems to think about, thus considering conservation science and conservation education as 'superfluous'.

In spite of this situation, nowhere is conservation education formally and systematically included in school programmes of different levels in different Latin American countries. Individuals or small groups acquainted with or interested in conservation and environmental problems are actively trying in several Latin American countries to speed knowledge about man and the basis of his existence. Perhaps one of the most successful attempts has been made in Venezuela by introducing conservation knowledge to youth groups from Secondary schools and universities. Lately special attention has been directed towards rural zones which do not get the benefit of the official extension services.

## **RÉSUMÉ**

L'Amérique Latine est un continent riche en problèmes de tous genres: développement, explosion démographique et autres événements d'un caractère parfois violent.

Les ressources du sol et de la forêt sont encore bien assez abondantes pour pouvoir subvenir aux besoins des populations en aliments et en matières brutes. Le dénuement proverbial de la plupart des peuples d'Amérique du sud découle de la situation politique et sociale plutôt que d'une insuffisance de ressources. La revendication habituelle du 'plus d'hectares en production' devra être transformée en une politique du 'plus de production par hectares'. Le rythme actuel

de l'augmentation de la population semble s'accroître et actuellement, la majeure partie de la population d'Amérique du sud a moins de 19 ans. Tandis que les structures économiques continuent d'être essentiellement agricoles, la migration des populations rurales vers les villes suscite de plus en plus des situations semblables à celles que l'on observe dans des pays hautement industrialisés. L'avenir de l'Amérique Latine dépend d'une industrialisation rapide. Toutefois il semble vraisemblable que ni l'industrialisation ni la rationalisation ne résoudre le problème de la poussée démographique.

Durant les années passées et dans certains cas depuis des dizaines d'années il s'est fait dans tous les pays d'Amérique Latine un lent travail de développement. Les paysans, souvent illettrés, ont appris grâce à un enseignement officiel de nouvelles techniques et ont pris des habitudes et des attitudes nouvelles dans l'organisation de leur propre vie.

Des services de développement amènent les paysans, par une formation pratique, à adopter de meilleurs techniques de production fondées sur des principes d'agriculture modernes. Cette action vise à une meilleure utilisation des terres, une meilleure organisation de la production et de la commercialisation des produits agricoles végétaux et animaux. Conformément à la politique officielle, ce travail de développement est mené principalement parmi les secteurs ruraux touchés par les plans nationaux de réformes agraires.

On développe chez les jeunes ruraux de 10 à 18 ans le sentiment de responsabilité grâce à des organisations du genre des 'Clubs V5' au Venezuela (700 groupes locaux actuellement). Enfin, les programmes de développement comprennent la formation de conseillers et d'experts ayant un niveau moyen de connaissance en agriculture, conservation du sol, emploi des engrais et des herbicides, lutte contre insectes et maladies, pépinières etc.

Au Venezuela, les services de développement comportent en particulier des programmes techniques destinés à améliorer la production agricole et à éduquer les milieux féminins ruraux. Cette action n'atteint toutefois qu'une partie de la population rurale et il n'est nullement garanti que cette politique conduise à une 'utilisation rationnelle' des ressources naturelles renouvelables ou à leur sauvegarde pour les générations futures.

Contrairement au développement agricole, l'éducation en matière de conservation cherche à toucher le plus grand nombre possible d'individus de tous les âges et de tous les niveaux. Grâce à cet enseignement, ils apprennent à comprendre leurs relations avec le milieu naturel qui les entoure et avec les racines mêmes de leur existence ainsi qu'avec les valeurs matérielles et non matérielles dérivées de la nature. Il y a dans l'ensemble peu de progrès dans ce domaine. Cette absence de progression s'explique par certaines attitudes mentales qui sont caractéristiques de l'évolution actuelle des pays d'Amérique Latine. A l'arrière plan, on retrouve la croyance fataliste au caractère inépuisable des ressources naturelles. Le mythe de la 'terre inconquise' est en pleine vogue. Il est même alimenté par l'espoir de la découverte de terres et de richesses nouvelles sur d'autres planètes. L'attitude du public et des autorités est en outre influencée par le développement de la technologie, à tel point que les concepts de la conservation écologique du milieu naturel sont souvent présentés comme des notions 'dépassées'. Pour les économistes qui sont les principaux conseillers des chefs politiques, l'exploitation des ressources naturelles est avantageuse si le produit des 'ventes' est supérieur aux frais d'investissement et aux frais opérationnels réunis. Sous l'influence d'arguments techniques d'un caractère douteux, l'opinion publique et gouvernementale tend à croire que tout est pris en main et qu'il n'y a pas de problèmes

dans ce domaine, considérant comme superflue la conservation de la nature et l'éducation en matière de conservation.

Dans aucun pays d'Amérique Latine, les disciplines de la conservation ne sont inscrites officiellement et de façon systématique aux programmes scolaires des différentes classes. C'est au niveau de l'individu ou de petits groupes de personnes connaissant les problèmes du milieu naturel et de la conservation que naît une action dynamique en vue de développer les connaissances sur l'homme et le milieu dans lequel il vit. Il est possible qu'une des tentatives les plus réussies aient été faites au Venezuela où des groupes de jeunes des écoles secondaires et des universités ont été formés aux notions de la conservation. Depuis peu, l'attention des promoteurs de la conservation s'est plus particulièrement tournée vers les zones rurales qui ne jouissent pas des avantages des plans de développement officiels.

# Environmental Education in Relation to National Parks and Rural Education in an Urbanizing Culture

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The history of man's relationship to his environment is one of missed opportunities and poor timing. When we have needed an enlightened look at resource management, we have instead torn at our world with a grasping, bare-knuckled determination to 'get ours.' When the problems we created became of interlocking, worldwide magnitude, demanding an ecological, conscientious concern, we reluctantly compromised by adopting a resource-oriented 'conservation' policy.

Today, the world hurtles on into a population-pollution trap that will shortly make nonsense of any attempt to differentiate between the 'resource problems' of urban and rural areas, and nothing short of sober contemplation of the entire world and all of mankind will do as a 'conservation' point of departure. It is man's attitudes and behavior, rather than natural resources, that have become the only relevant focal point for environmental education. If we fail to make this quantum jump, we risk losing another lap in our race against time. The National Park Service is pioneering an education effort in this new direction.

The National Park idea emerged first in the United States, almost a century ago, and the idea subsequently caught on in more than 90 nations.

The System's unique blend of natural parks and historic sites and recreation areas makes it a superb trial arena for an innovative program that identifies the individual with his natural and cultural heritage.

Essential to this program is the understanding that 'environment'—in the only sense that it matters to man—consists of everything in the universe as it relates to man, and that the laws that operate this universe cannot be circumvented, broken or repealed. Everything in the universe has a place, and each individual human being is truly 'at home' on his planet. He belongs here. He has a right to be here. He can learn, if he will, what else is here and how it all operates, relates, interacts and together makes up his world.

The forces that control environment in rural areas are the same as those that determine what the urban environment will be. The rural child will grow up to be highly aware of nature in the environmental equation that locks him in; the urban child will bear much less of what some psychologists would call a 'nature imprint.' But each child can learn that nature insists on balance and will make that balance prevail, no matter what price is extracted from the quality of life (as human beings judge it) as payment for the demands that human culture makes upon nature.

A woodland or a meadow community, without man, is in 'natural balance.' Along comes humanity with its toll for food and transportation and entertainment, and nature is temporarily 'knocked off balance,' as we see it. The en-

vironmentally enlightened child will see that the balance has merely been re-established, with diluted quality as the price for convenient dumping of wastes into air and water, for paved greenery, for miles of one-crop agriculture with its increased susceptibility to one-stroke disasters of various kinds.

The total picture, then, is what we are after in today's attempt to match environmental education to the environmental problems. The old conservation education dealt with wise use of natural resources, but these uses cannot be communicated without talking about the interactions and interdependencies of man with these resources.

In short, the National Park Service is in a peculiarly apt position for expressing and utilizing the duality of man's environment—his cultural and natural worlds. Today's environmental problems are made up of an increasingly complicated blend of the two worlds; the Park Service is responding with an environmental education program that acknowledges the validity of both worlds and demonstrates that there is no real, fundamental dichotomy, but rather, a potentially highly workable synthesis—and, further, that it is up to man to achieve this synthesis. The factors are all there. The rules were written in the beginning. Whether we come up with Armageddon or Elysium is up to us. If we opt for Elysium, then our environmental education will have to include heavy emphasis on human behavior, for this is the mother lode of our greatest ecological resource or the dark breeding place of our direst ecological disaster.

To implement this new approach, the Park Service has begun with a very proper role—that of communicating the natural and cultural values of the National Park System in the most meaningful ways open to us.

We have begun by making an effort to communicate these values not only to our visitors and to the public at large, but to our own employees as well. Members of the National Park Service family now attend special meetings and classes to update their understanding of the science of ecology, including human ecology. Everyone from truck driver and maintenance man to park ranger, superintendent and head office executive personnel has been exposed to a new look at his own job responsibilities in the light of the complicated world of human ecology.

The result has been better park maintenance and operations, better park design and planning, better programs developed by these men for our park visitors. This man-centered approach to the world, if it is valid, can be applied with equal relevance and success in urban or rural situations—in industrial or agricultural societies—in National Parks or assembly lines—in kindergartens or old people's homes. It has been a pleasant surprise to see how much more important our park personnel feel their jobs are, how much more readily they grasp and solve the problems involved once they realize their lives are personally inter-related with their daily work responsibilities.

But if we feel the man-centered approach to the environment is successful among the park professionals, we are even more optimistic over the results with children. We have crystallized the approach into two major education programs offered by the National Park Service, and this, briefly, is how they work.

The National Environmental Education Development (NEED) is a program designed to provide deeper understanding of the values to be found in visits to National Park areas, and to foster environmental awareness and involvement in the individual child, beginning with appreciation, and leading, at the high school level, to a pragmatic environmental ethic.

Essentially, it is a 'self-centered' program, for only through self-interest do

we stand a chance of reaching solutions to our mounting environmental problems. If there is any possibility of our survival as a species, that possibility involves convincing a sufficient number of individual human beings that they are, indeed, both creatures and creators of their world.

NEED, designed for kindergarten through 12th grade, is an environmental awareness program. It says: There is one web of life and you are part of it; the web is in trouble; you can do something about it.

The elementary phase of this curriculum-integrated program stresses appreciation of the environment; intermediate grade work deals with uses and abuses of resources. At the senior high school level, the goal is to shape the individual's increased will and ability for improvement into a workable environmental ethic ... a dependable guideline to responsible action.

In all the materials, the student himself is the beginning and the end of the lesson. The questions suggested all contain the first person singular. 'How do I fit in? What does it all mean to me? How do I affect it? Where does "it" leave off and "I" begin?'

Eventually the answer surfaces in the child's mind: I and the world are one, indivisible; the total web of life involves me and my every action.

The environmental ethic, goal of the program's third phase, naturally becomes a matter of some interest at earlier stages in the program, especially so for youngsters who tend more easily to relate abstract ideas.

A week in an outdoor laboratory, the 'on-site' part of the NEED program, is planned to occur at least once during each of the three program phases. When they arrive on site, the children are told to find their own place, a piece of earth to be their very own for one hour each day. They are encouraged to 'stake out' their spot, and to use the hour for drawing, painting, writing, conducting an experiment, or just meditating. Out of these quiet hours have come some amazing reversals of established behavior patterns, some profound flashes of environmental insights.

The NEED program is built out of the universal environmental constants-interrelationships, interdependency, change with continuity, similarities and diversities, patterns, adaptation and evolution. These are the 'big ideas' of the NEED program, the environmental 'strands' that run through lessons as diverse in subject matter as history, communications, mathematics, art, geography, social studies, and so forth. They have equal application within urban or rural settings.

As the child learns to recognize these strands, wherever they occur in nature and in human culture, he gains a sense of himself, of how he fits in to the world, of the idea that he has a right to be there, of the fact that there are certain rules he can depend upon and even learn to manipulate to his own advantage. If he is a child in an environmental trap, such as a rural or an inner city slum, the NEED program helps him to a new, 'cool' attitude—a quieting confidence that may come from his new feeling that there are ways out if he wants 'out,' that if he stays in, there are ways to change 'in.'

The personal awareness, the sharpened sense of environment and of the interweaving of self and world, were expressed by the students with an articulate skill that impressed the school staff members who participated. Luis M., 11, one of 19 members of his family living in three rooms in the Bronx, told the class during the last week of NEED work, 'I felt different when I came back—like a better person'. When his teacher pressed him to explain how he felt different, in what way, he responded, 'I felt smarter, and complicated.'

Yolanda was an oversized youngster with no visible interest, enthusiasm or even tolerance for the program. She endured the week on Fire Island in grim, negative silence—refusing to participate in any of the activities, morosely digging holes in the sand during her seemingly aimless Quiet Hour. Yet on the last day, Yolanda came to her teacher, alone on the beach, and after some agonizing hesitation, read her an original poem about God.

Yolanda's poem was her first, tentative step in what, for her, was a radical change of direction. One of the basic purposes of the NEED program is to make the individual feel like a rightful part of the total environment, at home in the world.

But beyond even this, was the year-later assessment of Dr. Bernard Friedman, Superintendent of District 7, Bronx, New York, who observed in the spring of 1969, that the classes which participated in the 1968 NEED field test had fewer discipline problems than other Bronx fifth grade classes and showed an increased eagerness to learn and a greater sense of cooperation with their teachers.

A second program, designed to reach a wider school audience, is the Park Service Environmental Study Area (ESA) network established on parklands across the nation. Programs operated on some 100 of these sites have been developed in cooperation with the local teachers and related to the NEED philosophy and structure.

The United States government has been seriously concerned for more than a century with the teaching of natural resource values. In answer to the pressures and environmental sore spots brought on by the early rape of the continent, the land grant colleges were founded, with their emphasis on agriculture, forestry, soil conservation—all of which played a major role in developing our rural economies along saner patterns.

