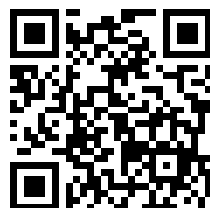


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INTERNATIONAL UNION  
FOR THE PROTECTION OF NATURE

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PROCEEDINGS AND PAPERS  
OF THE  
TECHNICAL MEETING

held at The Hague, 20, 21 and 22 September 1951

PUBLISHED BY  
THE NETHERLANDS ORGANIZING COMMITTEE AND  
THE SECRETARIAT OF THE INTERNATIONAL UNION FOR THE PROTECTION OF NATURE

42, rue Montoyer, Brussels

1952



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INTERNATIONAL UNION  
FOR THE PROTECTION OF NATURE,

*The Hague, 1951*

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## CALENDAR OF THE MEETINGS

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Wednesday 19 September 1951, 9.00 p.m. Reception given by His Excellency the Minister of Education, Arts and Sciences and His Excellency the Minister of Agriculture, Fisheries and Food, in the „Rolzaal” of the Binnenhof (Informal).

Thursday 20 September 1951, 9.30 a.m. to 12.30 p.m. in the Rolzaal:  
Technical Meeting.

Opening of the session by the President of IUPN.

Election of Chairmen of the technical meetings.

Discussion of theme A:

**Rural landscape as a habitat for flora and fauna in densely populated countries.**

3.00 to 5.30 p.m.: Continuation of discussions on theme A.

Friday 21 September 1951: 9.30 a.m. to 12.00 and 3.00 to 5.30 p.m.:  
Discussion of theme B:

**Management of nature reserves.**

Saturday 22 September 1951: 9.30 a.m. to 12: **Study of several current questions lying within the competence of IUPN. Among these:**

a. Problem of zoological gardens.

b. Wild Animal trade.

c. Transportation of wild animals.

d. Possible intervention on behalf of the Whale.

e. Statement on the activity of the Survival Service.

Announcement of resolutions and other recommendations.

Closing of the meeting.

## LISTE DES PARTICIPANTS. — LIST OF PARTICIPANTS.

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- |   |   |
|---|---|
| <p><b>ANTIPAS, B.</b><br/>rue Tsakalof 22,<br/>Athènes, Grèce.</p>  | <p><b>BRAAKSMA, S.</b><br/>Sumatrastraat 15,<br/>'s-Hertogenbosch, Netherlands.</p>   |
| <p><b>APPELMAN, F. J.</b><br/>Boreelstraat 7,<br/>The Hague, Netherlands.</p>   | <p><b>BRICHET, L.</b><br/>32, Bd Bischoffsheim,<br/>Bruxelles, Belgique.</p>  |
| <p><b>BARCLAY-SMITH, MISS P.</b><br/>British Museum (Natural History),<br/>Cromwell Road,<br/>London, S.W. 7, United Kingdom.</p>                 | <p><b>BROUWER, G. A.</b><br/>de Genestetlaan 32,<br/>Bilthoven, Netherlands.</p>  |
| <p><b>BENTHEM, R. J.</b><br/>Prof. Hugo de Vrieslaan 62,<br/>Utrecht, Netherlands.</p>  | <p><b>BRYCE, E. J.</b><br/>c/o Union Bank of Australia,<br/>71 Cornhill,<br/>London, United Kingdom.</p>                        |
| <p><b>BERNARD, CH. J.</b><br/>51 route de Frontenex,<br/>Genève, Suisse.</p>  | <p><b>BURHENNE, W.</b><br/>Schutzgemeinschaft Deutsches Wild,<br/>Viktoriastrasse 25,<br/>Münich, Germany.</p>                  |
| <p><b>BERRY, J.</b><br/>The Nature Conservancy (Scotland),<br/>12 Hope Terrace,<br/>Edinburgh, United Kingdom.</p>                                | <p><b>BÜTTIKOFER, M. J.</b><br/>Ligue Suisse pour la Protection de la<br/>Nature,<br/>37 Aeschenvorstadt,<br/>Bâle, Suisse.</p> |
| <p><b>BEZEMER, K. W. L.</b><br/>Backershagenlaan 50,<br/>Wassenaar, Netherlands.</p>  | <p><b>CARRIÈRE, J. E.</b><br/>Laan van Poot 358,<br/>The Hague, Netherlands.</p>  |
| <p><b>BIANCHI, A. T. J.</b><br/>Royal Tropical Institute,<br/>Mauritskade 63,<br/>Amsterdam, Netherlands.</p>                                     | <p><b>CLEYNDERT, H.</b><br/>W. de Zwijgerlaan 32,<br/>The Hague, Netherlands.</p>   |
| <p><b>BLOEMERS, M. C.</b><br/>Ministerie van Onderwijs, Kunsten en<br/>Wetenschappen,<br/>Prinsessegracht 21,<br/>'s-Gravenhage, Netherlands.</p> | <p><b>CONWAY, MISS V. M.</b><br/>Nature Conservancy,<br/>91 Victoria Street,<br/>London, S.W. 1, United Kingdom.</p>            |
| <p><b>BOTERENBROOD, MISS A. J.</b><br/>Wasstraat 38,<br/>Leiden, Netherlands.</p>   | <p><b>CROOCKEWIT, H. W. E.</b><br/>J. J. Viottastraat 27,<br/>Amsterdam, Netherlands.</p>                                       |
| <p><b>BOUILLENNE, R.</b><br/>Institut de Botanique,<br/>Université de Liège,<br/>Liège, Belgique.</p>   | <p><b>DAHLBECK, N.</b><br/>Svenska Naturskyddsföreningen,<br/>Riddargatan 9,<br/>Stockholm, Sweden.</p>                         |
| <p><b>BOYLE, C. L.</b><br/>Fauna Preservation Society,<br/>c/o The Zoological Society,<br/>Regents Park,<br/>London, N.W. 8, United Kingdom.</p>  | <p><b>DAMMERMAN, J. K.</b><br/>Rijksmuseum voor Natuurlijke Historie,<br/>Leiden, Netherlands.</p>                              |
|   | <p><b>DE JONGE, DICK</b><br/>Eendrachtsstraat 12,<br/>Amsterdam-Z., Netherlands.</p>  |

- DE JONGE, N. M.  
Wilhelminalaan 20 bis,  
Zeist, Netherlands.
- DE KOCK, J. M.  
Hoog Soeren 88,  
The Hague, Netherlands.
- DE LEEUW, W. C.  
Roodenburgerstraat 35,  
Leiden, Netherlands.
- DE VOOGD, C. N. A.  
C. M. von Weberstraat 19,  
Utrecht, Netherlands.
- DE VROOME, H. W.  
Rozenlaan 14,  
Vlaardingen, Netherlands.
- DE WIT, R. J.  
Rokin 92-96,  
Amsterdam-C., Netherlands.
- DOIGNON, P.  
21 rue le Primitice,  
Fontainebleau, France.
- DWARS, R.  
v. d. Wijkstraat 11,  
The Hague, Netherlands.
- EBERS, FRAU E.  
Haunshofen bei Station  
Diemendorf/Obb 13b, Germany,
- EVERWIJN LANGE, F. E.  
Maarn, Netherlands.
- FAEGRI, K.  
Botanical Museum,  
Bergen, Norway.
- FITTER, R. S. R.  
Greyhounds, Burford,  
Oxford, United Kingdom.
- FLON, H. E. A.  
3 rue Barthel,  
Melun, France.
- FOKKER, J. P.  
Government Service for Physical  
Planning,  
Lange Voorhout 19,  
The Hague, Netherlands.
- FRECHKOP, S.  
Institut Royal des Sciences Naturelles  
de Belgique,  
31 rue Vautier,  
Bruxelles, Belgique.
- GATHY, H.  
225, chaussée de Wavre,  
Bruxelles.
- GAVAGE, L. G. J.  
36, rue des Eburons,  
Liège, Belgique.
- GEERLINGS, L.  
Storm van 's Gravesandeweg 69,  
Wassenaar, Netherlands.
- GHIGI, A.  
Rue S. Giacomo 9,  
Bologna, Italie.
- GOETHE, F.  
Vogelwarte Helgoland,  
(23) Wilhelmshaven, Germany.
- GORTER, H. P.  
Contact Commissie voor Natuur- en  
Landschapsbescherming,  
Rokin 92-96,  
Amsterdam-C., Netherlands.
- GOUDSWAARD, J.  
Heemraadssingel 332b,  
Rotterdam C2, Netherlands.
- HAIG, I. T.  
Branch of Research and Technology,  
Division of Forestry,  
Food and Agriculture Organization,  
Viale delle Terme di Caracalla,  
Rome, Italie.
- D'HANGEST BARON D'YVOY, D.  
„Roseneath”,  
Kerklaan 1,  
Rozendaal, Netherlands.
- HARROY, J.-P.  
Union Internationale pour la Protection  
de la Nature,  
42 rue Montoyer,  
Bruxelles, Belgique.
- HEIMANS, J.  
Leonardostraat 10,  
Amsterdam, Netherlands.
- HERBERT SMITH, G. F.  
British Museum (Natural History),  
Cromwell Road,  
London, S.W. 7, United Kingdom.
- HOOGERVORST, R. J.  
van Swindenstraat 17,  
Utrecht, Netherlands.
- HURCOMB, THE RIGHT HON. LORD  
47 Campden Hill Court,  
London, W. 8, United Kingdom.

- JACOB, A.  
22 rue de Serbie,  
Bruxelles, Belgique.
- JACOBS, J.  
59 avenue de la Colonie,  
Anvers, Belgique.
- JELLES, J. G. G.  
Prins Mauritslaan 98,  
Overveen, Netherlands.
- JENSEN, H. A. P.  
The Nature Conservancy,  
91 Victoria Street,  
London, S.W. 1, United Kingdom.
- JOLLES, H. M.  
Weesperstraat 54-III,  
Amsterdam, Netherlands.
- JUCCI, C.  
Istituto Spallanzani Università,  
Pavia, Italie.
- KLEIN, W. C.  
Schoutenstraat 17,  
The Hague, Netherlands.
- KRUGERS DAGNEAUX, E. L.  
Mesdagstraat 14,  
The Hague, Netherlands.
- KUIPERS, MISS T.  
Parkstraat 37,  
Sappemeer, Netherlands.
- LAARMAN, E.  
Botanisch Laboratorium,  
Groningen, Netherlands.
- LAUDE, N.  
1 avenue Middelheim,  
Anvers, Belgique.
- LAURITZEN, F.  
Naturfredningsraadet,  
Torvegade 21,  
Copenhagen K, Denmark.
- LEBEAU, G. J. Ph.  
66 avenue du Couronnement,  
Bruxelles, Belgique.
- LESTEL, G.-H.  
11 rue du Bocage,  
Vélizy (Seine-et-Oise), France.
- MALSCH, F. M.  
Museumlaan 2,  
Utrecht, Netherlands.
- MAYNÉ, R.  
28 avenue de la Tenderie,  
Boitsfort, Belgique.
- MEES, MARTEN  
Emmaplein 7,  
Rotterdam, Netherlands.
- MEIJBURG, P.  
Valkenboskade 463,  
The Hague, Netherlands.
- MEMELINK, G.  
„Wildrust”,  
Hoenderloo, Netherlands.
- MINK VAN DER MOLEN, J. C.  
Gerard Doulaan 32,  
Naarden, Netherlands.
- MISSET, H. P.  
Da Costakade 42,  
Utrecht, Netherlands.
- MÖRZER BRUYNS, F. M.  
Emmalaan 33,  
Utrecht, Netherlands.
- NEDUNGADI, T. P.  
Embassy of India,  
Buitenrustweg 2,  
The Hague, Netherlands.
- Nicholson, E. M.  
13 Upper Cheyne Row,  
London, S.W. 3, United Kingdom.
- OUDEMANS, T. CH.  
„Klein Schovenhorst”,  
Putten, Netherlands.
- OVERDIJKINK, G. A.  
Julianalaan 202,  
Bilthoven, Netherlands.
- PHELPS, W. H.  
Apartado 2009,  
Caracas, Venezuela.
- PICHLER, G.  
Getreidegasse 43,  
Salzburg, Austria.
- PILON, J. J.  
Druivenstraat,  
The Hague, Netherlands.
- PLUYGERS, MRS. L. A.  
Koekoekslaan 4,  
Wassenaar, Netherlands.
- POLAK DANIELS, MISS CHR.  
Neuhuyskade 20,  
The Hague, Netherlands.
- REYMOND, A. F. L.  
2 rue de Tournon,  
Paris 6, France.



- RODERKERK, E. C. M.  
Elswoutslaan 14,  
Overveen, Netherlands.
- ROGER, J. G.  
The Nature Conservancy (Scotland),  
12 Hope Terrace,  
Edinburgh, United Kingdom.
- ROUET, J.-M.  
35 rue Saint Charles,  
Versailles, France.
- SAM, E. (MRS. THIERRY-MIEG),  
Unesco,  
19 Avenue Kléber,  
Paris 16, France.
- SANTORINÉOS, J.  
rue Galvani 16,  
Athènes, 8, Grèce.
- SARAZIN, CL.  
Herengracht 342,  
Amsterdam C., Netherlands.
- SCHEYGROND, A.  
Van Itersonlaan 7,  
Gouda, Netherlands.
- SCHIMMEL, H. J. W.  
Poortstraat 82,  
Utrecht, Netherlands.
- SCHUITEMAKER, J. P.  
J. Kostelijklaan 17,  
Velsen, Netherlands.
- SPARCK, R.  
Naturfredningsraadet,  
Torvegade 21,  
Copenhagen K, Denmark.
- STOFFELS, A.  
Kinderhuissingel 16,  
Haarlem, Netherlands.
- STOMPS, T. J.  
Plantage Middenlaan 7,  
Amsterdam, Netherlands.
- SUNIER, A. L. J.  
Plantage Kerklaan 40,  
Amsterdam, Netherlands.
- TEN BOKKEL HUININK,  
Nieuwekade 17,  
Utrecht, Netherlands.
- TER HOEVE, J.  
Hoogeweg 41,  
Zeist, Netherlands.
- D'URSEL, COMTE F. M.  
Ardenne et Gaume,  
41 rue Marie de Bourgogne,  
Bruxelles, Belgique.
- VAN BURKOM, J. H.  
Jachtlaan 134,  
Apeldoorn, Netherlands.
- VAN DEN BERGH, W. K.  
62 rue Ommeganck,  
Anvers, Belgique.
- VAN DER GOES VAN NATERS, M.  
Konijnenlaan 49,  
Wassenaar, Netherlands.
- VAN DER HOEVEN, J. W. W.  
Hoflaan 104,  
Rotterdam, Netherlands.
- VAN DER LINDE, R. J.  
A 22, 's Heer Hendrikskinderen, post  
Goes, Netherlands.
- VAN DER MOLEN, L. A.  
Dolderseweg 158c,  
Den Dolder, Netherlands.
- VAN DER VET, A. C. W.  
Sleedoorlaan 34,  
Rotterdam-Schiebroek, Netherlands.
- VAN DONSELAAR, J.  
Singelstraat 8 bis,  
Utrecht, Netherlands.
- VAN DOORN, D.  
Eendrachtsweg 75,  
Rotterdam, Netherlands.
- VAN HOEFLAKEN, J. H.  
Fred. Hendriklaan 183,  
The Hague, Netherlands.
- VAN ITTERSON, H. C.  
Roelofstraat 8,  
The Hague, Netherlands.
- VAN LEEUWEN, C. G.  
Koningin Wilhelminaweg 323,  
Utrecht, Netherlands.
- VAN OORDT, G. J.  
Janskerkhof 3,  
Utrecht, Netherlands.
- VAN PALLANDT VAN EERDE, PH. D. BARON  
Eerde,  
Ommen, Netherlands.
- VAN RIJSINGE, C.  
Hartenseweg 14,  
Bennekom, Netherlands.

VAN TIENHOVEN, P. G.  
Heerengracht 540,  
Amsterdam, Netherlands.

VAN VLOTEN, H.  
Romeinweg 1,  
Wageningen, Netherlands.

VAN WEEDE VAN DIJKVELD, E. W. J.  
Postbus 61,  
Bois-le-Duc, Netherlands.

VENEMA, H. J.  
University of Agriculture,  
Wageningen, Netherlands.

VIDESOTT, R.  
Corso Svizzera 19,  
Turin, Italie.

VOÛTE, A. D.  
Mariendaal,  
Oosterbeek, Netherlands.

VRYDAGH, J.-M.  
50 avenue des Lièvres,  
Wesembeek, Belgique.

WEEVERS, TH.  
Bergstraat 9,  
Amersfoort, Netherlands.

WESTERMANN, J. H.  
Albertus Perkstraat 49,  
Hilversum, Netherlands.

WESTHOFF, V.  
Koninginnelaan 3,  
Driebergen, Netherlands.

ZWILLENBERG, L. O.  
Van Miereveldstraat 9,  
Amsterdam, Netherlands.

**Le Conseil exécutif**  
de l'U.I.P.N. était  
représenté par:

**The Executive Board**  
of the U.I.P.N. was  
represented by:

*Président – President*  
CH. J. BERNARD

*Vice-Président – Vice-President*  
G. F. HERBERT SMITH

*Membres – Members*  
MISS PH. BARCLAY-SMITH  
M. C. BLOEMERS  
N. DAHLBECK  
W. PHELPS  
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*Secrétaire Général – Secretary-General*  
J.-P. HARROY

**Secrétariat - Secretariat**  
Mme M. CARAM, *Chef – Head*  
R. PURSER  
C. DEJAFFE  
N. GARNIR  
N. THACHER

## PROCEEDINGS OF THE TECHNICAL MEETING

held at The Hague, Netherlands, September, 1951

1st Session,

Thursday (20th), at 10 a.m.

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Dr. Charles J. Bernard, President of the Union, took the chair initially and gave a welcoming address. He then submitted the Executive Board's proposal for the conduct of business: chairman of the meeting, Mr. M. van der Goes van Naters, Secretary of the Provisional Council for the Protection of Nature (Netherlands), and leader of the discussion on Theme A, Mr. E. M. Nicholson, Nature Conservancy (United Kingdom), and on Theme B, Professor R. Bouillenne, Liège University (Belgium); at the concluding session, chairman for the concluding session, Dr. Bernard, and for the ratification of the conclusions and resolutions reached by the meeting, Mr. van der Goes van Naters. The proposal was approved.

Mr. van der Goes van Naters then took the chair. He expressed his thanks for the honour, and commented on the importance and significance of the meeting and on the subjects on the agenda. Nature protection had passed through three successive phases: passive conservation, active conservation and reconstruction. The idea of devoting this meeting to the discussion of the problem of rural landscapes as a habitat for fauna and flora in densely populated countries and of the management of nature reserves was born of an increasingly clear understanding of the tendencies followed by conservationists today. The modern approach to nature protection goes beyond, without excluding, the original conception of conservation, which was concerned principally with maintenance.

In his excellent inaugural address, Mr. van der Goes van Naters commented on and developed this central idea, illustrated by many examples; for the most part chosen from his own country. He recalled the difficult battle required to defend the small refuges, the woods and the ponds in a landscape completely modified by reallocation. In a similar manner he depicted the stimulating activity of the builders of a new landscape, creating polders extracted from the sea, where nature, as if in recognition of the assistance of these courageous men; took the arrangements with good grace and even spontaneously enriched them, as in the spectacular „Black Lake”, a magnificent bird reservation, and the new Eastern Polder of the former Zuyder Zee.

The protection of nature has passed from the concept of a simple establishment of reserve areas to that of rational management of an entire region, in full harmony with natural laws. It is mixed with town-planning, with the science of land utilization, even with the social sciences, to become more and more a chapter of human ecology.

Giving the respects due to the first country – Great Britain, in 1664 – to apply itself conscientiously to altering the traditional landscape in order

to improve it, the President of the Meeting explained how; in his view, by widely interpreting the word „nature”, such preoccupations fit completely into the programme of an international union, dedicated by its statutes to the protection of nature. If they do not wish to restrict the domain of nature in the Netherlands to the waves of the sea and the clouds in the sky, they must acknowledge the semi-natural, the human and cultural aspects of nature, in its large sense, for it behooves man not to forget, in human society, the eternal rule: *secundam naturam vivere* . . . .

Practical conclusions can be drawn from this truth, particularly when it is applied to such vast modern programmes as those called „Point Four” and “Colombo Plan”. The IUPN must not be absent from the theaters where these plans are being developed.

But beside these enormous macrocosmic areas of disturbance, there are microcosms which are none the less precious; the pond, the stream, the orchid station, the isolated tree. In speaking of the many sights and the richness of the “Boschplaat” on the Island of Terschelling, a wooded plateau of recent natural creation, whose contours are lost in the misty skies of the North Sea, Mr. van der Goes van Naters pleaded for the natural right of those peoples whose land is confined to profit by the assistance of the IUPN. To them, natural resources were only sparingly handed out, and they have more right than others to demand their conservation.

The speaker quoted the great classical poets and also the shepherds of the Maritime Alps, who have recommended that we „obey the law of the trees and the beasts”. This is the word which the IUPN brings, and if it is listened to it can reconcile Mankind and prevent conflicts.

Telegrams and letters from persons unable to attend the meeting were read, among them messages from Messrs. H. J. Coolidge (U.S.A.) and Roger Heim (France), Vice-Presidents (IUPN); Messrs. R. A. Falla (New Zealand), W. Goetel (Poland), H. Humbert (France), V. Van Straelen (Belgium), J. Vellard (Peru) and W. Vogt (U.S.A.), (Union’s Executive Board); Messrs. Dönhoff (Germany), O. Grimus de Grimborg (Austria), F. Isachsen (Norway), C. Jucci (Italy), G. Turner, J. Breuer and G. Matagne (Belgium), H. F. Lewis (Canada), V. H. Cahalane and L. A. Walford (United States), A. Urbain, A. Chevalier, P. Guinier, C. Hettier de Boislambert and G. Petit (France), J. Rouch (Principality of Monaco), C. Ruys, W. J. van Eysinga, J. P. Dudok van Heel, J. Linthorst Homan, C. T. Briejer, Ir. C. van Traa, S. F. A. van Wijnbergen, C. Rueb and G. W. van Steenis (Netherlands), W. Szafer (Poland), J. Huxley, F. C. Fraser, E. B. Ford and L. Parmenter (United Kingdom), H. Hediger and M. Petitmermet (Switzerland), and R. Bigalke (Union of South Africa). The following organizations apologized for not sending observers or representatives to the meeting: United Nations Organization, Amt der Tiroler Landesregierung and Bundesministerium für Unterricht of Vienna.

Mr. E. M. Nicholson then led the discussion. After some words of introduction, he suggested that the morning session be devoted to general remarks on the reports submitted by Messrs. E. M. Nicholson, H. P. Gorter and R. J. de Wit, L. Vanden Berghen and R. J. Benthem, and the working paper drawn up by Messrs. M. C. Bloemers, H. P. Gorter and R. J. Benthem (Netherlands), and the afternoon session, in principle, be devoted to the task of formulating the measures needed to implement the conclusions reached during the discussions.



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### TERSCHELLING

Des brise-vents protecteurs environnent les lots de terre dans la région agricole de l'île de Terschelling (Pays-Bas). Un allotissement d'échange a été effectué dans cette partie de l'île. Dans le dessein de reconstruire un paysage équivalent on a épargné autant que possible les brise-vents existants et en planté de nouveaux.

Sheltering windscreens surround the parcels in the agricultural area of the isle of Terschelling (Netherlands). A realloftment took place in this part of the island. Attention was given to the reconstruction of the landscape. Existing windscreens were spared where possible and new ones were planted.





Guillemots (*Uria aalge albionis*) sur les rocs de Staple Island près de la côte de Northumberland (Grande Bretagne)

Southern Guillemots (*Uria aalge albionis*) on the rocks of Staple Island near the Northumberland coast (Great Britain)



The working paper of Messrs. Bloemers, Benthem and Gorter was then taken item by item.

In connection with the section on the management of the landscape, Mr. Benthem commented on his special report and also on the maps he had had distributed, two of which showed the striking methods used by the Dutch authorities, particularly in the re-allocation of the land, in reconstructing the rural landscape on the island of Walcheren in Zeeland. Although this example involved unusual circumstances since it was flooded during the fighting of 1944 and 1945, it was nevertheless typical and showed certain characteristics also to be found in other areas influenced by industry and other human activities.

Mr. Nicholson considered the conclusions reached by Mr. Benthem an excellent basis for discussion. Without minimizing in the least the importance of the role of reserves, there was good reason to believe that in the modern world conservationists should concentrate more and more on a wiser management of the technical developments involved in man's economic activities, in order to promote a richer development of the natural associations of plants and animals which formed modern man's environment.

After declaring himself in complete agreement with the conclusions of the general speakers, Mr. A. H. Cleynert (Netherlands) called attention to the very important part played by town-planning in this field, as well as the problem of choosing the responsible authorities to carry out the plans. In his opinion there was a contradiction between the fact that the plans should be drawn up on the widest scale possible, in order to obtain perfect co-ordination, and the impossibility of working on too large a surface, thus making it difficult to execute the plans completely and efficiently. There is an optimum size to be used in intelligent planning which was both practicable and at the same time brought a maximum of satisfactory results. Such plans aim at complete co-ordination and thus require long preparation. One can think of others, sometimes called „facet plans”, with a single objective, such as protective measures for water or the conservation of a landscape having scientific or recreational value.

Mr. Nicholson considered that Mr. Cleynert's remarks, although somewhat premature and better suited to the problems mentioned under item IV, should be included in the present discussions, since the success of the management of the landscape depended on the scale used and on the authorities in charge. The problem and the difficulties it involved consisted mainly in convincing the men who planned the landscape to consider the principles of nature protection. He cited several examples in the United Kingdom, where it was very difficult to make use of arguments other than man's immediate material interests. But before asking the responsible authorities to give more attention to the principles defended by the Union, it was essential that the change of attitude being sought should be quite clear. They will surely ask us what we expect of them and an answer must be ready. The participants at this meeting might help in framing one.

Mr. K. Faegri (Norway) made a general statement of principles, aimed at avoiding the ambiguities which, in his opinion, threatened to compromise the future action of the Union. He took a stand against certain romantic slogans which he did not feel corresponded with reality. He tried to find an acceptable definition of the idea of nature; taking into consideration the

omnipresence of man, on the one hand, and, on the other; the part which man could and must logically take in maintaining natural balances of which he was a normal component. In a biocenosis there were: practically speaking, only three independent variables: the geological substrata, climate and man. All other variables, including all living beings other than man, were functions of these three basic variables. So far the sub-soil was entirely protected from exterior influences, as was the climate, although to a lesser degree. As to man; his actions varied according to what he considered to be his interest at the moment and therefore there was a possibility of modifying his influence. The actual result was a compromise and nothing more. It was a compromise involving beneficial human activities which should be defended and harmful ones which should be combatted. The meaning of the term nature protection must be found in the formula which took into account the dynamic aspect of the situation. Unless agreement was reached on the meaning of the terms used conservationists would sow confusion in the minds of the public without accomplishing any worthwhile results.

Mr. Nicholson suggested that the spirit of Mr. Faegri's remark be noted though it covered several points already expressed, and requested that further academic debate regarding the definition of nature protection be avoided; the preamble of the constitution of the Union having already dealt with the problem. The principal point to remember was that a temporary balance between the three factors mentioned by Mr. Faegri existed. This balance could, with careful planning, be made more favourable to man by enriching his environment. The Union's task was therefore to lead men to improve the natural surroundings on which they depended instead of letting these deteriorate through negligence, ignorance or greed. Human activities affected the balance of these natural factors. Their effort should be to man's advantage rather than disadvantage. The idea of improvement should replace that of pure conservation which was illusory, since it was static. According to Mr. Nicholson these were the most important conclusions to be drawn from the points made by Mr. Faegri.

Mr. H. Flon (France) supported the conclusions reached by Mr. Faegri and Mr. Nicholson. In his country it was also evident that nature protection was a matter of compromise. There were communities in France, considered worthy of protection which owed their existence to human action in the past. The heaths, certain woodlands in the Fontainebleau Forest, would not have existed without man's intervention. To suppress this human factor under the guise of conservation would result in the destruction of the natural community rather than its preservation.

Mr. F. Goethe (Germany) stressed the fact that in his country a clear distinction was made between the protection of nature (Naturschutz) and landscape planning (Heimatschutz).

Mr. M. C. Bloemers (general speaker) drew attention to certain cases where the natural balance had been upset and where continual human intervention was necessary in order to maintain a pseudo-balance. These were typical cases, where strong action was justified, in order to create a sufficiently stable new balance. There were biocenoses, where abnormal multiplication of insects, which man considered undesirable, necessitated repeated human action in order to exterminate these pests. If this action were slowed down or interrupted the increase was so great that the pseudo-

balance disappeared. In such cases an improvement of the existing conditions was necessary in order to restore the balance.

Mr. Faegri spoke again, and expressed his disagreement with several remarks made by Mr. Goethe and Mr. Bloemers. Increasing the number of representatives of a species was a praiseworthy but risky enterprise. How often has a measure adopted in a reserve to favour the proliferation of certain organisms resulted in the unexpected multiplication of other species and the destruction of species which should have been preserved. (Mr. Bloemers interrupted to point out that the problem of reserves was on the agenda for the following day). Mr. Faegri also felt that the distinction made by Mr. Goethe did not correspond to reality. If the German conception of nature protection was opposed to that of protection or management of the landscape it must include the idea of non-intervention, which he personally could not admit. In densely populated countries intervention was essential. Let the expression landscape planning be used rather than the somewhat romantic one, protection of nature.

Mr. Nicholson repeated his belief that the two concepts were not incompatible. The old-style romantic champions of nature protection whom Mr. Faegri objected to were becoming ever rarer. It must be realized that the principal task in forwarding human interests, in the widest sense of the term, was to enrich rather than to impoverish the plant and animal communities associated with civilization in all its aspects. The idea of favouring conditions which might facilitate the multiplication of certain species (particularly if they were threatened with extinction) then fitted perfectly into this fundamental programme.

Mr. N. Laude (Belgium) felt that the discussions were becoming too academic and asked that the meeting should turn its attention to the practical problems arising from the need for good management of reserves and wise landscape planning. Difficulties were certain to occur when the steps recommended during this meeting came up against the real or presumed interests of the public, industry or government. This meeting was called, above all, so that bearings could be taken, valuable objectives chosen and instructions drawn up.

The problem of water pollution was then examined. Messrs. Bloemers and Bernard explained the form in which the latter had planned to present a report on this question. This report had not been submitted. Mr. Nicholson however, invited Mr. Bernard to say a few words on the problem of water pollution. Mr. Bernard felt that it was unreasonable to try to cover such a broad subject in a few minutes and limited himself to pointing out the main aspects of the problem, residual water from factories and gutter waters emptying into lakes and rivers; the construction of large dams; the transformation of certain rivers into a succession of foul-smelling stagnant pools; drinking water and the related problem of epidemics; the disappearance of fish, etc. Conservationists must concentrate on problems in which their interests coincided with those of economists, hygienists and sportsmen, such as fishermen. Many laws had been passed but their effectiveness was doubtful, not so much because they were inadequate but because they were not enforced.

