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INTERNATIONAL POPLAR COMMISSION

R E P O R T O F T H E S I X T H S E S S I O N

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I - GENERAL REPORT

GENERAL REPORT

The International Poplar Commission held its Sixth Session in Rome at FAO Headquarters from 26 to 28 May 1952.

Delegates from the following countries, members and non-members of the Commission, took part in the discussions: Austria, Belgium, Finland, France, Western Germany, Greece, Italy, Netherlands, Spain, Syria, Sweden, Switzerland, United Kingdom and the United States. The International Union of Forest Research Organizations was also represented. The list of participants is appended to this Report (Annex 1). Argentina, Canada, Denmark, India, the State of Israel and Pakistan sent their regrets.

Prof. Ph. Guinier, Chairman of the Commission, conducted the proceedings and Prof. G. Houtzagers acted as Vice-Chairman. Mr. M. Leloup, Director of the Forestry Division, represented the Director-General of FAO.

On opening the meeting the Chairman laid emphasis on the work accomplished by the experts who have steadfastly contributed to the efforts of the Commission since its inception, and greeted the representatives of the States participating in the proceedings of the Commission for the first time: Finland, Greece, Spain and the United States. Mr. Leloup, in welcoming the delegates to the headquarters of the Organization, stressed the striking and speedy development of the Commission and its achievements since it came into being in 1947. He also underscored the importance the Organization attached to the discussion of the item on the Agenda concerning the future activities of the Commission and the eventual recommendations regarding a world-wide extension of its work.

The Commission then approved the Agenda drawn up by the Secretariat, with the following amendments:

Items 8 and 9 became respectively:

Item 8: White poplars

- a) Aspens - Studies under way and to be undertaken (history and program)
- b) White poplars - Studies to be undertaken

Item 9: Poplars in the United States

- a) Mission of experts to the United States (OECE/ECA) - Discussion of conclusions.
- b) Talk by Dr. Schreiner (United States)

Item 12 in the first draft became: "Permanent Committee - Election".

Item 13 "Other business" was added.

It was decided, under this item, to deal with the admission of Spain, and to hear communications.

After having established its time-table of work and made it clear that the non-member countries would take part in the discussions with the same rights as the delegates of the member countries, save with regard to statutory matters, the Commission went on to examine its Agenda items, took decisions and passed resolutions as follows:

I - ACTIVITIES OF THE SECRETARIAT

The Commission took due note of the Secretariat activities outlined in document FAO/CIP/43, and complimented and thanked the Secretary for the work done.

II - REPORTS OF THE ACTIVITIES OF THE NATIONAL COMMISSIONS

The Commission took due note of the reports submitted by the representatives of the National Commissions or the bodies functioning as

such, it expressed its thanks to the National Commissions and to the aforesaid bodies for the work achieved. The Commission also received accounts of poplar cultivation in the countries who were not members of the Commission but were represented at the Session, in particular, Spain and Greece.

Since it has not yet been possible for studies on "black heart", "splitting" of poplars and "cultivation of poplars outside forest stands" (that is to say, on farm land and especially grassland) to furnish final conclusions or to be undertaken, the Commission RECOMMENDED that the member countries continue these studies and report thereon to the next Session.

As regards the investigations into diseases which had been recommended to the National Commissions, considerable information was supplied to the Commission. Nevertheless, they will have to be continued along the lines indicated previously. The Commission took due note of the dangers inherent in the propagation of Hypanthria cunea introduced recently from the United States into Europe (Hungary, Yugoslavia and Austria), and requested the National Commission to follow carefully the possible spread of outbreak centers and eventually to take all timely measures likely to check the pest.

Lastly, the Commission considered that it would be preferable for the annual reports on the activities of the National Commissions or of the bodies functioning as such to be set out according to a uniform pattern, and to that end instructed the Secretariat, in liaison with the Permanent Committee, to draft a plan for such reports in the form of a standard questionnaire that would be sent to the National Commissions before each Session, and to which they would be requested to be good enough to conform. This questionnaire should be in two sections, one

general in scope, referring to the activities on which an annual report was requested at the previous Sessions, and the other, referring to the special surveys recommended for the year considered or submitted by the different countries in the form of special reports.

The annual report will thus be complete and permit the necessary comparison of the various findings and observations expressed on any one subject.