But to continue our nationwide environmental education efforts solely along these resource-based lines has little relevance to a population 90% of whom never set foot on a farm. New learning methods are needed to bring about an environmental ethic on the part of the urban millions who make up the overwhelming bulk of our population in the world today.

Our new world population is a young one. All over the world, it is 'tuning out' the science-oriented value systems and concerning itself with personal values. The question today is 'What is my place and my role in the world?' To a high degree, young people today are rejecting the measuring sticks of their parents—even of their education systems. The 'credibility gap', once applied to armaments, is now more importantly applied by our children to man-established value systems.

Our children may be wrong in some of their struggles for new ways to 'realities.' But they have a sound suspicion that there is a terrible wall of irrelevancy in the old value systems they are asked to accept and operate under. In their music, their art, their drug experiments, their interpersonal relationships, they are trying desperately to make contact—with themselves and their worlds.

This phenomenon is not limited to the United States. It is being expressed by young people in every nation of the globe. It is more truly a Children's Crusade than any that was mounted in any previous age and it is washing over the world like a tidal wave.

The wise men of this crusade will be the humanists and the behavioral scientists. In retrospect, this awakening will not be viewed as a rejection of techno-

logy but rather as an affirmation of man in relation to the technology he has created.

Desmond Morris, in 'The Human Zoo,' calls this technology a 'natural outgrowth of our powerful, inventive, exploratory human urges.' Despite its hazards, he suggests that exercising it is 'the most exciting game the world has ever seen,' and he disavows any notion that the game should be stopped. 'Nevertheless,' he implores, 'there are different ways of playing it, and *if we can better understand the true nature of the players\** it should be possible to make the game even more rewarding...'

In the years to come we may well look back on the 1960s as the beginning of the end of the reign of unbridled technology and the emergence of individual human dignity as the ultimate measuring rod of environmental quality.

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\* Italics supplied

## Supplementary Note on the Educational Program of The National Wildlife Federation

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More than thirty years ago the National Wildlife Federation was founded by a group of concerned Americans. These men were alarmed about the fate of our natural resources and our rapidly disappearing native wildlife. They were determined to launch a crusade to preserve our great natural heritage. During the ensuing years, they have been joined in the Federation by over two and a half million other Americans who share their concern.

From the beginning, the primary purpose of the Federation has been to enlighten all of the people of our country to the need for the wise use of our natural resources. Our conservation education efforts have taken many forms and have met with varying degrees of success. As the years went by we were reaching millions of adult Americans with these materials while the quality of our environment continued to degenerate with alarming speed. Obviously, some new approach was needed.

The idea for a nature club program for young people was first conceived in 1960. Great enthusiasm was expressed, but for lack of funds and personnel, the program could not be implemented. Over the course of the next year, considerable planning and research was carried out, but this was the extent of our progress.

At about this time a proposal to create NATIONAL WILDLIFE magazine was developed. It was felt that a colorful nature magazine could be launched and sold to a substantial adult audience and that it might provide the springboard for the development of our program for young people. This proved to be absolutely correct because NATIONAL WILDLIFE has been self supporting since its inception and it continues to provide support for other expanded environmental education programs.

In 1966 we decided that the time was finally right to renew our thinking about an environmental education program for children. Our confidence in the success of this project was based in large part on the results of a survey made among our own Associate Members. Among other questions which were asked, we inquired as to whether or not they felt that their children were receiving adequate conservation education in their school curriculum. Nearly 100% said, 'No.' We asked if they, as parents, would be interested in making such information available to their own children through a nature club program and a nature magazine. Nearly 65% answered affirmatively.

We talked with educators and learned that a child achieves 50% of his general adult intelligence by age four, 70% by age seven. The years before age ten determine very largely what a child will be when he grows up. What better time to instill in children a love of nature and an identification with all living things?

The results of these investigations gave us the confidence to launch the program which we had been planning for such a long time. We were ready to organize a nature club for elementary school age boys and girls. An important element in their club membership was to be a colorful magazine to be mailed to their homes ten times a year.

Our long-established National Wildlife Federation symbol, Ranger Rick, a stylized raccoon, seemed to be the perfect character around which to build our new program. Already in existence at that time were two children's books written by our able business manager, Mr. J. Ash Brownridge. Each of them told of an adventure which Ranger Rick and his animal friends had had while trying to help solve a major conservation problem; water pollution and forest fires. In a natural evolution the adventures of Ranger Rick became a regular feature in RANGER RICK'S NATURE MAGAZINE, the publication we went on to develop for young people. Ranger Rick is a character who helps children identify with the natural world. In the rest of the magazine we let the fascinating facts of nature speak for themselves.

Three years ago this fall we sent out our first direct mail announcement of the new program and when the first issue of the magazine went into the mail on December 15, we had enrolled more than 31, 000 children in Ranger Rick's Nature Club. Since that time the memberships have grown to nearly 225, 000 youngsters who are eager to learn all we can teach them about nature, natural science and conservation.

The children's response to the program was instantaneous. All of their mail comes addressed to Ranger Rick, not to us on the staff. They believe in what he is trying to do, and plainly care very deeply. Their letters open wide the usually secretive, wonderful, often hilarious world of their hearts.

A letter turned up recently in Ranger Rick's mail that read, 'I have decided to learn all about natur. Please sent it to me at onse' (*sic*). The letter was written in a childish scrawl on the back of a bill from a dry cleaner, and while it is a large order to fill, it is typical of the sincere attitude and interest in wildlife and conservation evident in every one of the hundreds of pieces of mail that Ranger Rick receives every week from our six-to-twelve year old readers.

Pennies arrive taped to the bottom of pages torn from note pads to 'buy things to help with your problems.' They sometimes offer solutions to problems that show wisdom beyond their years. Many of the letters are amusing, but their seriousness is always beyond question. They tell Ranger Rick in detail about their homes and pets and confide their hopes and fears to him. They complain about the attitude of adults (including their parents) toward wildlife and natural resources. They tell how proud they are to know the things they have learned from the articles and stories and frequently ask where they can learn more.

The nature questions they ask range from what to do with a bird's egg found on the ground (one child put the egg in a box with some grass and a dish of water and asked what to do next) to block busters like 'What is the approximate weight loss per week of a groundhog in hibernation?'

Above all, the children offer their greatest gift, *trust*, and a willing suspension of disbelief, each according to his or her own frame of reference. One little girl wrote, 'Are you a real raccoon? I hope not.' A boy wrote, 'The woods come right up to my back yard. I hope you will come see me some day.' He followed with complete directions and his phone number. The boy who sent the phone number probably doesn't believe in the existence of a raccoon such as Rick

any more than the girl who hopes he isn't a raccoon. But the boy offers his allegiance to the world of real wildlife by pretending Rick exists just the same as does the girl who wrote him—'Even though I know you aren't real.'

How could anyone resist a challenge as rewarding as this opportunity to communicate with young children on a subject to which they respond so fully? The magazine is a project loaded with personal satisfaction for all of us associated with the National Wildlife Federation.

But, the magazine is only a part of the program. Each child who becomes a member of Ranger Rick's Nature Club receives a membership certificate and badge along with other benefits through the year. He is also eligible to start a neighborhood club or to try to interest his teacher in starting a school class club.

Children who wish to share the fun of discoveries they have made as readers of the magazine, are invited to write Ranger Rick for advice on how to interest adults in their club plans. He feels this is very important since many adults have special interests and skills that can enrich the club programs. And they are needed to help arrange field trips, museum visits and other explorations. Also, adult leaders can and do bring to the attention of the community a local conservation problem discovered in the course of a club investigation.

Ranger Rick also tells the would-be clubs how to hold organization meetings and gives them advice on getting off to a good start. When a club is duly organized and has a willing adult advisor, it may apply for Official Branch Membership and receives a handsome certificate for framing. This, and the repetition of Ranger Rick's Pledge at club meetings serves to remind them that they are affiliated with like-minded groups in 43 states and several foreign countries—1, 253 clubs in all as of October 1969. Clubs have been joining at the rate of 40 to 50 a month in recent months.

NATURE CLUB NEWS—a page or pages in the magazine—keeps clubs up to date on monthly awards given by the National Ranger Rick organization for nature study and conservation projects. Recent examples are a special study by a School Class Club of African wildlife with drawings and poems and data on food and habitats; a book on birds and the foods they eat complete with pictures of different kinds of bird feeders which the club members made and faithfully kept supplied with food; and a conservation display arranged in the school library along with three exciting animal books donated by the club, pictures of animals that have been saved by conservation and (as the child reporter put it) 'pictures of people and the dangers of smog and water pollution.' Another favorite project has been painting and installing large permanent trash cans on school or nature center grounds and regular weekly cleanups.

One enterprising parent-leader of 23 six-to-seven-year-olds arranged for her club to meet every other week after school in a classroom where they have the use of conservation films and other study aids provided by the State. Another parent-leader wrote 'The ingredients that make a Nature Club successful are anticipation, participation, variation, competition, recognition (special awards) and a theme. It takes enthusiasm and concerted effort but it becomes a fascinating and challenging hobby. And after all, I do have the most mind-expanding subject: learning about nature. The Rangers really go for it. So there's no "sell" job—just the problem of how to organize a way to have fun with nature so it comes off with a purpose.' This leader, by the way, alternates meetings where nature games, dramatics and studies (metamorphosis, fossils and the age of the Planet Earth) are the features, with workshops where they happily assemble their fossil and insect collections or make such prize-winning exhibits for the State Fair as one entitled 'Cradles of Life: Soil, Water and Air.'

With leaders such as these, we can not help but feel as the National Wildlife Federation that one of the greatest benefits to arise from the Official Branch Clubs has been the opportunity afforded adults to use their talents, knowledge and enthusiasm in the most rewarding way possible.

Another thing about which we are happy is that the magazine does not have to be 'sold' by adults to children. One teacher put it this way, 'I don't *teach* Ranger Rick; I simply announce its arrival.' In a day when there is so much talk about Children being bored with education, this is extremely encouraging to an organization whose aim is indeed to educate in the broadest of fields, namely: how all living things affect each other and the world they live in. If there is fun and excitement along the way—so much the better! For we know that this generation of children must understand in their very bones the delicate balance between living things and their environment. We believe they can and should discover for themselves exciting examples great and small—from the hydrological cycle to a meadow food chain—examples of the giving and receiving that goes on among plants and animals (including themselves) and sun, soil, water and air.

Teachers and parents both tell us that they have found that Ranger Rick's Nature Magazine provides children with two-way motivation. One impels them from the home, club meeting or classroom to the library for more knowledge—even the reluctant readers. The other sends them into the outdoors to explore with heightened wonder and a keener understanding of what they are seeing.

Prompted by the questions and requests of teachers and leaders who seek to capitalize on both indoor and outdoor interests created by the magazine, we publish a free Teachers' and Leaders' Guide. It is written for us by a nursery school director, a primary teacher and an intermediate teacher who use the magazine in their classrooms. It features all manner of extra things to think about, talk about and do with specific articles in each issue. It suggests ways of using the content to inspire creative writing, music, word games, dramatics, art and crafts, as well as enriching the social studies and science curricula at different age levels. It encourages teachers and leaders to share with others their most rewarding ideas and projects.

The concept of One World may still be as far from realization *politically* as it was in Wendell Wilkie's day. But ecologically there has always been one world, the biosphere. The unending cycles of the necessary elements of life are not concepts beyond the understanding of children,—nor is the fact that short-sighted application of certain technologies can insert deadly elements into these life-giving cycles.

With this understanding our children can become the New Conservationists who realize the crucial importance of keeping nature's cycles in order. And conservation becomes both a *technology*, for combating the dangers of other technologies, and the *sound basis for laws* that support wise choices about the environment and its resources.

Now that our program is three years old we have only one regret—that we could not get it started sooner. The adult population of today cannot hope to accomplish all that is needed to be done to stop the pollution of our environment. We must be able to count on our children and our children's children to carry on the fight. How well we prepare them for this awesome responsibility may be the ultimate answer to man's survival.

We believe we have taken a major step in this direction.

## Section 5: ASIA AND AFRICA

### REPORT OF THE PROCEEDINGS

The Chairman stated that the final groups of papers contributed for the Session included those relating to countries of Asia other than India and also two papers from Africa. The first paper presented was by Prof. Dr. Jukuchi Shimoizumi on *Some Problems of Conservation Education in Biology Teaching in Japan*, which was read by Mr. J. Mishima on behalf of and in the presence of the author.

Dr. Emil K. Urban (Ethiopia) then introduced the paper on *Ecological Conservation Education in Ethiopia*, which he had prepared in co-operation with Mr. W. J. Murphy.

He was followed by Dr. H. Elliott McClure (U.S.A.) who presented a philosophical survey entitled *In Contemplation of the Global Wildlife Conservationist*.

The Chairman said that, unfortunately, the next contributor, Professor Denys Morgan, had not been able to come to New Delhi, but his paper on the *History of Conservation Education in Central Africa* had been distributed to participants and was stimulating reading. Instead, an additional paper which had been contributed to the programme, on *Nature Conservation Education in Indonesia* would now be introduced by Dr. R. C. Tarumingkeng, joint author with Dr. H. Basjarudin and both from the headquarters of Indonesian Forestry Administration and research institutions at Bogor.

After thanking those who had introduced papers the Chairman then opened the subject for discussion.

*Mr. C. E. Jayewardine* (Wildlife Protection Society of Ceylon, Chaitiya Road, Fort, Colombo, Ceylon): Although ours is a small country, we have two very good national parks in which most species to be found in similar areas of India occur except for tiger. We have been absorbing a lot of knowledge during this session, but I rather agree with what my friend from Kenya said earlier and feel that some speakers have been in danger of becoming a little impractical. We would like to educate a hundred per cent of the people in conservation, but although out of our 10 million there is a high literacy rate (over 90 per cent) and the standard of education is also high, I am still not sure how conservation fits in to the education pattern: it is of no use being too academic about it. When we go to villages and towns, we are asked the following question: 'How does this conservation education help to train us for a job?' As my friend from Kenya mentioned, there is at the moment no answer to that question. How then are we going to convince the people of the value of this education? At present, all we can do in Ceylon is to select children from the schools and ask them to distribute all the literature we can possibly obtain that is relevant; this is how we are trying to tackle the problem.