Mr. Nicholson shared Mr. Bernard's opinion that it was useless to open a discussion on water pollution without a preliminary report on the subject, and requested the Executive Board of the Union to devote special attention

to this problem; since there seemed to be no international body concerned with promoting research and action upon it other than the International Committee for Bird Preservation, which, however, was concerned with only limited aspects of it.

Mr. H. Flon (France) confirmed the fact that in his country there were laws against pollution which even went so far as to provide for the imprisonment of factory directors convicted of responsibility for a certain type of pollution. Unfortunately these excellent written laws remained a dead letter and the problem continued to be very grave, both for surface and for underground waters which were often not given enough consideration. No solution of the problem was possible without close and frank collaboration between technicians, public authorities, and conservationists. Industrialists would not really try to avoid actions liable to upset the local hydrography unless they were convinced they were defending their own interests.

In summarizing these viewpoints, Mr. Nicholson declared that, since no open objections had been made to the conclusions reached under item II of the working paper, these conclusions might be considered to have been adopted by the meeting. The question of pollution would be dealt with by the Executive Board of the Union. Moreover, the excursions to take place at the close of the meeting would permit any foreigners who were particularly interested in the problem to make a close study of the many remarkable achievements made in landscape planning in the Netherlands.

Item III of the working paper was then considered. Mr. Nicholson emphasized the importance of this item which listed the types of scientific research indispensable to a well-co-ordinated landscape planning policy. The same dilemma appeared again: either the advice to be given to industrialists and government officials who, in one way or another, influenced the natural balance of the environment should be definitely decided, or else the idea of intervening successfully should be renounced.

Mr. A. D. Voûte (Netherlands) suggested that research should not be restricted to inventories, classifications and statements. He emphasized the importance of the dynamics of various groups; above all of animals. In this connection he disagreed with Mr. Faegri who considered the climate an independent variable. Living communities were completely dependent on microclimates which might be greatly affected by human activities. An understanding of the influence of these microclimates on animal communities was an essential factor in controlling the evolution of these communities. Mr. Voûte had been to the International Congress of Entomology, and, once again, was struck by the small amount of knowledge of the dynamics of insect groups. When man wanted to modify a landscape he did it with the help of various techniques, such as insecticides, fertilizers, etc., the influence of which on living communities was profound, but still little explored, and research work was urgently needed in this field. Mr. Nicholson asked the participants to bring up as many examples as possible of similar research being undertaken. The purpose of meetings such as the present one was to make generally accessible a maximum amount of information about the achievements in various countries, which might be of value to experts in other countries. Mr. Voûte mentioned some of the results of the research being carried out in the institution which he directed in Oosterbeek. He would be glad to give further details to anyone who might wish them.

These research projects dealt primarily with the effects of hedgerows, planted for wind protection, on certain microclimates; various aspects of the ecology of black grouse; and various means of controlling the propagation of harmful insects without using insecticides, the problem once again being to determine whether particular living species could be called harmful.

Mr. Bernard called attention to the attempts being made in Switzerland to combat cockchafer, the disastrous effects of the too widespread use of insecticides, and the efforts to draw the attention of the persons and the authorities concerned to this danger. The Union had already been asked to deal with this problem at the Lake Success Conference in 1949, and many pages were devoted to it in the Proceedings and Papers of the International Technical Conference on the Protection of Nature, called jointly by Unesco and the Union (Lake Success, 22-29 August 1949).

Mr. Nicholson asked the participants to present positive research projects at the afternoon session. Then, having been assured that no one else wished to speak on item IV of the working paper, he put forward item V for discussion.

In connection with the subject of education in the field of nature protection, Mrs. Lucie Pluygers (Netherlands) mentioned several conclusions she had reached in Indonesia. The problem varied greatly, depending upon whether it was for Europeans or Javanese. Likewise, a clear distinction could be made between the education of teachers and of children and the general public.

Mr. N. Laude (Belgium) called attention to what had been done in the Belgian Congo in this field, which he regarded as one of the most important practical problems on the agenda of the meeting. Talks on nature protection were given to groups of scouts and educated negroes, and the authorities were trying to include at least one lesson a year on the same subject in the curricula of European and African secondary schools. A nature protection badge was given to scouts who had done their "good deed" in the field of conservation. He emphasized the fact that primary schools should be given priority in this work. He recommended the Union to prepare a syllabus, which might be used to increase the number of courses and lectures given on the subject throughout the world.

Mr. M. C. Bloemers, the general speaker, recalled that the Union had already, on several occasions, given its attention to this matter, only one aspect of which should be considered in connection with the present subject of discussion, namely the education of those engaged in planning rural landscape in densely populated areas. In his opinion two classes of young people should receive most attention: students of higher technical schools (architects, agronomists, horticulturists) and young peasants. He gave a few examples of what was being done in Holland in this connection; for instance, the series of lectures organized in winter in rural areas to call the attention of farmers to the importance of preserving and even improving their natural environment and of planting trees and hedges.

Mr. Laude urged that city dwellers should be given at least as much attention as the rural population.

Finally, Mr. van Naters, Chairman of the meeting, closed the morning discussion after pointing out again the connection between items IV and V of the summary report and putting forward the resolution that more be learned about the policy of protection organizations. Two solutions were

possible when there was a conflict between the interests of nature protection and political or industrial groups. One was an uncompromising attitude which resulted in either complete victory or complete defeat. The other was by way of compromise. He cited two cases in the Netherlands where the first solution had to be adopted: that of Saint Pierre Mountain, near the Belgian frontier, where the protectionists met with complete defeat, and the Boschplaat on the island of Terschelling, in Friesland, where, on the contrary, they were successful. He then mentioned an important and recent example of compromise, that of the Gran Paradiso National Park in Italy; here he believed it might have been possible to take an even stronger stand. Compromise was often desirable, although its results might not be spectacular enough to suit young people. In some cases, like that of the Ourthe dam project in Belgium, a struggle to the end seemed likely; in others, compromise was more desirable. In conclusion, the speaker hoped he would hear, during the afternoon session, speakers stating whether a policy of firmness or of compromise was better in their respective countries.

The session ended at 12 : 50 p.m.

Thursday (20th) at 3 : 00 p.m.

#### 2nd Session

The session was opened by the Chairman, Mr. van der Goes van Naters, who reiterated the hope that the various speakers would explain for the benefit of the meeting the situation in their respective countries.

The floor was then given to Mr. M. C. Bloemers to allow him to explain the results of a short conversation between the discussion leader and certain experts on the necessity of undertaking research. He remarked that the interesting problem of soil-mapping is not within the scope of the Union. Phytogeography and the work of inventories has proven to be the basis of all protective measures: When material means are lacking, the greater part of the work can be entrusted to independent researchers and the representatives of universities and scientific institutions, provided that the results obtained are submitted to a central organization. Further, it is considered necessary that:

1. ecological research of a general nature should be directed or co-ordinated by a central scientific organization;
2. research should be started on specific subjects, such as the biology of certain species or the nature of certain habitats, by specialized institutions. Necessary funds to cover such research could be provided by institutions or organizations interested in their results: Departments of Waters and Forests for the study of ecological forestry, hunters' associations for ethological and biological research on wild game, associations of fishermen for the study of fish, etc. Research on specific subjects should be based on research of a general nature and enrich it. Beyond co-ordinating national research, an international exchange of information on experiments undertaken and results obtained is strongly urged.

Mr. Nicholson wondered if the Union should be responsible for the results of these research projects. He did not think that its means were sufficient



for such a big task. It would be useful if the Union could become an intermediary for transmitting the addresses of institutions where, in each country, the information desired could be obtained. The Union should forthwith make contact with institutions willing and able to reply to such requests for information.

Mr. H. Jensen (United Kingdom) gave an account of some interesting work of the Nature Conservancy in the United Kingdom. This organization had many objects, such as advising Government Departments and acquiring and managing nature reserves, but among them scientific research had an important place. Research provided a background for all effective action, in that it established a solid basis for all enterprises and a classification of objectives by priority. Without a scientific foundation advice was valueless. The creation of a nature conservancy should not be attempted without a preliminary scientific study. That is why the Nature Conservancy disposed of funds which simultaneously permitted it to proceed with its own researches and to subsidize others at University centres. And already a scientific programme had been agreed upon and some initial results obtained. The objective aimed at is to fill in gradually the hiatus between scientific knowledge and the increasingly numerous interventions of applied biology. To this end, researches were planned or undertaken on such subjects as the effects of irrigation, the consequences of the improvement of wastelands, the problems posed by the drainage of marshlands, and those presented by the necessity for protecting the coastal areas. Other areas still remained to be studied, and where they were concerned, the Nature Conservancy would be pleased to obtain henceforth information from outside. He had in mind the biological question of animals living in hedges, the reason why these animals became harmful when the hedges were destroyed, the consequences of spreading insecticides under hedges, etc. He also considered the problem of industrial waste-heaps. On all the subjects which they had already studied as well as those with which they were still concerned, the Nature Conservancy wished to have regular contacts with research institutions in other countries, and was ready to supply in return the information in its possession. An international exchange of information was recommended.

Mr. Bloemers stated that where the problem of accumulations of refuse and rubbish was concerned, his country (Netherlands) was in a position to furnish the results of researches in response to the request of Mr. Jensen, and he was of the opinion that the Danes had also had experience with this subject which would be worth inquiring into.

Mr. J-P. Harroy (Union) drew attention to a particular aspect of financing of scientific research strongly advocated by the Meeting. Countries are rare which had, like Great Britain and the Belgian Congo, official organizations with (1) official means of conducting research within the framework of the protection of nature, and (2) budgetary means of realizing or of financing such research. Elsewhere, it was necessary (1) that the initiative should be taken by someone who was vitally interested in the problem, (2) that a research institution, a university for example, accept the patronage and carry on the aforesaid study in its laboratories, and (3) that the organizations created in any country to finance scientific research in general (for instance, a Centre for Scientific Research, etc.) should be solicited by the usual methods, whether by the persons who undertook it or by the

institution which sponsored the research. A special appeal was made to all those present at that meeting to keep this consideration uppermost in their minds when they returned to their respective countries; there existed a possibility of instituting the desired research almost everywhere, but a special initiative – and perseverance – was necessary to launch such projects, and the members of the Union should take this task on themselves. A project which was taking shape in Belgium was cited in this connection: several researchers all devoting their full time to the task were together to study the qualitative and quantitative impoverishment of the water resources of the country. The study would be undertaken jointly by hydrologists, biologists, and geographers.

Mr. A. Ghigi (Italy) mentioned some instances where research could be developed in his country. First, he recalled the regrettable inadequacy of the natural sciences curricula in the secondary schools there. Young Italians were thus unable to understand the problems of Nature at all thoroughly. Furthermore, the biologists in the Universities were tending to neglect the study of living things in order to concentrate on highly specialized studies of cells and genes. As the accent was always placed first on the aesthetic and cultural aspect of nature protection, the subject remained too confined within the Department of Public Instruction. Meanwhile, it was good news that the Department of Public Works had a reforestation project, in order to provide work for Italy's unemployed. He added that the hunting laws were satisfactory in his country, but that, like everywhere else, it was difficult to enforce them. After some reflections on the difficulties which, in a country with only relative political stability, impeded the efforts of those attempting to persuade Parliament to reform teaching or to make new laws for nature protection, he expressed the hope that the Commission on Nature Protection, of which he was Chairman and which was recently created by the "Consiglio Nazionale delle Ricerche" would soon, with the financial assistance of the centre which founded it, put into execution the solid scientific research programme already prepared by its members and of which some important features (a study of the causes of the displacement of stags from the Swiss National Park towards the Stelvio, etc.) were cited as examples.

Mr. Nicholson then concluded the discussion on item III and summed up the proceedings. Governments were still scarcely convinced that scientific research was indispensable to maintain control of the results of planning undertaken by them with even greater frequency and fullness in natural landscapes, which were indispensable as habitats for man. But even when this conviction was brought home to the leaders, their ideas often remained too vague and impractical concerning the nature of the research to be undertaken, the methods to be followed and the items which called for priority. It was for those with a complete understanding of the problems to instigate and formulate the recommendations necessary for filling the unacceptable gaps which still existed between the enterprises and the scientific bases which should serve as a foundation for them.

The discussion of item IV was opened by Mr. J. Berry (United Kingdom), who illustrated, with examples, the principle stated in the morning session by the Chairman of the Meeting, in regard to the acceptance or non-acceptance or compromise. Before the forming of the Nature Conservancy, Mr. Berry said he was in the service of the North of Scotland Hydro-

Electric Board, whose objective was to alter the natural hydrography by establishing dams, changing the course of the flow of waters, etc., which involved many problems where the interests of conservation entered into the picture. It was much more common than was supposed that the interests of industry and nature were not incompatible. If the attention of an engineer were drawn to the threat his project would be to a community or an area, he would very often do his best to take this aspect into account and to make a slight variation in his plan. In other words, if a steamroller were moving towards a precious object it was always better to address the driver politely and ask him to swerve and thus avoid the object rather than to try to stop or turn it by force. In order to illustrate the effectiveness of this approach and the goodwill often shown by engineers when their attention was drawn to certain undesirable consequences of their projects on nature, he gave two examples with which he was familiar. A reservoir, which threatened the existence of a rare plant reserve, was modified, in order to safeguard the reserve. Then it was proposed to flood a valley, at the base of which was a small ecological niche of great interest, the disappearance of which would have grieved naturalists. When informed of the threat, the engineer, at great expense, established a cement framework on the side of the cut, brought in soil and plants of the area, and surprised the biologists by constructing a new ecological niche to replace the one which would be destroyed! He believed that Scotland was the only place in the world which had a man-made ecological niche.

Mr. Bernard spoke of the problems in Switzerland arising from the numerous hydro-electric works. The question had even been raised as to whether they should be exploited on an international scale. Public opinion, backed by those who had only material interests, accused the friends of nature of opposing, systematically and unreasonably, every project for obtaining hydro-electric energy. This accusation had no sound basis. Of some two hundred and sixty projects in Switzerland proposed or already completed, only five had been contested in the name of the interests of nature. In three of them these interests had prevailed; in one case they had failed, and the fifth case was still pending. He cited the proposal affecting the Spöl, and the fight made in an effort to defend the Swiss National Park; in this instance no compromise whatsoever was acceptable. After a reference to an unfortunate project threatening an isle of the Rhine, he emphasized the menace resulting from the plans of an industrial concern to build a funicular railway to the summit of the Matterhorn. He said he had already written to the Italian authorities in the name of the Union, and asked the meeting to pass a resolution to the same effect.

Mr. G. H. Lestel (France) spoke of the situations created by the rapid development of the hydro-electric industry in France. Previously, the developments were never as thorough and complete as they were today, nor as complicated. Examples of the simple collection of low waterfalls were frequent. Nowadays enormous dams were being erected; important canal levels were dried up during the season when formerly they were irrigated, or on the contrary they were traversed by a powerful flow at a time when the seasonal water level was much lower in the past. This resulted in serious disturbances of the hydrography besides the newly flooded areas of the reservoirs. And the most serious were the cases, now being dangerously multiplied, where the aim of the construction work was to direct

part of the course of a river towards an entirely different basin, thus forcing the waters to follow a more sloping course, in order to make them more suitable for hydro-electric needs. Such a project had been undertaken in the Atlantic Ocean were turned towards the Mediterranean; and contrariwise plans were being prepared for waters in the Pyrenees, to be diverted from the Mediterranean to the Atlantic basin, and the same problem was being posed in the Alps, where a project was underway to send towards the Adriatic, via the Po plain, waters which today run towards the Rhone. All these large-scale projects could cause serious disturbances, the possible effects of which should be carefully studied beforehand. He hoped that the Union would consider this serious question.

Mr. G. Pichler (Austria) announced that the Krimml Waterfalls in his country, the highest in Europe (400 meters) were menaced by a hydro-electric project, and asked for the intervention and assistance of the Union, in order to avoid this peril.

Lord Hurcomb (United Kingdom) supported the statement of his compatriot, Mr. Berry. He based great hopes on the dissemination of information among technicians and industrialists involved in enterprises concerned with hydro-electric production. Requests, provided that they were reasonable and submitted at the right time, were very often more useful than violent protests or attacks. The hydro-electric project conceived for Scotland was good, and had taken into account the numerous angles indicated by nature protectionists; fish passes, for example, have been carefully sited. Similar information and enlightenment could be given later to managers of water transport and drainage undertakings. These managers were often glad to have their attention drawn to problems they were not indifferent to, but were not aware of, owing to the different character of their duties. He cited the case of a sewage-disposal engineer, whose undertaking, about fifteen miles from London, helped to create small artificial lakes, where birds flourished. The engineer, without forethought, had granted shooting rights for wildfowl there, thus permitting great slaughter of this abnormally abundant fauna. It sufficed to point out to him the unfortunate effect of his toleration of wildfowling for him immediately to withdraw those rights.

Mrs. E. Ebers (Germany) described the educational efforts being undertaken in her country by the Bund Naturschutz in Bayern e. B., an important organization which, since the war, was attempting to direct towards a love of nature the interest of young people who were still idealistic but unfortunately had been plunged into a state of confusion as the result of recent tragic events. The happy results that had been expected and to some extent realized had been somewhat compromised by the monetary reforms of Eastern Germany. She added that Unesco would be asked for financial help, if the Union were unable to provide them with material assistance. She related the efforts being made primarily by the senior champion of Nature Protection, whose work was known to and admired by all the members of this meeting, Professor Walther Schoenichen.

Mr. L. O. Zwillenberg (Holland) submitted considerations of a general character in the matter of education. He suggested modification of school programmes, and hoped that the Union would adopt the motion which he had proposed (see page 46).

Mr. J-M. Rouet (France) stated that he was an engineer, living and working amongst other engineers, and that it was his considered opinion that Lord Hurcomb and Mr. Berry were correct in their statements. Engineers could do a lot to compromise, or, on the contrary, to aid in maintaining natural equilibriums. They asked only to be informed, and it was up to nature protectors to see that they were. Thus educational action should be undertaken for their benefit, not on the school level, where curricula were already too crowded, but by contacting engineering associations. Some instructional material and lecturers could be put at the disposal of the leaders of such associations. Many of their members would be ready to protect nature if the way to do so were shown them.

In connection with Mr. Zwillenberg's statement, the Secretary-General of the Union drew attention to the fact that the Union, since its creation, had undertaken several different educational tasks. This had been thoroughly discussed at the Lake Success Conference. Several projects were now being undertaken: brochures and leaflets for the use of students in Italy, a Conservation Service, publication of a bulletin, and so on.

Mr. Nicholson concluded the discussion. Mr. van der Goes van Naters, Chairman of the meeting, asked delegates who wished to see their resolutions adopted on Saturday morning to draft the text and deliver it to the discussion leader or to the general speakers. He then thanked Mr. Nicholson for the exceptional authority and competence with which he had directed the discussions.

The session ended at 5.20 p.m.

### 3rd Session

Friday 21st at 10 a.m.

The session was formally opened by Mr. M. van der Goes van Naters, Chairman of the meeting.

Professor R. Bouillenne (Belgium), the discussion leader on Theme B, proceeded to make a general introductory statement connecting the subject discussed the previous day with that on the agenda for the present session. He repeated his belief that adult education should be the first consideration whenever a solution to a problem was being worked out. Then, passing to the agenda, he expressed pleasure at having to discuss the problem of nature reserves in Holland. This country could be cited as a model for its neighbours in Western Europe, since it had such a large number of completely protected reserves scattered throughout its territory. The working paper drawn up by Mrs. L. Pluygers, in collaboration with Messrs. V. Westhoff and M. Mörzer Bruyns, would be used as a basis for discussion. The first subject was the problem of the size and boundaries of reserves. Prof. Bouillenne noted that the size and boundaries depended on the site of the reserve and the site itself depended on the objective for which the reserve was established; there might be only one objective or several. In general, it belonged to one of the three following types: protection of certain species, of interesting ecological associations or of certain communities. Experience showed that preservation of natural communities must, at the very least; be assured in various key areas where man's

influence was spreading dangerously today. This was important for all countries; but particularly for tropical countries, which were still underdeveloped, and which were given special attention in the Point IV programme, with sometimes doubtful consequences. Furthermore, many underdeveloped countries once possessed an extremely advanced civilization, but unfortunately lack of precaution, born of ignorance, led to the upsetting of the natural balances of these territories. Every effort and attention must now be devoted to these key areas, which were the last battlefields in the struggle against the human tide submerging natural communities everywhere; they must be defended at all costs, and no compromise was possible here.

Mr. M. C. Bloemers (Netherlands), speaking from the point of view of a government official, feared that Mr. Bouillenne's proposals, convincing as they might sound, did not always achieve the desired results. He cited several examples – especially the case of the Gran Paradiso, referred to the day before by Mr. van der Goes van Naters – where compromise was necessary in order to serve the cause. Mr. Bouillenne clarified his meaning; individual declarations of principle helped to establish one's line of conduct, but need not be considered public policy. There were cases where they should yield only if forced to; and the resulting compromise must be considered to be a defeat. To another remark of Mr. Bloemers' he replied by distinguishing between cases where resistance to the end was desirable, and others where some latitude was permitted.

Mr. H. Flon (France) shared Mr. Bloemers' views, and expressed the belief that there was a possible gradation in compromises. He gave as an example the case of the Fontainebleau Forest, where the situation was serious in 1945, a time when the demand for wood for various purposes threatened large forest areas. Certain public services did what they could to rectify the situation, while others only aggravated it. Finally, a compromise was reached between those who considered the forests only as a source of timber and those interested in botanical research, who stood for complete non-intervention. A minimum of 1,500 hectares, an area large enough to satisfy the most exacting botanists and ecologists, was set aside as a reserve. The conservationists compromised, it was believed this was the last time. As far as was known at present, this area has definitely been saved. Mr. Bouillenne considered this an excellent example. When the reserve was being established compromise could be allowed, but once the statutes had been drawn up no further yielding should be accepted.

Mr. J-P. Harroy (Union) appreciated the views of Messrs. Flon and Bouillenne but was more doubtful than they about the soundness of the position gained at the price of such concessions. In this connection, he cited the case of the Luama reserve in the Belgium Congo which; unfortunately, was the victim of external human pressure, and was finally reduced piecemeal to a mere slice of what it had been at the time of its establishment. Every time more land belonging to the reserve was yielded, in order to increase the hunting land of the mining contractors in Maniema; the conservationists were assured that it was the very last time. In actual fact, since the causes of the requests for this land did not change, these concessions, made in order to ensure the future of the reserve, only resulted in further demands. In general, the solution to such problems probably lay in the drawing up, at the time the reserve was established, when every-



one was full of good intentions for the future, of such binding statutes as to discourage attempts to modify them.

Mr. M. Nicholson (United Kingdom) stated his belief that here as elsewhere success depended upon the skill and tactics used. Correct information obtained in ample time, regarding the intentions of those who might endanger a natural balance was essential if appropriate action was to be taken in time. Careful study must be made of the reactions and above all the technique used by those whose material interests might conflict with the objectives. This was necessary in order to help in planning their campaign, and also to avoid alienating public opinion. It would also enable a constructive policy to be suggested to their opponents as a substitute for their present attitude. There were two kinds of compromise; those involving a reasonable sacrifice in compensation for strengthening a shaky situation, and those where the main objective was definitely abandoned. Before joining battle, they must weight their chances, make sure the question at stake was worth fighting for, and, above all, not throw their reputation into the balance without having some assurance of victory. A wrong or misunderstood aggressive attitude could only be harmful. Their position was not yet strong enough to bear a succession of defeats. They should not go into battle unless convinced they were stronger than their opponents.

Mr. Bouillenne dwelt upon the sad fate awaiting defenders of nature, having to withstand ever-increasing appetites on an evergrowing number of fronts.

The importance of the legal aspect of the problem of nature protection was emphasized again, this time by Mr. N. Laude (Belgium). Independently of all considerations relating to the above-mentioned conflicts, it was of the utmost importance that all nature reserves were based on sound legal statutes. Thus, in Ruanda, a territory under Belgium trusteeship, the La Kagera National Park was actually the object of many covetous glances, since it was thought to contain deposits of tin. The Institut des Parcs Nationaux du Congo Belge intended to defend its nature reserve by bringing the matter before the State Council; and he believed that the Institute would win its case, since the legal statutes of National Parks in the Congo were so well drafted. The Union should take inspiration from this example. He recommended that a jurist should study laws such as these, the value of which had been proved, and draw from them general principles which the Union might make known to its members all over the world. There were compromises which were merely the acceptable outcome of a sort of bargain. In certain cases the important thing was to choose the objective, and then base the starting point accordingly.

Mr. G. H. Lestel (France) spoke, as had Mesrs. Bloemers and Nicholson, as a representative of a large government service. He defended the principles of nature protection with enthusiasm and energy; but his conviction and tenacity in carrying out this job depended upon the precision and promptness with which the scientific advisors defined the position they wanted him to defend. He preferred to know just exactly how much was expected of him rather than to have the impression he was being asked for a great deal in order to obtain a little. He would be able to serve the cause of conservation more satisfactorily if he were told just how firm a stand he should take and were given good arguments to support his case.

Mr. Bouillenne thought it advisable for the meeting to return to an

examination of the question of the size and boundaries of nature reserves; and asked Mr. V. Westhoff, one of the general speakers, to speak.

Mr. Westhoff developed his ideas on the extent necessary for reserves in Western Europe, if they were to achieve their purpose. He distinguished between floristic reserves, set up to safeguard one or more species, and biocenic reserves aimed at preserving one or more biotic communities. It went without saying that in all cases the area must be as large as possible, but there was a minimum size below which the success of the undertaking became uncertain or even impossible. This minimum was lower for floristic reserves than for biocenic reserves. But it varied with degree of adaptability of the protected species to the changes in its habitat. He gave five examples of Dutch reserves established to ensure the preservation of one or more species, and explained how three of these enterprises seem to be crowned with success (the Island of Texel, 1 ha. *Smyrnum olusatrum*; Groningen, 1 ha. *Cornus suecica*; Oude Ysel; 0,25 ha. *Anemone pulsatilla*) because there was no drainage work in their vicinity, while the two others (10 ha. and 11 ha. aimed respectively at the protection of *Carum verticillatum* and *Spiranthes aestivalis*) were failures because the drainage of surrounding areas drastically lowered the water-table and destroyed the species in question. In the former case a quarter of a hectare was sufficient, in the latter 10 ha. appeared to be too little. The same conclusions held true for biocenic reserves; but in the Netherlands, happily, such reserves were numerous and their size often surpassed the minimum requirement below which there was danger of upsetting the water-table. A reserve of deciduous woodland on rich soil (*Querceto Carpinetum*) fulfilled its purpose – except where there was drainage – when it was more than 10 ha. Other examples were cited, and he emphasized the fact that in densely populated countries such as the Netherlands the requirements were compelled to be less than in a less crowded country. Mr. Bouillenne thanked Mr. Westhoff for his interesting contribution, and remarked that even when a populated country had obtained a maximum of reservable surface, this maximum might prove insufficient. How then could they answer with certainty the precise questions of the representatives of administrations previously mentioned? And what could they say when these areas, hardly sufficient for securing the protection desired, had no guarantee that their status would be maintained in the future?

Mr. M. van der Goes van Naters replied to this question by recalling that laws were always in effect subject to revision, and that sometimes these revisions depended upon political considerations. When the protection of the Saint Pierre Mountain, which provided a shelter for several species of chiroptera, among others, was being urged in the Netherlands Parliament, one politician introduced the following argument into the debate: „You have the choice: cement for Dutch houses or shelter for bats”. To such persons who, with such cheap sophisms, defend the immediate interests of a certain few it should be possible to reply in the name of a federation of associations for the protection of nature, representing a political force to be reckoned with. In the Netherlands there are seventy organizations united in a federation powerful enough to be recognized by agricultural organizations. This made for a healthy national pressure in support of the activities of the International Union, and when this national pressure was reinforced internationally, tangible results were more easily obtainable.

Such an international pressure might have succeeded in preserving the Gran Paradiso National Park in Italy, for instance. It was vital to add the pressure of public opinion to laws; otherwise they would not be enforced or would be amended.

Mr. Bouillenne agreed with the conclusions of Mr. van der Goes van Naters, and suggested that the meeting proceed to the next item. Assuming that a well-defined reserve area, of sufficient size and properly protected, had been created, they should consider how it should be managed. In certain cases a policy of non-intervention should be adopted, even though this might mean the elimination of certain species which existed in the reserve at the time of its establishment. In other instances a way must be found to protect certain "aspects" which should be preserved. Elsewhere, the conservation of one or more species ought to be aimed at. The question then was to know whether intervention was justified inside the reserves and in what form and whether such intervention could go so far as to reintroduce into the biotope representatives of species which formerly existed there but had disappeared during the past few years or decades.

Mr. Ch. J. Bernard said he was convinced of the fitness and wisdom of certain interventions if carefully thought out. There were examples to prove this point. He mentioned the reintroduction of ibex from Italy into the Swiss National Park. The stags that keep emigrating from the Swiss National Park to the south were surely a token of the Swiss Government's gratitude to their Italian friends! But he insisted that action should be applied strictly to the reintroduction of species definitely identified with others formerly in the area. There could be no question, for example, of introducing brown bears from the Balkans or from Yugoslavia into the Swiss National Park, as the species was slightly different from the indigenous type. The latter and the North Italian species being identical, such an introduction might be considered. But a problem which was of greater interest to him, and which he would take up later, was the policy to be adopted towards valuable types, such as the ibex, which were so prolific now that they had become a nuisance. A campaign of elimination by shooting was all the more unpleasant as much effort and money had formerly been expended in order to promote their propagation, and since they had won public sympathy.

Mr. Westhoff discussed in detail the subject of eventual intervention. He distinguished between reserves protecting a "pseudo-natural" landscape and those protecting a "semi-natural" landscape. He subdivided the pseudo natural landscape into (a) "climax communities", (b) relatively stable areas where the biotic communities were constantly replaced by others, but themselves reappeared in other places (cyclic and proceeding successions), and (c) areas where the biotic communities tended towards the forest climax (terminable succession). The legitimacy and opportunity for intervention were therefore dependent upon the object of the reserve and the biotic environment contained therein. Semi-natural landscapes were created by human intervention and they should be maintained by a continuance of this intervention. In such types of reserves it was therefore impossible to reconcile the strict conservation of natural conditions with the preservation of certain species. A possible solution would be to subdivide the reserve into sectors, leaving nature alone in one part and in the other intervening to assure the maintenance of certain biotic communities

which ought to be preserved in their present condition. On the other hand, in reserves which enclosed pseudo-natural landscape, such a combination was possible, at least in the communities of types (a) and (b) where intervention should be restricted to eliminating disturbing influences, such as drainage, the multiplication of rabbits, or the introduction of exotic plants. In the case of "terminable successions" such combinations were almost always impossible, and intervention should be limited to occasional fellings or mowings in those sections of the reserve where it was decided that intervention was necessary.