III- INCREMENT STUDY ON SELECTED SITES

The Commission, after having taken due note of the partial results obtained in some countries, in particular in France and Belgium, RECOMMENDED that the National Commissions continue mensuration, specifying the ecological and cultivation conditions of the sites. To this end the National Commissions will ensure liaison with the Forest Research Stations whenever it appears desirable.

IV - ECONOMIC ASPECTS OF POPLAR CULTIVATION

The Commission, after having discussed the economic conditions of poplar cultivation, RECOMMENDED that the National Commissions continue their studies in this field, and especially with regard to the cultivation of poplars outside forest stands, that is to say, on farm land or grass-land.

The question of spacing having again been raised when discussing the aforesaid studies to be carried out, the Commission, after having stressed the necessity of adapting techniques to the prevailing economic needs, CONFIRMED that there was no new valid reason for reconsidering the conclusions reached in the field at the time of the preceding congresses with respect to the spacings recommended as optimum. Naturally, spacing depends on soil fertility and light intensity. As, however, such

conclusions were partly based on the economic conditions of the moment which incidentally do not seem to have changed - the National Commissions will continue with advantage to study plantation spacing problems, in order to be able to adapt their techniques to changing economic conditions, and also to gain by the introduction of new clones with different properties.

V - EXCHANGE OF PLANTS AND CUTTINGS FROM THE PLANT PROTECTION STANDPOINT

The Working Group set up at the last Session with Messrs. Peace, Rol and Van Vloten, carried out its work by correspondence. Its report (document FAO/CIP/38) was submitted to the Commission by Mr. Peace. (Annex 2 to this report).

The Commission approved the report and referred it to the National Commissions so that they might examine the possibilities of applying the measures advocated and give an account of their action thereon at the next Session.

VI - UTILIZATION OF POPLAR WOOD

In conformity with a recommendation made at the last Session, a Working Group, convened by the Chairman, met prior to this Session. The report of the Working Group (document FAO/CIP/56) is given as Annex 3 to this Report.

The report was submitted by Mr. Janis, Rapporteur, who pointed out that the Second Conference on Mechanical Wood Technology, held at Igls (Austria) in August 1951 under the auspices of FAO, had considered that the work carried on by the Commission in connection with Utilization was perfectly consistent with the objectives of the Conference and that it should be continued and expanded. The Rapporteur also emphasized the

difficulties encountered in going forward with the work because of the want of liaison between producers and users.

The Commission approved the report of the Working Group and underscored its conclusions, especially with regard to extending the work to include aspens and white poplars. It also expressed the desire that the different countries concerned exchange specimens. In addition, at the request of the Belgian National Commission, it called the attention of the National Commissions to the possibility of utilizing poplar wood for coach flooring, and enjoined them, if they deemed it expedient, to study this additional use.

In view of the importance of utilization problems, the Commission DECIDED that the Working Group on utilization, which until then had been an ad hoc group set up at each session, would become a Permanent Group under the chairmanship of Prof. Giordano, with Mr. Janis as Rapporteur.

VII- ASPENS

The Commission took due note of the document prepared by Dr. Heimburger (FAO/CIP/40) at the request of the Secretariat, and expressed its thanks to the author for the proposals made. It also heard the information supplied on the situation by some delegations and on the studies undertaken in their respective countries, as well as the observations put forward by other delegations. The delegates of Sweden and Finland gave full accounts of the situation in their countries.

In conclusion, the Commission called the attention of the National Commissions to the cultivation of the aspen, pointing out that the two questions to be examined first would be:

- (a) the different kinds of aspens,
- (b) the methods of propagation.

It also stressed the very special importance that studies on hybrids of European and American aspens would have.

VIII- WHITE POPLARS

In view of the importance of the question the Commission was unable to tackle it at the time of the Session. It RECOMMENDED that the National Commissions undertake studies on white poplars and their hybrids with aspens, from the dual standpoint of their botanical characteristics and their cultural utilization.

IX - POPLARS IN THE UNITED STATES

As a result of an approach by the Secretary of the Commission to ECA in Paris, and on the recommendation of the OEEC on a motion of the Secretariat of the OEEC Timber Committee, in 1950 ECA sent a mission of experts to the U.S.A. to study the American poplars.

This Mission consisted of Messrs. Houtzagers, Herbignat, Rol and Wettstein, Delegates to the International Poplar Commission, and others. Prof. Houtzagers was elected Chairman of the Group of Experts.