*Mr. Dewar W. Goode* (3 Mandeville Crescent, Toorak 3142, Victoria, Australia): I suggest that Australia might provide facilities for the regional (South-East Asia) education of rangers and others concerned with National Parks. The kind of thing I envisage would be a three weeks course starting at Wilson's Promontory National Park, Victoria, moving to the Kosciuszko State Park in N.S.W. and then to an appropriate area in Queensland. The course would be in the form of a moveable seminar of lectures, discussions and visits to National Parks. Subjects would comprise Ranger Training, National Park Management which

would include wildlife management, conservation control of exotic flora and fauna, amenity services, public relations, standards of signs and symbols, nature trails and so on.

It would be necessary to obtain funds from some charitable foundation for fares and personal expenses for visiting personnel. I would expect that the State and Federal Governments would assist in movements within the States and possibly some accommodation. A good aim would be a group composed of 2 representatives from each nation, including perhaps an amateur representative from an appropriate conservation body. I have taken the liberty to discuss this in a tentative manner with representatives and delegates from India, Malaysia and Indonesia.

*Dr. S. Somadikarta* (Zoological Museum, National Biological Institute, Bogor, Indonesia): In South-East Asia, especially in Indonesia, nature conservation education is just being introduced in schools. Thus, the gap between the people who understand something of conservation, and those who do not, is very wide indeed. One of the most urgent steps needing to be taken, especially in South-East Asia, in my opinion, is to educate the customs officers. I raise this point because it does happen, for example, that a permit is given for exporting jungle fowl, but very often it is a crown dove that is in fact exported under the permit; or a permit is given to export a monitor, but a giant komodo is exported in its place. But crown dove and giant komodo are protected by law, and this abuse of the permit system is a serious threat to rare species.

*Mr. G. U. Kurup* (Zoological Survey of India, Southern Regional Station, Madras, Tamilnadu, India): Educating the rural population in conservation has been stressed, rightly, here as a major problem. In this connection, I may point out one existing organization which could be used to take the conservation idea to our villages. India already has Community Development Departments with a tremendous coverage all over the country. At present work is oriented towards social problems. But a certain amount of nature orientation could be introduced into this, and probably a conservationist could be appointed to each community Development block or perhaps a few conservation training schools could be opened where personnel of the blocks could be trained. This would incidently, provide some employment as well. I would also suggest that the great economic benefits of nature conservation should be demonstrated in the form of suitable posters in the villages, especially so as to remind the rural population of what can be done about the endangered species. It is all too easy for what is taught to be quickly forgotten. Another very important point regarding the wildlife conservation is the prevention of poaching. Special attention should be given, with adults and children, to this problem which has yet to be solved.

*Mr. Peter Scott* (The Wildfowl Trust, Slimbridge, Gloucestershire, U.K.): There has been considerable general success in environmental conservation education over the last few years; but specific educational effort needs only limited action. I think we would be able to point to real achievements in several limited fields. One of the limited fields discussed over and over again is the use of illustration providing pictures of creatures so that you can use them to get across the meaning of conservation, because the villagers do not know these creatures by name. This needs painters—painters in the idiom of the country where the pictures will be used. The IUCN Survival Service Commission notes that people, especially the young, are interested in endangered species. Their sympathy is aroused. Survival of species is an urgent business of us all. I hope the Commission on Education will be able to continue to co-operate with other IUCN Commissions, and particularly with the Survival Service Commission.

*Mr. E. M. Nicholson* (International Biological Programme, 7 Marylebone Road, London N.W.1, U.K.): During a visit this month to the Serengeti, and as a result of discussions in Dar-es-Salaam and Nairobi, I was impressed by the great opportunity and the urgent need for much closer cooperation between Park Management, ecological research programmes, university education and tourism. Such a park as the Serengeti, for example, is visited by some 30, 000 relatively affluent and keenly interested visitors a year. If they could be provided, on the spot, with attractive educational material not merely relating to what they actually see there, but also to the underlying problems of ecology and conservation in the perspective of the world environmental problems, then they would return to their countries better fitted to develop an informed public opinion and to support the right educational approaches. Moreover they would make it possible to develop complementary educational programmes in the countries where the parks which tourists visit are located.

## On Some Problems of Nature Conservation Education in Japan

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The recent remarkable progress of modern industries in Japan, where the population density is very high, inevitably causes the rapid exploitation of natural resources and the reorganization of natural environment. In another sense, the waste of valuable natural resources and the destruction of the natural balance have occurred in many ways and in many places.

Japan is really an island country. Honshu, Shikoku, Kyushu, and Hokkaido are the four main islands. Besides these there are hundreds of small islands making up Japan. Seventy percent of the total area is occupied by steep mountains. Until recently these mountains had been covered with fine forests. Unfortunately, these fine natural forests have been cut down and are gradually replaced by artificial forests, or sometimes the land is left bare.

It is well known that dangerous typhoons with strong winds and heavy rain attack Japan every year and cause bad flooding. Many houses and crops are carried away and many people are injured or sometimes killed by the floods and landslides. It is apparent that these are caused indirectly by cutting down the natural forest. Therefore, these disasters are partly due to human activity, not merely natural calamities. The relationship between cutting down of the forest and the landslides or the flood, however, is not well recognized among the general public. Ignorance of causal relationships in nature provoke these results. It is quite necessary to establish a more perfect nature conservation programme on the basis of ecological understanding of the role of forests in the mountain areas. In response to this necessity, our study group has just started to study such programmes.

There are similar problems to be dealt with in flat regions, where almost all areas are cultivated, mainly as rice fields, or are involved in urban development. The crop per unit has made a remarkable increase recently, in proportion to the increase in the use of insecticides and other chemicals. On the other hand, the influence of insecticides which are absorbed by rice on human health, especially the influence of mercury, is being discussed. The effect of contaminated rice on the human body is serious as are the indirect influences of insecticides which spread to the environs of the rice field. Sometimes these chemicals pollute fish inhabiting the streams near the paddy fields and consequently the chances of eating polluted fish have been increasing. Moreover, chemicals have exterminated valuable wild animals and plants, so the rich fauna and flora of the countryside is becoming poorer. Unfortunately, the system of conservation education in Japan is not sufficiently up to date. Difficulties in dissemination of the proper awareness and knowledge of nature conservation are mainly caused by the lack of good teachers who have enough knowledge in nature conservation and the necessary basic knowledge, particularly of ecology. In addition, difficulties in ecology itself have to be revised from the

point of view of conservation. The development of a 'new ecology' is urgently needed for this reason, namely to form a more precise basis for modern conservation education.

## **SUMMARY**

The most serious and urgent conservation problems which the general public in Japan should become aware of are: (1) the ecological role of mountain forests and the relationship between their destruction and dangerous floods and landslides; (2) the wide use of insecticides and other chemicals in the lowland rice fields, the pollution caused by this use and its potential dangers to human health. A conservation education system relevant to recent needs does not exist in Japan, but work on it has been started. There is a general lack of teachers well trained in ecology and conservation. There is a general need for the creation of a 'new ecology', to meet the requirements of nature conservation and also able to form a firm basis for proper conservation education.

## **RÉSUMÉ**

Au Japon, les problèmes de conservation les plus urgents et les plus graves qu'il conviendrait de porter à l'attention du public sont les suivants: (1) Le rôle écologique des forêts de montagne et la relation entre leur destruction et les grandes inondations et les glissements de terrain; (2) L'emploi très large des insecticides et d'autres produits chimiques dans les rizières des plaines basses, la pollution causée par ses produits et ses dangers possibles pour les populations humaines. Il n'existe pas au Japon de système éducatif en matière de conservation répondant à ces divers problèmes: mais on a commencé à étudier la question. On constate un manque généralisé de professeur ayant une formation satisfaisante en écologie et dans le domaine de la conservation. Il serait très nécessaire de créer une 'écologie nouvelle' fondée sur les besoins en matière de conservation de la nature. Ceci pourrait également constituer une base solide pour l'élaboration d'un système d'éducation approprié dans le domaine de la conservation.

## Ecological and Conservation Education in Ethiopia

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The urgency for ecological and conservation education in Ethiopia cannot be overstressed. Historically a community of people remained in one location only until the forests were depleted of firewood and the soils no longer yielded sufficient crops. The consequence in many parts of northern Ethiopia, like parts of the present Sahara, has been the creation of eroded areas, with few native game mammals and with only one or two trees where once forests grew. Because these habits of the past have not changed, the same situation is spreading southward at an alarming rate. Today it has reached the center of the plateau approximately level with Addis Ababa and, without methods of control will continue southward depleting many of the nation's remaining stands of forest, soils and wildlife.

Only in the last two or three decades have attempts been made to conserve forests, soils and the wildlife of Ethiopia. State forests have been established especially in Kaffa and Illubabor provinces, and re-forestation has been attempted. In 1966, pamphlets on soil and water conservation practices were distributed by the Forestry Division of the Ministry of Agriculture. The young Wild Life Conservation Department, established in 1964, has made a start towards protecting the wildlife of Ethiopia. Despite these efforts little progress in ecological and conservation education has been made either in the schools of the major cities of the Empire or among the populations of rural and woodland areas. Therefore, when one discusses conservation and ecological education in Ethiopia, the problems associated with them are applicable to all populated areas of the Empire, rural and urban.

One reason for Ethiopia's lack of conservation practices is that a substantial number of children never go to school. Another is that a comparatively small percentage of all students in the schools receive any education in conservation. Out of a total population of about 20 million, the total enrolment in all educational institutions in the academic year 1967-68 was 535, 225 students (1967/68 School census for Ethiopia, Part 1. Ministry of Education and Fine Arts, Addis Ababa). A breakdown shows that in grade 1 there were 149, 296 students whereas in grade 7 there were 24, 298. This indicates that from grade 1 to 7 there was an attrition rate of approximately 84%. This figure is especially interesting, for conservation and ecological education does not start in the Ethiopian school system until grade 7. This, of course, means that this large percentage of students are never exposed to these subjects.

Another factor which should be taken into account is that approximately half of the teachers in the schools in 1967-68 were Ethiopian nationals. In their training these teachers received little or no background in ecology or conservation. Subsequently, their students received no information on these subjects. Although most of the teachers of foreign nationality come to Ethiopia with some impression of conservation and ecological practices, most have but little knowledge of the local fauna and flora or of local ecological conditions. The result

is that the students are often more familiar with plants and animals from other parts of the world than from their own. In illustrating their scripts students commonly use bluebells, oaks, alligators, deer and tigers, organisms which do not occur in Ethiopia.

Present teaching syllabuses in the Ethiopian school system do contain sections on conservation and ecology. Although conservation education does not begin until grade 7, grades 1-6 are introduced to simple drawings of a mammal, a fish, a bird, an insect, a seed, a flower and a stem even as early as grade 1. In grade 3 animals in relationship to habitat are discussed; in grade 5 crops and soil types are mentioned. In grades 7 and 8 the science book used (Fontaine, B. and Smith, M. 1964. Science for young Ethiopians, books 1 & 2. Ministry of Education and Fine Arts, Addis Ababa) contains a chapter on 'Forestry and wildlife in Ethiopia' in which names of various mammals are listed with distribution maps. Colobus Monkey, Wild Ass, Lion, Mountain Nyala, etc., are included, but there are unfortunately few photographs or pictures. Students memorize the animals' names and their distributions but often do not know what the species look like. This also applies to plants. Types of forest and their distributions are given but not in Amharic. This makes identification of forest-types difficult because the students do not associate names given in text with Amharic names they know. There are other chapters in the science book which include topics on soil conservation, on game policy and one which has maps showing rainfall, climate, soils and distribution of original and present forests.

The subject material on conservation and ecological education for grades 9-12 follows what has been taught in grades 7-8 but in more detail. Soil conservation and agricultural methods are emphasized in the 11 and 12 grade technical schools. In grades 9-12 the phyla of animals are discussed; the plant kingdom is covered in detail. Yet terminating students (grade 12), writing the Ethiopian School Leaving Certificate Examination, are regularly unable to place certain named animals and plants into major (taxonomic) groups they have studied. Often a jellyfish becomes an amphibian, an amoeba a mammal and a fern a fish!

This problem arises from the fact that teachers fail through lack of appreciation or understanding to cover these subjects, although textbook material on conservation and ecology is available. Another difficulty is the language in which conservation and ecology are taught. By the time a student reaches grade 7, he is taught in English although his mother-tongue is Amharic or perhaps one of the other Ethiopian languages. Ethiopian tradition seldom has encouraged people to become familiar with the plants and animals of their surroundings, e.g. the Amharic word for any fish is usually simply 'fish', that for birds is generally 'big bird' or 'little bird'. Hence, learning the names of different plants and animals is a new concept to many of the students.

Efforts are being made in elementary and secondary education by Mr. M. Watson, Science Advisor, Ministry of Education and Fine Arts, to improve science teaching, including conservation and ecology. Mr. Watson is preparing new courses and a new teacher's manual. Photographs and drawings of all Ethiopian animals and plants are presented. Suggestions are given for practical exercises which can be done with little equipment and money, yet which illustrate sound scientific ideas, including conservation practices. With an instructor's guide and with exercises planned for him, hopefully the inexperienced teacher will become more inclined to teach conservation and ecology.