Mr. J. G. Roger (United Kingdom) then made a general statement on the situation regarding nature protection in his country. He spoke of the problem of the preservation of endemic species, for which very small reserves had been established, of the pine-groves, and the division of large estates. He referred to the weakness of certain regulations and the excessive clemency in some courts of justice, which imposed a fine of one pound sterling on the poacher who had slain a red deer and on the driver who had parked his car in a prohibited area.

Mr. F. Faegri (Norway) thought the debate was like knocking at an open door. In his opinion, nature protection should be restricted to

1. defining the character and extent of human interference necessary to maintain a certain balance, the preservation of which was considered desirable, and
2. keeping up this interference. All the rest, he added, was only theory.

Mr. Harroy favoured the policy of non-intervention which could be justified in particular circumstances. In densely populated regions such circumstances had little chance of appearing, first because of the lack of space and secondly because the experience so gained would find little chance of being used outside the reserves. In tropical regions there were vast territories where conditions were different, and where the programme of technical assistance to under-developed countries urgently called for a greater quantity of specific ecological information. In those regions here and there virgin areas could still be found, and although they were being progressively nibbled at by primitive human occupation (semi-nomadic cultures) they were still quite large. It would be desirable, where such biotopes were still free from human interference, to demarcate an area where strict conservation could be practised without intervention, and where the natural laws of nature in a pure state could be observed by ecologists. Elsewhere in inter-tropical countries, under the pressure of economic development, (exploitation of agricultural products for exportation, the extension of food-producing cultivation, important increases in stock-breeding) some abrupt alterations in the natural equilibrium, accompanied by pedological or hydrological impoverishment were bound to occur. Such savage degradation of intertropical animal and plant communities was still largely unknown. There a thorough and careful study must be undertaken, in order to find a remedy for the situation. One positive form of approach to the problem would be to make a strict reserve, with all human influence abolished, of one zone that had already been affected by man. When the disturbance was not too marked, nature could to some extent return to a state sufficiently analogous to the primitive state to make the systematic observation of the successive steps extremely instructive. The study of biotopes influenced by man, as Mr. Faegri had

suggested, was of course indispensable; but entire continents were open to such observation outside reserves. When the latter were sufficiently vast like those of tropical countries, the authorities would be justified in dedicating certain sectors, both to directed ecological experiments and to prolonged phases of strict non-intervention.

The session ended at 12 : 30 p.m.

#### 4th Session

Friday, 21st, at 3 p.m.

At the outset Mr. Bouillenne, after recapitulating the conclusions reached at the morning session, suggested that the discussions should be directed to the problem of biological pressures exerted on reserves, and asked whether any of the participants had any ideas on accounting for the length of time a reserve had a chance of surviving these outside pressures.

Mrs. L. Pluygers (Netherlands) spoke on cases she had observed in Indonesia. A small reserve of 300 sq. meters in a very densely populated region in Java contained a botanical station of great interest. The supervision of this reserve was interrupted by the war. The barriers were destroyed, the enclosure invaded by men and animals, and the value of the site was reduced to nil. Two other reserves suffered the same fate; both were in the centre of the Isle of Java, one protecting teakwood trees and the other *Rafflesia Arnoldi*. Today, on paper, the Indonesians claimed at least ten reserved areas, but they did not correspond with an interesting biotope on the ground. Legislative measures, now dormant because there was no reason for their existence, should be restored, so that the public was no longer fooled, as at present. Mr. E. M. Nicholson (United Kingdom) advised great prudence and judgment in this respect. What was meant exactly by territory having lost its value? A disturbed biotope, when the cause of the disturbance ceased, could recover most interesting forms of equilibrium. He gave some examples, one of which was located in Java. In another case, the sea had invaded a reserve in Great Britain to such an extent that everyone believed that the biotope had ceased to be interesting, but the upshot proved different and their interest had even increased. Elsewhere, the army interfered in a protected area, with the effect that the biological value was severely modified, but not in the sense of an irreparable degradation as was at first believed. Mrs. Pluygers agreed with Mr. Nicholson's remark, but she insisted that it applied more to animal and especially bird groups than to plant communities, where resettlements were much slower, especially if the seed-carriers had disappeared from the vicinity.

Mr. Bouillenne then asked what attitude should be adopted towards animal groups which had become superabundant in a reserve area and which were harmful to the biological equilibrium of the reserve, and also likely to cause difficulties with the neighbouring inhabitants, where property and persons might be menaced by raids made by these animals outside of the protected area.

Mr. C. L. Boyle (United Kingdom) conveyed very interesting information on this line which he had from Colonel J. A. B. Sandenbergh, Warden of the Kruger National Park in the Transvaal. When game multiplied in a reserve, one way of keeping them from leaving the reserve was to increase

the number of water-points at their disposal. If there were no measures taken to increase the water supply in dry seasons, thirsty groups would leave the National Park and run the risk of being killed outside. Because of the lack of watering-places, much of the grazing land was useless to the herbivores in the dry season. In September 1949 Colonel Sandenbergh made an appeal in his country for funds to procure equipment to provide water-holes in parts of the Kruger National Park where the pastures were particularly rich but badly watered. Two enterprises were started at the same time: a General Water Fund (for the building of dams and barriers to retard the seasonal run-off of rain water) and a Borehole Installation Fund (for the purchase of surface installations for boreholes to be sunk at the expense of the National Parks). These two funds had received respectively £ 3,800 and £ 10,600 from the four provinces of the Union of South Africa. To date, fifty boreholes had been installed, equipped with pumps operated by windmills. The watering places are distributed on the scale of one for every 65,000 acres, thus allowing the game to move easily from one to another. Experience had shown that the boreholes most attractive to the fauna were those presenting the largest sheet of clear water. It was as if the animals estimated the duration of the water, and, if it appeared that it would dry up rapidly they sought other and better water; but, if the pan seemed to hold enough water for another month, the fauna took up residence in the neighborhood. The quality of the water did not seem to be important for the game. The most ideal type of water-hole was a flat pan-like surface situated in open country with good clear approaches. For the elephants, a different arrangement seemed necessary, because the elephants used the ponds (mud pans) for bathing but not for drinking. An experimental type of drinking point for elephants had been devised with a thirty-foot diameter concrete reservoir three feet deep sunk flush with the ground. Three quarters of it was then filled with river sand, and water was pumped into it from the mill. A screened overflow took the surplus water to a mud pan, where the elephants bathed. An elephant went to the reservoir, made a hole in the sand with his forefeet, and drank what appeared to him to be filtered water. Experiments of this kind were being carried out and seemed to prove that they were on sound lines. In any case two results were already assured: valuable animals such as the eland were no longer leaving the Park, and the approaches to the natural water-points were kept clear in the dry season, thus preventing damage from overstocking. Criticisms had been made against the system. One argument was that a water-point supplied from a mill to an ordinary mud-pan might become infested with parasites that would normally be killed in the rain-water pans when the veld dried during the dry season; but the remedy was simple, all that had to be done was to turn on the brake on the windmill and let the pan dry for a time. The fear was also expressed that the water-table would be lowered by the use of the pumps, but careful observations had demonstrated that it was without foundation.

Mr. S. Frechkop (Belgium) enlarged on a particular point outside the discussion. According to him, the authorities who created a reserve area assigned to themselves the task of maintaining and guarding the area against all forms of interests. Nobody would dream of demolishing the Sphinx of Gizah, even though it seemed desirable to mine beneath it; but in the Belgian Congo and in the United States of America projects for mineral

exploitation were likely to be considered which would destroy the National Parks. Should not the International Union be authorized by the United Nations Organization to take the place of such a government whenever it was forgetful of its duty towards humanity? Such an arrangement would perhaps allow wealthy countries to aid less fortunate ones to conserve on their soil some remains of nature of particular value. He recommended the creation, under the aegis of Unesco, of an international fund designed to aid national efforts for preservation. The National Park of the Gran Paradiso, among others, could have benefited by the use of such a fund. Other examples were cited by him, which, he claimed, established the necessity for international control for the protection of nature, among them the following:

1. The Nepal Government authorized an animal trader to capture eight rhinoceroses, and also made an effort to attract American big-game hunters;
2. The slaughter of 300,000 mammals in Rhodesia, to prevent the spread of sleeping-sickness.
3. Excessive slaughter during capture and loss by death following it at the time of the 1950 campaign by the Government Capturing Service of the Belgian Congo in efforts to secure a certain number of gorillas for scientific institutions and zoological gardens in different countries of the world;
4. The danger of a similar campaign being taken up under the same conditions in 1952;
5. The deplorable laudatory publicity recently given by a Brussels newspaper to the exploits of a sportsman who had slain a ridiculously large number of large mammals during a short holiday in Central Africa;
6. The serious threat to the hunting reserve of Kundelungu (Katango, Belgium Congo) where projects were being considered on behalf of a stock-breeding organization. These projects might be carried out to the great detriment of the indigenous wild fauna, despite the slight chances of success of this enterprise.

Mr. M. Mörzer Bruyns declared that in the Netherlands it had proved necessary to control the numbers of certain mammals and birds in nature reserves. The smallness of the reserve areas made a large number of any one species undesirable. The disappearance of certain predators (foxes, badgers, etc.) allowed the unchecked multiplication of other species (rabbits, etc.) to the point where they must be artificially controlled. In the Netherlands there were now about 20,000 couples of sea-gulls, whereas about 12,000 would be much better, as these birds were harmful to other breeding-birds in their neighbourhood, preying on their eggs and young. It was necessary, therefore, to manage the colonies of sea-gulls. On the other hand, intervention was sometimes necessary to stimulate proliferation, even including the increase of invertebrate species. An example in support of this statement was mentioned, that in mowing, measures to control drainage irrigation and burning were regularly taken. In some reserves the soil was thus left bare, to encourage the multiplication of certain species of hymenoptera. And that consideration led back to the problem already developed by Dr. Westhoff concerning the surface of reserve areas. The size of the protected species was the determining factor for the necessary extent of



the reserve. For a species of invertebrates, reserves of one hectare or even half an hectare proved sufficient. Large animals, of course, had to be kept in larger reserves, sometimes of several hundreds of hectares, and, if surrounded by cultivated areas, with sufficient protective areas around them. These protective areas should have a surface of 10 to 20 per cent of the reserve itself. As far as biotic communities were concerned animal cenoses needed larger reserves than did plant groups; for bird-life characteristic of a heath landscape a reserve of at least 150 hectares was necessary, whereas 10 to 20 hectares would satisfy the botanist anxious to safeguard plants of the same biotope. He asked for the opinions of ecologists in other countries.

Mr. Bouillenne then asked what the meeting thought of the establishment of buffer-zones round reserves. Mr. Bernard said that bordering the Swiss National Park districts had been provided where hunting was prohibited, and Mr. Nicholson stated that similar arrangements existed in his country, with legislation enabling the Nature Conservancy to limit hunting near reserves. Mr. Bouillenne recalled that when the Albert National Park was established it was made up of strict nature reserves and "annexed territories" where hunting, fishing and wood cutting were prohibited. This arrangement had now been abandoned. He mentioned several factors in favour of setting up protective belts around reserves in order to shelter the reserve's communities from the disturbing effects of neighbouring human enterprises, such as near-by drainage affecting the water resources of the reserve; carrying into the reserve (by the wind, streams, etc.) manure, insecticides, herbicides, etc., from the neighbouring fields, etc. The Camargue Reserve was unfavourably influenced by adjoining horticultural and agricultural activities. Obviously precautions must be taken to reduce these unhealthy effects by some control of agriculture in protective areas. Possibly the meeting would consider a resolution on the subject.

According to Mr. G. H. Lestel (France) legislation was also contemplated in France for conservation areas with precise provisions for the protection guaranteed in each case, but was not yet in force.

Mr. Harroy, in answer to Mr. Bouillenne's question, explained why the annexed territories of the National Albert Park, as of 1929, were abolished in 1934. It was amazing that in this connection nobody had suggested that the ideal form for a reserve was a circle and that the zone of protection be identified with a corona. In fact, when possible, it was useful to include a buffer-zone to absorb the pressure from the world outside the reserve. But the safest solution was always a constructive policy which strove to reduce the intensity of the pressure. It was this that the Director of the National Albert Park applied himself to achieve, with much skill. If the natives protested that their cattle lacked watering-places and wanted to enter the reserve in order to water their herds, it was better to arrange a watering-place outside the reserve than to double the number of guards to keep track of the comings and goings of such herds. If the natives, suffering from a lack of protein, cast envious eyes on those parts of the rivers that abounded with fish in the National Park, it was much better to make artificial ponds and stock them with young fish – even taken from the reserve – than to redouble repressive activity. If the neighbouring people complained of a lack of bamboo, wisdom recommended that they be furnished bamboo stumps collected from the protected bamboo-groves, and taught

to plant them in areas where they formerly grew spontaneously. To put an end to outside pressure, good will and imagination always proved more effective than attempts to enforce the laws.

Mr. A. Ghigi (Italy) warned against too much hasty generalization, and said that the problems of each particular case should be considered separately. That the Union should strive to draw up general laws was fine; but those made for a great National Park should not be extended to very small reserves. Biological equilibrium, besides, was extremely dynamic and unsteady. Some species might be present one year but not the next. Building up theories on such changing foundations was hazardous. In Italy there were valleys, such as the Po, where human occupation is practically 100 per cent. The forests and brushwoods there were exceptional. This semi-natural timber-growth suffered exterior pressure from all sides. Here and there the question was considered of establishing hunting reserves or areas, the latter in order to allow for nature reserves. But the discussions became impassioned, for there was so much difference of opinion as to the policy of conservation. When the proprietor of a restocked reserve saw the game, the multiplication of which he had financed and which had become too prolific for the area, going out of his territory, he argued that the game still belonged to him and was not to be hunted by anyone under any conditions. But, of course, outside the reserve area, hunters and farmers would not agree with this view. The former wanted to indulge in their sport, and the latter argued that the game damaged their fields. And, of course, as soon as the game became aware of the danger of being shot, with their customary instinct they would quickly re-enter the reserve, thus adding still further to the latter's unfortunate reputation of being a Pandora's box. Dr. Bernard shared Mr. Ghigi's views and quoted the following occurrence: In Switzerland in the "districts francs", the annual damage committed by the deer in farmers' fields was estimated to be 4,000 Swiss francs. Swiss hunters imported each year about a thousand hares, said to be for restocking, but which were all killed before the end of the first day of the hunting-season. The Swiss hunters had been recommended to practice a true policy of restocking, not losing sight of the dangers which were always present in the importation of exotic species, principally from the point of view of pathology.

Mrs. Pluygers contrasted the statements of Mr. Bouillenne, who would control agriculture in protective areas, with the opinion of Mr. G. Dennler de la Tour, who, in his report, allowed for the free exercise of agriculture in the same zone. How was this contradiction to be resolved? Mr. Bouillenne replied that it was necessary to consider each specific case in accordance with the general local conditions. In the Argentine it was normal to tolerate modest local agricultural activity in the proximity of large national parks. In Belgium it would be unwise to authorize farming involving deep drainage in the immediate vicinity of a peat bog protecting the Hautes Fagnes. The problem of tourism was then discussed.

Mr. Nils Dahlbeck (Sweden) referred to Mr. Harroy's report, wherein it was suggested that as far as possible tourism should be avoided in nature reserves. In the case of national parks the very name given the area signified that the traffic of visitors might not only be tolerated, but organized. He, however, was of the opinion that tourism never did any harm to the natural communities in the regions where tourists were allowed to roam. Mr.

Bouillenne in reply recalled the romantic conditions that attended the creation of the Yellowstone National Park in 1872. Its aim was primarily to guarantee that future generations should continue to enjoy the unique natural scenes that their ancestors had known. But there had been periods in the history of this and other national parks; such as the Yosemite, when the American authorities came to regret having encouraged so large a number of visitors, as trodden plants, cut flowers and even fires in the vegetation too often marked their trail. He agreed with Mr. Harroy's conclusions, that in reserves certain sections; as large as possible, should be maintained against all human traffic, while in others the movements of tourists should be channelled and controlled.

Mr. Bernard remarked that the Swiss National Park had been created by the people for the people, but this conception had had consequences which have not always had the approval of nature protectionists. Mr. V. Van Straelen once criticized the opening of the Hotel Il Fuorn in the very heart of the park. Mr. W. Burhenne was critical of the fact that there were so many footpaths in this reserve. Often greasy papers and empty boxes were thrown on the ground where a band of tourists had picnicked. He agreed that the solution was, as Mr. Bouillenne had said, to form a policy of compromise. The reserve of the Camargue furnished an excellent example: of three concentric zones, the outside was open to the public, the second was accessible only to duly authorized naturalists and artists, and the third remained strictly closed to everybody.

Mr. G. H. Lestel (France) remarked that once more the apparent disagreement dividing the speakers found its origin in a difference of definition; national park and nature reserve. The Union would have done a useful job when its Nomenclature Commission had finished its report.

Mr. H. Flon (France) spoke of the effects of tourism in the Forest of Fontainebleau. Since the fire in 1840 which was caused by the passage of the first train, much harm had been done by walkers. One good forester thought it was a wonderful idea to make footpaths for tourists, but the results were disappointing. Fortunately, the paths were not kept up and gradually disappeared. Today the walking routes were systematically separated from areas considered as reserved. It was essential to guide the walker, without seeming to, when it was desired to limit his access to the reserve. Placards specifying the zones where entrance was forbidden did not have the slightest effect, in fact quite the opposite.

Miss V. M. Conway (United Kingdom) said that the Nature Conservancy of her country would soon have to decide this important question of principle. First of all, she agreed with the reservations made by the previous speakers, the more so because in Great Britain, the aim of the Conservancy was much more scientific than touristic. But in the United Kingdom laws concerning the rights of the public complicated the situation somewhat. In consequence the Nature Conservancy was endeavouring to choose reserves in districts less frequently visited by tourists. They would not protect sites known to tourist agents as popular tourist spots. In Scotland and Wales the possibility of creating reserves without the difficulty of too many tourists still existed, but it was hoped that the few excursionists would be only an insignificant menace to the biotopes. In England, however, only small reserves were possible. They would try to limit access to persons having special reasons for visiting them; for instance, scientific. On lands

purchased by the Conservancy such a policy would be possible, but on lands leased by it, it will be for the owners to lay down the rules governing admission.

Mr. Harroy, in reply to Mr. Dahlbeck, said that tourist traffic always brought disturbing influences, whether wilful or not, conscious or unconscious. To be convinced of this it was only necessary to compare that section of a reserve where such traffic was allowed with a neighbouring one where the presence of humans was prohibited. A psychological attraction, which might be coped with without too many scruples, often urged the public to spots they would never have dreamed of visiting had they not learned that the authorities desired to reduce the traffic of human beings there to a minimum. How many territories in the Belgian Congo, just as picturesque as the national parks, were of no interest to tourists? How many people, who never thought of going in the Kibara and the Kundelungu, protested violently today they were not allowed to go into the Kibara, which was encircled in the Upemba National Park. They never thought of going to the Kundelungu, a plateau which almost became the National Park of Katanga instead of the Upemba Park, but which in spite of its magnificent landscape and still abundant fauna (this is the hunting reserve to which Mr. Frenchkop referred) offered very little attraction because tourist traffic there was not prohibited. In the Belgian Congo, it was true, the protected zones are always encumbered by their inadequate denomination. The name of the National Albert Park dated from 1925. It was not until 1933 that the London Conference specified the definitions of the conception: national park and strict nature reserve. As the terminology Albert National Park had entered into current language and legal texts, there was no question of changing it or saying that the greatest part of the area should be called the Albert strict nature reserve. Neither the National Park of Garamba nor the National Park of the Upemba were in the least national parks in the terms of the Conference of London. Mr. Lestel's remark was opportune in this respect, but it must not be thought that even if the Nomenclature Commission of the International Union were to submit a perfect report, universally accepted, that it would result in changing the names of the reserves in the various countries to correspond with the newly passed international nomenclature. The original denominations would persist in the most cases, and the best that could be hoped for is that the published lists would indicate the category of the general nomenclature in which the protected areas in each country should be placed, as determined by the owners of the various reserves, or possibly by foreign experts. In future, on the other hand, authorities creating new reserved areas would be expected to follow the international regulations.

Mr. Dahlbeck agreed with the general conclusions of the preceding speaker as far as the damage committed by tourists had been proved. He also readily agreed with many of the ideas of the preceding speakers, but thought it should be remembered that the Kruger National Park had not lost all its scientific interest despite the thousands of tourists who visited it annually. The Yosemite National Park had 800,000 tourists last year who visited the parts open to them, but there are some 5,000 square kilometers in this National Park where excursionists were not allowed.

Mrs. Pluygers believed Mr. Dahlbeck's conclusion to be over-optimistic.

In Sweden the public had an instinctive sense of what to do and what not to do in a national park. Unfortunately it was not so everywhere. Besides, the problem was different in densely populated, temperate zone countries and in the tropics – in Indonesia, automobile tracks were simultaneously used by the public and by large game. In the Netherlands the „Vereniging tot Behoud van Natuurmonumenten in Nederland” distinguished among its sixty-odd reserves four categories with reference to their accessibility to tourists:

1. Large reserves, mainly of aesthetic interest, which were freely accessible;
2. Reserves of ornithological interest, accessible before and after the breeding season only;
3. Large reserves of scientific interest – accessible to members of the Society only, by special permission of the directors;
4. Small scientific reserves, accessible for research only.

Mr. W. Van den Bergh (Belgium) asked to make a general comment. He regretted that the discussion had not carried on the examination of the practical means of achieving the objectives enumerated. In Switzerland and in Holland nature protectionists had the luxury of being able to refuse any compromise. In Italy compromises had been accepted after a fight. In Belgium there was no spokesman able to represent nature protectionists scattered throughout the country. There had never been any attempt to bring all the forces under a single banner. He would therefore like the Executive Board of the Union to see if a way could be found to assist the Belgians to achieve such an association. Furthermore, he considered it regrettable that more direct contacts had not been established with town-planners who were so much involved in the management of landscapes. They should be advised of the results of the work of this technical meeting. Indeed, some of them should have been invited to attend. The Union impinges on numerous fields in which it would be useful to cooperate with other specialists. The Executive Board might perhaps bear this point in mind in the future.

The session ended at 5 : 30 p.m.

### 5th Session

Saturday, 22nd, at 10 a.m.

As had been arranged, Mr. Ch. J. Bernard, President of the Union, directed the first part of the discussion, which was related to the examination of various statutory activities of the Union. He suggested that the problem of zoological gardens and of the sale and transport of wild animals should be taken together. He then called on Dr. A. L. Sunier, formerly Chairman of the International Union of Directors of Zoological Gardens, to open the discussion.

Mr. Sunier referred to the report of Mr. F. J. Appelman (Netherlands) in which a distinction was made between rich and poor zoological gardens, a distinction which Mr. Sunier did not advocate. He believed that zoological gardens, like museums, should have education as their first objective, and should be classified according to their efforts and their success or failure

and not to their financial resources. Almost equal to their educational work is their important role in acting as scientific research centres, where the psychology and pathology of animal species could be carefully studied, thanks to the experimental equipment available there, which did not exist elsewhere. On the whole, the demand for living wild animals by zoological gardens was negligible as compared with other reasons for the disastrous diminution of many representatives of this type of fauna. Of course, this plan must be carefully defined so as not to go outside what he had in mind. Species which were becoming very rare and threatened with extinction must be excepted; in such serious instances the temptation to search for them, just because of their rarity, and of acquiring specimens at any cost, in order to satisfy the public's craving for an attraction, must be strenuously resisted. Only zoological gardens worthy of the name which undertook the double task of education and scientific research should be allowed to acquire rare specimens. There were today many institutions whose main objective was purely commercial; they sought rare animals merely for their publicity value. A satisfactory solution of the problem would be to bring about the adoption of an international agreement to prohibit the import of animals given in a list of protected species, exceptions only being allowed in the case of zoological gardens of recognized repute. Naturally, such exceptions would be carefully scrutinized, and restaurants, saloons, and even dance-halls exhibiting a few mammals or caged birds would no longer continue to rank as zoological gardens.

Mr. F. J. Appelman (Netherlands) emphasized that this report (see page 102) was not submitted by the zoological garden of which he was director, but was a personal document. He discussed the causes, mentioned by Mr. Sunier, which much more affected the future of wild animals than the few requests for specimens made by zoological gardens. These causes were, in the order of importance, the continual restriction of habitats arising from the extension of human occupation, the corresponding scarcity of sanctuaries, the perfecting of arms and hunting equipment, and the growing opinions in favour of the extinction of wild species (mammals, insects, etc.) in order to protect certain domestic species (herds, cultivated plants, etc.). Furthermore, many wild animals were being exterminated for sport or for meat, ivory, fur and leather. In comparison with the slaughters by the native populations of tropical countries the number of living animals captured, which were intended for zoological gardens, or were killed or died as the result of such capture, represented only a very small percentage. Therefore, the extent of the damage done by zoological gardens in obtaining animals must not be exaggerated, except, of course, in the case of rare species.

Dr. Bernard mentioned an example within his knowledge. In Java in 1931 new regulations were adopted to prevent the sale or delivery of rare animals to foreign zoological gardens. The totally protected species included the gibbon, orang-outang, bird-of-paradise, and varan of the Comodo. Before the enactment of these laws the species were in great danger. An order for 20 varans had been placed by a group of important zoological gardens in the United States. Another time two so-called hunters had slaughtered all the gibbons in the large reserve of the mountainous region of Tjibodas, ostensibly for research. He believed that this animal had never appeared in the region since then. This was when women were fond of

wearing monkey-fur. It was the same story for the birds-of-paradise of New Guinea. The law prohibiting the capture, sale or transport of these birds had completely changed the situation. Its application was not too difficult, as the supervision at the ports was sufficient to put a serious check on export. At the same time measures were taken to continue to supply specimens to reputable zoological gardens of the educational and scientific type. But, since the local authorities admitted their inability to distinguish such institutions from others, it became the custom to send all captured specimens to Dr. Sunier in Holland and thus assure that their distribution would be properly made. He expressed the hope that this excellent procedure would remain in force.

Mr. Harroy reminded the assembly that this is not the first time that the Union has been concerned with this serious problem. Several lists of "accepted zoological gardens" had been secured, in particular that of the Fauna Preservation Society, and notice had been taken of this subject. Further, in accordance with the suggestion of the American Vice-President, Mr. Harold J. Coolidge, with reference to the International Union of Directors of Zoological Gardens, which met during the first week of last June in Amsterdam, an agreement was reached to provide for two permanent delegates of the I.U.D.Z.G., to be designated by it, to establish and maintain contact with the I.U.P.N. These delegates were Mr. L. S. Crandall and Mr. J. Delacour, both of New York. Mr. Harroy concluded by asking the assembly whether it was suggested that the I.U.P.N. remain passive and leave this problem to the I.U.D.Z.G., or should the documentation be continued and the former Union intervene only when specifically requested to do so? He would submit to the Executive Board such measures as might represent the views of the meeting.

Mr. van der Goes van Naters, Chairman of the Meeting, illustrated the difficulty of the problem under discussion by quoting a recent press report: a Dutch innkeeper at Schoorel had just expressed his intention to add to his establishment a scenic railway which would join the summit of a high dune to the sea, a lake where small steamboats would circulate, a rocky area for chamois, and a pond to be inhabited by rare birds.

Mr. Sunier explained that he had been President of the International Union of Directors of Zoological Gardens, which, as its name implied, was an organization of persons and not institutions. To be elected to membership, a candidate must receive a favourable vote of four fifths of those voting. The I.U.D.Z.G. placed the protection of nature high on its list of statutory objectives. In reply to Mr. Bernard he said he could easily send him a list of the members of this Union. Mr. Harroy repeated his question as to the role which the I.U.P.N. should play in the official recognition of zoological gardens worthy of the support of authorities, and in placing on the index commercial establishments which did not merit such support. Mr. Bernard replied that there were no objections on the part of the meeting to this task being assigned to the I.U.D.Z.G.; the I.U.P.N. would act only in an advisory capacity or else when intervention was requested by it.

Mr. R. Mayné (Belgium) believed that the I.U.P.N., while allowing the I.U.D.Z.G. actually to discriminate between institutions, should nevertheless concern itself with the principle of the problem. Today there were private firms which made extravagant profits by exhibiting mammals and especially caged birds. The considerable profits made would undoubtedly lead to

many similar enterprises, with probable disastrous results. What happened to the wild fauna – specimens captured for exhibition for profit – was already known. Intervention was very desirable, in order that the selling price of living specimens should rise to such a height that in the future it would be to the interest of the owners to transport them only under the best of conditions, and to treat them with the care necessary for their survival. Among the possible means of achieving this result several excellent proposals in Mr. Van den Bergh's report (see page 100), and in particular the inclusion of stricter rules governing the conditions of transportation, might be cited. Mr. Bernard supported this last remark.

Mr. M. W. Van den Bergh (Belgium) said that strict regulations for the transport of animals under an international control were essential. The control should primarily be made much stricter at ports. He described the incredible conditions which existed today: birds confined for long hours, with twisted necks, in boxes too inadequate in size, animals travelling with such lack of air-space that airline hostesses were instructed to throw pails of water over them at each halt, etc. In this respect veterinary services had a very important role to play, and their services were indispensable for remedying these disgraceful conditions.

Mr. A. Ghigi (Italy) agreed with the conclusions in Mr. Van den Bergh's report. He was also ready to distinguish between zoological gardens with cultural and scientific aims and amusement parks; but, like some other speakers, he was worried about the criteria for discriminating them. He mentioned the example of the zoological garden in Rome and the much more modest establishment in Milan – the difference between them being in size only – both were municipal projects and both were attached to the Natural History Museum of the city. Why, then, was the Director of the Zoological Garden of Milan refused admission to the I.U.D.Z.G.? Was it because of the status of the institution he directed, or for reasons of a personal nature? The reply was that the exclusion was the result of trading in animals. Was this reason satisfactory for a decision affecting the entire zoological garden of Milan? Mr. Ghigi concluded by mentioning the anxiety caused by the increase in the commerce of exotic birds. The Micronesian Islands were the scene of enormous destruction caused by this commerce. The International Committee for Bird Preservation was concerned about this. Could the I.U.P.N. assist them in this work?

In reply to Mr. Ghigi Mr. Sunier said it was true that it was because he engaged in the commerce of wild animals that the Director of the Milan Zoo was precluded from membership in the Union, in accordance with its statutes. But this circumstance in no way excluded the Milan Zoological Garden from the ranks of institutions permitted to obtain rare animals from governments, in accordance with scientific aims.

Mr. G. Pichler (Austria) suggested that in accordance with what has been said, the I.U.P.N. should consider cooperation with the International Zoophile Organization, whose headquarters was at Geneva. Dr. Bernard agreed, and then suggested a discussion on the problem of the protection of whales, arising from the increased hunting of these animals organized in certain countries.