The report of the Mission has now been published by the OEEC. Prof. Houtzagers commented on the conclusions before the Commission and laid emphasis on the assistance given to the Mission by the American specialists, especially by Dr. Schreiner, and on the cooperation established between them.

Dr. Schreiner supplied some data on the work now being carried out in the United States, and illustrated his account with slides.

On the occasion of Dr. Schreiner's talk, the question of how to space seedlings in a plantation came up again and the Commission once more stressed the purpose to be achieved, namely, to supply industry with the products it needs.

After having thanked Dr. Schreiner for the documentation and information provided, the Chairman pointed out that, with the assistance of the American specialists, the Commission could continue to work toward this particular objective, namely, to increase production in order to meet industrial requirements.

X - FUTURE ACTIVITIES OF THE COMMISSION

The Commission took due note of the document drafted by the Secretariat (FAO/CIP/45) concerning the future activities of the Commission, and approved the general conclusions.

In particular, the Commission, which in a previous recommendation had already decided to extend its studies to include aspens and white poplars and to intensify its studies on utilization by establishing a Permanent Working Group, DECIDED to promote regional meetings of poplar specialists, if necessary on the occasion of other forestry meetings.

In addition, the Commission in its discussions on its future activities stressed the danger of xylophagous insects, which is increasing with the development and expansion of poplar cultivation. It also noted that it would be advantageous to use the latest statistical methods for the experiments in progress.

Consequently the Commission:

- a) EXPRESSED THE WISH that there should always be entomologists in the National Commissions;
- b) RECOMMENDED the use of the latest statistical methods when making experiments and requested that the methods now in use be submitted at the next meeting for examination by a Working Group.

In conclusion, taking into account the above decisions tending to develop the activities of the Commission in certain sectors (aspen, white poplar, utilization) and to promote regional meetings, and taking into account the transfer of FAO to Rome, the Commission DECIDED:

- a) to meet only every two years from 1953 on, the Permanent Committee continuing to meet annually;
- b) to enlarge the Permanent Committee by raising the number of its members to 9, the Committee being renewable by one-third at each meeting;
- c) to request the Secretary to submit proposals for amending the Statutes, in order that they may conform to the above decisions taken and allow the activities of the Commission to expand.

XI - DATE AND PLACE OF THE NEXT MEETING

The Commission DECIDED to accept the invitation of the German Federal Republic to meet at Baden-Baden in the spring of 1953, and CHARGED the German Delegate with transmitting the thanks of the Commission to his Government.

It was specified that the Fifth International Poplar Congress would be arranged to take place when the Commission met.

XII- PERMANENT COMMITTEE

Considering the decision taken above to enlarge the Permanent Committee, the Commission, pending the adoption of new Statutes, DECIDED to maintain the Permanent Committee in its present form, but to include also the representatives of Sweden, Switzerland and Germany.

It INSTRUCTED the Secretary to call upon the aforesaid countries to appoint a temporary representative until the next meeting.

XIII- ADMISSION OF NEW MEMBERS

Spain was unanimously elected Member of the International Poplar Commission.

Since this country already has a National Poplar Commission, it will only definitely become a Member of the Commission when the National Commission has approved the Statutes and appointed a permanent delegate to it.

XIV - OTHER COMMUNICATIONS AND RESOLUTIONS

1) The Poplar in Yugoslavia: Mr. Pourtet, at present FAO Expert on Reforestation appointed to advise the Yugoslav Government, sent a memorandum on the poplar situation in Yugoslavia to the Secretariat. This memorandum was submitted to the Commission by Mr. Rol, and the Commission decided that it should be left with the Secretariat for distribution to the interested experts.

2) White Poplars in Italy: Mr. Allegri had prepared a paper on white poplars in Italy (document FAO/CIP/51) for the delegates who were to take part in the study tour. Mr. Allegri commented on his report before the Commission, which expressed its thanks for his work: it would be particularly appreciated by the delegates who went on the excursion.

3) The Poplar in the Customs Schedule Nomenclature: Mr. de Vaissière, in the name of the French National Commission, proposed that the poplar should be listed separately in the customs schedule (Annex 4).

The International Poplar Commission took due note of this proposal and drew the attention of the National Commissions thereto, deciding to review the question at the next meeting.