Other efforts are being made to encourage ecological and conservation education in Ethiopia. The Haile Sellassie I University College of Agriculture at

Alemeya is stressing conservation practices; within the last five years several of the graduates have gone into the field to introduce these practices to the local people. We at the Biology Department in the University are attempting to give our biology majors a good background in ecology. In the third year the biology major is required to take general ecology with field trips. Although the lectures in general ecology are similar to the lectures of ecology courses in other parts of the world, the field-trips are different. There are three weekend trips, one to the Rift Valley to study the habitats provided by four large lakes of varying chemical, physical and biological features, one to the Arussi Mountains during which the students are able to see mountain flora and faunal zonation from 7,000 to 12,700 feet (Podocarpus and Juniper to Erica and alpine flora) and one to the Awash National Park with its dry lowland vegetation and large mammals. Although the students are kept fairly busy, they are not expected to spend most of their time in academic exercises. One of our aims is to show the student that not only can he learn ecological principles while in the field but that he can have an enjoyable experience, that he can live and work in the bush without fear and apprehension (many students insist that we camp at the local police compound), that he can enjoy the out-of-doors and at the same time learn something. Because we are training future secondary and elementary biology teachers, we hope that whatever interest and enthusiasm we have instilled in them will be passed on to their students.

A very serious difficulty in establishing modern conservation and ecological practices is the lack of vocational incentive. The majority of young Ethiopians are not aware of the immensity of the problem nor of its national importance. However, international and national agencies are helping to alleviate the problem, notably the African Wildlife Leadership Foundation, U.N. Agencies, the Ethiopian Wildlife and Natural History Society, and the Haile Sellassie I University College of Agriculture and Biology Department. With their help and the encouragement of the Ethiopian Government the educational attitude towards conservation and ecology is slowly changing.

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## SUMMARY

The urgency of ecological and conservation education in Ethiopia cannot be overstressed. In general, little progress in environmental education has been made in this country apart from a few recent efforts.

The main reasons for this distressing situation are as follows: a substantial number of children never go to school; only a comparatively small percentage of all students receive any education in conservation; the teachers of Ethiopian nationality (approximately half of the total) receive little or no background training in ecology or conservation; most of the teachers of foreign nationality coming to Ethiopia have some knowledge of conservation and ecological practices, but little knowledge of the local flora and fauna or of local ecological conditions.

Present teaching syllabuses in the Ethiopian school system do contain sections on conservation and ecology. There are some problems here, however, arising from the teachers' lack of appreciation or understanding of these subjects and from the languages in which conservation and ecology are taught. Ethiopian

tradition has seldom encouraged people to become familiar with the plants and animals of their surroundings, so even learning the names of different plants and animals is a new concept to many of the students. Efforts to improve teaching are being made by preparation of new courses and a new teacher's manual, so that hopefully even the inexperienced teacher will become more inclined to teach conservation and ecology.

Some other efforts are being made to encourage ecological and conservation education in Ethiopia. The Haile Sellassie I University College of Agriculture at Alemeya is stressing conservation practices; within the last five years several of the graduates have gone into the field to introduce these practices to the local people. Field work and study are very important.

With the effective help of some international and national agencies and with the encouragement of the Ethiopian Government, the educational attitude towards conservation and ecology is slowly changing.

## RÉSUMÉ

On ne peut que souligner la nécessité de développer, en Ethiopie, un enseignement portant sur l'écologie et la protection de la nature. A part quelques efforts récents, les progrès réalisés dans ce domaine sont dans l'ensemble faibles.

Cet état de choses est dû à divers facteurs: un nombre important d'enfants ne fréquente jamais l'école; seul un pourcentage assez restreint d'étudiants reçoit une formation dans le domaine de la conservation de la nature; les enseignants éthiopiens (la moitié environ du nombre total de professeurs) ne reçoivent que peu ou pas de formation en écologie et en matière de conservation; la plupart des enseignants étrangers possèdent certaines connaissances dans les domaines de l'écologie et de la conservation mais connaissent mal tant la flore et la faune que les conditions écologiques locales.

Les programmes d'enseignement actuels accordent une certaine place aux disciplines de l'écologie et de la conservation de la nature. Mais ceci soulève des problèmes par suite d'un manque d'appréciation et de compréhension de ces sujets de la part des professeurs ainsi que de certaines difficultés linguistiques. En effet, au cours de son histoire, le peuple éthiopien a rarement cherché à se familiariser avec les plantes et les animaux qui l'entouraient, de sorte que le simple fait d'apprendre les noms des plantes et des animaux constitue une nouveauté pour beaucoup d'étudiants. La préparation de nouveaux cours et d'un nouveau manuel devrait contribuer à améliorer l'enseignement de ces disciplines; ainsi on peut espérer qu'un professeur même inexpérimenté sera en mesure d'enseigner l'écologie et les disciplines de la conservation.

D'autres efforts ont été entrepris en Ethiopie afin d'encourager le développement de l'éducation en matière d'écologie et de conservation. La Faculté d'agriculture de l'Université Haile Sellassie I met actuellement l'accent sur les méthodes de protection de la nature; au cours de 5 dernières années, plusieurs étudiants diplômés ont été travailler sur le terrain afin d'initier les populations locales aux méthodes de conservation. Les travaux et études sur le terrain présentent une grande importance.

Grâce à l'aide efficace de certaines organisations, nationales et internationales et à l'appui du Gouvernement éthiopien l'attitude de l'enseignement et des enseignants à l'égard de la conservation se modifie peu à peu.

## In Contemplation of the Global Wildlife Conservationist

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To the English speaking public the precepts of conservation appear to be permeating all facets of society. Conservation is before us in all of our mass media (magazines, newspapers, radio, TV, etc.) and we even see insecticide companies responding with full page ads implying 'We are trying to save your environments not to destroy them.' These mass media are printed in hundreds of languages other than English. Soil conservation, forest management, water preservation are mentioned in them and beautifully illustrated articles on nature often appear. But articles advocating wildlife management and restraints in wildlife harvest are not too popular. (Walt Disney feature pictures on animals are popular in Japan, but so unpopular in Thailand that theatres schedule them only for short bookings). What are the reactions of people reading these articles?

I cannot speak from world-wide experience, but I have spent nearly twenty years in Asia studying Asian wildlife, customs and cultural influences. In all technological matters peoples of the world look to the West for guidance, and many cultures look especially to America. This faces us with a responsibility which too often we fail to grasp. In our complacency as 'Experts' we fail as interpretative advisors. This is especially evident in the field of conservation and wildlife management.

Several years ago one of our 'Experts' was called to Taiwan to make recommendations for a wildlife management program. The Taiwanese did not respond and since then there has been very little progress. I reviewed his proposals and in general the expert missed the boat. Very little that he suggested was apropos to the Taiwanese. His suggestions were excellent if for a more sophisticated state, but not for Taiwan. Recently I suffered through a lecture by a British expert who came to Thailand. He wasted our evening discussing conservation as applied to the lovely English Oak country of Britain, none of which was apropos for monsoon Thailand with a rural literacy of 25% or less. Too many clichés are mouthed and too little thought given to adapting to the situation at hand. This is really not a criticism, rather a statement of fact, for it is very difficult to look at a problem through another's eyes.

Recently the Wildlife Society of United States which includes the largest enrolment of professional wildlife managers and conservationists, listed sixteen important policies to guide their members. By so doing the Wildlife Society accepted the position of a world advisor in wildlife conservation. The Society Council intimates this when they say 'The Wildlife Society is the principal international professional organization concerned with all wildlife resources of this planet. Its interests embrace the education, research, training, management, regulatory and administrative activities related to maintaining the wildlife resource for the optimum good of Mankind.' Whether accepted or not it is being thrust upon us. We are becoming 'World Experts' if for no other reason

than that we have been fairly successful in developing wildlife programs at home.

Let us look into this more closely. Just who are we? We are biologists trained in a Christian community under the strongest of Anglo-Saxon influences. We spring of a society that nurtured the Society for the Prevention of Cruelty to Animals, Red Cross, Boy Scouts; in other words our outlook on life is from Britain, the Anglo-Saxon outlook. To this add our American heritage of vast spaces, sparse human populations and affinity with nature. Now, we, who have been imprinted in childhood by these influences, are asked to advise other people whose imprinting has been different. Our whole structure of advice will collapse if we are not aware of and do not take cognizance of these differences. It is true that basic needs of wildlife and conservation in general in any country or under any culture may be similar, but an American carpenter pushes a saw, a Japanese carpenter pulls a saw, yet both build beautiful and sturdy structures. In its essence conservation or wildlife management is people.

As I discussed in an earlier paper there are four social constituents that must exist before you can have effective wildlife management or conservation.

These are:

1. A literacy level high enough so that the majority of the people can understand the need for conservation, i.e. a society sophisticated enough to support conservation.
2. A society with an economic level high enough to support conservation.
3. A society where the protein needs are satisfied or augmented by other than wildlife sources.
4. A moral standard high enough among the law enforcement officers to resist graft and to enforce conservation statutes.

The first three may be manifestations of but one, a superior economic development, but the fourth is a separate factor. Very few societies with which I am acquainted, and probably but few in the world, have all four of these components. In Asia only Japan would be classed as such, yet 18 years ago I sat on a mountain side and ate contraband thrush meat cooked over an open fire and provided by netters to the game warden who was with us and who had been sent to apprehend them. The Japanese *public* has now accepted the responsibility of wildlife management and the restraints that such demands. No other Asian or South-East Asian *society* has reached this point. We in United States still see the game warden having difficulty bringing game hogs or poachers to justice, for unsympathetic local courts or judges throw the cases out of court (see 'The plight of alligators,' Audubon Magazine 1968).

But the problems of conservation are more deeply rooted than these four social developments would suggest. The imprinting of the world's children is the stumbling block for the western concept of conservation and wildlife management. And how the children are imprinted depends upon the beliefs of the adults and what these beliefs are is colored or dominated by heritage and mythology. In other words we are getting down to where people live, to the beliefs that effect their souls and their here-afters.

Christianity teaches that animals were put on earth for the use of man. In my childhood church teaching there was never anything said about using this gift wisely or with a sustained yield in mind. Noah's Ark was the closest approach to wildlife conservation that I can remember. Kindness, care and protection of animals were taught at school and in the home. Christianity has been super-

imposed on hundreds of other more deep seated beliefs. The Anglo-Saxons applied a Good Samaritan interpretation to the use of animals and have evolved from it the principles in America and other Anglo-imprinted peoples.

This is not true of other Christianized peoples. In the Philippines Christianity was imposed upon the beliefs of the Igorots and other tribes (people of Negrito, Proto-Malay, Malay, Sinitic, Chinese and other ethnic stocks). In our work with bird migration we receive numerous letters from farmers, school teachers, policemen, doctors, lawyers and local government officials which in tone read like this: 'Dear Sir: Before I begin this letter may the Lord bless you and may God be with you always. Yesterday I was walking in the country with some friends and I shot at a flock of 15 egrets sitting on a tree. I only got three and the rest flew away. I am very sorry to tell you that one of these was your bird. On its leg was a silver ring with a number. I am very sorry that your pet died, but it was good to eat. If there is any reward for finding it please let me hear from you by return mail. May the Good Lord abide with you and guide you.'

How can this callous killing be acceptable in the conscience of such a devout minded person? It is relatively simple. His religious teaching says that animals were put here for his use. Therefore, this is within his domain and is a God-given right. On the surface it looks like this mind could be easily influenced with a little education and thought, but it can't. The concept of animal use goes much deeper. Before the Spanish brought Catholicism there had been the influence of the Chinese and Chinese thought is Buddhistic. Buddhism is six hundred years older than Christianity and where it moved across Asia it was superimposed on even older theologies. In Chinese tradition we find several levels of worlds. The lowest is Hell or eternal torture and damnation; well depicted at the Tiger Palm Gardens in Singapore and Hong Kong. Above this is the State of Starvation. Then comes the world of Animals and above that the world of Man. Other more esoteric worlds are above man. This then is the crux of the situation. Animals are secondary citizens and not worthy of consideration or respect. Recently I asked several Thais why the elephant was removed from the Thai flag. It used to be a red flag with a white elephant. White elephants are revered as good omens. The usual response to my question has been that a flag is to be respected, 'We did not want an animal on our flag for we do not respect animals.' The present Thai flag is red, white, and blue stripes.

Put this position of animals with the concept of divine approval for man's use and you have a situation where a religious man kills with no conscience. I have a friend who is working with rabies in the Philippines and he finds that dogs are looked upon as beneath man's dignity and when he approaches a man to inoculate his dog against rabies, for the protection of the man and his family, often the owner will not catch the dog and hold it while it is being inoculated. He considers this beneath him.

This concept of the lower animal world is deeply ingrained in Buddhistic thought and recently I heard an Asian scientist discussing animals in a public lecture and referring to the lack of emotions in animals. Of course, they cannot have the attributes of man, they are on a plane beneath him.

Buddhism entered Japan in the seventh century and there found Shinto as its matrix. Shintoism still exists in a fusion with Buddhism, but Shintoism is essentially a naturalistic theology. It believes that all things both animate and inanimate are endowed with a spirit. Where an offering of fruit is placed before the home shrine it is the spirit of the fruit that goes to the spirit of the shrine. The fruit may be eaten later by adults, but not by children for they need

spirit more than does an adult. Buddhism has not supplanted this feeling. There is no dramatic distinction between the spirit of a bird or other animal and man. Each year a priest came to our laboratory, set up a shrine and joined with the animal caretakers in a prayer for the spirits of the mice sacrificed to medical science. It is very easy for this belief to be led into a conservation concept since animals already have the dignity of spirit.

Hinduism teaches reincarnation, some millions of them, and animals are protected because they may be incarnate forms. The most extreme sects carry this concept to infinity, eating only vegetable matter and avoiding the killing of any mobile life. Sacredness is embodied in the domestic cow, not the wild gaur or other bovines, but this embodiment does not give it a sacred place in which to dwell and be cared for. Rather the cow is allowed to roam and breed and starve from having destroyed its environment. Any suggestions of wildlife management impinging upon the rights of cattle result in an immediate violent reaction as expressed by recent legislation in India stating that no cow or its offspring shall be injured or killed. No provision in this legislation is made that these same cows should be properly housed, kept in good health, and provided with adequate food.

Judaism classified animals as 'clean', fit for man's food, or 'unclean' but workable as draft animals, and lumps all of the rest.

Mohammedanism or Islam took the 'unclean' dog and pig from Judaism and increased their uncleanness. Now they are unclean to the soul as well and eating pig or touching a dog can damn one's soul to eternal fires. However, the Muslim does not hesitate to make use of wild animals for food, except wild pigs and wild dogs.