Mr. P. G. Van Tienhoven, the first speaker, reported the somewhat alarming results of an inquiry, very carefully carried out by his compatriot, Mr. W. Eshuis, in cooperation with the International Whaling Commission



(London), the Discovery Committee on Whaling (a section of the National Institute of Oceanography of London) and the International Bureau of Whaling Statistics (Sandefjord). This inquiry endeavoured without success to discover whether there was any scientific basis for limiting the annual catch of 16,000 Blue-whale units by the floating factories in Antarctica. The results were about the same when attempting to classify the whale population of the oceans by age, average size, the percentage of different species represented, or by the number of Cetaceans in reserve areas. One field where documentation was easy, however, was that of the hunting methods, increased each year by additional equipment. The Netherlands Government was about to sanction the operations of a group financially interested in whaling. There was no doubt that the Cetaceans were seriously threatened. Moreover, besides those countries which had joined the International Whaling Committee and had signed an agreement which was not altogether perfect and which was not entirely respected by some of the signatories, there were other countries which allowed uncontrolled whaling. The I.U.P.N. should seriously consider this question and make protests to the governments concerned. Mr. Bernhard asserted that it would be wrong to reproach the International Union for the Protection of Nature for lack of interest in the problem of whales. On the contrary, the Union had engaged in much correspondence on this problem, and was convinced that well-informed specialists were carefully dealing with this question and it would therefore be unwise for it, with its very limited means of documentation, to take independent action. Mr. van der Goes van Naters recalled that the Washington Conference of 1946 had decided to create a Whaling Commission charged with assembling and periodically publishing figures and indices. One of these publications was issued in November, 1950, and it would be well if the Executive Board of the Union were to get into touch with the Commission. Mr. Bernard thought this proposal would be agreeable to Mr. van Tienhoven, and he himself was in favour of it. Mr. van Tienhoven also agreed, but added that precise information was lacking on the question. The exploitation which threatened the future of the species must be opposed, as it was in imminent danger. Perhaps the increase of the world production of vegetable fat would some day alleviate the menace. Meanwhile the propaganda for increased whale-fishing was alarming, and it should be discreetly but energetically counteracted, when going beyond certain limits.

Mr. Bernard feared that one of the outcomes of this propaganda was the pressure being exerted in certain fields to hamper the publication of statistics compiled by the Commission in Washington. Mr. Harroy confirmed Mr. Bernard's statement that the Union was not uninterested in the problem. The preceding year, at Brussels, Dr. F. C. Fraser, Deputy Keeper of the Department of Zoology, British Museum (Natural History), had pointed out how the Union might reasonably hope to deal with the question. Its scientific aspect was in the hands of technicians of the International Whaling Commission, with infinitely greater authority than the Secretariat of the Union had, even when assisted by biologists they might consult. The Union should therefore limit its action to a triple role: (1) to find out from the aforementioned Commission the exact state of the question; (2) to disseminate this information among its members and to the public, in order to remove fears, if the material gathered were reassuring, or to

stimulate public opinion if the contrary; and finally (3) to give the International Commission all the assistance in its power. It was in this spirit that the Union made contact with the organizers of the International Conference at Cape Town in July, 1951, and offered such support as might be required. He recently had an interview at Paris with Mr. Paul Budker, Assistant Director at the Natural History Museum (Colonial Fisheries Laboratory), the author of the remarkable article on the Whaling Industry and the Protection of Cetaceans published in the first issue of *Pro Natura*. Mr. Budker had just come from the Cape Town Conference. His impressions were not as pessimistic as those of Mr. van Tienhoven. He planned to go to the Netherlands and get into touch with people there, interested in this problem, and give them first-hand information.

Mr. K. W. L. Bezemer (Netherlands), Friend of the Scott Polar Research Institute, circulated a report which will be found as an annex to the proceedings (see page 104). This report, supported by figures, was very alarming. He recommended the Union to take in hand the systematic exploitation of the innumerable documents scattered throughout the world, the collating and methodical analysis of which was necessary for the accuracy indispensable for convincing the authorities and the public of the urgency of the peril and the need for quick and energetic action. The Union should appoint a small commission charged with the work of preparing a preliminary report.

Mr. N. Dahlbeck (Sweden) added to Mr. Bezemer's statement. Notwithstanding the soothing assurances, he considered the situation dangerous. At the present rate of capture, whales would disappear within ten years. The Union should act, and act quickly.

Referring to a remark of Mr. van Tienhoven's, Mr. K. Faegri (Norway) regretted that he could not share the hope that the increase in the production of vegetable fats would increase the chances of the whales' survival. These animals were hunted not only for their fat, but also as sources of proteins and of medicinal supplies. Even if the earth's fats were increased, the whales would still be seriously threatened. As Mr. van Tienhoven emphasized, the danger lay in those countries which did not subscribe to the Convention and ravaged the seas by escaping all control. These countries made an unfair profit by poaching in the areas which the signatories of the Washington Convention had mutually agreed to reserve in the general interest of humanity. The discussion on the problem of whales was then concluded.

Mr. F. Goethe (Germany) expressed sincere thanks to the Union for its effective intervention in the case of the Teutoburgerwald. The need for the establishment of a military training centre was the reason for the proposal to cut a vast stretch of a huge mountainous forest, which had been protected because of its beauty. The Union's intervention made an important contribution to save a thousand hectares of wood from the axe, to which he hoped another 2,000 ha. would soon be added. The special character of the present political situation in Germany justified particular gratitude to the Union for its action. He himself was a scientific associate of the „Vogelwarte“ of Helgoland at present installed at Wilhelmshaven. This institution, being the official centre for the protection of sea-birds in Germany, and a member of the German section of the International Committee for Bird Preservation, keenly desired intervention by the Union in the problem of the pollution of waters by fuel-oil. A sub-committee was appointed at Upsala in 1950,

whose efforts the Union should support. The situation had grown worse in the last few months. Numerous corpses of birds killed by heavy oil spread on the sea were still found near the eastern Friesland islands. The Union could do useful work both on the diplomatic level and by publishing pamphlets to stir the imagination of those responsible, seamen, ship-owners and ship-builders, and make them realize the horror of the cruel and evil results of their negligence.

Mr. Bernard and Mr. Sunier exchanged views on the situation as regards nature protection in Indonesia. In this connection Mr. van den Bergh repeated the need for effective control of the detention and transport of animals, not only in the country of their origin but also in other countries. Mr. N. Laude (Belgium) proposed sincere thanks to the Netherlands' authorities for their hospitality, to Mr. van der Goes van Naters for his able direction of the proceedings; to Mr. Bernard; to the discussion leaders, Messrs. E. M. Nicholson and R. Bouillenne; to the various speakers; and finally to the organizers of the meeting, with special thanks to Mr. M. C. Bloemers.

The conclusions and resolutions having been distributed, Mr. van der Goes van Naters took the chair and asked the meeting to vote on each resolution separately. On the suggestion of Mr. Harroy it was agreed to divide them into two categories, those which were the conclusions of the preceding two days discussion, and those of a more general nature which were not. Five resolutions were then adopted concerning the problem of rural landscape as a habitat for flora and fauna in densely populated countries; and two others were added on the subject of the management of nature reserves. These seven resolutions are reproduced separately and presented as an annex to this text (see page 48).

Listed below are the resolutions made concerning the general activity of the Union, but not connected with the technical meeting:

1. Education,
2. Protecting the Krimml Waterfall in Austria,
3. Utilization, in certain specific cases, of the texts of the resolutions of The Hague Technical Meeting by the Executive Board of the Union,
4. Intervention by the Union for financial support from certain governments for the protection of threatened species,
5. Danger created by the increase of amusement parks exhibiting captured animals.

The text of the first four of these five resolutions were drafted outside the secretariat of the Union. The following is the unrevised wording:

#### *I. Education.*

Whereas it is of vital importance that all educators in general, and the teachers of primary and secondary schools in particular, should be aware of the facts and problems of Nature and the conservation of natural resources, as well as that those educators should be convinced of their responsibility for bringing about that change of mentality and of attitude towards nature which is indispensable if there is ever to be the universal acceptance and good-will necessary for nature protection and conservation to fulfill their task.

The Technical Conference therefore proposes; that a speedy attempt at the realization of the aforesaid object should be undertaken by an international information campaign amongst educators; at first by means as inexpensive and generalized as possible and later by publicity of a more substantial character; and invokes the cooperation of all agencies and governments in spreading this information amongst educators.

## II. *Krimml Waterfall.*

The Technical Meeting proposes that the Executive Board of the Union should forward the following resolution: The International Union for the Protection of Nature requests the Austrian Government to oppose the destruction in the province of Salzburg of the famous Krimml Waterfall, threatened by the projected hydro-electric works.

## III. *Resolutions of the Technical Meeting.*

The Technical Meeting, having discussed the theme "Rural landscape as a habitat for flora and fauna in densely populated countries", considers that nature is particularly threatened in those countries where rapid development is in progress, desires that the attention of certain governments, where it is decided by the Executive Board of the IUPN that the matter is of special urgency, be drawn to the resolutions, made on the above subject.

## IV. *Financial support in the work of protecting species.*

The Technical Meeting proposes that the IUPN should approach governments which would be favourably inclined to finance protective measures in the case of particularly threatened species.

The following is Resolution No. 5, drafted on the instructions of the assembly of the Technical Meeting, on the subject of zoological gardens.

## V. *Zoological Gardens and Amusement Parks.*

The members of the Technical Meeting, concerned by the danger threatening wild fauna by the increasing multiplication of commercial firms which exhibit animals in captivity to lure the public to amusement parks, recommends that the IUPN obtain information carefully on this subject and take all measures considered effective to combat this danger. To this purpose the IUPN should study the means of inducing the authorities to exercise control of the detention and transport of wild animals, particularly rare and protected animals.

After the adoption of these resolutions, Mr. van der Goes van Naters, Chairman of the Meeting, thanked the organizers of the meeting, both Dutch and others, and especially Mr. M. C. Bloemers, whose services had been much appreciated. Gratitude was also expressed to Mr. Ch. J. Bernard, Messrs. E. M. Nicholson and R. Bouillenne, and to the various speakers, and special mention was made of the excellent interpretation of the discussions.

The session and simultaneously the Technical Meeting ended at 1 p.m.

The excursionists to Friesland left in two coaches shortly afterwards.

## CONCLUSIONS AND RESOLUTIONS

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### *Theme A.*

#### **Rural landscape as a habitat for flora and fauna in densely populated countries.**

- I. 1. All over the world, but especially in densely populated countries, nature is becoming increasingly modified by man. This is inevitable and the implications must be accepted and taken into account in future efforts for the protection of nature, which must accordingly broaden its approach and adopt new methods.
2. In particular, it should be recognized that the development of the landscape is a public concern and that scientific principles, embodied in a revised and extended concept of nature protection, constitute the only sound basis which can be found for it.
3. Nature protection for this purpose must abandon romantic ideas of preserving or re-establishing a supposedly "natural" fauna and flora and must seek to modify technical and economic influences in a direction most favourable to achieving an equilibrium of existing plant and animal communities, and wherever possible enriching their variety and their opportunities for development.
4. In order that nature protection may effectively influence the treatment of the landscape it is essential that reliable and authoritative scientific advice on the underlying problems should be available. Accordingly, it is urgently necessary that those responsible for giving such advice should ensure that
  - a. such scientific data as have been secured in any country shall be readily available to others and
  - b. where scientific data are not yet available the necessary steps should be taken to secure them by an appropriate programme of research. For example, the meeting has shown that further research is urgently necessary on:
    - a. biological aspects of water supply and hydroelectric schemes and of pollution by oil and other substances and
    - b. ecological factors governing the maintenance, increase and decrease of animal and plant populations, especially in conditions influenced by modern civilization.
5. It is important that the general public, the teachers in schools and universities, and particularly those professionally engaged in changing the landscape such as, town and country planners, engineers, farmers and foresters should be given adequate up-to-date and reliable material on the principles and practice of nature protection. The provision of such material in a simple and accessible form is urgently needed.

6. In all countries the responsible agencies for nature protection should be given the opportunity of examining projects and proposals for changes in the landscape in order that they may advise at an early stage on the method of carrying them out with the least possible damage to nature, or may if necessary be able to oppose projects which cannot be made acceptable.

Noting the general agreement which has been reached on the problem of rural landscape as a habitat for flora and fauna in densely populated countries, it was thought desirable.

1. To invite the Executive Board of the International Union for the Protection of Nature to contact in every country one or more general or specialized scientific institutions which would be willing to act as a channel to facilitate the exchange of scientific information on research completed or in progress in the field of nature protection.
  2. To invite members of the meeting on their return to their respective countries to make every effort to secure recognition by the official and unofficial organizations concerned of the principles set out above.
  3. To invite observers of international organizations to bring the above recommendations to the notice of their agencies.
- II. Considering the steady increase of the world population, and the constant perfecting of technical equipment, as well as the large scope of the projects being undertaken on the earth's surface by technicians of all classes, who are not all aware of the problems connected with the protection of nature, it is deemed desirable that, Courses in the conservation of the environment and the protection of nature should be included in the curricula of all universities, engineering schools and scientific and technical schools, for the students of these colleges who will be responsible for the drafting and the realization of these projects.
- III. The attention of the scientific world should be drawn to the effects of some of the large-scale works, namely, the building of hydro-electric dams, on natural hydrography. The drying-up of rivers and of the water table as well as the diversion of waters from their natural course towards entirely different basins, constitutes a very serious violation of natural and millenary water regimes. The alarming consequences of this situation should be urgently and scientifically studied.
- IV. It is deemed desirable that the International Union for the Protection of Nature should give its full attention to the question of water pollution and water conservation on land as well as the sea. The International Union for the Protection of Nature should take the necessary steps so that the problem can be studied on an international scale, taking into account the existing information in every country.

- V. The Executive Board of the International Union for the Protection of Nature will be asked to request the Italian and Swiss Governments to seek an agreement to prevent the construction of a funicular railway to the summit of the Matterhorn.

*Theme B.*

**Management of Nature Reserves.**

- I. It is proposed that, taking into account the local legislation, precise protective regulations should be established in favour of carefully selected areas, representative of the principal biogeographical complexes of a country. These regulations should not only be enforced by the authorities, but also accepted by public opinion.
  - II. It is deemed desirable that, around nature reserves, protective zones should be established in which agriculture, hunting, drainage, etc., would be allowed, insofar as such do not oppose the scientific aims of the reserve.
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# RURAL LANDSCAPE AS A HABITAT FOR FLORA AND FAUNA IN DENSELY POPULATED COUNTRIES

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## WORKING PAPER

by

M. C. Bloemers

(in collaboration with H. P. Gorter and R. J. Benthem)

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### I. *Introduction.*

- a. All over the world but especially in densely populated countries nature (including natural living communities in semi-natural or cultivated areas) is superseded by the influence of man (all reports).
- b. This influence has to be accepted as inevitable (Nicholson I, Gorter).
- c. For different reasons, however, we should endeavour to maintain nature's balance, qualitatively and quantitatively, as far as possible. Protection of nature is a factor deserving to be taken into account beside or even against other interests of human society (all reports implicitly).
- d. National and international action on behalf of nature protection is extremely urgent, considering the rapidly progressing impoverishment of nature (all reports).

### II. *Management of the landscape.*

- a. Reserves are indispensable, on one hand as an independent means towards nature protection (breeding haunts, flora habitats), on the other hand as an element in the landscape (Gorter, Vanden Berghen, Nicholson V).
- b. Reserves have a limited value only (Nicholson II, Gorter, Benthem).
- c. In extensive areas having a sound rural landscape, comprehensive management in accordance with the laws of nature should be aimed at (Nicholson II, Gorter, Benthem).
- d. In these areas natural elements should be preserved as much as possible (Gorter sub a, Benthem, Vanden Berghen).
- e. The problem of water supply, pollution of water and the conservation of natural water courses play an important part (Nicholson III).
- f. In many cases human influence intervenes to such a degree that conservation is inadequate. In these cases that same influence should be directed towards the creation of new landscapes which should be biologically and economically sound and efficient (Gorter sub b, Benthem, Nicholson IV).

- g. In areas previously deprived of their natural elements steps should be taken and stimulated for the reconstruction of the landscape (Bentham).
- h. In all rural or semi-urban areas a broad and direct policy should aim at the maintenance, the reconstruction or the creation of efficient and sound landscapes where indigenous flora and fauna will be able to subsist (Nicholson I, IV, VI a, Gorter, Bentham).
- i. If this policy is realistic and positive satisfactory results can be hoped for (Nicholson VI b).

### III. *Research.*

- a. Protection of nature must be based on research (Nicholson VI c).
- b. All measures on behalf of the landscape should be based on soil mapping and vegetation mapping. This mapping should be undertaken systematically (Vanden Berghen less positive, Bentham implicitly). Proper use of this data needs knowledge – still to be broadened – of the living conditions and dynamics of different forms of vegetation (Nicholson III).
- c. To achieve fauna conservation our still inadequate knowledge of the living conditions of animal species and their adaptability to new conditions urgently needs completion (Nicholson III).
- d. Research should be stimulated. Volunteers (students, private societies) should be employed (Nicholson III, V).
- e. Research should be coordinated. Research programmes should be worked out (Nicholson III).
- f. International exchange of information on research and research programmes is essential (Nicholson III, VI c).

### IV. *Influence of protection agencies.*

- a. Nature protection should be considered and action taken accordingly whenever developments affecting the landscape are attempted (Nicholson V, Gorter, Bentham implicitly).
- b. As different social interests are concerned in these matters, public agencies, in exerting their powers to guide these developments, should carefully weigh all the various factors, one of which is nature protection (Gorter implicitly).
- c. Even if this is not fully carried out, it is of the utmost importance that protection agencies should be consulted so as to be able to use all available means to prevent unjustifiable or even unnecessary damage (Nicholson IV, V).
- d. This can be attained either by special legislation or by arrangements between public or private protection agencies on one side and other public agencies or private concerns on the other side (Nicholson V).
- e. In the case of extensive works this consultation can lead up to the drafting by experts of landscape plans as a part of these works (Bentham).

- f.* Nature protection should be promoted by specialised, authorized and sufficiently independent agencies (Nicholson V implicitly).
- g.* International exchange of information on legislative and administrative devices in the field of nature protection would be useful (Nicholson V).

**V. *Education.***

- a.* The aims of nature protection can be attained only if all aspects of their essential importance have been brought home to the people (Nicholson IV, V, Gorter, Benthem, Vanden Berghen).
- b.* In this meeting special attention might be given to the need of teaching the principles of nature protection to future technicians (engineers, agronomists, etc.) who will take an important part in the planning and carrying out of large scale modifications of the landscape (Nicholson IV).
- c.* The education of teachers and protection experts needs special care (Nicholson IV).

**VI. *International exchange of information.***

Means should be devised to stimulate international exchange of information on nature protection, preferably by establishing direct contact between persons and agencies concerned with the same problems in different countries (Nicholson VI f).

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# **RURAL LANDSCAPE AS A HABITAT FOR FLORA AND FAUNA IN DENSELY POPULATED COUNTRIES**

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## **GENERAL INTRODUCTION**

by

**E. M. NICHOLSON,**  
**Nature Conservancy, Great Britain**

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- I. In densely populated countries inhabited by advanced industrial communities the direct and indirect repercussions of human activities on the flora and fauna are growing at a rapid and disturbing rate. In such countries the requirements of communication and utility services, mining, organised recreation, water supply, afforestation, mechanised agriculture and other activities are involving drastic modifications in habitats far beyond the fringes of centres of population. In many areas the remnants of primitive and more or less natural habitats are not only being extinguished or reduced to insignificance, but even those that remain are increasingly subject to neighbouring human influences such as water and smoke pollution, drainage and the incursion of artificially fostered pests or weeds. Moreover, the countryside with its cultivated farms and planted woodlands is also changing in character and is becoming far more remote from natural conditions than it was even twenty years ago, owing to the use of artificial fertilisers and insecticides, the elimination of hedgerows, open streams and waste strips, the replacement of animal power by electrical or mechanical power, the introduction of more exacting hygienic and sanitary requirements, and other factors. There is a tendency for considerable areas within a certain distance of centres of population to acquire a character intermediate between town and country as these terms have hitherto been understood, and to become a kind of no man's land in which natural conditions are increasingly modified and even rural activities are becoming subordinate to urban and suburban recreation, water supply, communications and other activities. Wide belts of reservoirs, airfields, golf courses, playing fields, allotments, cemeteries, camping sites and so forth are characteristic of such intermediate zones which are neither urban nor rural in character.
- II. In such conditions the old-fashioned remedy of seeking to set aside and protect from development or disturbance certain fragments of natural habitats scattered here and there no longer promises a satisfactory solution. The modern approach must clearly be more complex and positive. Nature conservation, instead of being content only to try to defend certain remnants of land, must take the initiative and must seek itself to modify further the modifying influences of civilisation so as to render these influences beneficial (or at any rate less harmful) to the interests of fauna and flora. This is admittedly a large and

difficult task but there are encouraging signs that it can be successfully undertaken.

- III. The indispensable foundation of successful intervention on this scale, and even of the successful management of Nature Reserves surrounded by areas subjected to modern development, is a comprehensive programme of research. Certain species of mammals and birds appear unable to survive in densely populated countries, but such cases are rare, and even where their primitive habitats and living conditions cannot be preserved many rare and specialised forms have shown themselves capable of making astonishingly successful adaptations. For example, ducks and geese, which are normally wild and unapproachable have adapted themselves to wintering in very large numbers on urban reservoirs and other artificial waters, and in central London Mallards (*Anas platyrhynchos*) have even nested by small water tanks on sites of bombed buildings. As a converse example, Kites (*Milvus milvus*) which are now so shy in Britain that they often desert their nests if human beings come anywhere near them were, up to two centuries ago, familiar London birds nesting well within the town, as they still do in other countries. We need to know more about the alternative potential habitats to which animals, especially vertebrates, are capable of adapting themselves, and the conditions in which this adaptation can take place. As it often happens that different habitats are occupied by the same species in different countries this is a peculiarly suitable subject for international research and exchange of information. We also need to know much more about the dynamics of animal and plant population growth. When species are introduced to new areas and when environments are drastically changed by human action, it often happens that very large increases of certain species result, some of which endure for long periods while others come to a peak which is then followed by a more or less marked reduction. Such great and unpredictable changes may have considerable economic effects, or may seriously modify the natural flora or fauna. Here again is a subject on which the systematic comparison of experience in different countries could be of great value in suggesting how to interpret and even to control such movements.

To mention one further example, great developments are taking place in human demand for water and in the extent of human interference with water supply. Such problems as pollution and diversion of water courses for the formation of reservoirs and other purposes are obvious examples. Water tables may be lowered unintentionally by interference for some different purpose at a remote point, and such indirect effects which may remain unnoticed for several years may decisively alter the fauna and flora. Might it not be useful to examine which are the most important and pressing of these common problems and which countries have completed or are carrying out research work which can throw light upon them?

- IV. In addition to research there is an equally important problem of public education amounting virtually to the formulation and dissemination of a modern ecological outlook which can reconcile and harmonise

the broad requirements of technical civilisation with the interests of fauna and flora and with the wise use of natural resources. It is particularly unfortunate that engineers, industrial managers and others whose actions often involve large scale modifications of habitats are often lacking in experience and appreciation of ecology, although there are many who have been extremely helpful and sympathetic when approached. Much of the teaching and propaganda in the fields of biology and nature conservation has itself been inadequate in this respect, and has often been coloured by sentiment or by out-of-date biological conceptions. If the majority of authorities now engaged in modifying environments could be brought up even to the present standards of the more enlightened minority that alone would lead to an immense advance in the avoidance of unnecessary destruction of important environments and in the inclusion in new developments of provision for the requirements of fauna and flora in the way of cover, water and food plants.

- V. A further large and important field of fruitful international comparisons consists in the study of legislative, administrative and other devices applicable in densely populated countries. In Great Britain, for example, the National Parks and Access to the Countryside Act, 1949 includes a provision giving to the Nature Conservancy a statutory duty to notify to local authorities areas within their boundaries which the Conservancy considers to be of special scientific interest, after which it becomes the duty of the local authority to consult the Conservancy before agreeing to any development schemes which may change the character of the area in question. Administrative arrangements have now been made under which the Nature Conservancy is automatically consulted by Government Departments proposing to undertake or to authorise developments which may lead to important ecological changes, and in this way ecologists are brought into consultation at an early stage before decisions are made on such varied matters as the choice of sites for bombing ranges and military training, the afforestation of heaths and uplands, land drainage and the management of National Parks. The Conservancy is also given powers to make by-laws restricting shooting in areas surrounding Nature Reserves where this appears necessary for the protection of the Reserve. Provision is also made for agreements between the Conservancy (or a local authority with the approval of the Conservancy) and owners and occupiers of land under which the land can be dedicated permanently as a Nature Reserve in a manner binding on future owners and occupiers. In the case of Royal Parks and other land held by the Ministry of Works there is an Advisory Committee which has had an important influence in decisions regarding the planting or felling of trees and shrubs, public access to plantations and waters and other matters affecting the bird life. The Society for the Promotion of Nature Reserves has taken a leading part in initiating work in this field for many years, and in bringing together interested persons and organisations. Under another scheme volunteers have been recruited to act as honorary wardens of Reserves at special danger periods of the year. Universities and other bodies have undertaken special surveys of the flora and fauna

of Reserves subject to changing conditions such as fens and coastal sand and single spits. The Council for the Promotion of Field Studies runs four Field Centres at which courses of instruction are given in a wide range of subjects relevant to nature conservation. The present South Bank Exhibition in London of the Festival of Britain contains an important exhibit of nature conservation in different typical habitats of Great Britain.

It is not claimed that such arrangements are peculiar to Great Britain, or that they have yet achieved sufficiently important results, but they may serve to indicate the field where comparisons of the experience of different countries may be of value.

VI. *Conclusion.* To sum up this brief and necessarily superficial introductory paper, it is suggested that:

- a. A broader approach is needed to the preservation of fauna and flora in densely populated countries extending beyond such fragments of land as can be converted into Nature Reserves and embracing the entire rural landscape, together with an intermediate zone which is no longer strictly rural but has not become definitely urban.
- b. There is no reason to despair of maintaining a satisfactory fauna and flora in these altered conditions given a realistic and positive policy on these lines.
- c. Knowledge of the fundamental ecological processes involved is still inadequate and international exchange of information on research programmes could be of considerable practical value.
- d. The formulation and wide dissemination among the public of an ecological approach consistent with modern knowledge and modern conditions is urgently necessary, and here again exchange of information on techniques, failures and successes could be of value to the authorities and voluntary bodies concerned.
- e. Many countries have tried various administrative, legal and other methods to check ecologically unfortunate developments and to promote or encourage the conservation of the fauna. Systematic exchange of information on such subjects could point to possible improvements and additions to the arrangements already adopted by particular countries.
- f. Finally, it is urged that more can be learned in a short time by discussion and inspection of actual existing examples of research and developments in their practical context than by discussions in terms of generalisations and principles, and that the aim should be to build up direct personal relations between "opposite numbers" concerned with similar problems in different countries who can by direct correspondence and exchange of visits add to the sum of practical experience, which can then be available as required for description and dissemination through international channels.



# **INTRODUCTION TO THE PROBLEM OF RURAL LANDSCAPE AS A HABITAT FOR FLORA AND FAUNA IN DENSELY POPULATED COUNTRIES**

by

**H. P. GORTER and R. J. DE WIT,**  
**Joint Committee for the Protection of Nature and Landscape,**  
**Amsterdam**

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The most obvious methods of preserving fauna, flora and vegetation of any area are to create a number of nature reserves and to promote legislation ensuring the protection of wildlife outside as well as inside these refuges. The Union's activities are primarily directed towards these aims.

On further consideration, however, the problems prove to be much more complicated, especially in connection with the part played by the factor "man" in the natural environment.

Thus we nowadays do not regard nature protection as an activity that is confided to the mere setting aside of certain limited reserves, but rather as an intrinsic part of the whole of human economic activity, viz. as that aspect of it which is concerned with the inroads made on nature by man. A case in point is exhaustive cultivation, leading to the destruction of the soil, of which soil erosion is a symptom. Looked at from this point of view, nature protection has evolved from the creation of reserves to the comprehensive management of a whole area in harmony with the laws of nature.

While this implies that attention is also given to areas under cultivation, which can never become reserves, the concept of "nature", on the other hand, has assumed a more relative character than it was originally supposed to have: in many cases semi-natural areas are worth preserving and deliberate human activity is required in order to maintain them in their present condition.

There are still other reasons that make it desirable for nature protection to see a whole region and its landscape as a unity. Wild animals are apt to move about and often venture outside the wildlife refuges. Many animals, e.g. various species of birds, find their food in areas that can hardly be called natural, so that cultivated land is to be regarded as part of their habitat.

Reserves for the flora and for vegetations should also be considered in their setting of a wider environment influenced by man. In many cases these reserves will have to be screened off from the influence of the surrounding cultivated area. Besides, it is necessary that fragments of wild nature should remain amidst cultivated land; the number and size of these isolated spots should be such that they can serve as links in a chain of habitats ensuring the dispersion of the seeds which helps to maintain the dynamical character of the vegetation.

Last but not least there is the question of man's contact with nature and wildlife. It is highly desirable that native plants and birds can also be observed outside the reserves proper and that people can live in an environment which, if not natural, shows much of the harmony inherent in wild nature.

It is therefore necessary that the position of the natural element in the landscape as a whole should be made an object of attention and care by conservationists. In doing this, the movement for the protection of nature assumes responsibility for one of the essential aspects of human society, and takes its place among social movements dealing with problems surpassing the mere preservation of species or habitats. The conservation movement then shows itself willing to make a positive contribution to the solution of these social problems.

Hence it follows that nature protection should, among other things, aim at:

- a. the preservation of the natural elements in the landscape
- b. planned development of those parts of the countryside where the natural elements have disappeared entirely or have become too scarce.

*Ad a.*

The more or less natural elements in cultivated areas will not, especially if their size is too small, be in the best possible condition, because they are to a high degree exposed to the influence of the surrounding country. It should be borne in mind that the landscape as a whole is controlled by man so that both the constructive and the destructive forces of nature have been curbed, and the landscape has become much more static. As constructive forces we may regard processes such as the deposition of silt, the development of shallow pools into bogs, the formation of peat and of dunes, the spontaneous growth of young forest trees; among the destructive forces are ice-drifts, fires, inundations by the sea, changes in the course of a river. It follows that the formation of "new" habitats, in which a succession of plant and animal communities can again develop, has become of much rarer occurrence. Therefore it has become more necessary as well as more difficult to ensure the survival of the various types of plant and animal communities.

In the Netherlands this problem has to be faced now, as the country is largely brought under cultivation, while most nature reserves are comparatively small in size, so that they may be in danger of being spoilt owing to the influence of the adjoining nonnatural areas. Conservationists in the Netherlands have therefore looked for methods to neutralize this influence by conscious human effort and in general to manage the nature reserves in such a way that their scientific value would be maintained as far as possible.