XV - STUDY TOUR AND SPECIAL REPORTS

The Commission expressed its thanks to the Director-General for

Forests in Italy and the President of the "Ente Nazionale per la Cellulosa e la Carta" (National Cellulose and Paper Society) for the splendid study tour and receptions they had organized.

It requested Messrs. Rol, Herbignat and Allegri to draw up a report on the observations made on Identification and Culture, and Messrs. Vivani, Peace and Regnier a report on the Insects and Diseases observed during the tour. These special reports will be appended to the General Report.

Finally, a note by Dr. L. Chianese on the expansion of poplar cultivation in Southern Italy, and which sums up the information given to the members of the Commission on the Study Tour, is also attached to this report.

XVI - GENERAL REPORT

The Commission decided to entrust the Secretary, jointly with the Chairman and Vice-Chairman, with the drafting of the General Report.

General Report - ANNEX 1LIST OF PARTICIPANTS

Chairman : Prof. Ph. GUINIER
 Vice-Chairman: Prof. Dr. G. HOUTZAGERS
 Secretary : Mr. R.G. FONTAINE

Mr. M. LELOUP, Director of the Forestry Division, represented the
 Director-General of FAO

DELEGATES -a) Member countries:

AUSTRIA : Mr. W. WETTSTEIN, Professor
 Mr. H. LIPPERT, Director of the Paper and
 Cellulose Industry.

BELGIUM : Mr. A. HERBIGNAT, Inspecteur des Eaux et
 Forêts
 Mr. G. MOSCATELLI, Directeur "Unione
 Agricolo-Forestale", Pisa.

FRANCE : Mr. Ph. GUINIER, Directeur honoraire de
 l'Ecole Nationale des Eaux et Forêts
 Mr. R. ROL, Sous-Directeur de l'Ecole
 Nationale des Eaux et Forêts
 Mr. J. de VAISSIERE, Conservateur des Eaux
 et Forêts.
 Mr. R. REGNIER, Directeur de Recherches
 agronomiques (INRA).
 Mr. A. JAVIS, Directeur de la Manufacture
 d'Allumettes de Saintines (Oise)
 Mr. J. CHARDENON, Contrôleur Principal du
 S.E.I.T.A.

WESTERN GERMANY : Mr. F.W. BAUER, Professor at the University
 of Friburg.
 Mr. Dr. F. WECHSELBERGER, Landforstmeister

ITALY

- Mr. G. SACCHI, Director-General of Forests
Mr. A. PAVARI, Director of the "Stazione Sperimentale di Silvicultura" Florence.
Mr. L. FUNICIELLO, Inspecteur Supérieur des Forêts.
Mr. G. PICCAROLO, Director of the "Istituto di Sperimentazione per la Pioppicoltura", Casale Monferrato.
Mr. G. GIORDANO, Professor of Wood Technology at the University of Forestry, Florence.
Mr. E. ALLEGRI, Deputy Director of the "Stazione Sperimentale di Silvicultura", Florence.
Mr. W. VIVANI, Phyto-pathologist at the "Istituto di Sperimentazione per la Pioppicoltura", Casale Monferrato.
Mr. L. CHIANESE, Directeur Agricole et Forestier de l'Organisation Nationale pour la Cellulose et le Papier, Rome.
Mr. Dr. G. LENSI, Inspecteur Principal des Forêts.

NETHERLANDS

- Mr. G. HOUTZAGERS, Professeur à l'Université Agricole de Wageningen.
Mr. F.W. BURGER, Ingénieur en Chef du Service forestier de l'Etat, Bilthoven.
Mr. N. Van der KOLK, Wood technologist, Paper Mills.
Mr. J.L. BIENFAIT, Director of the "Houtinstituut T.N.O.", Delft.

SWITZERLAND

- Mr. E. GAILLARD, Inspecteur fédéral des Forêts.

SWEDEN

- Mr. H. JOHNSON, Director of the Swedish Forest Tree Breeding Institute.