I am afraid that I can't carry this comparison further to the idiosyncracies of beliefs about animals in the minor religions and mythologies of the numerous African and South American cultures. All of these have a very important bearing upon the ability of the westerner to communicate with people and to imbue them with a desire to conserve or manage wildlife. They are so important that the man who ignores them is defeated before he starts.

If we are going to act as advisors in wildlife management for the rest of the world let us review some of our policies in the light of local beliefs and customs. The complete list of policies as enunciated by the Wildlife Society is given as an appendix to this paper.

'Encourage wildlife management agencies to establish fish and game regulations that will provide maximum sustained use of wildlife for all types of recreational opportunity of the highest possible quality.' This presented to communities that have no game regulations at all? The IUCN approach was more realistic. By creating a sense of status if a country had game laws or conservation activities it stimulated some countries to at least write laws into their systems. More important, the above statement presupposes that information as to what constitutes 'maximum sustained use' is available. In most instances it is not. Basically the premise is sound and a fundamental part of the foundation for any management effort in any environment.

'Encourage wildlife management agencies to require an appropriate degree as a minimum qualification for employment as an enforcement officer.' In much of Asia biology is not even considered a profession. The professions are law, medicine, the physical sciences. If a student fails his freshman year in Thailand he cannot go on in the profession. He must continue in general science (which may include biology) or education. We must first make biology attractive

to the type of people that we want in wildlife management. Some students trained in western schools are returning and are being taken into government agencies and the effects of these will be felt in the future.

'Encourage colleges to include enforcement training in their wildlife curricula.' First we have to have a wildlife curriculum. No college in South-east Asia, that I know, offers a degree in wildlife management. Few even offer ecology or conservation courses. The IUCN has continually advocated that people be brought to colleges in developing countries to establish such studies.

'Develop an ethic that permits man to appreciate, value, enjoy and conserve plant and animal communities as co-inheritors and co-inhabitants of his environment.' All ethics include some sort of love of environment, even as stylized as the Chinese envision it; but to conserve plant or animal communities as 'coinheritors' is beyond the comprehension of masses of the world population. In many communities wild animals have economic value as food or sport, but the whole area dominated by Buddhism denies that they have social values, especially if by social value we mean spiritual uplift, recreational stimulus other than hunting, artistic stimulus, etc. For example, in 1968 a Thai biologist discovered a new species of bird: it was not an inconspicuous drab creature, it was a beautiful black swallow with racquet tails and bright yellow eyes. He wished to honor the King of Thailand and to stimulate a national interest in birds as well by naming this bird for the King. The government protocol officials prevented him from doing this because animals were beneath man and the people would consider such a thing as an insult to their King rather than an honor to him. I had a somewhat similar experience in Malaya where the Sultan of Selangor, who had a small collection of animals, asked me to get him an owl. I wanted to present a Fish Owl to him, for it is a large and beautiful species, but his aides would not permit me to do so, because in this Muslim community owls brought bad luck and if he had an accident I would be blamed.

A fertile soil for the conservation concept lies in the folklore of nearly every culture. Most peoples have stories about the time when animals talked to people. In Japan the folklore is replete with animal stories involving sparrows, pheasants, the raccoon-dog, owls, crows, swallows, deer, etc. In Malaya it is the mouse deer that features as the wise animal of the forest. In Thailand famous children's stories revolve around a fish and weaver-bird. Conservationists can capitalize on these and stir a greater interest in nature from them. This has been used very effectively as a method in Japan, but less so in other Asian countries.

'Encourage man's understanding of human ecology and his realization that man shares with all other biological organisms a dependence upon the environment, such dependence being as real and complete for humans as it is for other organisms.' This is, of course, a basic premise upon which all conservation efforts stand and one which must be constantly kept before all educators. In Asian schools it is being presented lightly and has not reached the layman here anymore than in Africa or South America.

'Foster the concept that the human population can and must be maintained, by all civilized and peaceful means, within the limits of the world's resource base in order to fulfill man's spiritual as well as physical needs.' We must first define what makes up the 'world's resource base.' The demands on this resource to fulfill the American's spiritual and physical needs far exceed these same demands as made by a Malayan Sakai, and I doubt that we are justified in equating these. We are in the position of saying that *our* resources must be expended one way and *yours* another.

'Allocate space of sufficient quality and quantity for sustaining wildlife populations, so that wildlife will continue to satisfy the basic needs of significant segments of the human populations and will continue to enrich the world.' This idea would be easily sold to an African pygmy, but has escaped the Philippine Igorot entirely. He performs wonders of terracing and irrigation at the total destruction of his natural environment. There is almost no place for wildlife. For these mountain people the sight of a shrike tied by its nostrils to a string on a stick and whirled by a happy child until it flutters out its life and can be eaten does not strike on the chords of humanity, compassion and spiritual experience as we see them. The local farmers or townspeople in the vicinity of Khao Yai National Park in Thailand consider the Park an infringement upon their rights. Even the sophisticated Thai rarely goes to the Park, because it is too lonely (it has a golf course, hotels, and excellent cabins); he prefers to get his spiritual and sporting experience from a crowded beach.

Over vast areas of South-east Asia thousands (300, 000 birds a year in Bangkok) of birds, mammals, turtles and other creatures are sold to devout Buddhists who release them. The teaching is that you gain merit toward a happier hereafter or future life if you release a caged animal. This belief would appear to be a fertile one in which to seed conservation, but it is countered by the fact that there is lack of social responsibility (conscience or guilt) for the animal after it is released. You do not kill an animal directly, but by the same token it is not your responsibility if someone else kills one or for you to do anything about it if one lies injured before you. Hundreds of dogs are killed on the streets of Bangkok by cars each year. My daily records over a ten mile stretch of road shows an average of a dog killed every three days. But no one ever picks them up or removes them from the road. They are gradually ground to bits by passing vehicles. We cannot advance wildlife conservation until first we have implanted the sense of responsibility for the welfare of remote animals such as those of the field or forest.

The SPCA concept originated in England and found fertile soil in America. The British took it to their colonies and attempted by legislation or the establishment of local societies or chapters to force it upon the people whom they were governing. In this they largely failed. In many areas, such as Hong Kong, people obey the law and are not openly cruel to animals, but do not believe in it. In Southern Taiwan (not in the British sphere, but in the American one) the local farmers capture thousands of Brown shrikes for food. The trappers break the lower jaws of the birds so that they cannot bite and the birds are tied in bundles and hung alive before restaurants where the prospective gourmet may select his meal from fresh but slowly dying birds. No one is shocked by this gross cruelty! It is the way things are done!

Do not misconstrue my intentions. I am not berating the concepts of other ideologies or cultures, I am only presenting examples which illustrate problems that face the global wildlife expert. We certainly are not free of taint in the western world. Dr. Conway of the New York Zoological Society reports that 'more than 28 million live wild animals were imported by the American pet business, laboratories and zoos last year'. U.S. hunters killed over 65 million birds and mammals during the same period. President Johnson sent his Fourth Annual Report on the status of the National Wilderness Preservation system to Congress in 1968 and in this message he stated 'We must preserve, for use by this and future generations, some of the America that tempered and formed our American character ... an America where a man can be alone with all the glories of nature; and for this reason we shall not be content until we have a National Wilderness Preservation system adequately symbolic of our great

national heritage.' How do we as wildlife conservators reconcile the two attitudes? It takes a bit of explaining when we approach other cultures.

American conservationists are becoming enamoured with the 'Wilderness Concept.' We feel that in an exploding population this is an urgent expedient which must be taken before all wilderness in our vast North America can be reduced to pollution. For North America we may be right, but we are not justified in advocating the Wilderness Concept in much of the rest of the world and it is an almost abhorrent thought to the millions of Chinese distributed over Asia. The degree of gregariousness of peoples varies from culture to culture. Many nationalities can stand crowding which in U.S. results only in violence and friction. I have a very close friend, a biologist, who is of Chinese extraction. He does much field work in the Malayan jungles yet when I attempted to explain the wilderness concept to him, expounding upon the spiritual and inspirational values of being alone in the wilderness, he shuddered and said, 'Alone!' We must reevaluate our whole concept of 'Wilderness' when applying it to other cultures and before advocating it to them. The Japanese have made a step in this direction with their concept of 'Quasi'-National Parks and monuments.

One facet of global wildlife management which I have not mentioned, but which may be a major stumbling block is politics. Even if we can find ways and means of reaching the conscience of peoples of many beliefs, the effort may be wasted if there are political differences involved. During the past five years my organization has banded nearly a million birds in Eastern Asia. Thousands of these have left South-east Asia each spring and flown into China and equal thousands have moved south from Korea and Japan each fall. The political wall that prevents any contact with its neighbors is dynamically signified by the *one* recovery recorded which we have from China. A farmer (we think), unable to communicate with us, scratched his address on a bit of aluminum which he attached to the opposite leg of one of our banded swallows and the bird was recaptured in Malaya (by the same banders who had originally marked it). The aluminum was removed and the bird released, probably to return to the same farmyard or village and I suspect that the farmer seeing his bird back without his tag wonders if the message was delivered.

One of the most monumental global tasks facing wildlife managers at present is to develop a whale management program and then to get the opposing ideologies to agree to it and to have conscience enough to abide by their agreement. The massive investment and profit in whaling is such that only when there is attrition in profits through extirpation or outright extinction will there be a belated meeting of the minds to attempt effective management.

All of the foregoing discussion and examples lead to the realization that we must reevaluate our approach to global conservation and land use. We are probably demanding too much of some cultures and too little of others. We are at that point in world wildlife conservation where we must recognize that some of the sophisticated and munificent societies *can, must* and *will* create preserves and management areas in which wildlife will and can exist. In the rest of the world it is too late for many species. Societies must develop to the point where they can and will create refuges and this takes time, but there is none. There will be widespread extirpation, extinctions and reductions of wildlife and wildlife habitats. In no way should we as conservationists reduce our efforts to save what can be saved and to imbue other people with the desire to conserve. It is only that we should not become discouraged by the losses that will occur. I am in favor of trying to save the ibexes, pandas and rhinos, but when they are gone we should turn our efforts to the next. Sometime in the

future mankind in general will reach the realization of the values of wise management of his environment. If he fails in this and declines, the animals and environments that he has preserved will spread. If he succeeds in managing himself and his environment then he will have preserved a fauna and flora from which he can draw seed for repopulation of denuded and improverished areas. The biological world of tomorrow will not be that of yesterday or today. This is a harsh outlook but we must recognize that it is before us. We are best prepared to deal with a situation when we are willing to admit that it exists. The dedicated people of yesterday have accomplished much, the dreams of tomorrow have less substance to begin with. We must mold our conservation efforts so that they will appeal to and stimulate people of other ethics and other modes. I think that some of these steps should be:

- A. Any approach to conservation must be within the ethics of the cultures and communities involved.
- B. Any recommendations must be made to conform within a sustainable cost by that society or culture.
- C. We must recognize that as countries both new and old feel their strength and growth a byproduct of this is an anti-western feeling. Therefore, we must so manipulate the demand for conservation that it seems to spring from within the culture. It should not associate with the 'Pale Face Way.'
- D. Use of the IUCN principle has been effective and can be pushed more vigorously; i.e. appealing to the status and national pride of the new nations. They 'Belong' by establishing national parks and refuges. Many respond to the competition of having 'more or better.'
- E. (I am afraid I am back in my own cultural roots with this one, but) the recreational benefits of wildlife and nature should be advocated, but in the same breath we should seek to take the profits out of wildlife. We recommend conservation for the tourist profits and at the same time deplore the harvesting of wildlife for profit. Again, these two have to be reconciled in the minds of people who do not see them through SPCA eyes.
- F. Strive through education to imprint the children of all peoples with the concept of conservation and sustained environmental use.

In this discussion there has been no intention to be critical, biased or bitter; rather I have tried to present problems and pitfalls which the internationalist will face and to give anecdotes from which the considerate reader can draw parallels in his own experience. Many of our failures have resulted from creating irritants rather than palliatives. If we do not want a rebuff (a kick in the teeth) then we must bend every effort to understand causes that could lead to irritation before we enter upon a situation.

In summary:

Western conservationists are being asked to accept the role of advisors in world conservation.

In accepting this global responsibility the wildlife scientist should familiarize himself with the attributes and needs of those cultures which he seeks to advise.

There should be recognition that the demand of the human population on the world's resources has reached that point where there is no longer time to wait for the slow process of cultural change to save many forms of wildlife and environments.

What can be saved now, both biological and environmental, must be protected and managed as seed for the future.

Where a society has reached a sophistication great enough to recognize conservation, environments and fauna will be preserved. Where this level has not been reached they will not be preserved. We must recognize this, but continue in our efforts to inspire the less sophisticated societies to maintain their environments.

## APPENDIX

Guides for wildlife conservationists as enunciated by the Wildlife Society (not arranged in order of importance).

1. Encourage wildlife management agencies to establish fish and game regulations that will provide maximum sustained use of wildlife for all types of recreational opportunity of the highest possible quality.
2. Encourage wildlife management agencies to require an appropriate degree as a minimum qualification for employment as an enforcement officer.
3. Encourage colleges to include enforcement training in their wildlife curricula.
4. Establish and promote programs leading to a better understanding and closer working relationship between wildlife personnel, including enforcement personnel.
5. Develop an ethic that permits man to appreciate, value, enjoy and conserve plant and animal communities as co-inheritors and co-inhabitants of his environment.
6. Encourage the use of techniques known to be of value in counteracting damage situations, including (a) exclusion or mechanical protection; (b) use of repellent chemicals or devices; (c) environmental or biological control of the offending population; (d) reduction of the number of offending individuals or local populations through transfer or lethal control.
7. Encourage that lethal control, where employed, be related to social and economic benefits and be the minimum necessary to bring the damage within tolerable limits.
8. Encourage control methods as efficient, safe, economical, humane and selective as possible.
9. Encourage that animal control programs be thoroughly planned, justified, carried out and evaluated on the basis of total social benefits.
10. Encourage research in animal ecology and in methods of damage prevention and control in order to determine when and how much control is necessary and to develop optimum methods for its accomplishment.
11. Encourage man's understanding of human ecology and his realization that man shares with all other biological organisms a dependence upon the environment, such dependence being as real and complete for humans as it is for other organisms.
12. Minimize, within the context of human needs, all types of contamination and mass alteration of the environment by human populations.