*Ad b.*

This problem, too, has become urgent in the densely populated Netherlands, as during the last few decades many parts of the country have gradually been stripped of their natural elements, so that the landscape is deteriorating slowly, and sometimes even rapidly. This means that the harmony of the landscape is destroyed and the possibilities for the survival of wildlife are greatly decreased, but it also has economic consequences. For a homogeneously planted or sown area is particularly liable to be infested by pests, while the soil structure may easily deteriorate. Moreover, as Mr. Benthem will discuss in his detailed report, there are in the Netherlands some war-

devastated areas (e.g. the island of Walcheren, which lost its entire vegetation owing to inundation with salt water) or other regions where an entirely new landscape is to be created (e.g. in the Zuyderzee polders, where thousands of hectares of water are reclaimed). For all these cases there have been found ways and methods of building up a harmonious landscape, in which the natural element is sufficiently represented.

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## LA CARTHOGRAPHIE DES GROUPEMENTS VEGETAUX ET LA PROTECTION DE LA NATURE EN BELGIQUE

par

C. VAN DENBERGHEN

Belgique

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*L'Institut pour le Développement de la Recherche scientifique dans l'Industrie et l'Agriculture (I.R.S.I.A.) patronne et subsidie, depuis 1947, un Comité pour l'Etablissement de la Carte des Sols et de la Végétation de la Belgique. Ce Comité, présidé par M. V. Van Straelen, a entrepris l'exécution de deux cartes. La première, pédologique, enregistre la constitution du sol superficiel. La seconde indique la distribution, en Belgique, des principaux groupements végétaux. Cette carte phytosociologique, dont les promoteurs sont MM. J. Lebrun et A. Noirfalise, est basée sur les principes de l'école franco-suisse tels qu'ils ont été définis par J. Braun-Blanquet et ses collaborateurs.*

Une dizaine de planchettes de la carte des groupements végétaux, à l'échelle du 1.20.000e, sont actuellement achevées ou en cours d'achèvement. Chacune d'entre elles recouvre un territoire de 8.000 hectares. Certaines de ces cartes donnent un aperçu sur la végétation spontanée de régions de la basse et de la moyenne Belgique où la densité de la population rurale ou semi-rurale est de l'ordre de 100 à 250 habitants au kilomètre carré (région de Gand, région de Lebbeke entre Alost et Bruxelles, Brabant wallon et pays de Herve). D'autres cartes ont été levées en Ardenne dans des régions où le peuplement humain est moins important (20 à 60 habitants au kilomètre carré). Plus particulièrement, le plateau des Tailles, celui de Saint Hubert et la région de La Roche ont été prospectés.

Au cours de leurs travaux, les cartographes phytosociologues n'ont pu reconnaître de surfaces encore occupées par des groupements végétaux qui peuvent être qualifiés de naturels, c'est-à-dire non influencés par l'homme. Cette situation n'est apparemment valable pour protégée qu'en des sites semi-naturels tels que des forêts non plantées mais exploitées, des landes secondaires, des prairies non amendées, des tourbières partiellement indemnes . . . .

Ces groupements végétaux semi-naturels ont pratiquement disparu des régions à peuplement dense. Les territoires des planchettes Gand, Lebbeke et Herve sont, à quelques dizaines d'hectares près, complètement déboisés et mis en valeur d'une façon intensive. Le Brabant wallon est mieux partagé.

Quelques bois assez étendus – mais profondément altérés par l'homme – y subsistent. Partout, les bois sont propriétés privées. Souvent clôturés et jalousement gardés, le public n'y a pas accès. Dans ces conditions, le problème de la protection de la Nature, pour les territoires en question, ne se pose plus. Il conviendrait, pourtant, de prendre des mesures pour empêcher le défrichement et le lotissement des dernières propriétés boisées. On pourrait également tenter une campagne d'éducation auprès des ruraux pour faire naître chez eux le sens du pittoresque naturel, les encourager à planter quelques arbres près de leurs fermes, leur faire comprendre l'utilité des haies . . . .<sup>1)</sup>

La situation est différente en Ardenne. Le paysage semi-naturel s'est maintenu dans les régions boisées ou n'a été modifié que récemment. C'est ainsi que le plateau des Tailles était occupé, il y a moins d'un siècle, par des landes étendues (landes humides à *Erica tetralix*, landes sèches à *Calluna* et *Vaccinium vitis idaea*) qui encerclaient quelques hêtraies résiduelles, des prairies à *Meum athamanticum* et des tourbières à Sphaignes hygrophiles. Actuellement, ce paysage, dont la genèse s'explique par des pratiques agricoles extensives, est métamorphosé. Des plantations d'épicéas ont été faites sur d'immenses étendues; des pâturages amendés, clôturés par de la ronce artificielle, nourrissent un nombreux bétail. Le progrès économique et social a refoulé les groupements végétaux semi-naturels en quelques rares sites que des circonstances fortuites ont empêché de mettre en valeur.

Le levé de la carte phytosociologique d'une pareille région offre l'occasion de délimiter ces sites. Le cartographe, s'il ne se contente pas de faire un travail de simple routine, pourra localiser les endroits les plus intéressants des points de vue floristique et faunistique et attirer sur eux l'attention de personnalités qui tentent de maintenir, en quelques coins choisis, des groupements végétaux en voie de disparition. Remarquons que ces endroits ne sont pas nécessairement les sites „classiques”, les stations célèbres, que floristes et faunistes – souvent de tempérament conservateur – respectent parfois depuis des générations.

Le levé d'une carte phytosociologique, bien que son but principal soit d'ordre économique, peut donc rendre de très grands services à la cause de la Protection de la Nature. L'examen des cartes des régions densément peuplées fait apparaître l'absence, sur de vastes étendues, de sites offrant un intérêt au naturaliste. L'urgence de la nécessité d'une protection efficace pour les sites encore plus ou moins intacts de ces régions déshéritées apparaît avec force. Dans les territoires moins densément peuplés, la carte des groupements végétaux rend compte de l'importance de l'élément semi-naturel dans le paysage actuel. La carte constitue une base sûre qui permet, à bon escient, de choisir les sites qui seront appelés à être protégés.

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<sup>1)</sup> On peut noter que le même mot „schoon” qualifie, en flamand populaire, ce qui est propre. Dans l'esprit de la population rurale, rien n'est aussi beau qu'une clôture en béton fraîchement repeinte ou qu'un sol ratissé, débarrassé de sa dernière mauvaise herbe.

## TREATMENT OF RURAL LANDSCAPE

by

R. J. BENTHEM,

Chief Landscape Department,  
State Forest Service, Holland.

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Man's influence on the landscape is as old as the human race itself. Only recently however the whole of soil and organic life we call „the landscape” has come to be explicitly recognized as an element of world economy which might be endangered and deserves special attention and care. By the beginning of the 20th century the inroads made on the landscape and the apparent waste of natural resources warned mankind that an intelligent study of this matter was urgent. As a reaction this newly discovered danger gave rise to a movement for protection of nature.

Originally this movement was almost exclusively directed towards preservation of natural areas. When the steadily progressing need for intensification of land use and the correspondingly increasing interference with natural conditions was however fully taken into account, it became clear that mere preservation no longer constitutes an adequate solution to the problem of nature and landscape roused by the belated interest in flora, fauna, climate, soil conservation, etc.

The more all social and economic concerns are getting entwined and all parts of human society are becoming interdependent, the more complex these problems are growing.

*Even if it should be possible to preserve all the remaining fragments of „natural” or „semi-natural” landscapes, careful treatment of the extensive areas outside the reserves would remain necessary. Our heritage of flora, fauna and characteristic rural beauty can never be confined to reserves, which are of necessity relatively small.*

The giving of this treatment, which is creative, to nature and landscape outside the reserves is a great problem that practically all densely populated countries should now face; its solution will become one of the tasks of the national governments. As the areas in question are those parts of the earth's surface where human activity will be permanent, our policy should be adapted to the dynamic character of these landscapes. All this is convincingly shown by the development in the Netherlands with their dense population and intensive cultivation of the soil.

There will hardly be a country in the world where the necessity as well as the possibility of changing the existing structure of the landscape is as great as in the Netherlands. A more detailed exposition of this subject was given in my report on „Reconstruction of the landscape in the Netherlands”, presented to the IUPN conference at Lake Success. I take the liberty to mention once more some of the chief points.

In the agricultural areas of the Netherlands, where practically every square meter of the soil is somehow made productive, the major changes in the landscape are the results of agrarian activity. Some tens of years ago this chiefly meant the reclamation of the then waste lands, which were converted into fields and pastures. But now that such lands are hardly to be found anymore, the reconstruction of the landscape is mainly a result

of the improvement of existing arable land or pasture and still more of re-allotments.

When agriculture is rationalized and mechanized, many capriciously shaped lots that have been formed in the course of time do not come up to present-day standards of efficiency. Moreover, greater accessibility through new roads or the improvement of existing ones becomes inevitable and in most cases better drainage of the land is also necessary.

All these technical activities on behalf of agriculture which are largely financed by the government, cannot but have a profound influence on the landscape. Rows of trees or shrubs along boundaries between adjoining parcels or estates that are thrown together must fall, water courses and roads are widened and remodelled. Their avenues or hedgerows must be cut down. On the other hand a new landscape has to be created. New plantations have to be designed and planted. Valuable nature elements, refuges for wildlife, should be spared as much as possible and if necessary be protected by ditches, dams or otherwise.

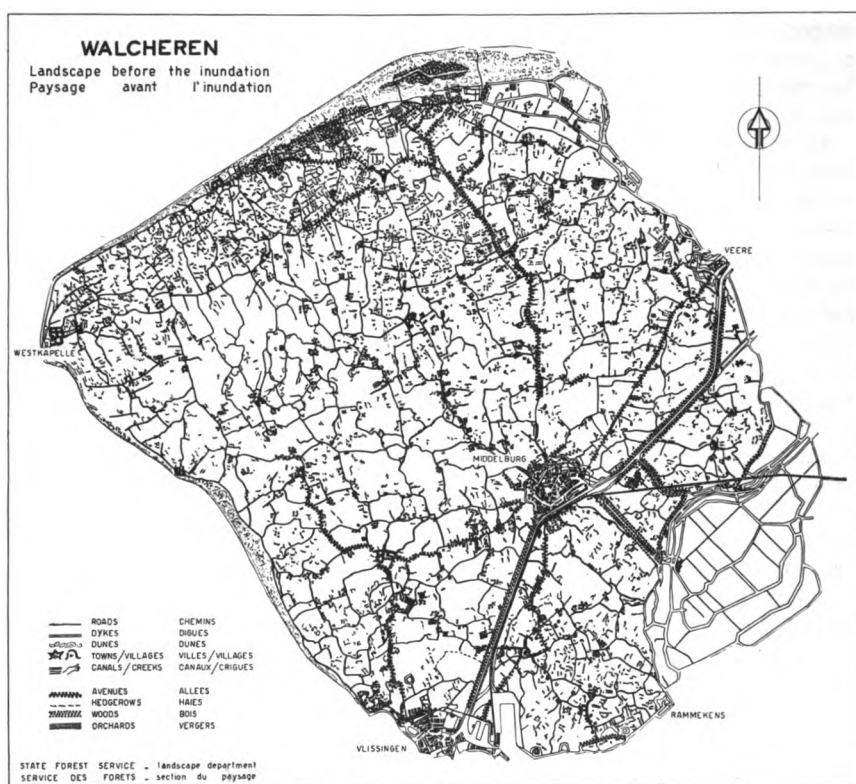
All these measures for the reconstruction of the landscape are incorporated in special *landscape plans*. The Dutch Government has entrusted the drawing up of these plans to the National Forest Service, which has created a special branch for landscape planning. This department closely co-operates with various experts in the fields of agriculture, biology and physical planning and takes into account soil mapping.

A striking example of this kind of agrarian and scenic reconstruction is the rebuilding of the island of Walcheren; as its dykes were bombed in World War II, practically the whole island was flooded by salt water. A remarkable landscape, which possessed great beauty but could never meet the demands of the 20th century, was lost. The old country of Walcheren was characterized by a maze of many fine impractical narrow and winding roads, inefficient parcelling of land and an abundance of hawthorn hedges, the remains of an obsolete hedgerow country.

Reconstructing this landscape meant that the land had to be re-allotted, the size of the farms enlarged, the network of roads improved. Effective roadside plantations are planted, while some natural areas are preserved and partly planted. We submit two maps of Walcheren, one of the old country that has gone and one of the new landscape that is now being built up.

Landscape plans of this kind are now in course of preparation or execution for large parts of the Netherlands and the nature of the new agricultural landscape of the low-lands will to a great extent be determined by the success or failure of such-plans.

In addition to the plans for re-allotments, landscape plans of a similar nature are made and executed for the reclamation works, such as those in parts of the former Zuyderzee. One of these plans, viz. the design of the northeast polder in the Zuyderzee, is shown on a third map. The entirely different geological structure of the land and the opportunity to draw up a land division scheme without having to take into account existing conditions have led to a landscape design entirely different from the one for Walcheren. Bold, regular fields, long straight shelter belts, situated at smaller intervals near the west coast, carefully planned woods and orchard areas, farms, villages and small country towns form the basic pattern of this new open polder landscape.

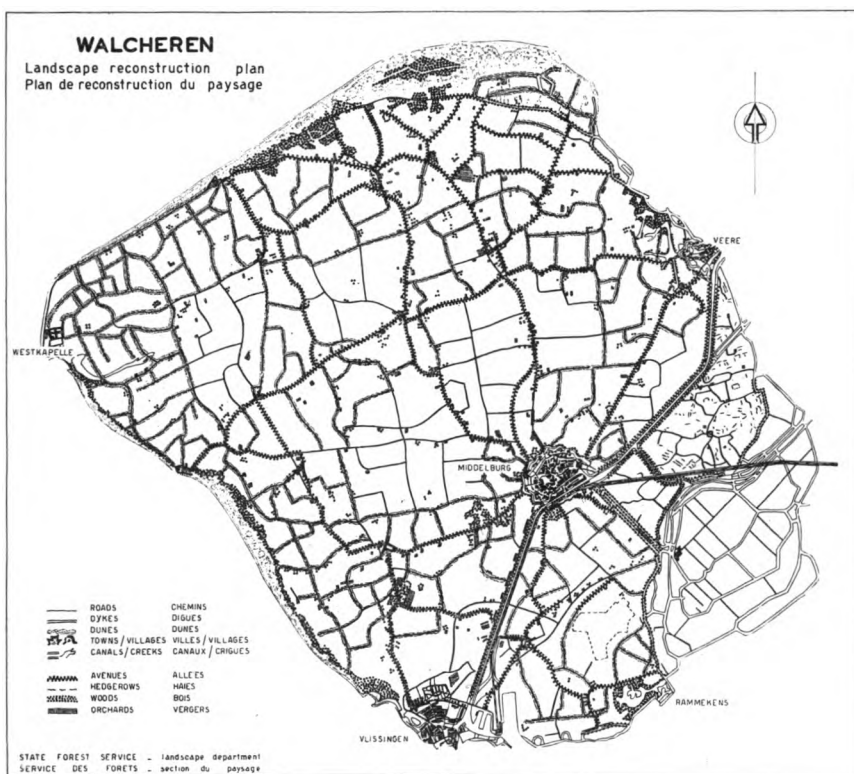


## WALCHEREN BEFORE THE INUNDATION

Outline of the landscape of the isle of Walcheren (Netherlands) before Worldwar II. Characteristic were the crotchety, primitive network of roads and the scattered remains of the former hedgerow-landscape.

## WALCHEREN AVANT L'INONDATION

Carte sommaire du paysage de l'île de Walcheren (Pays-Bas) avant la guerre. Les éléments caractéristiques étaient le réseau de chemins irrégulier et primitif et les restes éparses d'un paysage de haies.



## THE RECONSTRUCTION OF WALCHEREN AFTER THE INUNDATION

A new landscape has been planned for the island of Walcheren (Netherlands). Attention should be given to the new network of roads adapted to the present-day requirements of agriculture and to the carefully planned plantations.

## LA RÉCONSTRUCTION DE WALCHEREN APRÈS L'INONDATION

Plan pour le paysage de l'île de Walcheren (Pays-Bas). Dans ce plan le réseau de chemins renouvelé et adapté au besoin de l'agriculture contemporaine et la distribution systématique des plantations méritent l'attention.



In this report it is impossible to deal in greater detail with the various aspects of landscape planning in the Netherlands, e.g. in planning the arterial roads, planning the open spaces in cities, towns and villages, the planting of forests, of trees along dykes, in farmyards, etc.

*Of more general interest is the fact that a planned development or reconstruction of the landscape is becoming of vital importance to various other European countries and maybe to other parts of the world.*

Everywhere valuable nature areas need protection. Agricultural regions with villages, farms and fields where the landscape has been impoverished inconsiderately should be planted in a simple but efficient way. And in a great many agricultural regions where fine and well-planned landscapes are still to be found – we need only mention the landscape of the British enclosures – critical attention will have to be given to their maintenance.

Large-scale landscape plans will have to be executed with government support. For without much planting of and special care for the landscape, our posterity will only see some scanty remains of landscapes which we now cherish as a precious heritage from former generations.

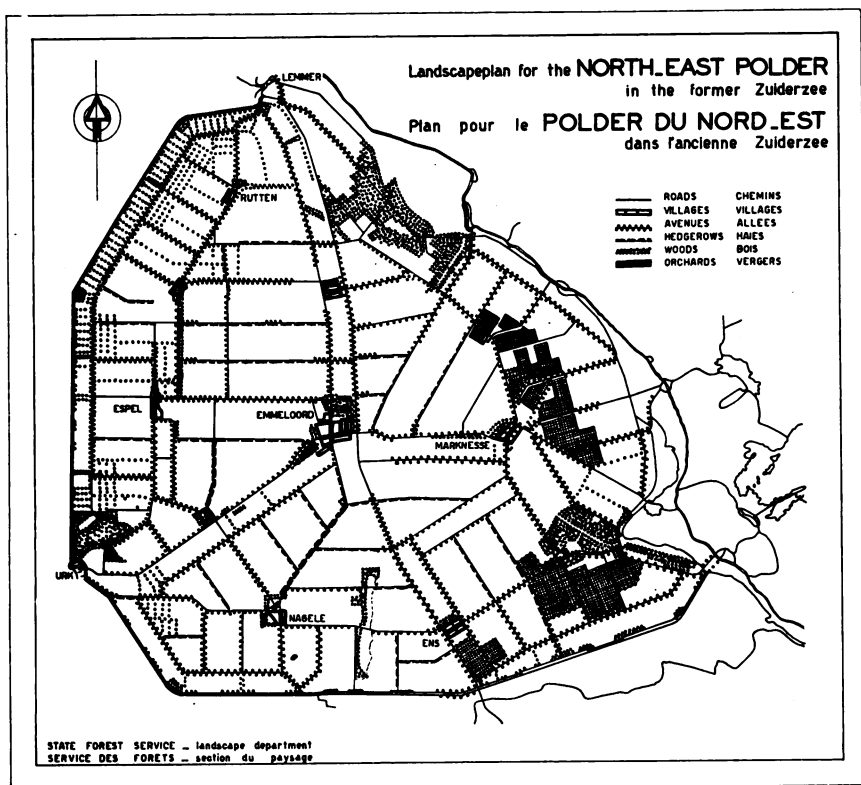
In certain cases we should even take in hand new projects for places where conditions are favourable to the development of habitats or vegetations that are no longer existant. In other words, the creation of new-nature-areas in suitable places where they are lacking is part of the landscape planner's task.

The development of the natural sciences, especially of ecology, and the experience gained in very intensive cultivation of the soil in densely populated countries have clearly shown the functional importance of a well-planned and healthy man-made landscape. We have learned to see the landscape and its parts not exclusively from the point of view of either aesthetics or profits. What we need now is a wider, more comprehensive occupation with nature and landscape than we have known before.

The preservation and management of nature reserves, the protection of certain species of plants and animals will be an essential part of this more comprehensive policy, *but still only a part*. And this policy should not be a national concern only. On the contrary international co-operation in this field is urgently needed. We may expect that these activities for the „treatment of nature” or the „treatment of the landscape” – in which both reconstruction and preservation will be main themes – will, on account of their greater comprehensiveness, also meet with more support and understanding on the part of the many other movements aiming at better relations between man and nature. We need only mention the advocates of soil conservation, improvement of the climate, increase of rural beauty, conservation of natural resources, nature study, game preservation, etc.

In this way it will become possible to appeal to a much larger portion of the world's population than is the case now, when interest in these matters is virtually confined to a small group of specialists. For an idea is only likely to become the driving force of a powerful social movement if it is accepted by large groups of people.

Teachers and school-children, scholars, scientists and plain workmen, farmers as well as town dwellers in search of recreation areas, all these and many more are involved in the struggle for the preservation of the world's natural wealth. To convert them to these ideals would mean an important step in our common action for a better world, a world in which



### NORTH-EASTERN POLDER OF THE FORMER ZUYDERZEE

Unlike the reconstructed Walcheren, this vast, new agrarian area is divided up and ornamented by long straight avenues and windcreens, extensive woods and orchards and massively planted yards. These elements impart to this area a character not of romance, but of vigour and harmony.

### LE POLDER N.E. DE L'ANCIENNE ZUYDERZEE

Par opposition au paysage de l'île de Walcheren celui de cette région agricole vaste et nouvelle est accentué par des allées et des écrans d'arbres longs et droits, des bois et des vergers étendus et de larges enclos plantés. Ces éléments donnent à cette région un caractère peu romantique, mais fort et harmonieux.

the closely interwoven interests of man and nature will be reconciled. Therefore the movement for the protection of nature should not remain in „splendid isolation“, but it will have to make known its ideals and to practice what it preaches wherever possible.

As a conclusion to my plea for planned constructive action towards the solution of the problem of nature and landscape I would like to quote one of the pioneers of the conservation movement, Professor Tansley:

„Whether we like it or not, large-scale planning for the postwar world is inevitable; but just as we can plan for freedom as well as for order, efficiency and material well-being in the political and social spheres, so we can plan for beauty and dignity in our physical surroundings. This matter involves the lay-out of our cities, towns and villages, but is also concerned, and no less vitally, with the treatment of the countryside“.

# MANAGEMENT OF NATURE RESERVES

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## WORKING PAPER

by

Lucie H. Pluygers

(in collaboration with V. Westhoff and M. F. Mörzer Bruyns)

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### I. *Size and Boundaries of Reserves.*

- a. The size of a nature reserve should primarily depend on the biological requirements of the species or the biotic communities to be preserved (Cahalane, Westhoff, Bressou, Caldwell).
- b. Reserves may vary from several hundreds of thousand hectares to a very few (Westhoff).
- c. As a rule, natural conditions can more easily be maintained in large reserves than in small ones (Bressou, Westhoff).
- d. Small reserves will generally be subject to many boundary troubles (Caldwell).
- e. The boundaries of a reserve should be well-chosen and preferably be natural ones. Animal wanderings, e.g. seasonal migration, beyond reserve boundaries will occur when reserves are too small (Cahalane, Harroy, Caldwell).
- f. Limited habitats of scarce animal species should not be situated near the border of a reserve (Caldwell).
- g. Though several characteristic animal species of a certain area may be preserved in large reserves, it is preferable that the protection of a single species only should be mainly attempted in reserves of smaller dimensions (Bressou).
- h. Small reserves may be particularly affected by influences from the outside, mainly agricultural, such as: a. possible alteration of the original water-table, b. addition of plant nutrients entering the reserve with the water or the wind (artificial manure) (Westhoff), c. deforestation and the possible introduction of exotic species (Bressou, etc.).
- i. Fauna reserves should preferably be situated in sparsely populated areas of small economic value (Cahalane, Caldwell, Harroy).
- j. Buffer zones (intermediary zones) of a width varying between 10–20 miles (Dennler de la Tour) should separate fauna reserves from areas of intense human occupation in order to allow animal drift without repercussions on their numbers (Caldwell, Cahalane).

## II. *Control of numbers of individuals.*

- a. Artificial measures in order to keep big game within the boundaries of a reserve, such as fencing (Cahalane, Caldwell), poison (Cahalane), hunting outside the boundaries (Cahalane), have generally proved to be inefficient and costly. In case of excess herbivore populations and definite lack of predators, drastic shooting inside the reserve is the only solution (Cahalane, Caldwell).
- b. The lowering of the original water-table in nature reserves caused by drainage of surrounding areas will first affect the flora and consequently the fauna (Westhoff, Caldwell, Cahalane).
- c. Improving water-supply in partly arid areas by artificial boreholes and permanently filled drinking troughs will check heavy losses of fauna during droughts and will keep the animals within the boundaries of the reserve (Cahalane, Caldwell).
- d. As to artificial food-supplies, the suppression of contagious diseases of big game, etc., management should be adapted as much as possible to natural circumstances. Vaccinations should be avoided (Bressou).

## III. *Intervention and non-intervention.*

- a. Non-intervention will be possible in very large reserves only and as a rule should be regarded as the ideal policy (Harroy, Cahalane).
- b. Protection of nature aims at leaving nature to itself on the one hand and at maintaining as many species and biotic communities as possible on the other hand. The latter purpose may rank prior to the former and justify intervention (Westhoff).
- c. In *botanical* reserves the necessity of intervention depends on the character of the vegetation and its successions.  
If human interference has been or still is a factor in the development of a scarce vegetation („semi-natural” or ”pseudo-natural” landscapes as defined by Westhoff) not constituting a climax, intervention or non-intervention will depend on the possible successions to which the vegetation may be subject. In the case of ”cyclic” or ”proceeding” successions (Westhoff) in a pseudo-natural landscape intervention can be limited to averting obnoxious elements from the outside. In a semi-natural landscape, intervention should consist of the continuation of the human influence which has determined the landscape.  
If the succession is ”terminable” (Westhoff), intervention may aim at maintaining one or more stadia. In this case however, part of the reserve or a nearby situated similar reserve should be left to develop freely. Both developments should be studied periodically (Westhoff).
- d. In order to preserve a certain species within a reserve it is required that the ecology of that species be thoroughly studied and that alterations in its habitat be avoided. If such alterations are caused by species entering the reserve from the outside, correcting measures are immediately required (Bressou, Cahalane, Westhoff).

- e. The smaller a reserve the more management it will require, the larger its area the less management will be necessary (Bressou, Westhoff).
- f. Re-introduction of locally extirpated species is practiced, among other reasons, to readjust the original equilibrium between the species (Cahalane).

#### IV. *Native populations within the boundaries of large reserves.*

Nature reserves may only be preserved in their original state when all interference from primitive native human populations is eliminated (Harroy).

#### V. *Influence on nature reserves from Tourism.*

Allowing tourism in a nature reserve means a definite attack on the integrity of the biotic communities to be preserved (Harroy).

#### VI. *Scientific Research of Nature Reserves.*

It is generally agreed that more study and scientific research of nature reserves is necessary in order to manage them adequately (Cahalane, Westhoff, Harroy, Bressou) but it is stressed that excessive visits from nature students, photographers and scientific collectors should be avoided (Bressou).

#### VII. *Duration of the status of a reserve.*

Reserve areas should be maintained in their original status during a long period, if possible permanently, and this should be aimed at especially when restoration of the numbers of the species to be protected is at stake (Bressou).

#### VIII. *Fires.*

Fires in tropical areas of savannah type may be caused by lightning and by native human populations. Fires may be regarded as a form of human intervention (Cahalane), but as they have effected the flora and consequently the fauna of certain regions since time immemorial, "fire climax" communities may be considered as natural areas and in some cases no measures against fires are taken (Harroy, Cahalane).

# MANAGEMENT OF LARGE NATURE RESERVES

by

VICTOR H. CAHALANE

Chief, Biology Branch, U.S. National Park Service,  
Washington, D.C., U.S.A.

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National parks and other large nature reserves are samples of original environment. It is generally agreed that their value decreases in direct proportion to interference by man. Ideally, natural forces should be allowed to run their course. Animal populations are forever fluctuating. To the scientist and naturalist, this ebb and flow is a normal phenomenon, to be "preserved" as carefully as individual species.

The ideal of complete non-intervention seldom can be practiced. In regions of the world which have long been inhabited by civilized man, the park areas may be invaded by foreign influences. Exotic animals or plants may have become established. Alterations in the native animal and plant communities may have been wrought before the areas were reserved, or subsequently under indifferent managers. These or others factors may lead administrators to undertake corrective measures.

In the 34,375 square miles of the United States National Park System, many of the great parks are inadequate as wildlife sanctuaries. Having been chosen primarily for spectacular landscape values, they are chiefly high mountain areas. With few exceptions, their ample high-altitude (summer) ranges are not matched by adequate lowland (winter) habitats for migratory mammals. Furthermore, the larger predators have been nearly or quite extirpated from the parks within the United States proper. For this reason, excess game populations sometimes build up, and starvation and range depletion results.

As far as possible, however, administration of national parks in the United States is intended to maintain the natural oscillations in animal populations. Except in one relatively small fenced area, there is no general policy to stabilize the numbers of any species. The authorities believe that, "If the parks are to function as natural reservations, their animal life must be subject to the least possible regulation by man. . . Park management policy permits interference only to prevent extermination of a species threatened either directly by falling below a safe minimum, or indirectly by rising to such heights as to menace its food supply."

It is preferred that natural controls be allowed to remove excess numbers of animals from the United States parks. In the case of migratory game or fur-bearing mammals, hunting or trapping outside of the boundaries should be a controlling factor. This is sometimes ineffective as a reduction measure because state authorities are unable or unwilling to permit drastic killing, or hunters are too few. When the more effective animal predators are not sufficient in natural numbers, action must sometimes be taken within the sanctuaries in order to avert catastrophic destruction of vegetation.

Reductions of park wildlife have been authorized in very few instances. Two of these involved highly scenic areas of heavy visitor use. In another case, the fragment of original winter range within the park had been serious-

ly damaged by decades of over-use by wapiti (*Cervus canadensis*). In consequence, one ungulate species had been extirpated and others threatened. Attempts were made in all cases of reduction to live-trap and remove the "surplus" animals. Years of experimentation and effort convinced authorities that this method was not effective when large numbers of animals were involved. It became necessary to resort to killing by shooting on the open range. In most instances of excessive numbers, however, it has been decided that the problem was either too localized, or that the destruction of the animals by man would have an unsatisfactory conclusion in the biological sense, and therefore was not justified.

Extirpated species are restored to the American parks whenever practicable. This action is taken in order to present a more nearly normal fauna to the public. Restoration will fill a vacant biological niche and help to readjust the original equilibrium between species. If suitable living conditions have continued, such a program of "interference" with Nature seems justifiable.

This measure should be kept within natural limits. Unfortunately restocking of game fishes has been carried to extreme lengths in terms of natural area administration. Fish are the only animals that can be killed for consumption or for sport in the American National Park System. Angling is intensely popular in ten areas. Annual stocking has been carried on for many years. While the program recently has been greatly restricted, a total of 6,840,000 eyed eggs, fry and fingerlings were planted in the waters of the ten parks in 1950. Artificial stocking, heavy fishing, and immigration of non-native species have modified the aquatic communities of practically all park waters. In some instances, native races of fish have been exterminated outright or lost by hybridization with alien races or closely related species. While it is impossible at present to close the parks to the angling fraternity, an attempt is being made to regulate fishing pressure in accordance with the natural productivity of the waters. When artificial methods are unavoidable, the minimum size of fish is stocked that will yield satisfactory results.