UNITED KINGDOM

- Mr. T.R. PEACE, Forest Pathologist, Forestry Commission.

b) Non-Member countries:

- FINLAND : Mr. R.O. SARVAS, Professor of Silviculture,
Forest Research Institute.
- GREECE : Mr. PANOS SKALTSAS, Inspector of Forests.
- SPAIN : Mr. SANZ--PASTOR FERNANDEZ de PIEROLA,
Ingeniero Patrimonio Forestal del
Estado.
Mr. M. NAVARRO, Ingeniero Patrimonio
Forestal del Estado.
Mr. F. JALME FANLO, Ingeniero, Jefe de
Brigade, Patrimonio Forestal del
Estado.
- SYRIA : Mr. ZAKARIA SIBAHI, Secretary to the Syrian
Legation in Rome.
Mr. NAAMANI ZOUHEIR, Attaché to the Syrian
Legation in Rome.
- UNITED STATES : Mr. E.J. SCHREINER, Forest Geneticist,
U.S.Forest Service, Northeastern
Forest Experiment Station.

OBSERVERS --

INTERNATIONAL UNION OF FOREST RESEARCH INSTITUTES:

Mr. A. PAVARI, Vice-Chairman of the Union.

General Report - ANNEX 2

THE TRANSMISSION OF POPLAR DISEASES FROM ONE COUNTRY TO ANOTHER

(Report of the Working Group set up at the Fifth Session of the International Poplar Commission, 1951.)

by:

Messrs. R. ROL (France), H. Van VLOTEN (Netherlands) and
T.R. PEACE (Great Britain).

The dangers inherent in the transmission of poplar, and particularly poplar cuttings, from one country to another, and especially from one continent to another, have been stressed by Dr. G.F. Gravatt of the United States Division of Forest Pathology, in his paper on "The Danger of Spreading Diseases on Poplar Cuttings", which was presented at the 5th International Poplar Congress in 1951. It is only necessary here to mention a few special points. Firstly, there are several serious diseases of poplar, in particular the cankers caused by Septoria musiva and by Pseudomonas syringae f. sp. populea, which have only a limited distribution and could presumably do damage over a much wider area if spread on cuttings or other material. Secondly, fungi such as the poplar rusts (Melampsora spp.) are known to vary from continent to continent, so that the transmission of these fungi from one continent to another might result in clones previously resistant being attacked by the newly introduced species or strain of the fungus. It may well be found that fungi of almost universal distribution, such as Dothichiza populea, have strains in different countries, so that its introduction from abroad,

even into countries already infected, might result in increased damage. Finally, the propagation of poplar on a clonal basis means that if a disease or pest is introduced, to which one particular clone is susceptible, all the trees of that clone will re-act to the disease or pest in a like manner, and losses are bound to be severe. All these reasons make it highly desirable that great care should be taken, lest by allowing the easy transmission of poplar cuttings from one place to another, we eventually produce a universal distribution of all poplar pathogens.

At the moment it would obviously be easier to restrict the transit of cuttings from one continent to another, than from country to country in the same continent. For this reason separate proposals are submitted for these two cases. It should be made clear that in the suggestions made below, 'Poplar' is intended to apply to all members of the genus Populus.

I. Transmission of Cuttings and Plants from one Country to Another in the Same Continent.

In practice, so far as the International Poplar Commission is concerned, this means between countries in Western and Northwestern Europe. It would probably be reasonable to regard Austria, Belgium, Denmark, France, Great Britain, Italy, Luxembourg, the Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and Western Germany as a continental unit for this purpose. There are obviously strict limitations on the sanitary measures that can be taken without hampering legitimate trade in cuttings and plants. Any extension of the regulations already in force for some countries with regard to certified stocks of poplar is likely to have a good effect, since these stocks will normally

be of varieties resistant to bacterial canker and are likely to be well looked after in the nurseries, and therefore kept free of diseases and pests. There is no doubt that certification of poplar stocks is one of the most valuable aids in the exchange of disease free poplar material.

In great Britain licences are required to import poplars. In practice these are normally granted for small or large quantities of poplar known to be suitable for timber production and resistant to bacterial canker, provided they are certified true to name by a Government agency in the exporting country. They are also normally granted for small quantities of ornamental varieties. The licences have two distinct values as regards sanitation. Firstly, they provide an automatic record of all imports and their destination, and secondly, they can be used to control imports and thus enforce some of the regulations for intercontinental traffic suggested in Section II.