13. Foster the concept that the human population can and must be maintained, by all civilized and peaceful means, within the limits of the world's resource base in order to fulfill man's spiritual as well as physical needs.
14. Allocate space of sufficient quality and quantity for sustaining wildlife populations, so that wildlife will continue to satisfy the basic needs of significant segments of the human populations and will continue to enrich the world.

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#### SUMMARY

In the light of twenty years' studies of wildlife, customs and cultural influences in Asia, the author submits some reflections on an effective, global approach to conservation education.

Conservation efforts should be sufficiently flexible and suitably moulded so that they will appeal to and stimulate peoples of varying ethics and modes. The following points serve as guidelines for the compilation of a conservation programme:

sensitivity to existing ethics and communities involved;

feasibility of any particular society or culture sustaining the cost of the recommendations;

recognition of anti-western feeling in many countries: therefore demand for conservation must seem to arise from within the national culture;

appeal to the status and national pride of the new nations;

advocacy of the recreational benefits of wildlife and nature, but—at the same time—seeking to restrict wildlife profiteering.

through education imprinting the children of all peoples with the concept of conservation and sustained environmental use.

Western conservationists are being asked to accept the idea of advisors in world conservation. In accepting this global responsibility the wildlife scientist should familiarize himself with the attributes and needs of those cultures which he seeks to advise.

There should be recognition that the demands of the human population on the world's resources has reached that point where there is no longer time to wait for the slow process of cultural change to save many forms of wildlife and environments. What can be saved now, both biological and environmental, must be protected and managed as seed for the future.

Where a society has reached a sophistication great enough to recognize conservation, environments and fauna will be preserved. Where this level has not been reached they will not be preserved. We must recognize this, but continue in our efforts to inspire the less sophisticated societies to maintain their environments.

## RÉSUMÉ

A la lumière de 20 années d'études sur les animaux sauvages d'Asie, les influences culturelles et les coutumes des pays asiatiques, l'auteur propose un certain nombre de réflexions sur un approche efficace et générale des problèmes d'éducation dans le domaine de la conservation de la nature.

Les théories de conservation devraient être extrêmement souples et façonnées de telle sorte qu'elles puissent intéresser et attirer des peuples aux éthiques et aux coutumes très variées. Un programme de conservation devrait être établi en fonction des critères suivants:

appréciation des éthiques existantes et des communautés intéressées.

possibilité pour la société ou la civilisation concernée de supporter à longue échéance le financement des recommandations.

reconnaissance de l'existence d'un sentiment anti-occidental dans de nombreux pays: par conséquent le besoin d'une action destinée à conserver la nature doit sembler émaner du peuple concerné.

appel à la fierté nationale des jeunes nations.

mise en évidence des avantages de la faune et de la nature du point de vue du tourisme; mais parallèlement chercher à restreindre le profit des animaux sauvages.

inculquer aux enfants de toutes les nations, par le moyen de l'éducation, la notion de conservation et d'utilisation continue du milieu naturel.

Les promoteurs occidentaux de la conservation de la nature sont chargés du rôle de conseillers de la conservation à l'échelle mondiale. En acceptant cette responsabilité, le spécialiste doit se familiariser avec les caractéristiques et les besoins des peuples auprès desquels il joue le rôle de conseiller.

Il faudrait prendre conscience de ce que les exigences de la population humaine à l'égard des ressources du monde ont atteint un point où il n'est plus possible d'attendre de la lente évolution des civilisations qu'elle assure la sauvegarde de certaines formes animales ou certains types de milieux. Ce qui peut actuellement être encore sauvé dans le domaine biologique et écologique doit être protégé et considéré comme un fond de réserve pour l'avenir.

Une civilisation qui a atteint un degré d'évolution suffisamment avancé pour admettre le principe de conservation, assurera la sauvegarde du milieu naturel et de la faune; mais là où ce niveau n'est pas encore atteint ceux-ci ne seront pas préservés. Il nous faut accepter ce fait, mais en même temps continuer à inciter les sociétés moins évoluées à préserver le milieu naturel dans lequel elles vivent.

## Problems of Conservation Education Among the Population of Rural and Woodland Areas in Zambia

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Zambia obtained its Independence on 24 October 1964. Throughout the modern history period in Africa, the area of land now named Zambia has existed as an impoverished relation to its neighbouring states. Copper production formed (and still forms) the basis of its economy, while the 'barren emptiness' of almost 290,000 square miles<sup>1</sup> cries out for natural and human resources development. Zambia is a developing country, with vast, complex and apparently bewildering problems, yet its peoples are aware of the challenge of being able to compete in the comity of nations and its Government realistic enough to justify the efforts of experimentation in a society demanding a change for the better and hopes for a brighter future.

President Kaunda<sup>2</sup> has stated 'I find it difficult sometimes to keep my temper when well-meaning observers communicate with me that I must run a country on so few trained personnel. They invariably manage to imply that it is tragic that political expediency has forced me to "Africanize" and replace seasoned, experienced expatriates with inexperienced young Zambians—as though I were implementing a policy of despair. What the critics fail to realize is that these so-called inexperienced young men have often packed more into their short lives than many experienced senior expatriates'. President Kaunda's remarks are relevant to our immediate comments upon the problems of conservation education among the populations of rural and woodland areas.

Zambia's resources development is a complex demanding the co-ordination of all activities in the genesis of rural and woodland economies, communications, general education, adult education, personnel training—each and all contributing to the growing political awareness of Zambia's people.

### PROBLEMS IN GENERAL

The Republic of Zambia occupies 751,100 km<sup>2</sup> being situated in the interior of southern tropical Africa. This comparatively large area has a human population estimated at four million with an average density of 5 persons per km<sup>2</sup>. Approximately 98% of the peoples are Africans (distributed amongst 70 defined tribal divisions, speaking 17 languages and 23 dialects). The remainder of the population is made up of approximately 70,000 persons from Europe or of European descent, 10,000 Asians and about 2,000 persons of mixed ancestry.

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<sup>1</sup> Hall, R. *Zambia*, Pall Mall Press, London, 1965

<sup>2</sup> Kaunda, K. D. *A Humanist in Africa*, Longmans, London, 1966

Development is a word that conjures great excitement and controversy in the national vocabulary. Two national plans<sup>3,4</sup> are concerned with the development of natural resources, economic diversification, agricultural commerce, transportation and trade re-orientation, planned mobilization of human resources and this latter salient factor demanding a massive, pragmatic education programme. It is the education programme that would inaugurate a requisite transformation in the socio-economic life of the country as a whole.

It is to be expected, indeed recognized and accepted, that a newly independent state will show primary emphasis upon political development, in an urgent attempt to establish the concept of nationhood, hence Zambia's geographic position in Africa determines the economic and social structures within the state as much as without, relative to its neighbours and the world.

The characteristic rurality of most of Zambia places an immediate and ponderous burden upon the Government Administration and the presently inadequate communications and transportation systems between the capital city, Lusaka, and the outlying areas, makes for costly and difficult development projects. The remoteness of many rural areas promotes a feeling of 'not being recognized or looked after' amongst rural communities. Communications deficiencies are made worse by natural topographic features (which have economic potentials) such as large swamp areas, natural lakes and river flood-plains, precipitous escarpments and much scrub and natural woodlands. Wet season deluges add even to disruption in modern road communications. The ancient rocks exposed in the region of Central Africa right over the high plateau (1, 200 metres and above) are covered, for the most part, by infertile soils. The basic rural economy of subsistence agriculture is thus limited and recent nutrition surveys emphasize the educational need for demonstrable instruction in the raising of crop plants that would satisfy the needs of villagers and domestic livestock.

Without doubt, the present exercises of Government Ministries (of Rural Development, Natural Resources and Education) are geared to ameliorate the essential plight of rural communities through instructional programmes in elementary agriculture, village lay-out and habitation.

Traditional and acceptable food crops in Zambia include maize (*Zea mais*), cassava (*Manihot esculenta*), groundnut (*Arachis hypogaea*), various beans (*Phaseolus* sp., *Glycine* sp., *Vigna* sp.) and other (mainly non-indigenous) vegetables, whilst cotton (*Gossypium* sp.), sugar cane (*Saccharum officinarum*) and tobacco (*Nicotiana tabacum*) provide valuable potentials of processed vegetable products. Some effort is being made to develop production levels with tea (*Thea* sp.) coffee (*Cafea* sp.) and kenaf (*Hibiscus cannabinus*). Cattle, in rural areas are generally moved about within a semi-subsistence economy, where the tsetse fly is not a hazard; cattle play an important part in traditional cultures. These Zebu strains make a sharp contrast to the high quality beef herds of indigenous Angoni crossed with Brahmin, Angus, Herefords and Boran stock. Cattle as a source of dairy produce, chiefly Frieslands, are limited to 'line-of-rail' and supply urban populations, not rural populations.

Soils and rainfall, water supplies, fuels and building materials coupled with vegetable and animal foods form the main concern of rural and woodland communities. All of these items are intimately bound up with the primary problem of survival of the human population, hence the great importance of school-

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<sup>3</sup> *The Transitional Development Plan*, Govt. Printer, Lusaka, 1964

<sup>4</sup> *First National Development Plan* (FNDP), Govt. Printer, Lusaka, 1966

ing programmes that will not lay emphasis upon the achievement of literacy (usually in alien language) but upon sound conservation principles, for these do, indeed, represent a priority in the commonwealth of the rural community, its sustenance, good health and sense of being cared for. Formal schooling programmes should, this wise, pay especial attention to the environment, its components, its complexity, Man as an intrinsic part of it, balanced and renewable natural resources, in a word, conservation education.

75% of Zambia's peoples live in rural areas and the majority of these will continue to do so, in spite of rapid urbanization. The rural practice of a semi-subsistence economy exploited through rotational cultivation, gathering of wild food plants and drug-bearing species, cattle herding, fishing and hunting (some call this poaching), coupled with a strong conservatism is still truly representative of the national culture. Villagers, on the whole, are not frustrated by the stringent socio-economic demands of urbanized folk; they adhere to a social structure which is communal, based on traditional land tenure. Modern commercial products are found in remote rural areas and the bicycle, transistor radio set, imported cloth and canned foods are looked upon as luxuries, nevertheless appreciated. There is a keen sense of 'developing' in a rural community and the teacher, administrator and medical officer alongside the parliamentary representative are heeded together with the wisdom and understanding of traditional rulers. It is through all of these categories of people that the principles of conservation education can best be effected. The matter is not solely for the primary school, secondary school or vocational training centre. It is for the leaders of thought and enlightened members of the rural communities to 'educate', in the strict sense, the people towards a better understanding of their place in the natural environment.

### **SOME POSSIBILITIES**

To the outsider, social and economic progress on the line-of-rail has been outstandingly good. The recent report entitled 'Education in Transition'<sup>5</sup>, the committee of which was chaired by C. A. Rogers, notes that in most rural areas in Zambia there is an air of resignation and hopelessness and that the local people hold that improvements in their living cannot be either expected or seen in their time. As would be expected, a rural-urban drift occurs and the countryside's human populations seem to show neglect. As the Rogers Report rightly points out, a concentration of effort in rural education development, in better housing, attention to nutrition and health needs will, by implication, demand equally serious attention to a curriculum in schools more closely related to local needs, that is, to environmental education. 'Development in rural areas is not and cannot be the responsibility of one Ministry—it suggests a co-ordinated thrust involving many Ministries' (op. cit.).

If 75% of Zambia's population lives in rural areas and if there is an annual population increase of 3.5% then immediate man-power employment figures show that a distinct limit on wage-earning jobs in urbanized areas will determine that the bulk of the population will remain rural for many years to come.

Such facts speak for themselves. The implication as far as general education is concerned is reflected in the enlightened policy of curriculum development incorporating each and all of the aspects of conservation education for every

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<sup>5</sup> *Education in Transition*, Govt. Printer, Lusaka, 1969

sector of the rural community. This feature was borne in mind by the organizers and participants at the recent Natural Resources Education Seminar held at the University of Zambia, 30-31 May 1969<sup>6</sup>. The recommendations of this Seminar are expressed fully in Annexe I of this paper. Suffice it here to quote the rationale of the Seminar:

1. To focus attention at all levels upon the necessity of Natural Resources Education regarding wildlife (both plants and animals) and all renewable Natural Resources that may be considered appropriate and relevant for inclusion in schools curricula and in the continuing education of adult citizens in general.
2. To recommend the creation of an influential association for Natural Resources Education by means of which the public sector will be actually involved and establish an initiative in sponsoring activities outside of the area of official sources and policy.
3. To sponsor Natural Resources Education programmes with special reference to Field Study Centres, preparation of teaching materials for use in schools and teacher education colleges, and to sponsor the recruitment of qualified personnel who will be practically involved in the achievement of such aims.
4. To study the relationship between the traditionally isolated areas of schools and training colleges curricula and to set out working programmes for instruction based upon the integration of ideas, concepts, principles and materials relevant to Natural Resources Education.
5. To produce a Report and Recommendations, based upon actualities and pragmatic principles that will be of workable value to those concerned with Education/Training policy, planning and manpower production (along the lines set out at the UNESCO Conference on Research and Study in Africa concerning Conservation and Utilization of Natural Resources, Lagos, Nigeria, 1964).

President Kaunda said, in his commendatory address to the Seminar, 'As far as our schools and colleges are concerned, we need to pay attention to *what* we teach about conservation principles and *how* to teach these things. Our teacher training programmes need to include much more course materials on natural resources, and our practising teachers need opportunity to have refresher and further training in natural resources education'<sup>6</sup>.