The major problem in Africa is caused by marked inequalities in seasonal rainfall and the sporadic occurrence of devastating droughts. For many years, the South African national parks authorities have endeavoured to equalize, as far as possible, the water supply in the areas under their administration. In part, the program was designed to compensate for water which has been diverted to irrigation projects on watersheds above the Kruger National Park, and so prevented from flowing into the sanctuary as of old. However, additional boreholes have been installed and others are planned with a view to attracting the larger mammals into arid regions of the park. The objectives are to increase the wildlife and to distribute consumption of forage plants over various sections, as well as to avert or reduce heavy mortality during severe droughts. It remains to be seen whether this program of intervention will have the desired benefits without serious drawbacks.

A serious problem of management in many large nature reserves is their possible effect on surrounding areas. Animals may leave the sanctuaries and cause damage to other properties. Occasionally, buffaloes, hippos and elephants move from Kruger Park westward onto agricultural areas where they cause some loss. It has been demonstrated that about one-half of the coyotes reared or summering in Yellowstone National Park migrate to lower



elevations, outside of the park, in winter. Of this number, half remain permanently outside where they may commit depredations on sheep and other small domestic animals.

In both the South African and the American cases, a satisfactory solution is difficult. A game-proof fence on the boundary of Kruger Park would be costly and possibly disrupting to the normal habits of many species of the larger mammals. Destruction of migrants might result in a drastic reduction of the park wildlife population. This type of solution (by use of "1080" poison) on the travelways of coyotes outside of Yellowstone National Park destroys park animals as well as those that have left the park permanently. As a result, the coyote population is reduced within a nature reserve where the larger carnivores have been virtually destroyed and where increased instead of decreased predation is needed.

In the parks of Belgian Congo, the ideal of complete non-intervention has been practically achieved. A minimum of management is practiced. In all of the four areas, animal populations are permitted to fluctuate unhampered by interference by man. Predation by four-footed mammals is unchecked. However, hunting by natives has been terminated since they adopted the more effective weapons of the white man.

Only one important intervention is made. Lightning and other fires are controlled or reduced in three of the Congo parks. Experience in Parc National Albert demonstrated, however, that fire was necessary to maintain the subclimax type of grasscover. Through the centuries, many of the mammalian species have become specialized for existence in and on this type of vegetation. They proved to be poorly adapted to the climax growth which follows the virtual elimination of burning. Accordingly, fires are now permitted to take their course in Parc Albert.

In conclusion, we can agree that, ideally, large nature reserves should be free from interference by civilized man. However, because of limitations of area and other restrictions, a degree of artificial management often is applied. Management is reduced to an absolute minimum in the parks of Belgian Congo. It is practiced somewhat more intensively in the American national parks, where excessive population of ungulates may be shot out (in a few instances), to avert extreme deterioration of range. Intervention by developing abnormally large water supplies is a feature of the vast wildlife sanctuaries of South Africa. These and other acts of interference may have unforeseen and undesirable consequences. It is essential that all proposals for management in large natural reserves be based on sound scientific study. Interference with biotic relationships sets up unfortunate friction, and should be withdrawn as soon as possible.

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## GESTION DES RESERVES ZOOLOGIQUES DE DIMENSIONS RESTREINTES

par

CLEMENT BRESSOU,

Directeur de l'Ecole Nationale Vétérinaire d'Alfort,  
Alfort, France.

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La gestion d'une Réserve dépend du but poursuivi. Il convient donc d'établir dès l'abord ce que l'on entend par une Réserve zoologique de dimensions restreintes.

Nous adopterons la définition qu'au nom du Comité français nous avons présentée avec M. Bourdelle au Symposium technique de la Conférence de Fontainebleau (1949) et que la Commission de la Nomenclature de l'U.I. P.N. avait bien voulu, alors, retenir.

„Les *Reserves Zoologiques* sont: soit des Réserves de *Conservation* destinées à sauvegarder certaines espèces animales dont l'existence est menacée de disparition ou de modification, soit des Réserves de *Réimplantation* destinées à réintroduire dans ces régions des espèces animales qui y vivaient autrefois et qui ont disparu depuis plus ou moins longtemps.

Dans ces Réserves, il est interdit de procéder à toute destruction d'animaux, à toute introduction d'éléments étrangers et à toute perturbation préjudiciable au but poursuivi sans l'avis préalable de l'autorité scientifique qui en assume le contrôle”.

Cette définition fixe ainsi les caractéristiques des Réserves zoologiques: ce sont des Réserves limitées à un but *particulier* et *dirigées* vers ce but par l'intervention de l'autorité compétente.

Si la protection de plusieurs espèces animales caractérisant la faune d'une région peut se faire dans des Réserves de grande étendue, les Réserves de dimensions restreintes n'assurent, par contre, de préférence, que la conservation d'une seule espèce, exclusivement ou principalement.

La conservation d'une espèce animale peut cependant être envisagée indépendamment du territoire sur lequel elle vit, en interdisant sa destruction par l'homme sur toute ou partie de son aire d'habitat, ainsi que le font certains règlements de chasse et de pêche. Ces mesures conservatoires, pour aussi efficaces qu'elles soient, ne constituent pas une mise en réserve de l'espèce envisagée. Méconnaissant les conditions écologiques et éthologiques de cette espèce, elles sont aveugles, restent aléatoires et précaires. Au surplus, elles s'appliquent à des animaux dont la raréfaction est sans doute inquiétante, à des espèces qui présentent les signes biologiques d'une disparition prochaine. L'interdiction de la chasse ne saurait à elle seule suffire à sauver le Castor d'Europe ou le Flamant rose, par exemple.

Une Réserve zoologique doit réaliser l'équilibre le plus parfait entre l'espèce que l'on veut protéger et le milieu dans lequel on veut la faire vivre.

Il est évident qu'une des conditions essentielles de la réussite est la connaissance de la biologie de l'espèce envisagée, de sa physiologie, de ses moeurs, de ses maladies. Ces connaissances ne seront jamais assez parfaites et il conviendra de les compléter par des observations permanentes et méthodiques.

Non moins importante est la connaissance du milieu favorable au développement de l'espèce. Seul est scientifique et rationnel l'établissement d'une Réserve zoologique en fonction du milieu dans lequel vit l'espèce considérée, de l'équilibre qui s'établit entre la dite espèce et les divers constituants de ce milieu: sols, plantes, eaux, animaux coexistants, . . . . Les connaissances écologiques sont seules capables d'obtenir le but recherché.

De ce point de vue, il semble que la mise en Réserve générale d'un territoire soit la mesure la plus scientifique pour assurer la pérennité d'une espèce; c'est elle qui garantit le respect des divers équilibres naturels influençant cette espèce. Mais, outre que la mise en Réserve générale entraîne des servitudes qui rendent la réalisation difficile, le milieu dans lequel vit une espèce en voie de disparition est souvent dégradé et partant peu propice à la régénération et à l'accroissement de celle-ci.

Le milieu naturel reste néanmoins la condition à rechercher pour la constitution d'une Réserve. Il faut se méfier des biotopes artificiellement créés qui peuvent avoir sur les individus des influences insoupçonnées et lointaines. Les conditions dans lesquelles vivent les animaux dans les ménageries et les parcs zoologiques même de grande étendue altèrent, et souvent profondément, la biologie des espèces ainsi conservées.

Dans une Réserve de dimensions restreintes, le biotope naturel risque d'être souvent modifié par de nombreux facteurs. Par les techniques agricoles tout d'abord: le drainage et l'irrigation, le déboisement, les multiples façons culturales ont une action évidente sur la flore et sur le sol. A la faveur d'une protection trop rigoureuse, l'équilibre entre les diverses espèces animales coexistant sur un même territoire peut être rompu en faveur de l'une d'elles qui devient alors nuisible au développement de celle que l'on veut conserver. L'introduction hasardeuse d'une espèce étrangère est à proscrire, tant les conséquences des acclimations inconsidérées peuvent être désastreuses.

Ces divers facteurs agissent directement lorsqu'ils s'exercent à l'intérieur du périmètre d'une Réserve; s'ils interviennent à l'extérieur de ce périmètre, ils peuvent encore avoir, à distance, une influence perturbatrice indirecte. Les autorités chargées de la gestion d'une Réserve devront surveiller en permanence les variations du biotope et intervenir immédiatement pour atténuer ou corriger les conséquences de ces variations.

Certaines de ces interventions seront périodiquement nécessaires pour obtenir le développement d'une espèce fragile ou raréfiée à l'extrême; telles, par exemple, la distribution d'une nourriture d'appoint dans des périodes de disette ou d'intense reproduction, la suppression des individus malingres et tarés, l'action sanitaire lors de certaines épizooties, etc. . . . On devra cependant se méfier de la mise en pratique systématique des méthodes zootechniques employées dans l'élevage des animaux domestiques; on choisira plutôt les aliments naturels que les produits artificiels ou étrangers au biotope originel; on préférera la sélection naturelle à la sélection artificielle; on proscriera les croisements hasardeux; on cherchera à développer mieux l'immunité naturelle que l'immunité artificielle obtenue par les vaccinations. En toutes circonstances, on se rapprochera le plus possible des conditions naturelles de l'équilibre biologique.

L'étendue d'une Réserve zoologique est très variable; elle dépend essentiellement de la nature de l'espèce à protéger et de sa biologie; une réserve ornithologique ne peut être comparée, sur ce point, à une réserve entomolo-

gique ou à une réserve de Mammifères. On devra cependant, en principe, disposer de la plus vaste surface possible de façon à faciliter l'extension de l'espèce, supprimer au maximum l'influence des facteurs extérieurs, faciliter, à l'intérieur même de la réserve, l'exécution de mesures passagères visant à l'amélioration des individus (isolement, parquage, reproduction, etc. . . ). Les conditions naturelles d'existence sont plus facilement maintenues dans un territoire d'une vaste étendue que dans un espace trop exigü.

Une zone périphérique de protection sera toujours recherchée; c'est par elle que la Réserve se protégera le plus efficacement des actions perturbatrices indirectes et qu'elle s'isolera le mieux.

La durée d'une Réserve zoologique dépend aussi du but poursuivi. En principe, il faut qu'elle soit permanente et aussi longue que possible. Une espèce animale ne retrouve son équilibre biologique qu'au bout de plusieurs générations; son accroissement est plus laborieux encore; la durée est donc une des conditions essentielles du succès.

Enfin, comme dans toutes les organisations de Protection de la Nature, une Réserve zoologique de dimensions restreintes doit pouvoir être étroitement surveillée. Organiser un centre de conservation pour une espèce animale sans être en mesure de faire respecter les disciplines convenues revient parfois à précipiter la destruction de cette espèce. Le silence, au dire de certains, est la meilleure mesure de conservation. L'accès d'une Réserve devra donc être sévèrement réglementé, notamment en ce qui concerne le droit de visite banale et le tourisme. Tout ce qui a été envisagé ailleurs, relativement à l'éducation du public et à la diffusion des principes de la Protection de la Nature trouve ici son application.

Nous avons dit que l'évolution de la Réserve doit être méthodiquement suivie. Sans doute une Réserve zoologique doit-elle se prêter à l'étude scientifique de l'espèce animale protégée, mais cette étude ne doit en rien entraver les conditions normales d'existence des individus; elle ne devra être confiée qu'à des chercheurs qualifiés et dûment accrédités, non ouverte au premier diplômé venu. En cette matière, les organismes de gestion feront bien de se méfier du zèle des techniciens spécialistes et de l'ardeur des collectionneurs scientifiques; leur comportement est parfois plus dévastateur que celui des promeneurs et des ignorants.

Le milieu biologique créé et entretenu par la constitution d'une Réserve zoologique est souvent différent du milieu naturel environnant. Il peut même influencer celui-ci, entraîner des désordres et avoir des conséquences économiques préjudiciables aux intérêts privés. Il appartient à l'autorité gestionnaire d'intervenir sur la Réserve de façon à concilier l'intérêt général que représente la conservation d'une espèce rare et l'intérêt particulier des exploitations voisines. Ses décisions s'inspireront encore de la connaissance de la biologie de l'espèce protégée, de sa résistance aux mesures d'exception imposées par les circonstances, de la gravité des perturbations enregistrées. Aucune règle ne saurait être fixée par avance.

En définitive, une Réserve zoologique de dimensions restreintes doit être une Réserve étroitement dirigée; sa gestion doit être confiée à une autorité scientifique; elle doit être conduite en s'inspirant essentiellement des données écologiques et éthologiques relatives à l'espèce protégée.

# **DYNAMISME ET TRANSFORMATIONS DU TAPIS VEGETAL DANS LES PARCS NATIONAUX AFRICAINS**

par

**J. LEBRUN,**

**Secrétaire Général de l'Institut National pour  
l'Etude agronomique du Congo Belge (INEAC)  
(Bruxelles), Belgique.**

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Aux yeux de beaucoup d'ardents et de sincères promoteurs de la création de „Réserves naturelles intégrales, conservatoires de la Nature . . .”, la stabilisation du manteau végétal apparaît comme un corollaire de la protection complète, telle que réalisée – avec plus ou moins de rigueur ou de succès – dans les Parcs Nationaux africains. Cette opinion est l'expression du désir, extrêmement louable en soi, de conserver d'une façon intangible des aspects de végétation qui, en bien des cas, présentent un intérêt pittoresque ou scientifique indéniable. En fait, elle est, pour une très grosse part, complètement erronée. Les écologistes américains ont particulièrement mis l'accent sur le caractère éminemment dynamique de la végétation. Leurs travaux, confirmés par des recherches suivies dans toutes les régions du globe, ont montré qu'à une exception près – sur laquelle nous reviendrons – toutes les communautés végétales ne constituaient, dans un territoire biologique donné, que des stades transitoires. En fait, les communautés végétales agissent puissamment sur leur „milieu” et particulièrement sur le substrat. Un type de végétation donné modifie les propriétés physico-chimiques et biologiques de son sol et, par là même, prépare l'avènement d'une autre communauté qui lui succède sur le même emplacement. Des „successions” de ce genre sont connues depuis longtemps et sont aisées à observer en un laps de temps très court. D'autres le sont moins et requièrent pour être mises en évidence des modalités d'observation plus rigoureuses. Souvent l'évolution est lente, et le passage d'une communauté définie à une autre exige un laps de temps considérable, qui peut être de l'ordre de plusieurs siècles. Parfois aussi, ce dynamisme semble arrêté, „subit un temps de pose” et ce, généralement par suite d'un effet inhibiteur du à l'influence humaine (les prairies des alluvions fluviales en Europe, par exemple, où le facteur d'inhibition est le paccage ou le fauchage). En d'autres cas, la „succession” est accélérée, parfois même brutale. Selon les circonstances, cette évolution du tapis végétal est „progressive” en ce sens que la communauté qui prend place est physionomiquement, structuralement et écologiquement supérieure; tantôt, elle est „régressive” et l'on peut dire dans ce cas que la végétation se „dégrade”. Les lois fondamentales qui président à ce dynamisme sont actuellement assez bien connues.

Tout aspect végétal bien défini, ou pour parler un langage plus précis, toute association végétale offre un caractère plus ou moins transitoire. Cette règle est pratiquement sans exception, si ce n'est pour la communauté végétale qui couronne l'évolution, réalise l'expression végétale la plus complète du milieu considéré, l'harmonie climat-sol-végétation et que l'on appelle „climax”. A l'échelle des variations climatiques très lentes, le climax reste pratiquement stable, sauf intervention brutale de facteurs

artificiels ou géomorphologiques. En fait, le climax végétal – seule communauté réellement stable et qui, théoriquement, mise à l'abri de toute intervention artificielle soit susceptible de se maintenir indéfiniment – n'est que rarement réalisé sur le terrain et n'offre le plus souvent qu'une répartition spatiale insignifiante. Ajoutons encore que les Parcs Nationaux africains ont souvent été choisis plus pour leurs populations animales que végétales. Or, les espaces les plus favorables aux grands troupeaux si spectaculaires d'animaux sauvages sont avant tout des parcours herbeux, c'est à dire des types de végétation herbeuse, très éloignés des climax régionaux qui, pour l'Afrique intertropicale et planitiaire au moins, sont toujours de caractère forestier.

Il résulte de ces considérations forcément trop sommaires, que la végétation des Parcs Nationaux, comme presque partout ailleurs, demeure soumise aux lois fondamentales de dynamisme et qu'aucune mesure de protection, à l'échelle humaine, ne saurait modifier sa lente mais continuelle transformation.

Notre propos est plus ample encore. Il vise à fournir quelques indications sur les effets transformateurs de la végétation et inhérents aux principes mêmes des réserves intégrales.

Parmi le complexe des interactions des divers facteurs actifs à cet égard et qu'il est malaisé de dissocier, on mettra en évidence, sans doute d'une manière très incomplète encore, les quelques aspects suivants:

### *I. Transformations du tapis végétal provoquées „immédiatement” par la mise en réserve intégrale.*

La mise en réserve, qui postule l'exclusion de toute intervention humaine dans un cadre biologique donné, entraîne une rapide évolution du tapis végétal et la disparition de diverses communautés particulières par suite de l'abandon des pratiques suivantes:

- a. exploitation forestière et pastorale;
- b. défrichement, labour et cycle cultural, impliquant des phases de reconstitution des communautés *naturelles*, lesquelles tendent, à la longue, à dominer;
- c. suppression dans certains cas, atténuation souvent du régime des feux-courants.

Il s'agit ici d'un facteur particulièrement important dont la suppression ou l'atténuation entraîne: 1°. la disparition progressive de certaines communautés de „pyrophytes”, 2°. la possibilité rapide de réinstallation dans les communautés herbeuses de pionniers ligneux, et, à la longue, de divers types forestiers.

### *II. Transformations dues à la protection de la faune.*

La protection aboutit, pour certains groupes faunistiques au moins, et selon les circonstances de lieu, à un accroissement plus ou moins balancé dans le temps et qui retentit sensiblement sur le tapis végétal:

- a. modification directe de la composition des parcours selon le comportement de chaque groupe d'animaux;

- b. modifications du sol, et, indirectement, sur les associations végétales;
- c. prépondérance des espèces „zoochores” dont la dissémination est assurée par les animaux;
- d. extension des types de végétation zoophiles: reposoirs d'animaux, déjections, etc. . . .

### III. *Transformations dues au tourisme dans les réserves.*

Ce point mérite d'être souligné, car il ne peut être minimisé. L'organisation de tourisme, par ailleurs si légitime et si souhaitable, provoque un brassage indéniable des éléments floristiques. L'introduction d'espèces végétales nouvelles dans les Parcs Nationaux est un fait aisément concevable. Il favorise l'extension des éléments nitrophiles-rudéraux et l'introduction d'associations anthropiques.

En conclusion de cet exposé que nous avons voulu extrêmement sommaire et qui justifierait un bien plus ample développement, nous souhaitons mettre en évidence les deux points suivants:

1. Il est erroné de croire que la mise en réserve intégrale, telle que pratiquée dans les Parcs Nationaux africains, postule la stabilisation du manteau végétal. Souvent, au contraire, elle est à l'origine d'une profonde transformation du tapis végétal.
2. La création de Parcs Nationaux n'est pas une garantie du maintien de certains aspects végétaux, de certaines associations . . . . Certains groupements qui affectent même un très haut intérêt scientifique, à cause de leur caractère rélictuel, parce qu'ils sont peu représentés ou qu'ils hébergent des plantes rares, ou pour toutes autres raisons encore, ne persistent que grâce à l'action répétée de certaines influences humaines qui assurent un „rajeunissement” ou un „renouvellement” régulier du milieu et qui cessent d'agir au sein des réserves intégrales.

Le même fait a été constaté dans les réserves intégrales européennes, où la suppression d'actions anthropiques entraîne la disparition de plantes rares ou d'associations considérées comme des joyaux floristiques.

En fait, et c'est là la conclusion majeure de ce bref exposé, la grande idée de la réserve naturelle intégrale qui postule avant tout une expérience fondamentale de dynamisme biologique dans une nature „vierge” ne coïncide pas avec le souci légitime de conservation de certaines communautés ou de certaines espèces. . . . Il s'agit, réellement de deux ordres d'idées nettement différents qui exigent des solutions et des modalités de réalisation différentes.

Conservation intégrale de la nature et conservation de communautés ou d'espèces sont l'une et l'autre des tâches qu'il importe au plus vite de réaliser ou d'étendre – ce n'est pas notre objet que d'appuyer une fois de plus des vérités aussi éclatantes – mais elles sont, en fait, irréductibles . . . .

# THE MANAGEMENT OF NATURE RESERVES IN DENSELY POPULATED COUNTRIES CONSIDERED FROM A BOTANICAL VIEWPOINT

by  
V. WESTHOFF  
Netherlands.

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In sparsely populated countries nature reserves can be large and, to a high degree, complete in themselves. Development of their vegetation, it is true, may lead up to a more uniform and monotonous "climax community" which involves a certain impoverishment of flora and fauna, but if they are large enough and remain sufficiently undisturbed, physical factors (such as fires, floods, rivers changing their course) will counteract the tendency towards stabilization and will renew the process of succession. In these countries intervention on behalf of the botanical features of nature reserves, if at all necessary, can perhaps be restricted to a minimum.

This is not the case in densely populated countries. Not only do we meet here with the difficulty that nature reserves are as a rule too small to remain undisturbed by outside influences, but a more serious, because more fundamental, problem arises from the succession of vegetation itself. For both reasons intervention may be, and in most cases is, necessary.

It is the aim of this paper to draw a distinction between different categories of landscapes with respect to their more or less natural character and to their degree of stability and to discuss for each of these categories the desirability and the possible methods of intervention.

First of all the fact must be stressed that "intervention" does not necessarily mean "changing the status quo". Succession, i.e. development, being a universal feature of vegetation, it is clear that in many cases the *maintenance* of the status quo necessitates as well a form of intervention.

The easiest case to deal with is that of a territory in a condition of natural equilibrium, ecologically speaking a climax. Such are deciduous forests and, in some cases, areas of shifting dry silicate sand. Such a community should be left alone. Its natural (native) flora should be spared. No exotics (as notorious Dutch examples may be mentioned: conifers, Rhododendrons, *quercus borealis*) should be introduced. Should any of those species have been introduced into a deciduous forest before it was brought under proper management, it ought to be removed.

In some cases the natural equilibrium may have been thoroughly disturbed but not beyond repair. The N.W. European deciduous forest on rich soil, the *querceto-carpinetum*, may degenerate, its flora and fauna be impoverished by drainage or by excessive planting of conifers. The ecologist only is able to estimate the degree of degeneration by means of qualitative and quantitative analysis of the biotic community. In these cases restoring the natural conditions may be difficult but should as far as possible be aimed at.

In many cases real "crop woods", which are of economic value to their owners and often consist for a large part of exotic species, have been declared nature reserves. They may be of interest on behalf of recreation or fauna protection, on account of the growth of fungi etc. It would be



impossible or even undesirable to try to turn such nature reserves into natural deciduous forests. Only in the rare case, when a more or less natural wood community of biological interest is deteriorating through injudicious management, is there any sense in trying to readjust its development.

So far we have discussed woodlands, which are a terminal phase of vegetation development. By far most biotic communities, however, are either still developing or artificially maintained in a certain condition (such as heaths and mown reed-swamps). A decision on how to proceed is much more difficult in this case.

As a principle it is preferable to let succession take its course. Nature protection means leaving nature undisturbed to follow its course according to its own laws. Should, however, this principle be applied to the extreme, in a country like the Netherlands scarcely anything would remain in the long run but woodlands. Nearly all other biotic communities would disappear except on the seacoast where new littoral communities are continually arising. Such a consequence cannot be our aim.

We have to maintain the other biotic communities as well, for nature protection also involves the maintenance of as many species of plants and animals as possible.

One may be compelled to ask why the survival of plant and animal species should depend on man's intervention. This sounds contradictory. In which habitats would these organisms have thriven if man did not exist? Where did they live before man started exerting his influence upon nature?

This is the answer. Any Northwesteuropean country if left alone would be overgrown for the largest part by forests. Nevertheless, through various causes (big herbivores, tidal influences, brooks and streams, fires caused by lightning, ice, inundation, penetration of salt water, sandshifting, micro-climates unfavourable to woodlands, rivers changing their course) sufficient space would be left for all other biotic communities.

When the best part of a country is cultivated it gradually loses its dynamic character, physical revolutions will no longer be tolerated, and in nature reserves, biotic communities which have not reached the climatic stage will have no chance of developing according to natural laws or following the course of their natural development. Still another fact has to be taken into account. Ever since the beginning of the present climatic period, i.e. as long as our present flora and fauna have existed, no country in N.W. Europe has been without human habitation. Neolithic man has disturbed the forest community to such an extent<sup>†</sup> that a number of other biotic communities have had the opportunity of developing. Human influence should therefore be considered in this light as a "natural" factor, and, at least *to a certain degree*, to protest against any human intervention whatsoever in nature reserves in the name of nature, becomes, paradoxically enough . . . unnatural.

The next question we have to answer is this. In which cases should a nature reserve with a developing (changing) vegetation be left alone and in which cases is this not appropriate? The answer should be based on a classification of landscapes according to the degree of their natural state with the help of the conception "flora" and "vegetation". These conceptions are often confused, although they were sharply outlined

more than a century ago (Thurmann, 1849). For this reason they will be briefly discussed here.

The *flora* of a territory is a list of plant species, varieties etc. (the whole of which is called "taxa") which have been observed in that territory. Such a list need not necessarily be qualitative only; such indications as "common" or "rare" for instance may be added; yet the special, actual coherence between the individuals is disregarded. "Flora" is an abstract conception.

On the other hand *vegetation* is the concrete vegetable mass covering the earth or a part of it; it may be defined as: „a mass of individuals of living or fossile plants coherent with the spot where they thrive or have thriven and in their spontaneous arrangement" (this definition excludes e.g. flower beds and the collective trees of an arboretum). Thus the *species* (taxa) are essential to the composition of the *flora*, the *individuals* and their *number* to the *vegetation*. The flora may be rich and the vegetation poor (dry, calcareous sand-dune slopes), the opposite may occur as well (artificially manured pastures). Furthermore it is important that the composition of flora changes very slowly as long as man does not intervene on a big scale. The larger the region under consideration, the slower the change. In a country such as the Netherlands, natural changes can be observed within a period of several centuries only. Vegetation on the contrary is changing continually and often very rapidly (succession), the more so if man does not intervene.

With the help of these clear conceptions of "flora" and "vegetation" landscapes may be classified on the base of their natural state in the following four categories:

1. *Natural landscapes*: Flora and fauna are spontaneous, i.e. they are established in their habitats without human aid. The vegetation is also wholly determined by natural factors, having developed without any human control. In the Netherlands the only examples of such natural landscapes are marine sand flats and some saltings.
2. *Pseudo-natural landscapes*: Flora or fauna are wholly or mainly spontaneous. The vegetation has been influenced by man or by his domestic animals (either directly or through changes in the habitat), but the character of this vegetation has remained similar to the natural vegetation of the considered habitat. Examples are: saltings (pastured), living bogs, fresh water tidal estuaries, shifting-sands, parts of the dunes, several types of deciduous forest.
3. *Semi-natural landscape*: Flora and fauna are mainly spontaneous. The character of the vegetation however is determined by man and is very different from the natural vegetation of the considered habitat. Examples are: heaths, moors, mown reed swamps, "blue grass lands" or "litter fen" (*Molinietum*), green pastures without artificial fertilizing along a not normalised rivulet, woodland planted with exotic poplars but with the undergrowth of a natural deciduous woodland.
4. *Cultivated landscape*: (rural landscape): Not only is the character of the vegetation determined by man, but the flora is also more or less artificial and the specific assemblage of the fauna has been changed as well as impoverished. Examples are: sown pastures, coniferous forests,

arable fields (In this paper the rural landscape will be left out of consideration).

With regard to the management of nature reserves it is necessary to make a distinction between natural, semi-natural and pseudo-natural landscapes.

In the case of semi-natural landscapes such as heath and "litter fens" (Molinietum) human control is the main factor determining the continuance of these biotic communities. In order that these communities should be maintained it is necessary to proceed with the continuous or periodical activities determining the character of the vegetation of the reserve such as mowing, burning, felling, pasturing, cutting of sods, as circumstances may require. At the same time however certain parts of each landscape should be left to develop freely and this development should be studied. The results achieved by scientific nature protection independently in Great-Britain and in the Netherlands during the years 1940–1948, have justified this same conclusion thanks to ecological research. Since 1948 most semi-natural reserves in the Netherlands are managed according to this trend of thought.

We have to deal next with the natural and pseudo-natural landscapes. As the woodland has been dealt with already, these landscapes may be considered only inasmuch as they contain developing (changing) vegetations. To decide whether we should intervene in the succession, we must distinguish between three possible kinds of succession which might be called *cyclic*, *proceeding* and *terminable succession*.

Nature reserves which should be left to their own development are, in the first place, those which, in certain extensive, self-containing territories, represent either a cyclic or a proceeding succession. These two concepts indicate, that all (or nearly all) biotic communities of such a territory are continuously rising and declining, being all present at the same time, be it at every turn on other spots. Examples of a cyclic succession may be observed in a living bog and in a domain of shifting dunes. In the living bog three communities occur: wet troughs with *Rhynchosporium* (small sedges), *Sphagnum* tussocks and *Erica* tufts. The *Sphagnum* tussocks grow out of the *Rhynchosporium* troughs, but at a certain moment (for instance when they reach the height of a foot) they accumulate more and more slowly and degenerate into tufts overgrown with *Ericetum*; then they desiccate and subside. Surrounding and still living *Sphagnum* tufts surpass them in height; in consequence, the closed-in *Erica* tussock becomes a *Rhynchosporium* trough again, but now on a higher level. *By this cycle* the whole bog gradually grows, until it is destroyed by draining or excavation. When it is protected, any intervention would be wrong. A similar situation is found in shifting sea dunes behind the coastal range, where the stabilised sand is blown out secondarily by wind.

Examples of a "proceeding succession" can be observed in all cases where new land continually arises out of the sea. Young embryonal dunes with *Triticum junceum* are succeeded by higher dunes with marram grass (*Ammophila*), which may develop into dune shrub, dry wild pastures or open xerophytic communities, etc.; but new embryonal dunes arise where the old ones have developed into other forms. On the saltings, the open *Salicornia*-community is succeeded by a closed turfy grass mat of *Pucci-*



*Photo Lichtbeeldeninstituut,  
Amsterdam*



Giethoorn dans le N.O. de la  
province d' Overijssel (Pays Bas)

Giethoorn in the N.W. of the  
province of Overijssel (Nether-  
lands)



Le lac du Belter Wijde dans le N.O. d'Overijssel (Pays Bas)

The lake Belter Wijde in N.W. Overijssel (Netherlands)

*Photo H. Vogelzang*





*Photo J. van Dijk*

Schoenetum nigricantis: *Parnassia palustris*, *Epipactis palustris*,  
*Schoenus nigricans*, *Juncus anceps* ssp. *atricapillus*

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„De Derde Slenk” dans la réserve de l'Etat du Bosch-  
 plaat dans l'île de Terschelling avec flore halophile

„De Derde Slenk” in the State-reserve the Boschplaat  
 on the isle of Terschelling with halophilous flora

*Photo H. P. Gorter*



*nellietum* and this again by the high salt marsh with *Armeria*, *Festuca* and *Juncus gerardi*, which may develop into fresh pastures or into fresh wet dune valley vegetations; but at the same time a new *Salicornietum* occurs, etc.

In all such cases we must do nothing except eliminate disturbing factors; it is necessary to organise the control of rabbits and of sea gulls, and to neutralize the results of drainage, to keep down the number of tourists, etc. No other intervention is justified. A usual form of intervention in a sea dune landscape is the consolidation of shifting dunes by artificial methods. In a nature reserve such an intervention should not be allowed, except in very extraordinary situations, such as occurred, for instance, after the complete destruction of parts of the dune landscape by the "Atlantik-wall" in the second world war.

The nature reserves presenting a cyclic or a proceeding succession are the most valuable and important ones. They are "living", dynamical complexes, but at the same time they are self-containing and in spite of all the changes inside their boundaries they maintain their character and their differentiation without human intervention.

In the Netherlands, the state reserves, situated on the Westfrisian islands of Texel, Vlieland and Terschelling, are excellent examples. The largest and also the most varied of these reserves, and the one with the most satisfactory boundaries, is the Boschplaat on Terschelling (4400 ha); for these reasons it is the most important nature reserve of the Netherlands.

Most of the pseudo-natural landscapes, however, do not present a cyclic nor a proceeding succession, but a "terminable" one, as all their communities finally develop into a woodland climax. The most important examples are shallow waters ("broads"), swamps and fens. Nature reserves of this type are usually small, which complicates the intervention problem still more (see below).

Although each one of these cases has to be considered separately and presents its peculiar problems, it can be said in general that it is desirable to divide the reserve (or a number of reserves close to each other) into two parts: a part where the succession is left to itself and is studied by periodical analysis of permanent "vegetation quadrats" (indicated in the field by numbered concrete poles or iron stakes), and a part where a certain intervention is applied. Sometimes it may be sufficient to mow a reed or sedge vegetation or to remove periodically certain water plants (mainly *Stratiotes aloides*). Sometimes the reed (*Phragmites communis*) has to be "mown to death", often under the water surface.

In other cases, shrubs and young trees (*Betula*, *Salix*, *Frangula*, *Myrica*) may have to be torn out, perhaps periodically. The most extreme intervention is to dig out a swamp which has filled up a previously open water. This measure, being rather costly, can but seldom be practised. In many cases the nature reserve consists of a complex (mosaic) of semi-natural and pseudo-natural landscapes (e.g. heaths, little bogs, "litter fen", "carr" or swamp wood, reed or sedge swamp), so that intervention measures become rather complicated and careful planning is necessary.

It has already been pointed out that the problem is still more complicated because in most cases the succession is not quite a natural one, but is subject to influences from outside. The most dangerous, unpleasant and wide-spreading influence is the vitiation of the water by artificial manure, used in the environment of reserves. This manure gets into the reserve either by

means of the wind or by running water. This results in an intrusion or a strong extension of certain nitrophilous, or at least „nutrient-philous” plant species, which are the more harmful because many of them are endowed with more competition power than the indigenous flora of the reserve. Consequently the characteristic species of the original swamp or bog are expelled by changes in their edaphical habitat as well as by the competition of the invaders. One of the most dangerous enemies is the common reed (*Phragmites communis*) in mesotrophic and oligotrophic swamps, bogs and dune valleys (i.e. swamps etc. which are acetous and poor in nutrients). The suppression of these invaders is often possible, but this is only a palliative. It is necessary to eliminate the disturbing chemical influence as far as possible, for instance by building dikes and by planting protecting rows of trees at the borderlines of the reserve. Another frequently dangerous exterior influence is drying up by drainage, which may be discovered by studying the changes occurring in the vegetation on ”permanent quadrats”. If possible, it has to be prevented by water control, for instance by placing a mill which supplies water from the environment to the reserve. However, this method can not be applied when the reserve contains communities characteristic of mesotrophic and oligotrophic habitats as the latter would be spoiled by the water rich in nutrients from the manured surroundings. Consequently a small reserve of mesotrophic and oligotrophic swamp or bog is irretrievably lost, when exposed to drainage. Therefore these communities are the most threatened ones of Northwestern-Europe; many plant and animal species belonging to these communities are nearly exterminated.

From the intricacy of the problems dealt with in this paper, it becomes evident that a plan for the management of a nature reserve from a botanical point of view must be based on:

1. a vegetation map of the nature reserve, making it possible to indicate exactly what has to be done in each part of the reserve.
2. a continuous study of the changes in the vegetation. This is only possible by following the method of permanent quadrats. In the Netherlands as yet  $\pm 100$  of such quadrats are being studied, they are situated in 17 nature reserves in 10 of the 11 provinces. Much more work is urgently needed, but a larger staff of professional investigators should be appointed.

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## EFFECTS ON AREAS OUTSIDE THE RESERVES CAUSED BY PRESSURE OF FAUNA FROM WITHIN

by  
**KEITH CALDWELL**  
Great Britain

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The problem that arises when fauna leave their reserves and do damage, or are killed outside the boundaries, is one that had frequently to be faced: it will generally be found that the smaller the Reserve the greater the difficulties.

Large Reserves are usually situated in areas that have little development value, moreover they are (or should be) big enough to enable normal seasonal movement of their indigenous fauna to take place within their confines.

A certain amount of drift over any artificial boundary is always liable to occur, but such drift should be small provided that the area of the Reserve is adequate for the fauna resident within its limits. Where Reserves are large and situated in country of small agricultural value it is unlikely that animals wandering beyond its confines will do any serious material damage. They may and most probably will, once they have crossed the border, be hunted by the local inhabitants but such hunting is relatively unimportant and can generally be controlled. In any event, granted that the Reserve is really large, it will be found that animals quickly learn the boundaries and remain within them.

It is, of course, always possible that some scarce animal may have its habitat in one part only of a large Reserve and that part may be close to the boundary. This of course means that the location of the Reserve in respect of this particular animal is ecologically unsuitable. Such unsuitability may have been caused by geographical or ethnological reasons and is probably inevitable.

Under these circumstances, special measures will probably be necessary to safeguard this particular animal.

In general, much can be done by improving water facilities. It has been found in Southern Rhodesia that a steady water supply, e.g. by pumping water into circular concrete drinking troughs, will hold the game and greatly delay, or even entirely check, seasonal migration.

But I would emphasize that the supply must be constant and regular. Even a short stoppage will cause the game to move away. It must be kept in mind that the creation of additional water supplies may in time lead to such an increase of animals that the grazing, even in a large Reserve, will prove inadequate.

Where Reserves are enclaves, surrounded by highly developed areas, trouble is probable. Where such Reserves are small it is certain. In both cases should fauna cross the borders in any numbers a considerable outcry – by no means unjustified – may be expected. As I have said, where Reserves are of adequate size the animals can probably be taught to respect the boundaries and those that get killed in the process form an insignificant portion of the stock. If the Reserve is small migratory tendencies will ensure movements which will inevitably cross artificial lines. Ungulates can, to a limited extent, be kept back by the expensive expedient of fencing but carnivora, especially lion, seem to take a perverse pleasure in overcoming any obstacle, ignoring the variety of food available for them at home and making a pest of themselves outside. This problem needs careful consideration for it is essential that it be overcome. The obvious solution, i.e. to destroy the lions, is objectionable for other reasons than sentiment. Provided the balance of nature be left undisturbed no great alteration in numbers of the fauna may be expected, but the extermination of the carnivora means a great increase of the ungulates. In time the grazing facilities of the Reserve will prove inadequate and drastic action, of a most unpleasant kind, may be essential if public outcry from marginal residents



is to be avoided. Such outcry will probably have as its aim the abolition of the Reserve.

To sum up, Reserves should be:

- a. of adequate size to allow for seasonal movement of the resident fauna;
- b. situated in and surrounded so far as possible by country that has little or no development value.

Granted the above and granted that the balance of nature be not artificially upset, I do not see any reason to anticipate serious effect on areas outside the Reserves caused by the pressure of fauna within.

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**POSSIBLE EFFECTS ON AREAS OUTSIDE THE RESERVES  
CAUSED BY THE ABUNDANCE OF FAUNA  
INSIDE THE RESERVES**

by

**J. BURHENNE,  
Schutzgemeinschaft Deutsches Wild, Munich**

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A. Rural landscape as a habitat for flora and fauna in densely populated countries. *Our opinion:*

- a. A relatively numerous, but not necessarily species-rich animal wildlife population can be safeguarded in densely populated countries, if appropriate laws exist for its protection. This also applies to the flora, in which case it is even more important than where the fauna is concerned that authorities responsible for the ameliorations should consider the interests of Nature Protection.
- b. The existence of a wide variety of fauna and flora is largely dependent on the maintenance of their habitats. In every respects the ideal solution would be the establishment of as many reserves as possible, but obviously this procedure meets with certain difficulties in densely populated countries.

Therefore: If item a) is fulfilled, special attention must absolutely be directed to item b).

We should like to explain this briefly in the light of the conditions prevailing in Germany.

Not taking into account the heavy inroads made by the Occupation Powers on the stock of game animals, Germany has a relatively large wildlife population and the conditions required under item a) above are respected in the country.

The number of animal species has not been much reduced by man. However this does not apply to those animal species which flee civilization and whose numerical decrease is conditioned by the overcrowding of their living space.

The situation is more difficult as regards the original flora, because in areas which have so far been the habitat of a large part of the flora the lack of space has led to extensive cultivation operations, e.g. drainage of moorlands and marshlands, river bed and brook regulations with biological changes in the adjacent lowland forests, improvement of ploughing of lands covered with xerophytic plants (heath steppes, etc.). This is also the cause of the reduction in the number of animal species which flee civilization and which had their haunts or even their refuges in these areas (examples: Emsland moors; Dachauer and Erdinger Moors in Bavaria; regulation of the Lech river bed with subsequent heavy biological damage to the surrounding lowland forests and thus to the fauna and flora; Garching Heath near Munich, formerly an area famed for its flora.

In the forests the conditions with regard to the fauna and flora are comparatively more favourable; the conditions of local impoverishment of the soil, due to monoculture of forest trees, will be improved by the recently initiated silvicultural measures.

The result of inroads on nature is in part very doubtful also when considered from an economic aspect; a regional lowering of the ground-water level in certain areas, decrease of soil moisture and of farm-crop yields, increasingly harmful effects of winds on lands which, in line with consolidation or cultivation measures, have largely been denuded of all brushwood and hedges; simultaneous heavy decrease in the number of song and gallinaceous birds as well as other insect-eaters and thus an increase of damage caused by insects and field-mice.

The extensive timber cuttings during post-war years as well as the removal of copses and single-standing trees in the open country have facilitated this development. Drainage operations have in general resulted in an exaggerated rise and fall of natural running waters to the detriment of agriculture, forestry, fishing industry and power industry. Besides, the problem of waste water disposal with all its prejudicial effects, which can by no means be considered solved in Germany, comes into play.

The Nature Protection authorities are endeavouring to deal with these problems with the aid of laws establishing as many reserves as possible of certain types of natural landscapes which are disappearing, (e.g. in the high mountains, in natural river-sides, in moors, forests, heath steppes, etc.) They hope, on the one hand, to maintain the biotic communities existing there, and, on the other hand, to preserve the biological balance in the landscape as a whole. In addition, the Nature Protection authorities wish to promote a sound development in landscapes so as to avoid the harmful after-effects of short-sighted encroachments on nature, such as may occur following the establishment of power-plants, cultivation of large areas, and other operations. Furthermore plans are being made to establish recreational areas around the big cities as long as there is still time before an unsound development of building activities spreads over the still unspoilt landscape. In Bavaria,

for instance, there already exist a large number of landscape reserves devoted to this purpose.

#### *B. Management of Nature Reserves.*

The Nature reserves in Germany, with the exception of those in the Alps (areas up to 22,000 ha.), are in general relatively small, covering between 10 and 800 ha. It is understandable that small reserves in particular slowly succumb to the influence of their cultivated surroundings. When they were established it was impossible to realize what the effects of the ever spreading civilisation and cultivated landscape would be, mostly because no protective zones, that is areas where neither building nor draining, etc. is allowed, were provided.

The external influences on nature reserves are of the most various kinds. The original character of the reserves is considerably affected by certain factors, e.g. the use of fertilised top-soil on heath steppes or lands grown with xerophytic plants and the resultant change in the plant-sociologic aspect. The same process is brought about by draining areas on the boundaries of nature reserves.

Most nature reserves owe their existence merely to some legal measure, the land belonging either to the State or to some private owner; only a few reserves are the property of nature protection organizations or natural science societies. In the case of reserves that have been created by legislation but which are owned by third parties there is frequently the danger of unauthorized interference on the part of the owners as an effective supervision is hardly practicable.

It has been necessary to take over the existing economic pattern in some reserves, e.g. in lowland moors or heaths, so as to maintain the conditions for which the protective measure was enacted. Thus, to preserve the juniper heaths on the Alb and in the Jura, it was necessary to continue sheep grazing, or, in the case of the alpine litter-grass meadows, which are characterized by an outstanding flora, the yearly autumn mowing. On the other hand, in the few remaining original forest reserves and high moors any economic exploitation must of course be out of the question, as their present state would be altered.

Owing to the relatively small size of the reserves any floral influence upon the surrounding areas is practically impossible; it is, however, understandable that the free-living animals (of course only certain species) should at times emigrate from the reserves into the surrounding countryside. This regeneration is due to the establishment of refuges for wild animals, because it is there, under continued natural environmental conditions, that wildlife is protected to the greatest possible degree.

As regards damage caused by game emigrating from nature reserves, we in Germany have no trouble at all. Apart from the inroads made by the occupation authorities, in our country good game laws have ensured the existence of a satisfactory stock of game everywhere. This is the reason why there is virtually no area where hunting is not permitted, i.e. why hunting in nature and game reserves can, nay must, be engaged in to render possible a proper regulation of the wildlife

population. Under the German game law the obligation to pay compensation for damage generally rests with the game tenants. Rare species of animals are protected all the year round everywhere. For the rest, all hunters are bound to comply with the shooting regulations specifying the number of cloven-hoofed game animals which they may bag, in fact, which they shall kill with due regard to the interests of agriculture and forestry (Landeskultur). It goes without saying that the shooting regulations drawn up by the game tenant and approved by the appropriate authorities are subject to a much more rigorous control in the case of game reserves.

(What we should like to emphasize in particular with regard to the game-damage problem is the following: Judging from numerous experiences of our own in Germany as well as from those which our representative was able to make on his last journey to Switzerland, the tendency is generally to exaggerate the damage caused by game. People are mostly ignorant of how damage exerted by game, if there is any at all, is caused and how it affects the farm crops, and they do not have the faintest idea of how to reduce it. We are of the opinion that the problem of game damage cannot be dealt with in the same way in all countries. On the other hand, it would not be too difficult to prepare uniform directions which would enable everybody working on this problem to assess damage caused by game appropriately, take measures for preventing it, and thus save very considerable amounts of money. This is why we deem it necessary for IUPN to collect, in a questionnaire, relevant experiences from various countries and, as already mentioned, to print a bulletin containing generally applicable suggestions. (We shall be pleased to cooperate in this matter).

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**THE OUTSIDE REPERCUSSIONS OF FAUNA KEPT IN  
NATIONAL PARKS AND NATURE RESERVES AND THE  
NEED TO ESTABLISH  
„WILDLIFE PROTECTIVE ZONES”  
ADJACENT TO THEIR BOUNDARIES**

by

**G. DENNLER DE LA TOUR.**  
**Buenos Aires, Argentina**

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In most national parks and nature reserves special stress is laid on the conservation of wildlife, particularly of species which are vanishing in these areas.

The strict protection enjoyed by the animals in such reserves, refuges or parks, soon makes them fearless. Unhindered reproduction and a consequent increase in number induces them to extend their living space outside the park or reserve boundaries where they fall easy prey to hunters, who,

in the non-protected areas, take advantage of their boldness and are authorized by the law to kill them.

When wild animals venture out of a park area, where they have never been disturbed or attacked because this area is not inhabited by man, and enter into an inhabited and exploited area they gradually begin to shun the proximity of man, withdrawing as far as possible to an uninhabited region, i.e. to the protected area. Only when the livestock of the park is so numerous that the returning animals meet with resistance do they seek another exit from the boundary zone and enter free hunting ground.

The purpose of creating "*Wildlife Protective Zones*" of 10–20 miles wide (according to the physiographic conditions) around the park boundaries is to avoid a sudden transition from a strictly protected area into a non-protected one and the above-mentioned consequences.

In the "protective zones" animals will have learnt again to beware of man and therefore will not fall such easy prey to the hunter as in the cases of animals leaving the park and coming straight into the non-protected zone. Moreover, these are almost always animals whose reproduction in the park is so abundant that their immigration to the bordering territory and the repopulation thereof is only to be desired.

The basic condition for protective zones is the prohibition of hunting of either all animals or certain species only as the case may be. It is important too that in the protective zones there should not be dogs running at large and stalking. On the other hand, agriculture, cattle breeding and forestry are to be permitted in the protective zones.

Agreements about such zones should be made with the States or Provinces in which the parks are situated. The respective width of the protective zones depends on the species of game and on the physiography of the surroundings of the park in question. Therefore, the establishment of the zones should be based on a thorough biological knowledge and exact physiographic field studies.

When I explained this idea to the Associate Director of the U.S. National Park Service, Mr. A. E. Demaray, he explained that it is now put into practice in some National Parks of the U.S.A. in different ways: the U.S. Forest Service administering land adjacent to park boundaries has actually established protective or buffer zones for the protection of wildlife. In other cases adjacent wildlife refuges administered by the U.S. Fish and Wildlife Service are closed to hunting and thereby serve as a protective zone for wildlife. In still other cases adjacent private lands closed to hunting serve as a protective or buffer zone along at least parts of park boundaries.

All these cases show only partial buffer zones; "wildlife refuges" in particular cannot be considered as "protective zones" for adjacent National Parks because they need their own buffer zone as well, except for the parts adjacent to another reserve.

The real aim of "wildlife protective zones" will be accomplished only when they completely encircle all special wildlife reserves and when they are wide enough to avoid everywhere a sudden transition from a protected area into a non-protected one.

**CONSTRUCTION A L'ETUDE DU PROBLEME DE LA GESTION  
DES RESERVES NATURELLES  
CAS PARTICULIER DES REGIONS INTERTROPICALES**

par

**JEAN-PAUL HARROY,**

**Secrétaire Général de l'Union Internationale  
pour la Protection de la Nature.  
Bruxelles**

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Les spécialistes réunis à La Haye au mois de septembre 1951 confronteront leur expérience au sujet des éventuelles interventions que peuvent rendre nécessaires les pressions biologiques exercées, tant du dehors qu'à l'intérieur même des réserves, sur la faune, d'une part, sur les espèces et les associations végétales, d'autre part. Ils examineront simultanément les répercussions que peut comporter, le cas échéant, à l'extérieur des réserves l'abondance de la faune maintenue dans ces dernières.

Le cadre choisi pour les discussions est limité aux pays densément peuplés. Les zones tempérées sont implicitement prises en principale considération par la nature même de cette restriction. Mais il n'est pas sans intérêt de se tourner pour quelques instants vers des régions intertropicales, où le problème revêt des aspects assez particuliers, mais peut-être relativement plus simples, malgré leur complexité, que dans nos pays d'Europe Occidentale, et par là plus significatifs et susceptibles de comporter des enseignements plus aisés à traduire en lois.

L'auteur de ce court rapport connaît d'expérience personnelle, pour en avoir dans chaque cas exercé la gestion pendant plus d'une année, deux grandes réserves naturelles centre-africaines: le Parc National Albert, secteur sud (450.000 ha) situé au Kivu et au Ruanda, et le Parc National de la Garamba (490.000 ha) au N.E. du Congo, en bordure du Soudan Anglo-Egyptien.

Ces deux réserves intégrales, d'où toute occupation et circulation humaines sont proscrites – sauf de rares exceptions, dans le Parc National Albert, justifiées, notamment par les nécessités du tourisme – constituent pratiquement deux cas extrêmes dans l'échelle des considérations qu'il est convenu d'envisager ici.

La première de ces réserves, le Parc National Albert, assure la protection d'une importante fraction du Graben centre-africain, la chaîne des volcans Virunga, les plaines alluviales au sud et au nord du Lac Edouard, toutes les eaux belges de ce lac, une portion de forêt équatoriale, les contreforts occidentaux du Ruwenzori. Région où l'équilibre biologique est délicat, où la moindre ablation du couvert végétal naturel est néfaste aux sols que leur relief tourmenté condamne à être une proie aisée pour l'érosion. Région à climat agréable pour l'Homme, de par son altitude moyenne comprise entre mille et deux mille mètres, région fertile aussi dans ses secteurs enrichis par les apports minéraux des volcans, où l'occupation humaine autochtone était donc déjà dense à la venue des Européens, où cette occupation autochtone n'a cessé de s'amplifier depuis, où de nombreux colons agricoles à peau blanche se sont installés et continuent à s'installer, ce qui provoque une demande de terres sans cesse croissante et une dégrada-

tion incessante des couverts naturels et des faunes primitives. La création du Parc National Albert était donc une mesure de salut public prise dans une zone extrêmement menacée, où il s'agissait, pour protéger les équilibres hydriques et pédologiques locaux, d'élever rapidement l'une ou l'autre digue susceptible de préserver contre l'invasion dévastateur des hommes quelques derniers lambeaux d'une flore et d'une faune primitives dignes d'intérêt à tous les points de vue. Il s'ensuit donc, d'un autre côté, que le Parc National Albert constitue un îlot protégé battu de toutes parts par les ressacs d'une marée humaine inlassable, aux exigences d'autant plus violentes que le contraste s'accroît entre les zones occupées dégradées par leurs occupants et le sanctuaire tout proche, où la richesse des associations vivantes est bien faite pour exciter l'envie de ceux qui ont détruit le plus clair des associations semblables existant jadis sur les terres qu'ils occupent aujourd'hui. En bref, le Parc National Albert est peut-être le modèle des réserves sur lesquelles s'exerce du dehors une pression active et continue, pression qui se traduit d'une part, par des récriminations continuelles, proférées par les habitants du voisinage et, d'autre part, par des actes de braconnage fréquemment répétés.

Le Parc National de la Garamba, sur la crête de partage Congo-Nil, étendue de savane relativement très peu peuplée, se présente sous un jour bien différent. Les mobiles qui justifient sa mise en réserve sont tout autres que l'action d'„emergency” qui s'est imposée au Kivu. Deux espèces de grands mammifères, le Rhinocéros Blanc et la Girafe, très recherchées malgré les réglementations, l'un pour la valeur de sa corne (80 £ le Kg.), l'autre pour celle de sa queue (10 £ pièce dans tout l'Est africain où elle constitue un signe de richesse parmi les autochtones) étaient en passe de disparaître dans cette région du Congo où elles se trouvaient jadis abondamment représentées. Aujourd'hui, dans les quelque 5.000 km<sup>2</sup> du Parc National de la Garamba, où n'habite plus aucun indigène, survivent avec certitude quelques centaines de Rhinos Blancs et quelques milliers de Girafes, alors qu'en dehors du Parc National les rhinos subsistant au Congo ne se comptent désormais plus que par unités et les girafes par dizaines. L'objet premier de la réserve intégrale est donc atteint. Mais il l'est dans un pays où les collectivités humaines contigües à la réserve habitent encore des aires très giboyeuses et où la disette de terres ne se fait pas sentir. Un Azande n'a donc de regards de convoitise vers le Parc National de la Garamba que si sa vieille fibre de braconnier lui fait concevoir le désir de s'enrichir en peu de temps par l'abatage, qui ne lui est plus possible hors de la réserve, d'une girafe, ou, mieux encore, d'un rhinocéros. Et les autorités chargées de la surveillance et de la répression éprouvent beaucoup moins de difficultés matérielles et aussi de scrupules de conscience, à châtier ce braconnier, abondamment pourvu en protéines, d'autre part, et qui n'est entré dans le Parc, en contravention des lois, qu'attiré par le seul appât du gain facile, que lorsqu'il s'agit pour elles, au Kivu, par exemple, de faire appliquer les règlements à un pauvre diable sous-alimenté qui ne comprend pas pourquoi on lui interdit d'aller tuer une antilope dans la réserve pour nourrir sa famille affamée comme lui.

Les caractéristiques de nos deux champs d'observation étant ainsi précisées, cherchons maintenant quelques constatations qui y ont été faites et qu'il pourrait être intéressant de rapporter aux congressistes de La Haye.

Commençant par le cas simple, qui constitue le phénomène-témoin de l'observateur, on peut donc retenir que la seule réelle forme de pression biologique s'exerçant de l'extérieur sur le Parc National de la Garamba correspond, ainsi qu'il a été dit plus haut, aux braconnages nés de la facilité exceptionnelle qu'offre ce paradis terrestre à tous ceux qui veulent sans effort s'y procurer en abondance viande de chasse et trophées précieux. Quelques délits de circulation y sont encore causés par la proximité du Soudan, le „no man's land" de la réserve constituant une ligne de fuite, voire une terre d'élection idéale pour les repris de justice désireux de fuir les polices et les magistrats. Mais l'immense savane qui déroule ses merveilleux paysages entrecoupés de forêts galeries entre l'Aka, la Dungu et la Garamba, peut à coup sûr être considérée comme l'un des derniers secteurs habitables de la Planète où les lois de la Nature se développent avec un minimum de troubles d'origine anthropique. Seuls les feux de brousse allumés au dehors du Parc par les indigènes, feux qui incendient annuellement tout le pays et dont les autorités locales sont encore toujours impuissantes à enrayer le passage dans la réserve, viennent perturber régulièrement les équilibres naturels des associations du Parc National. Mais leur action remonte à tant de siècles que nombreux sont déjà les écologistes qui ont cessé de lui voir un rôle réellement perturbateur et qui ont rangé le „fire climax" parmi les équilibres considérés comme indépendants de l'influence anthropique.

Le Parc National Albert, en revanche, est riche en situations de nature à retenir l'attention dans le cadre de nos préoccupations d'aujourd'hui.

Parmi les savanes de plaine exondée, le passage régulier des feux provoqués volontairement par les autochtones y est déjà tout aussi difficile à empêcher que dans le Parc National de la Garamba. Surtout au sud du Lac, les incendies de brousse emplissent chaque année le ciel de leurs immenses nuages de fumée noire, chassant devant eux les mammifères effrayés, levant les vols d'insectes et d'oiseaux, imprimant à la végétation ce port tourmenté et rabougri caractéristique de l'action périodique des flammes.

Mais à cette première action extérieure pesant sur l'équilibre biologique du parc national viennent s'en ajouter bien d'autres.

La plus sensible correspond à l'impossibilité qui s'est manifestée de racheter pour le Parc National Albert – comme les autorités ont réussi à le faire complètement au Parc National de la Garamba – tous les droits indigènes préexistants, tant d'occupation ou de circulation que d'exploitation et d'usage. A la Garamba, moyennant indemnisation en argent fixée contradictoirement et moyennant mise à leur disposition de terres de culture ou de chasse équivalentes en valeur et en surface à celles qu'ils acceptaient de quitter, les autochtones se sont engagés à ne plus jamais pénétrer dans la réserve intégrale. Au Parc National Albert, des refus se sont exprimés de céder certains droits et il en résulte que des groupes d'indigènes y ont conservé deci-delà la faculté d'y résider, d'y pêcher, d'y couper des lianes, d'y faire paître leurs troupeaux, d'y récolter du sel. Or l'expérience a démontré que l'exclusion complète de tout être humain est la seule garantie de conservation totale dans une région. Le simple maintien d'un droit de circulation rend déjà presque illusoire toute surveillance. Le braconnier, à l'approche du garde, se débarrasse sans peine de ses armes, de ses engins de pêche, du gibier et du poisson qu'il transporte. Et le convaincre de culpabilité devient dès lors malaisé. Tandis que l'inter-



diction pure et simple de circuler dans la réserve lève automatiquement toutes les difficultés. Le droit que quelques centaines d'indigènes de ce Kivu surpeuplé ont réussi à conserver de séjourner ou circuler dans le Parc National Albert constitue donc une très lourde hypothèque pour l'intégrité de plusieurs secteurs de ce sanctuaire naturel, et correspond à une manifestation des plus sensibles de la pression anthropique exercée sur ses associations végétales et animales: introduction volontaire ou involontaire d'espèces étrangères à la flore et à la faune autochtones, prélèvements, abusifs divers, troubles apportés à la quiétude des troupeaux, etc.

Une constatation similaire résulte des nombreuses présences et fréquents passages d'Européens dans ce pays pittoresque, au climat agréable. Malgré le désir des dirigeants de l'Institut des Parcs Nationaux du Congo Belge de garantir au maximum l'inviolabilité de ces biotopes réservés à l'étude de la Nature vierge, l'opinion publique fut la plus forte et parvint à imposer – nouvelle manifestation de pression – une organisation officielle du tourisme dans certains secteurs du Parc National Albert, circulations que l'écologiste ne peut, une fois de plus, considérer que comme une atteinte à l'intégrité des formations protégées.

Après les revendications couronnées de succès, il y a lieu ensuite, d'énumérer toutes celles auxquelles les autorités s'efforcent de tenir tête, et non sans peine. Rappelons qu'en 1929, le législateur avait incorporé dans le secteur du Mikeno du Parc National Albert la totalité de la belle forêt de Bambous couvrant les rampes ruandaises des volcans éteints de la chaîne des Virunga. La vague de protestations soulevée par cette sage mesure aboutit à un compromis en 1934: plusieurs dizaines de milliers d'hectares du Parc National Albert de 1929 furent rendus aux autochtones, afin de leur assurer leur ravitaillement en tronc de Bambous, si précieux pour leur économie. Le résultat fut tragique. En deux ans, les derniers Bambous de ces secteurs avaient finis d'être rasés, pour faire place à des champs de petits pois, vite érodés et remplacés par de mauvaises pâtures. Et les protestations reprenaient, les protestataires osant comparer le riche bambusetum resté dans le Parc avec les „terres dégradées qu'on avait mises à leur disposition". Aujourd'hui, de bonnes âmes, ignorantes du passé récent et des catastrophes qui accompagnent toujours le déboisement des pentes raides, se font l'écho de ces doléances et déplorent qu'on s'oppose à la réouverture de ces dernières forêts à la coupe indigène. Si on cédait à leurs instances, il ne faudrait pas deux ans pour que la dévastation du bambusetum des Virunga soit consommée. Et que la situation des protestataires soit redevenue exactement ce qu'elle est aujourd'hui.