We have made a specific start in the operation of two schools' camps, one in the Kafue National Park, the other on the boundary of the South Luangwa Game Reserve. These two camps, well designed and equipped, have served an invaluable purpose with course work on conservation in rural areas for primary school teachers and children. More recently, the Nyamaluma Camp (South Luangwa) has seen the operation of a very successful 10-day programme on Field Biology for secondary level graduate teachers. Here, the rural environment afforded an ideal setting for practical projects in game studies, stream ecology, soils and vegetation patterns<sup>7</sup>. Such a venture, inaugurated by the keen interest of the Wild Life Conservation Society of Zambia,

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<sup>6</sup> *Report and Proceedings of the Natural Resources Education Seminar*, Wild Life Conservation Society of Zambia, Lusaka, 1969

<sup>7</sup> *Field Biology Course Programme*, Nyamaluma, September 1969 (see Annexe II for details)

requires every support and encouragement. It was with great satisfaction that the recent Seminar recommended the idea of Field Study Centres to be activated in Zambia and the present two schools' camps are scheduled to be incorporated into this scheme. It will be noted that the idea of Field Study Centres is not to take the place of the formal school in the teaching of conservation education, rather to act as local catalysts in the nation-wide drive to make the population, as a whole, aware of the need to attend to the natural economy. Treating conservation education, therefore, in its wider sense, the Field Study Centres will include in their training programmes opportunities for any group of people to study the local environment, both physical and biological, Man's place in the ecosystem, ethnology (traditional culture, crafts and arts, building design, food production, etc.), local geography and history studies. All of these play direct or indirect parts in the arena of conservation education.

The Field Study Centre may be looked upon as an institute of a Natural Resources and Cultural Trust, and its programmes would be so designed as to appeal to

- primary school children
- secondary school pupils
- teacher training college students
- university students
- all kinds of teachers
- adult members of both rural and urban communities
- government administrators
- field training officers
- local government officers
  
- visitors from overseas, as students, field research workers and tourists desiring to learn more on conservation topics.

Here we believe is one medium that will help elicit a more conscious awareness of a national heritage.

In Zambia we also view the problems of conservation education in rural areas through the existing primary and secondary schools' curricula. Such curricula are far from adequate, being bound to an unrealistic course structure and content that is academically biased and based upon a pattern of formal education developed in the context of European *qua* European socio-economic systems. What are considered to be the four basic areas of formal schooling, i.e. Language Arts, Social Studies, Experimental Sciences and Mathematics, require re-appraisal and orientation to local needs. Attempts at curriculum development (under the guise of syllabus revision and 'adaptation') will fail unless educators in Zambia seriously turn to investigations on the local environmental conditions in which people find themselves. This principle is particularly true in rural areas. We need to find out a great deal more about the flora, fauna, soils, water resources, geomorphology, epidemiology, patterns of behaviour in traditional cultures, to even begin to itemize appropriate materials for presentation in schooling programmes at every level. It is admitted that these criteria for curriculum development are by no means universally accepted by the pundits in 'education'. But until such criteria are accepted

as a sound basis for total education we shall be impeded in our endeavours to establish right attitudes through conservation studies<sup>8</sup>.

Although not concerned specifically with rural education, the activities of the UNESCO Study Group (Zambia) on Biology Teaching, operating from the University of Zambia, are intended to collate local natural resource materials and integrate these into a pragmatic Biology Programme for secondary schools in Zambia. Educationally, this Study Group works from the sound principle that effective instruction is better achieved by exposing pupils to immediate environmental experiences. Through this idea, the investigation of tangibles leads on to the understanding of environmental phenomena in general. We have the cooperation of various technical departments and institutes of Government in this project, for example, the Fisheries Research Institute (Chilanga), The Dept. of Wildlife, Fisheries and National Parks, the Geological Survey Dept., the Training Division of the Ministry of Rural Development, the Nutrition Commission, the Museums Board, etc. Inevitably, the recommendations of this Study Group will be of inestimable value to rural schools as well as urban schools.

As part of this Study Group project, we have been successful in establishing an in-service programme for secondary level Biology teachers; this shows itself in short, intensive courses on aspects of local natural resources importance, relevant to secondary level instruction. In November 1969 we have a 5-day course in Limnology and Fisheries Biology for a selected group of Biology teachers and this is conducted at the Fisheries Research Station near Lusaka. Similar short courses are planned for 1970 on Grassland Studies, Forest Ecology, Rocks and Minerals and a full week's course on Wild Life Conservation in the Kafue National Park (Treetops Camp).

Lastly, I would comment upon another approach to conservation education, out-of-school and in a rural setting. Charcoal production is a local industry found in most rural and semi-urban areas in Zambia where natural woodland is accessible. In Zambia the traditional charcoal burner uses a partial combustion technique which achieves the production of charcoal as an end-product, but is wasteful insofar as all of the valuable, volatile substances contained in the raw wood are vaporized as smoke and lost to the atmosphere. We are working with two or three local charcoal burners, who are semi-literate but wise enthusiasts, with an eye on extra profits. By designing a simple condensing unit of glazed fire-clay sanitary conduits we are able to collect and condense the wood vapours under water in used road-tar containers. A pilot plant uses these crude distillates and illustrates fractionation. The pyroligneous acids, tars, oils and alcohols are thus separated by temperature regulation. It is intended to exploit this project further with a view to innovating sufficient charcoal burners to form a cooperative that can sell the crude material to commercial distillers. This project teaches without chalk or text-book the idea that conservation includes the non-wasteful usage of natural resources.

In Ghana a similar field project has met with success, in which local palm wine makers crudely distil the fermented sap and sell the distillate to a national distillers' corporation for spirit production. In Nigeria, the author encouraged, by extension work from the University, the improved production

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<sup>8</sup> Morgan, D. Schools' Curricula and Natural Resources Education, sessional paper in the *Report and Proceedings of the Natural Resources Education Seminar*, Lusaka, 1969

and quality of fired bricks made from local clays by demonstrating to villagers the use of prepared sands and borax alongside regulated firing processes. In Lesotho, the author demonstrated the use of plant dyestuffs obtained by simple extraction procedures from tree bark and rock lichens; village women were able to see a mordanting process and dye preparation that they could easily exploit in a craft industry.

Behavioural objectives in conservation education are thus achieved by going out to the people, investigating their living conditions and means of livelihood and teaching-by-doing the know-how wherewith country folk will learn and understand their part in natural resources conservation.

## **SUMMARY**

Since political independence was achieved and Zambia declared a sovereign state in 1964, the Government has set out a pragmatic policy and establishment for the development of the vast rural areas, previously neglected to the advantage of 'line-of-rail' communities.

During the process of economic development, the socio-economic components of a nation show themselves in a sequence of changes that are symptomatic of rural-agricultural/urban-industrial metamorphosis.

To begin to understand the national and international philosophy underlying the policy of socio-economic development and to face up to the challenge offered by rural-urban interdependence, the national educational structures must incorporate within curricula and training programmes a great deal on natural and human resources, land, land use, water, minerals, floras and faunas, industries and products and services intrinsically related to these.

Zambia's people are being exposed to these problems and the reforms sought after in formal schooling programmes, adult education and curriculum development, will hopefully express themselves in all sectors of society becoming individually and socially conscious of the resource potentials and their rightful exploitation to the common good.

Some recent projects in conservation education, designed to innovate primary, secondary and adult groups are presented and future plans outlined.

## **RÉSUMÉ**

Depuis que la Zambie a acquis son indépendance politique et qu'elle a été proclamée État Souverain en 1964, le gouvernement a entrepris une politique pragmatique de développement des vastes zones rurales auparavant négligées au profit des communautés urbaines.

Au cours du processus de développement économique, les facteurs socio-économiques d'un pays suivent une évolution qui est caractéristique de la transformation rurale-agricole/urbaine-industrielle de la contrée.

Pour commencer à comprendre la philosophie nationale et internationale sous-jacente à la politique de développement socio-économique et pour faire face au défi lancé par l'inter-dépendance entre villes et campagnes, il faut que les systèmes éducatifs nationaux incorporent à leurs programmes d'enseignement un grand nombre de thèmes nouveaux tels que les ressources naturelles et humaines, le sol, l'utilisation des terres, l'eau, les minéraux, les flores et

faunes, les industries et leurs produits ainsi que toutes les activités qui leur sont liées.

Les populations de Zambie sont affrontées par ces problèmes et les réformes visées par les programmes scolaires, les programmes de formation des adultes et l'extension des matières enseignées exerceront—souhaitons le—une influence favorable à tous les niveaux de la société qui prendra ainsi conscience de façon individuelle et collective des ressources potentielles de son pays et de leur exploitation rationnelle pour le bien de tous.

L'auteur décrit quelques projets récents dans le domaine de l'éducation en matière de conservation, destinés aux écoles primaires, secondaires et aux adultes et donne un bref aperçu des projets futurs.

## ANNEXE I

Recommendations of the Natural Resources Education Seminar, held at the University of Zambia, under the auspices of the Wild Life Conservation Society of Zambia with the assistance of the African Wildlife Leadership Foundation, 30-31 May 1969.

CONSIDERING the decisions adopted at the Lagos Conference in 1964 on the ORGANIZATION OF RESEARCH AND TRAINING IN AFRICA IN RELATION TO THE STUDY, CONSERVATION AND UTILIZATION OF NATURAL RESOURCES, and the confirmation of these decisions in the OAU Technical and Scientific Research Committee and the support given by Heads of African States;

NOTING that the socio-economic progress of human communities and sovereign states is of commendable growth and that Man has unprecedented possibilities for making or marring his natural environment;

It is RECOMMENDED that in countries in Africa which urgently need and desire the scientific exploitation of their Natural Resources the use of modern methods must be carefully planned, so as to ensure the greatest possible benefit from Natural Resources and to avoid (at all costs) the damaging and destructive effects that have occurred in the past;

BELIEVING that no lasting effect, behaviouristically or otherwise, can be made without due attention and action in the integration of Natural Sciences, Technological Sciences and Social Sciences *on an interdisciplinary basis*,

It is RECOMMENDED that there be a close integration between Wild Life Conservation teaching and research institutions together with the Department of Wild Life, Fisheries and National Parks in Zambia;

It is RECOMMENDED that, following the Seminar, three voluntary committees or working parties be organized to investigate

- i. the coordination of all activities involving Natural Resources study, conservation and utilization in Zambia,
- ii. environmental education at all levels in schools and society,
- iii. the formulation of conservation principles that should be applied at all stages.

It is RECOMMENDED that the idea of Field Studies Centres be activated and encouraged in Zambia;

It is RECOMMENDED that an interdisciplinary design of training and research programmes in the whole spectrum of environmental education be best effected in the establishment of a School of Environmental Sciences within the next phase of development of the University of Zambia;

It is RECOMMENDED that teacher education and further training programmes be planned to effect the concepts of environmental education in primary and secondary level institutions AND similarly in educational administrations.

It is RECOMMENDED that the School Camps Project in Zambia be effectively established and developed to include a wider range of programmes involving environmental studies.

## ANNEXE II

Example of Field Biology Course Programme, designed for secondary level biology teachers in Zambia

Nyamaluma Conservation Camp, 1-12 September 1969

Monday, Sept. 1	Field Party assembles at University and travels to Nyamaluma (348 mile journey)
Tuesday, Sept. 2	Early Wild Life Viewing Breakfast (8.00) Mid-morning lecture on S. Luangwa Ecology Lunch (12. 00) Briefing Visit to Chichere Hot Springs Late Wild Life Viewing Supper (7. 00) Discussion on field projects
Wednesday, Sept. 3	Breakfast (7. 00) Lecture on Freshwater Studies Visit to local stream for reconnaissance and selection of project areas Lunch (12. 00) Briefing Stream ecology project (2 groups) Laboratory Supper (7. 00) Campfire discussion on projects
Thursday, Sept. 4	Early Wild Life Viewing Breakfast (8. 00) Stream ecology project Lecture on Elephants—recent field studies Lunch (12.30) Briefing Stream ecology project Laboratory Supper (7. 00) Laboratory

- Friday, Sept. 5            Breakfast (7. 00)  
                                  Stream ecology project  
                                  Lunch (12. 00)  
                                  Briefing  
                                  Laboratory  
                                  Late Wild Life Viewing (Lusindazi)  
                                  Supper (7. 00)  
                                  Discussion on field projects
- Saturday, Sept. 6        Breakfast (7. 00)  
                                  Lecture on Population Dynamics  
                                  Stream ecology project  
                                  Lunch (12. 00)  
                                  Briefing  
                                  Laboratory (complete work on project)  
                                  Supper (7. 00)  
                                  Film Programme
- Sunday, Sept. 7         Breakfast (7. 00)  
                                  Lecture on Aspects of Insect Ecology  
                                  Visit to Mfuwe  
                                  Lunch at Mfuwe Lodge  
                                  Afternoon free  
                                  Supper (7. 00)  
                                  Evening free
- Monday, Sept. 8         Breakfast (7. 00)  
                                  Trip up the Luangwa River to Kakumbi  
                                  Cropping Station  
                                  Tour of Cropping Station  
                                  Coffee break (10. 30)  
                                  Lecture on Parasitism in Elephants  
                                  Lunch (12. 30)  
                                  Return to Nyamaluma via S. Luangwa Game Reserve,  
                                  Mfuwe Pontoon  
                                  Supper (7. 00)  
                                  Lecture on the idea of Conservation in schools/col-  
                                  leges curricula
- Tuesday, Sept. 9        Breakfast (7. 00)  
                                  Air Reconnaissance (group 1)  
                                  Air Reconnaissance (group 2)  
                                  Rest of party: Discussion on Anaesthetics in immobili-  
                                  zation of wild mammals  
                                  Lunch (12. 00)  
                                  Air Reconnaissance (group 3)  
                                  Supper (7. 00)  
                                  Lecture on Soils Analysis and Ecology
- Wednesday, Sept. 10    Early Wild Life Viewing  
                                  Breakfast (7. 00)  
                                  Lecture on Plant Collecting and the Teaching of  
                                  Ecology  
                                  Trip to Luamfwa  
                                  Lunch (in the field)  
                                  Laboratory and Field Reports—group discussion  
                                  Supper (7. 00)  
                                  Packing of Kit

Thursday, Sept. 11      Early Breakfast (6. 00)  
Depart for Lusaka  
Lunch (Kachelola Hotel)  
Arrive Lusaka (6. 00 approx.)