Cette situation n'est pas unique, ni par sa localisation géographique, ni par la nature des revendications exprimées. Le droit de couper des végétaux divers, celui de faire paître du bétail, celui de chasser ou de pêcher sont l'objet de fréquentes sollicitations. Doubles, cela va sans dire, de passage aux actes dont la répétition ne décroît qu'en fonction de la vigilance de la surveillance et de l'énergie des répressions.

Un prétexte fréquemment invoqué pour taxer le Parc National de boîte à Pandore correspond aux méfaits, réels ou imaginaires, reprochés aux mammifères, voire aux insectes ou aux microbes, habitant normalement la réserve. Les lions sont au premier rang des accusés: vols de bétail, attaques contre les hommes, suivies d'un repli dans la réserve où ils se trouvent dès lors à l'abri de leurs poursuivants, sont invoqués à juste titre, de même.

que les dégâts commis dans les plantations par les éléphants, les zèbres, les cochons sauvages qui sortent du Parc National pour se régaler de ces excellents fruits ou racines cultivés par les hommes, puis rentrent prudemment dans le secteur protégé où ils se sentent – on oserait presque dire où ils se savent – en sûreté. Bien entendu, des exceptions tant aux règles sur la chasse qu'aux dispositions concernant les réserves intégrales ont été prévues pour permettre la légitime défense des personnes et des biens. Et bien entendu aussi, ces exceptions sont largement exploitées pour justifier des abatages dont l'utilité principale correspond à la consommation des dépouilles du prédateur présumé. A proximité du Parc National Albert, au moins autant que partout ailleurs en Afrique, il n'est pas rare de voir tirer sur un éléphant ou sur un zèbre sous prétexte qu'il pourrait bien un jour commettre quelque dégât quelque part dans une culture.

Les accusations portées contre les réserve par leurs antagonistes sincères parfois, intéressés souvent, sont renforcées encore par les verdicts des agronomes et des vétérinaires, ces médecins des organismes domestiqués par l'Homme. Des projets de détruire certains arbres du Parc National Albert ont été formulés en 1937 par des agronomes qui les accusaient d'être des „plantes-hôtes” du *Lygus*, ennemi des caféiers du voisinage. Des actions de masse ont été préconisées contre des aires du Parc National où avaient pondu des essaims d'acridiens. Des déboisements furent, de même, demandés dans la galerie forestière de la rivière Semliki pour détruire des gîtes à glossines, danger pour le bétail indigène des alentours. Et le lieu n'est guère indiqué ici pour rouvrir la controverse des partisans et des adversaires de la terrible et drastique méthode de protection du bétail par l'extermination massive et systématique de tout le gibier sauvage, réservoir maudit où se perpétuent les virus de la peste et les germes de la trypanosomiase.

La faune de la réserve n'est pas sans réagir à sa manière contre ces manifestations de la pression biologique s'exerçant au dehors du territoire protégé à son intention.

Premier effet bien compréhensible: la chasse qui s'est intensifiée à l'extérieur du Parc National a vite refoulé dans les limites de ce dernier les survivants des troupeaux traqués au dehors. Et le contraste n'en est que plus frappant, par conséquent, entre ces vastes étendues vides, où fuient encore des rongeurs et de petits herbivores attirés par les pâturages peu visités, et les plaines du Parc National peuplées de centaines de mammifères de toutes tailles. Cet appel de la zone où règne la quiétude est extrêmement perceptible. Il semble être si net que les animaux donnent littéralement l'impression de reconnaître les limites au delà desquelles cesse leur immunité. Nombreux sont les mammifères blessés à proximité des plantations qui rentrent dans le Parc pour guérir leurs plaies ou pour mourir tranquillement. Les rivières constituant frontière de la réserve sont typiques à cet égard. Et le cas est régulièrement observé d'hippopotames dormant ou circulant paisiblement en plein jour sur la rive située à l'intérieur du Parc National alors que c'est en vain que sur l'autre rive, où les menacent les pièges, lances ou fusils, l'on chercherait sur le sol la moindre empreinte, pourtant facile à repérer, de leur pesant passage. Bien plus, sur des routes automobiles formant limite de la réserve, les observateurs, blancs et noirs, sont nombreux qui ont vu des antilopes, broutant à proximité de la route au moment de l'approche d'un véhicule et allant en apparence se mettre systématiquement

en sûreté sur le sol du Parc, puis regardant paisiblement passer la voiture..... Le fait a été observé trop souvent pour que le facteur hasard puisse encore être invoqué.

Il se crée donc incontestablement dans les limites de la réserve une concentration d'animaux provoquant dans certains cas de véritables déséquilibres passagers, dont les conséquences, pour l'observateur averti et impartial, peuvent être du plus haut intérêt. Les éléphants sont devenus si nombreux dans la plaine du Lac Edouard que les visiteurs du Parc National Albert conçoivent souvent quelque appréhension à circuler sur ces pistes automobiles à chaque tournant desquelles ils sont exposés à se trouver face à face avec un pachyderme d'humeur inconnue. Dans le même secteur, les lions étaient devenus si abondants en 1937-38 que le cheptel antilope en quelques années y a littéralement fondu, provoquant, d'ailleurs de vives protestations de la part des touristes, et, par la suite, une réduction très sensible du nombre de ces lions. La multiplication des hippopotames du Lac Edouard et de la Rutshuru de son côté fut telle que le pédologue américain Ch. Kellogg put émettre la boutade que les plus fortes manifestations d'érosion qu'il lui fut donné d'observer dans tout le Kivu, il les trouva dans le Parc National Albert là où ces vastes herbivores en sont venus à pulluler au point d'y engendrer tous les maux de l'„overstocking”.

L'effet corollaire se fait par conséquent sentir et la surpression biologique née dans la réserve par suite des conditions exceptionnelles qui y règnent, se traduit par l'envie qu'éprouvent désormais certains herbivores de courir le risque de s'exposer aux dangers qui les attendent hors du Parc National pour pouvoir brouter des pâturages moins fréquemment visités que ceux de la réserve. Eternelle loi naturelle de l'action et de la réaction, dont les écologistes s'attachent à percer les mystères et dont l'étude ne peut s'entreprendre dans de meilleures conditions qu'au sein ou à proximité de ces réserves intégrales, derniers observatoires du genre encore laissés à la disposition des Naturalistes.

# QUESTIONS D'ACTUALITE - CURRENT QUESTIONS

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## DOCUMENT DE TRAVAIL SUR LE PROBLEME DES JARDINS ZOOLOGIQUES

ET

## LE COMMERCE DES ANIMAUX

par

WALTER VAN DEN BERGH

Directeur Zoo - Anvers

Belgique.

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A l'Ordre du Jour de la réunion de travail de l'U.I.P.N. à La Haye, figure le problème des Jardins Zoologiques et celui du trafic des animaux sauvages, deux questions apparemment distinctes, mais d'après moi en réalité étroitement liées entre elles.

Avant d'examiner les deux questions et justifier à quel point elles sont liées, constatons d'abord que dans tous les pays se dessine une tendance à augmenter le nombre des Jardins Zoologiques et que dans tous les pays le commerce des animaux prend une très grande extension.

### *a. Les Jardins Zoologiques.*

Pour les Jardins Zoologiques à caractère scientifique et culturel, le problème n'en est qu'au stade du début pour la bonne raison qu'un Jardin Zoologique répondant aux exigences que l'on est rationnellement en droit de réclamer d'un ZOO sérieux ne s'improvise pas et ne se crée pas du jour au lendemain.

Quoi qu'il en soit, il faut éviter que la multiplication des Jardins Zoologiques culturels dans un même pays finisse par empêcher ces derniers de remplir leur mission, par manque de moyens.

A côté de ces Jardins Zoologiques à caractère scientifique et éducatif, nous assistons à une multiplication des parcs d'attractions et de centres commerciaux se prévalant de la qualité „zoologique”, alors que leurs fins sont essentiellement récréatives et d'ordre lucratif. Cette multiplication, elle, est un fait établi.

S'inspirant de l'exemple et du succès de ZOOS culturels, sans comprendre la portée éducative de ceux-ci, et ne considérant que leur côté accessoirement récréatif et spectaculaire, ces parcs d'attractions mettent précisément en relief et exploitent habilement ce qui constitue en réalité le côté le moins intéressant, des Jardins Zoologiques culturels. Ils semblent avoir trouvé dans l'animal vivant, un nouveau filon d'exploitation lucrative qui serait légitime et contre lequel nous n'aurions pas à nous élever s'il ne s'accompagnait pas, bien souvent, de graves abus; si, pour toutes ces entreprises, l'animal n'était pas subordonné à des fins qui ne se justifient pas et qui sont

même en contradiction absolue avec les devoirs les plus élémentaires que nous avons vis à vis des animaux.

Il faut donc, en premier lieu, souligner la nécessité absolue d'établir une distinction bien nette et précise entre les Jardins Zoologiques culturels qui ont à charge une mission de vulgarisation zoologique et un programme d'éducation culturelle et scientifique, et les parcs d'attractions prétendus „zoologiques”. Cette distinction doit être admise définitivement si l'on veut éviter la décadence des Jardins Zoologiques scientifiques et culturels au seul profit d'entreprises commerciales, d'exploitants de spectacles et de trafiquants de bêtes sauvages.

La multiplication des parcs „zoologiques”, purement récréatifs, constitue-t-elle réellement un mal?

En toute impartialité on est obligé de répondre par l'affirmative.

Elle constitue un danger et un mal:

1°. du point de vue purement humanitaire et moral parce qu'il est inadmissible qu'on pourchasse, capture et détienne en captivité des animaux sauvages, des créatures vivantes, pour l'amusement et pour la réalisation de profits.

Elle constitue encore un mal:

2°. du point de vue de la protection de la Nature, car, leur nombre croissant crée une demande toujours plus grande sur le marché des animaux, spécialement dans le cas de la faune protégée qui est bien souvent plus spectaculaire et qui attire davantage le public.

Et ainsi nous en arrivons à examiner le second point à l'Ordre du Jour:

#### *b. Le commerce des animaux:*

Si dans le passé ce commerce se limitait à quelques commerçants à réputation établie, une demande croissante d'animaux sauvages a fait naître une nuée de commerçants qui, attirés par l'appât du gain, se soucient fort peu de la „marchandise” qui fait l'objet de leur commerce.

Achetant en général à forfait et sur la base F.O.B., les trafiquants des pays importateurs ne s'inquiètent pas des conditions dans lesquelles seront transportés les animaux, puisqu'ils sont couverts par l'assurance.

Il en résulte une mortalité dont, de temps en temps, la presse internationale nous apporte l'écho.

Ainsi, nous en arrivons à examiner à quel point les deux questions sont liées, car si le commerce des animaux s'est développé ceci est dû à l'augmentation de la demande créée par la multiplication des parcs d'attractions, soit-disant „zoologiques”.

Ces parcs dans lesquels les nécessités biologiques et physiologiques des animaux ne font pas l'objet de soucis constants et de dépenses énormes, comme dans les Jardins Zoologiques dignes de ce nom, ne s'encombrent pas d'un programme d'éducation scolaire, populaire et scientifique et réalisent des bénéfices sérieux leur permettant un renouvellement constant de leur cheptel, réduit chez eux au rôle . . . d'accessoire scénique.

Ayant des fonds à leur disposition ils cherchent à acquérir par tous les moyens les animaux spectaculaires qui appartiennent trop souvent à la faune protégée. Est-il nécessaire de souligner que les commerçants d'animaux en tirent profit au détriment de la faune?

Il est incontestable que plus il y aura des parcs d'attractions, soi-disant



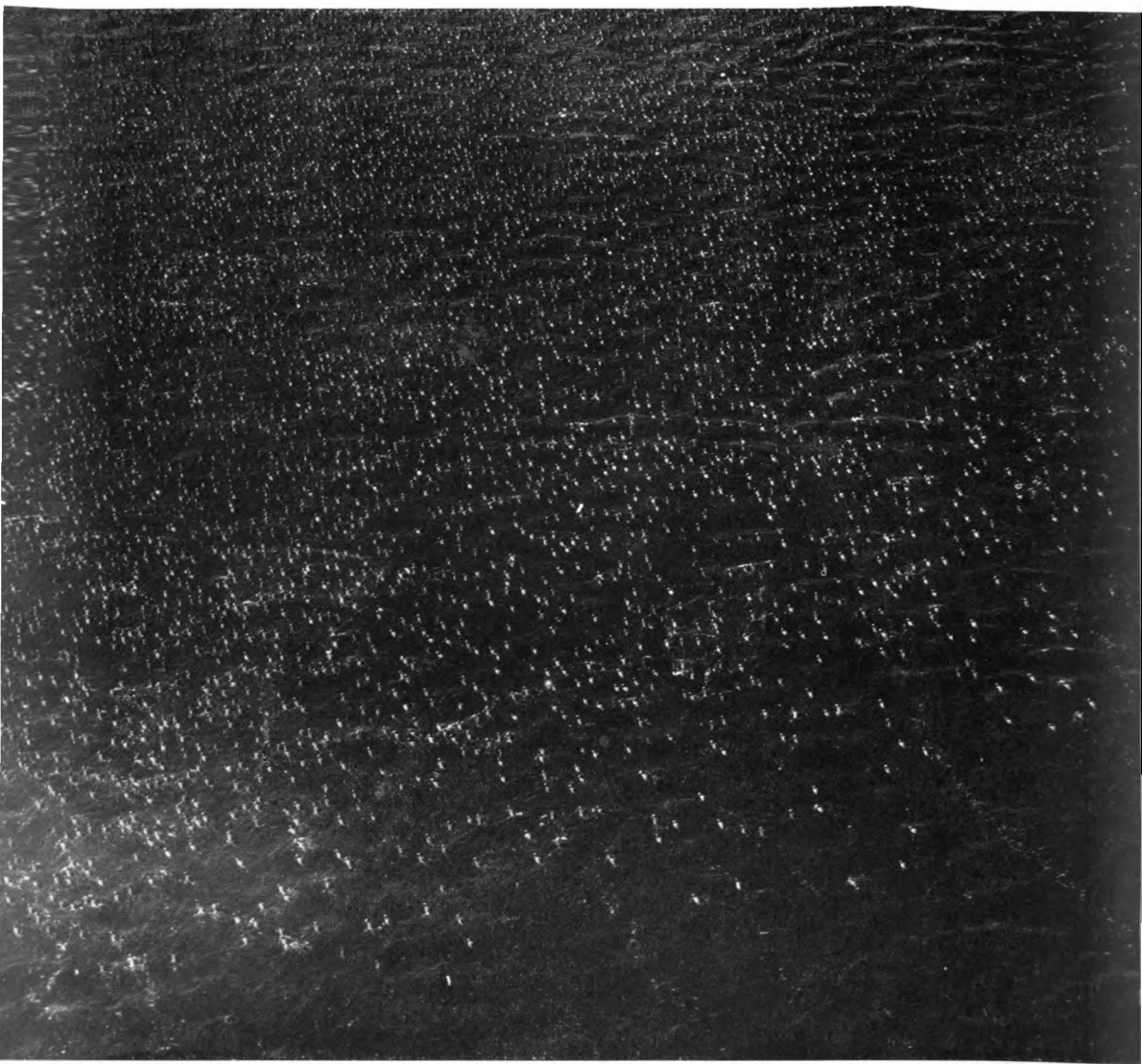


*Photo Jean-Paul Harroy*

*Collection Institut des Parcs Nationaux du Congo-Belge*

Le volcan Karisimbi, vu de Lukumi (Parc National Albert, Kivu, Congo Belge)  
Alt. 3800 m.

The Karisimbi volcano, seen from Lukumi (Albert National Park, Kivu, Belgian  
Congo) Alt. 3800 m.



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Quelques 7000 canards dans la réserve du „Zwarte Meer”

Some 7000 ducks in the reserve the „Zwarte Meer”

„zoologiques”, plus grande sera la demande en animaux sauvages, plus rapide aussi sera la disparition de certaines espèces.

D'aucuns prétendent que la chasse que tels gouvernements autorisent dans des territoires réservés est infiniment plus meurtrière et qu'en conséquence il n'y a pas lieu de s'émouvoir des quelques pertes provoquées par le commerce exagéré en animaux.

Admettre ce point de vue cependant reviendrait à prétendre qu'il ne faut pas combattre les petits maux à cause de l'existence des grands. . .

*En Résumé:*

- la discrimination entre Jardins Zoologiques culturels et parcs d'attractions à étiquette zoologique, s'impose;
- il importe que les Jardins Zoologiques culturels existants soient officiellement reconnus sur le plan national et international – et que leur nombre soit limité, par pays;
- les animaux dits „protégés” doivent être réservés exclusivement aux Jardins Zoologiques culturels et encore pour autant que ces animaux soient suffisamment en nombre à l'état sauvage;
- il convient par ailleurs qu'un règlement international sérieux contrôle le trafic et les conditions de transport (cages adéquates, nourriture appropriée, soins qualifiés assurés, etc. . . .) de tous les animaux dans tous les pays du monde.

*Conclusions.*

La situation n'en est encore qu'à ses débuts. Il est aisé de se représenter ce que l'avenir nous réserve dans ce domaine.

En défendant le programme ci-dessus, en le faisant aboutir nous aurons servi les générations à venir et nous aurons surtout bien mérité de la Protection de la Nature.

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**PROBLEM OF ZOOLOGICAL GARDENS AND WILDLIFE  
ANIMAL TRADE**

**by**

**F. J. APPELMAN**

**The Hague,  
Netherlands.**

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1. Amongst the subjects chosen for discussion at the Symposium at the Hague on September 19–22, 1951 the following are mentioned:

a. Problem of Zoological Gardens

b. Wild Animal Trade.

I should like to make a few remarks on these subjects.



2. Zoological Gardens are to be found all over the world and are steadily growing in numbers. Some of these Gardens are run on purely business lines and only for profit, others for cultural (scientific and educational) purposes.

It does not seem adequate to divide the Zoological Gardens into Cultural and Non-Cultural ones, as some "non-cultural" Gardens are, thanks to their better financial position, much more up to date and far better run and adapted than some poor so-called "cultural" Zoos.

The only right discrimination seems to be to divide the Zoos into good and bad ones and one can only hope that the bad ones, that is the Zoos run on inadequate funds and under poor management will soon disappear through lack of interest from the public.

Of course the Union might try to urge the Governments to enforce regulations prescribing minimum standards (financial and biological).

The greatest objection to the ever growing number of Zoos probably lies in the fact that all those Gardens are going to kill each other through unfair competition. This means that they will all run into financial difficulties, and a financially poor Zoo means badly kept animals and thus also a culturally poor one.

For our purpose however, that is, the Protection of Wild Fauna, the question is whether the Zoological Gardens, even in greater numbers, would ever present a real threat to the preservation of Wild Animal Life.

This most important question will be considered in:

### 3. *Wild animal trade:*

Perhaps everybody present at this meeting, myself included, considers trade in wild (live) animals in many cases an objectionable business; nevertheless, it seems pretty unreal to look on this matter merely from a sentimental viewpoint, there being ever so many other people who see nothing degrading in such a trade.

The main question to be answered is whether that kind of trade means an appreciable danger for the preservation of wild fauna.

In answering this question we, of course, should exclude the trade in animal products (skins, antlers, ivory, fats, oil, etc.) which, as we all know, has already proved to be disastrous to many species.

What I mean to consider here is only the trade in live animals to supply Zoos, Parks, and individuals with all kinds of animals, birds, reptiles, etc.

In my opinion that trade entails, with a few exceptions, no real danger for the preservation of the fauna, as the animals involved in this business are only a fraction of a percent of the animals killed in other ways.

Again with a few exceptions, the causes for the extermination of wild animals must be looked for elsewhere than in wild animal trade. It is much easier and much cheaper to kill a hundred elephants, giraffes, rhinos, etc. than to capture one specimen alive. For every specimen caught alive there are thousands killed by sportsmen or killed to protect crops or to fight the Tsetse fly or to avoid competition with the cattle, etc.

At the International Technical Conference in Lake Success (1949) Mr. J. P. van den Eeckhoudt cited some very interesting figures concerning wild animals killed in Southern Rhodesia alone, during the years 1924-25, in an attempt to control the Tsetse fly.

The official number of animals killed during that campaign amounts to

321,573, including 254,925 antilopes and 5,657 zebras. This amounts to many times the number of live animals which were exported during those years by animal dealers all over Africa!

Moreover it seems pretty sure that at least the same number will have died of wounds in the forest without being reported.

And if we look at the number of elephants, rhinos, giraffes, zebras and all kinds of antilopes killed yearly by sportsmen and ivory and trophy hunters, the few dozens caught and exported by live animal dealers are of no account. Thousands more are killed through the disintegration of their biotopes.

In fact the real threat to animal and bird life exists in the field and does not come from aviculturists and Zoos, which means it does not come from (controlled) animal dealers.

As to the much talked of commercialization of game, it only seems fair to state that game is commercialized not only by animal dealers but also by sportsmen and even by governments.

Many sportsmen sell their bag and even their trophies in order to pay for their sport and many governments make a profit out of the exploitation of their wildlife stock for which purpose they even import exotic game species, thus causing great danger to the natural fauna.

As I mentioned before, there are however a few exceptions and it seems clear that they concern those species (e.g. apes) that are not subjected to hunting and are sometimes fully protected. Regarding those species all trade should of course be strictly prohibited.

It seems unrealistic and even unfair however to try to forbid trade in live animals which are subjected to hunting, or which are killed in quantity for other purposes.

And we should never forget that for every few dozen zebras, giraffes and other antilopes we see shipped by traders there are many hundreds and even thousands killed in the field which are not known about.

In closing I should like to say that I did not state the above facts out of sympathy for animal dealers but in order to present a realistic and fair picture of the problem.

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## **POSSIBLE INTERVENTION ON BEHALF OF THE WHALE**

by

**K. W. L. BEZEMER**

**Friend of the Scott Polar Research Institute**

**Netherlands.**

---

Nearly all the whale hunting nowadays takes place in the Antarctic waters. As we know, in the Arctic waters the whales, hunted in earlier centuries, were ruthlessly destroyed and are now nearly extinct.

In the end of the 18th and the beginning of the 19th century great explorers like Cook, Bellingshausen, James Ross and others, discovered Antarctic, at

the same time bringing home news about the great number of fur-bearing seals and whales in the South Polar Ocean.

The story of those seals has been a very sad one. Between about 1820 and about 1825 the fur-bearing seals were slaughtered by hundreds of thousands on the beaches of the South Orkneys, South Shetlands and South Georgia, and became extinct.

The hunting of whales on a big scale started later. New devices of hunting and killing the whales and of taking them aboard had to be developed first, but the Antarctic whale-hunting only came into its great stride when becoming pelagic. Big floating factories and fast catchers were put into service and whale-catching was in its hey-days again. We all know that after a few years of free-hunt, international agreement was reached and the number of whales allowed to be taken annually was restricted. In later years this number has been 16000 Blue-whale units (the catches of landbased stations not included, as there is no restriction on them). These 16000 units will as a rule be caught.

The problem which confronts us now is: will the stock of Antarctic whales allow the regular, annual killing of that given number on which the International Whaling Conferences agree?

Of course you will not expect from me an answer on this problem, which is indeed a most intricate one. I would only draw the attention to two points.

1. Not a few experts are of the opinion that the toll taken of the whales is too heavy, in view of the fact that a certain number of a given species is absolutely necessary, for that species be able to survive at all. We may be very near the critical point already. Don't forget in this respect that whales are neither rats nor rabbits.
2. The interests of the party we are most likely to find against us, are very big. Huge capitals, mostly English and Norwegian, but also Argentinian, Japanese, Dutch and other, are involved in whaling. There might therefore be a tendency on the side of these interests to minimize the danger in which the whale is standing. We must be afraid that they only will give in at the moment on which it is not worth while any more – from an economic point of view – to send out their costly hunting expeditions. Maybe it will be too late then to save the whales. In this connection I would like to give the figures of the number of whales caught in the Antarctic waters from 1904 till 1939.

<i>Number of whales taken during 1904–1939</i>	
Blue Whale . . . . .	246.729
Fin Whale . . . . .	197.036
Sei Whale . . . . .	5.230
Humpback . . . . .	48.997
South Right Whale . . . . .	588
Sperm Whale . . . . .	6.787
Others species . . . . .	6.306
<hr/>	
Total: . . . . .	511.673

Mind you, these were not sparrows, but highly-specialized mammals, the largest animals which exist or, as far as we know, ever have existed.

In my opinion it is absolutely necessary that IUPN devote its attention to this problem. We are in the happy position of having the disposal of a wealth of information and a mass of accumulated data on several sides of the problem. I mention only the very important investigations on this subject which have been undertaken over many years by the British Discovery Committee, and the work done by Norwegian experts and institutions.

I would propose to set up a small commission or committee, emanating from the IUPN, in order to report on the urgent problem of the status of the Antarctic whales, trying to ascertain whether intervention on behalf of these wonderful, huge creatures will be desirable.

## SIDELIGHTS OF THE TECHNICAL MEETING

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Just as some people are somewhat disconcerting when first met, The Hague is a city one learns to like on better acquaintance. It is true that the delegates to the Technical Meeting were lucky enough to spend three days in the marvelous setting of the Binnenhof. The Binnenhof, meaning „interior court”, is part of the most spectacular section of the city, situated on the banks of a romantic little lake. The „Rolzaall”, where our meetings took place, dates from the middle of the 13th Century, when it was part of the residence of the Counts of Holland. An atmosphere of imposing grandeur remains, to which has contributed the magnificent architecture of the Hanseatic Cities.

What we have chosen to call the "Sidelights" of the meeting were faultlessly and masterfully arranged by the Netherlands Committee, animated by the enthusiastic and indefatigable Mr. M. C. Bloemers, and our first expression of thanks and admiration goes to the members of this Committee. Next we salute the personnel of the Touring Club of Holland, who put their premises at the disposal of our Secretariat with unequalled good humor and obligingness. Here they will find an echo of our gratitude, as much for the hospitality given and received as for the thousand considerate gestures which accompanied it.

Smiling and always present whenever her help was solicited, as it was practically constantly, Mrs. A. J. A. Frowein-van der Schalk made an important contribution to the success of the Meeting by her devotion, her tranquil efficiency and her faculty of knowing what everybody wanted before they could express it. To her we also send our sincere thanks.

Under the patronage of His Excellency the minister of Education, Arts and Science and H.E. the minister of Agriculture, Fisheries and Food, the Netherlands authorities received the delegates Wednesday evening in the Rolzaall. This reception offered an occasion for the first contacts to be made and the impression was given that cordial friendliness had been included in the agenda. The informal conversations and the exchange of views between participants of all nationalities begun here contributed a new animation to the preceding meetings.

An evening of films was arranged for Thursday in the Education Museum.

Some excellent films on the National Parks of Holland and Italy were shown, as well as an interesting documentary on aspects of Holland as reflected in the canals and lakes.

Saturday, just past noon: punctually the busses were waiting for us, and we set out happily for those magnificent excursion days – that is, all of us who were not obliged to return immediately to their occupations. The outskirts of the city rapidly led on to forests and heathlands, bordering on picturesque villages where we regretted we could not stop. Soon we arrived

at the aquatic bird reserve of the „Zwarte Meer”, part of the former Zuyderzee.

Alerted by the big bell of the boat which took us on a tour of the reserve, the wild ducks and marsh hens obscured the sky and then resettled peacefully, and secure in the knowledge that they would not be disturbed in their habitat guarded by the wisdom of men.

The evening we spent in the charming village of Zwolle remains one of the best memories of the excursion because of its gaiety and the friendly relaxed atmosphere which prevailed. Dr. G. F. Herbert Smith, Vice-President of the Union, made a short and witty after-dinner speech of thanks to our hosts.

The region which we crossed the next day has been recovered from swamplands since the Middle Ages. A Frenchman once said "God created the world, except for the Netherlands, which the Dutch themselves created", a witticism which contains some truth, for the fight against the floodwaters must be carried on continually in this area. The result is a strange, flat landscape which would be monotonous were it not cut up by canals and lakes and brightened by charming little isolated hamlets, sometimes connected only by means of canals and lanes for cyclists. The trip we took in the punts through the canals led us to discover these continually enchanting villages situated in this extremely pleasant landscape.

While some participants ended the excursion on Sunday evening by returning to The Hague via the Northeast Polder, the rest of us went on to Harlingen, where we embarked on the boat and headed for the Island of Terschelling. We were reunited at Westerschelling over cups of tea, and we were kindly received by a welcoming speech by the Mayor of the island, who was thanked on our behalf by Mr. R. Mayné. Then we were introduced to Terschelling. How can it be described – the beauty of this Island of Dreams, the paradise of birds, and doubtless of painters, the elusive character of the light, the moonlight paleness of the dunes in the Noordvaarden reserve, the charm of the Frisian villages and the cordiality of their inhabitants. A picturesque evening of native folkdances had been arranged for our benefit. After we had been dazzled by their ability, the costumed dancers invited the excursionists to join them, which they did most willingly, and we must say that suppleness of spirit was not the only attribute of the latter. Mr. J. Berry pointed out in a very amusing fashion that the dances were similar to those in his native Scotland, and in a few words he expressed the pleasure of all of us.

On Monday the day developed according to the full and perfectly conceived programme. The journey across the Boschplaat in the gaily decorated covered wagons, the picnic in the dunes, the amazingly Egyptian frieze outlined in the Nordic sky by the long-necked wild geese in spectacular flight, the arrival at the sea-side in the afternoon, and the little artificial lake in the sunset are only a few chosen from many pictures which are engraved on our memories. Among this abundance of rare species, in this harmonious equilibrium maintained by man's intervention, the naturalists were beaming! Some counted with delight twenty-seven white bunting nestling nearby on the sands, while others discovered the *Salicornes*, admired *Parnassia palustris*, or even the humble thousand guilders herb.

Sadly we returned on Tuesday morning to depart from Westerschelling, whose ancient Middle Ages lighthouse seemed to signal a last farewell

to us. We returned by the Isselmeer Dike (Afsluitdijk) and the „Wieringermeer” Polder, whose 20,000 hectares, reclaimed in 1930, were flooded by the Germans in 1945 and then again reclaimed. Nothing was neglected by the organizers of this remarkable excursion, nothing was disappointing or of mediocre quality: the carefully chosen itinerary, the impeccable hotels, the excellent meals (ah, those Dutch breakfasts!), the picturesque and pleasing Frisian houses, and the birds which grouped together just at the desired moment and which delighted us with their spectacular mass flights, and the weather, which, by an astonishing feat in this misty country, managed to remain beautiful for five whole days.

Marguerite CARAM.



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Entomology

339.49

I 84 p

1951

104146



UNIVERSITY OF MINNESOTA



3 1951 D00 190 363 U

Printed by  
van Waesberge, Hoogewerff & Richards n.v., Rotterdam

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