*Note:*    Director of Field Biology Course    D. Morgan (General Biology)  
              Senior staff assistants            P. Khabele (Botany)  
  A. Ibbotson (Entomology)  
              Special lecturers                J. Hanks (Biologist)  
  J. Dillmann (Veterinary ecologist)  
  A. Lavu (Resident Lecturer,  
  Nyamaluma).

The Course is funded by the Ministry of Education, the Natural Resources Board (Rural Development) and organized through the School of Education, University of Zambia.

### ANNEXE III

Extract from UNESCO Planning Meeting on Integrated Science Teaching, Final Report, Paris, March 17-19, 1969 ref. SC/MD/13 concerning the design of Curricula in Rural Areas

'Belief systems which control learning are often markedly different in Western and non-Western cultures. For children living in societies which traditionally are non-scientific in the Western sense, faith in the capacity of man to discover and interpret the nature of the physical world and thereby to control it to his personal advantage may imply something of the nature of an intellectual and moral quantum leap. Without such a change, it is possible to acquire scientific knowledge and techniques, but such learning will represent nothing more than replacing one authoritarianism for another with the new being no less sterile and inhibiting to intellectual development than the old.'

para. 12 of Final Report

'In *rural development programmes*, science teaching in primary schools can have much to contribute to the development of human resources. Children can be helped to acquire a scientific approach to their environment by becoming personally involved in the successful analysis of simple, but challenging problems. They can be prepared to tackle aspects of underdevelopment such as rural improvement, malnutrition, superstition and problems of health through an approach to science education which has its aim and emphasis towards greater self-reliance. There will be a greater likelihood that they will face, with confidence, the challenge of progress and development in their later life. Science teaching projects linked with the life of the local community can be developed in the local primary school which can be of interest to the village, as a whole, and the school can be conceived of as a preparation for life in the developing village community rather than as an escape from it to the towns.'

para. 13 of Final Report

'In considering the learning process and the teaching of science and mathematics, stressing an integrated approach, the deliberations (of the Planning Meeting) were framed into four major categories: (a) the learning process, (b) the socio-cultural environment, (c) curriculum design, (d) the preparation and training of teachers.'

para. 14 of Final Report

## Nature Conservation Education in Indonesia

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In Indonesia Nature conservation activities which include management of nature reserves and protection of wildlife as well as soil and water conservation are being regarded as an integral part of forestry. These activities have therefore become the responsibility of the Forest Service (Directorate General of Forestry, Ministry of Agriculture) through the Office of Nature Conservation and Wildlife Management of the Directorate of Forest Development.

The total land area of Indonesia comprises about 190 million hectares of which, 120 million hectares are state owned forests. The forests include nature conservation areas of 117 Nature Reserves, 21 Wildlife Sanctuaries and 15 Game Reserves, covering a total area of about 3 million hectares.

The enormous task of implementing nature conservation which should be done in such large and rich-in-life areas calls for a great number of well educated supervisors with the backgrounds of both management and ecology, as well as of specialized research workers in the field of Nature conservation/ecology. As far as manpower is concerned, due to the fact that the country is still in its early stage of development, shortages of personnel in almost every field are strongly felt. The severe shortage of qualified personnel probably occurs most in the field of nature conservation. A number of factors affect this, e.g. inadequacies in educators and education funds. Another relevancy, yet the most important determinant, is the lack of awareness of most of the population of the importance of nature conservation. To cope with the latter, extension work is being carried out by the Forest Service in the way of distributing leaflets/brochures, conducting seminars and lectures and information by means of television and radio broadcasts. Extension work is conducted in cooperation with Forestry Schools, Secondary schools and local authorities.

The present data on nature conservation personnel are as follows: 5 seniors (university graduates or equivalent), 50 middle ranks and 350 lower ranks. The personnel needed to conduct proper supervision and administration of nature reserves and wildlife sanctuaries throughout the country should amount to: 30 university graduates, 250 middle ranks and 1500 lower ranking personnel.

As stated earlier, nature conservation activities are administratively attached to the Directorate General of Forestry. Accordingly, formal education in nature conservation is incorporated in forestry education.

In Indonesia, education is conducted by various authorities. Public schools such as elementary and high schools as well as Universities are administered by the Department of Education and Arts while vocational schools are usually administered by the Department related to their fields. Consequently, forestry schools of the lower and middle levels are run by the Directorate General of Forestry, while Faculties (Colleges) are conducted by the Directorate General of Higher Learning of the Department of Education and Arts.

The Forest Service has two schools, namely the Forest Police Schools (primary level, for lower officials) and the Senior High School of Forestry (secondary level, for middle ranking officials). A third, which existed during the years 1949-1956, was the Academy of Forestry, founded for the purpose of fulfilling the need for high level personnel during the transition period after independence. A similar curriculum was followed in the Academy of Agriculture, which also had a Nature Conservation section; the latter was opened in 1964 but unfortunately closed in 1967 along with the Academy.

#### **FOREST POLICE SCHOOL (FPS).**

The requirements for admission are, elementary school diploma (6 years) and two years experience with the Forest Service. Courses offered (Nature Conservation section):

- nature conservation
- forest regeneration
- forestry police matters
- plant identification
- forest protection
- silviculture
- forest influences
- knowledge of firearms

The duration of study is one year. The FPS are located at Salatiga (Central Java), Makassar (South Sulawesi), Pematangsiantar (North Sumatra) and Kadi-paten (West Java). The one at Salatiga because of its transfer to the State Forest Enterprise, closed its Nature Conservation section.

In its five year development plan, the government intends to open additional FPS in Manokwari (West Irian), Ambon (Moluccas), Samarinda (East Kalimantan), Pontianak (West Kalimantan) and Palembang (South Sumatra). The FPS at Salatiga trained 50 personnel who were appointed to Nature Conservation posts.

#### **SENIOR HIGH SCHOOL OF FORESTRY (SHSF)**

Students admitted are those who have completed secondary high school (elementary school plus three years). A selection on the basis of grades is also required. There are four sections of study viz., Management, Engineering, Planning, and Nature Conservation.

The three-year curriculum, of which the first two years comprises basic and forestry courses while the remaining year is designated for specific courses, includes

Basic courses:

Indonesian Language	Soils
English Language	Economics
Physics	Agrarian Law
Algebra	Chemistry
Geometry	Mapping
Botany	

Forestry courses:

Silviculture	Dendrology
Forest Protection	Forest mensuration
Forest influences	Forest Planning
Forest exploitation	Management
Wood technology	Business administration.

Specialized courses (Nature Conservation Section).

Statistics	Zoology
Nature Conservation Legislation	Tourism/Guiding
Nature reserve and Wildlife Management	Knowledge/Use of firearms.
Museology	

The Nature Conservation section in the SHSF was started in 1963, and attended by 15 to 20 students annually. Locations of the SHSF are at Bogor and Kadi-paten (West Java), while additional SHSFs are being planned for Makassar (South Sulawesi), Pematangsiantar (North Sumatra), Samarinda (East Kali-mantan), Madiun (East Java) and Manokwari (West Irian). Teaching Staff of these SHSF are foresters (Academy and University graduates) with experience in forest management and nature conservation.

## HIGHER EDUCATION

As there is no specific institution for higher education in nature conservation, the task is carried out along with forestry education in the Faculties of Forestry. The Faculties of Forestry of the Bogor Agricultural University (BAU) in Bogor and the Gadjah Mada University (GMU) in Jogjakarta, the oldest institution in the country, also serve as feeder faculties for younger Forestry Faculties. These two institutions besides having a Faculty of Fores-try, also have Faculties of Agriculture, Veterinary Medicine, Fisheries, Animal Husbandry and Agricultural Engineering.

The duration of study in the Faculty of Forestry is 5-6 years, divided into:

1-2 years, preparatory

2 years of candidature (the completion of which is marked by the conferring of the Sardjana Muda diploma—equivalent to the Bachelor's degree).

2 years, graduate study.

The diploma of Sardjana, which is equivalent to the Master's degree, is conferred after completion of the graduate study. Requirements for admission are a twelve year pre-university study (six years of elementary school and a total six years of high schools) and selection on the basis of aptitude, health and physical fitness, and high school grades.

The curriculum of the undergraduate studies in the Faculty of Forestry consists of:

- I. Mental and physical education: Religions, Philosophy of the Pantja Sila, Military Training.
- II. Social sciences: Economics, Rural Sociology, Agrarian Law, English.
- III. Biological sciences: Plant physiology, Botany, Zoology, Genetics, Dendrology, Plant Taxonomy, Ecology.
- IV. Physical sciences: Physics, Chemistry, Geology, Soils, Climatology.
- V. Mathematics including Statistics and Experimental design.
- VI. Forestry sciences: introductory forestry, Forest mensuration, Forestry Law and Policy, Geodetics and Mapping, Forest product technology, Forest pathology, Forest entomology, Photogrammetry, Silviculture, Forest engineering, Forest planning, Wood preservation, Wildlife management, Forest ecology, Forest exploitation and sawmilling, Soil and water conservation, Forest inventory, Forest economics, Forest management.

Students who pass the candidate level (B.Sc.) select their graduate field of study from one of the following fields: (1) Forest management, (2) Forest planning, (3) Forest economics, (4) Logging and (5) Forest product technology. Nature conservation can be taken as a major subject under the heading of Forest management. Courses of instruction offered to students majoring in Nature conservation include Climatology, Silviculture, Entomology, Pathology, Forest influences, Wildlife management, Forest soils, Forest administration and Forestry law and policy. Courses in the field of Zoology can be arranged to be taken at the Faculty of Veterinary medicine.

In the first year of graduate study students are required to conduct four months field work in management and planning, and a one semester course. The second year is designated for research, thesis writing and seminars.

Besides the two aforementioned Faculties there are two younger faculties: The Faculty of Forestry of the Lambung Mangkurat University in Banjarmasin and the Faculty of Forestry of the Mulawarman University in Samarinda.

The Faculties of Agriculture of the following universities also serve forestry education: the Hasanudin University in Makassar, the Patimura University in Ambon and the Tjendrawasih University in Manokwari.

Up to the present these younger faculties are only conducting undergraduate programmes, due to shortage in teaching staff and facilities. Their graduates continue their study at either one of the feeder faculties (the Bogor Agricultural University or the Gadjah Mada University).

## Chairman's Conclusions

In his closing address to the Session Dr. Tom Pritchard spoke as follows:

It is clear from this morning's session that environmental education is a subject of great social relevance in all parts of the world. But few countries could claim with confidence that their leaders, or their populace, are sufficiently aware of the relevance of this kind of education as a means of preparing people to live in a world where pressures on individuals, and on their environment, are reaching uncomfortable proportions. It is, therefore, regretful that, in spite of the ideas and practical achievements of small groups of pioneers in this field, including the participants at this morning's IUCN session, there is still much apathy throughout the world—the unwillingness or inability of people to appreciate the sheer urgency of providing mankind, especially the young, with the means of understanding the interdependence of man and his environment, and the significance of conserving some of the natural features of the earth in this context.

In summing up, four other features of the papers and discussion impressed me greatly.

*First*, there is the question of ways and means of incorporating environmental education (whether it be in geography, biology or other subjects) into the curriculum of schools and other institutes of formal education. A small, but growing number of people now accept the urgency of preparing young people to become enlightened about environmental problems so that when they become adult they will behave, or formulate policies, or take decisions, or do all the other things that adults do, in such a way that they will not, unwittingly, cause needless damage to the world they live in. But having accepted that, the formidable task of designing an appropriate syllabus, and all the supporting materials, such as textbooks, teachers' guide and so on, has to be tackled; and the even more formidable one of incorporating this kind of education into curricula that are already heavily congested with other, more traditional, school subjects. Above all, there is a shortage of teachers appropriately trained to teach environmental education. Then there are many other related issues, whose importance varies from country to country, that mitigate against the spread of environmental subjects into the educational system.

*The second group* of issues concern the educational approach that might be adopted. Here, tremendous diversity is possible, in accordance with the ethnic, cultural and historical background of the population. But there is fairly universal agreement about the need for much teaching out of doors to provide first hand opportunities for pupils to come into contact with nature and the problems of looking after the environment.

*Thirdly*, what about all those people who have left school without any knowledge of these matters; and those who never attended school, and probably never will in the future? This is not merely a problem of countries with large rural populations, like India. Many of the industrial nations of the world, with extensive educational facilities, provide very little opportunity for educating children or adults in environmental matters. But the problems of the illiterate masses in developing countries is a special one that needs

urgent attention—experts should be asked how the concepts, and techniques, can be made known to these people. It assumes a special significance as so many illiterate people in the world are 'very close to nature' in the sense that they till the soil and are closely governed by natural forces throughout their lives.

*Lastly*, there is clearly a feeling in favour of greater involvement by official and voluntary bodies concerned with environmental matters and conservation. Throughout the world, great benefit could be obtained if these organizations adopted a higher level of responsibility for interpreting what they are interested in or professionally concerned with. One aspect of this, of course, is the training of specialists; environmental agencies should, surely, have a closer link with the institutes of higher education to ensure that a proper relationship develops between those who train students and those who will ultimately employ them. There is no doubt that the environmental professions should be growing vigorously at this point in time; but sadly, one hears so many tales about unemployment amongst young ecologists and conservationists, an issue that should surely receive very special attention by the several international and national agencies which could help.

I now thank all those who presented the papers, and the speakers in the discussion, for taking us all another step forward towards an understanding of the world-wide problems of environmental education. I hope each of us, after returning home, will take some action of value to our community in the light of the stimulation and knowledge we obtained here in New Delhi.

# Appendix

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