It is suggested that the attention of the nursery trade should be called to the importance of sanitation in regard to poplars. Exporting nurseries should be asked to see that all plants and cuttings sent to other countries are healthy, and that all diseased poplars are removed from the nursery and its neighbourhood. Importing nurseries should be asked to keep plants or cuttings received from other countries under observation for one to two years and to destroy any that show evidence of serious disease. If any disease or pest not generally distributed in Europe (Dothichiza populea is an example of a generally distributed disease), is known to exist in the neighbourhood of an exporting nursery, the exporter should be asked to warn the person receiving the plants, so that a special look-out can be kept for the disease in question on the imported plants. If possible these precautions should be supported, and to some extent enforced, by the Plant Pathological Service of the

country concerned. This would be one means of bringing them to the notice of the nursery trade; another useful method would be through the medium of the trade papers; all possible means should be used.

II. Transmission of Cuttings and Plants from one Continent to another

Here it should be possible to introduce much more stringent regulations without serious damage to trade, and the much greater risk involved, particularly as regards the possibility of bacterial canker reaching America or Septoria canker reaching Europe, would certainly justify their introduction. The following recommendations should if possible be made a part of the quarantine legislation of Member countries, but, where this is not possible, persons concerned should be asked very strongly to adopt them on a voluntary basis.

1. Exchange of material should take place through a strictly limited number of channels, preferably through institutions, persons or firms nominated by the National Poplar Commissions.
2. Exchange of material should be limited to outtings, grafting material, seed and pollen.
3. The number of outtings of any one clone exported in one year to one recipient should be limited to fifteen.
4. Each National Commission should keep a central record of all exports and imports, naming the clone concerned, the place of origin and the name of the person and Institution receiving the outtings.
5. The nursery where the outtings or other material are produced, or the trees from which they are collected, and any place where they are stored, should be at least one kilometre from any poplar suffering from bacterial canker or from Septoria musiva.
6. The plants in the nursery, where the cuttings are produced, should be sprayed or dusted at least twice with a general purpose fungicide, and at least twice with a general purpose insecticide, during each season.

7. All cuttings and grafting material should be surface sterilized before dispatch with materials capable of destroying fungi and insects. (It is hoped to be able to make definite recommendations on this matter in the near future as a result of work being carried out in the United States by Dr.A. Waterman). The ends of the cuttings should be wax covered to prevent the sucking of air and spores into the vessels.
8. On receipt all cuttings should have one cm. cut off from each end and burnt, and should then be re-sterilized.
9. All cuttings received from another continent should be grown for at least two years in a nursery, not less than 0.75 km. from any home grown poplar trees or normal poplar nurseries.
10. Any person receiving cuttings from another continent should not pass on any material to another country in his own continent, until the plants, resulting from the cuttings, have been grown for at least two years, i.e. until they can be declared reasonably free of imported diseases and pests.

It is suggested that these recommendations might be submitted to certain non-member countries likely to be concerned, in particular to the United States, Canada and the Argentine Republic.

General Report - ANNEX 3

REPORT OF THE WORKING GROUP ON THE UTILIZATION OF POPLAR WOOD
(23 May 1952)

Convened by the Chairman of the International Poplar Commission, the Working Group on the Utilization of Poplar Wood met in Rome on 23 May 1952.

The following experts attended this meeting:

- Mr. Guinier, Chairman of the International Poplar Commission
- Mr. Fontaine, (FAO) Secretary of the International Poplar Commission
- Mr. Giordano, (Italy) Chairman of the Working Group
- Mr. Janis, (France) Rapporteur
- Mr. Bauer, (Germany)
- Mr. Bienfait, (The Netherlands)
- Mr. Chardenon (France)
- Mr. Gaillard (Switzerland)
- Mr. Moerath (FAO)

Mr. Giordano and Mr. Janis were re-elected as Chairman and Rapporteur respectively.

The meeting had been convened in order to facilitate an exchange of views and information on the first industrial tests on the use of poplar wood correlated with laboratory tests, as recommended during the course of the Fifth Session of the International Poplar Commission.

Observations made about the test form.

Mr. Bienfait made some remarks on the method of sampling and on the number of trees for experimentation. He stressed the fact that the coloured reactions which had been suggested for the study of tension wood have not always been successful. He also added that he thought the best

thing he could advise would be samples of 2 x 2 cm. for bending tests. In conclusion, he gave the results of experiments carried out in his country.

Mr. Gaillard pointed out that it had not yet been possible to obtain a sufficient number of samples in his country to carry out enough tests. He hoped, however, to be able to publish the results of micrographic studies by the end of the year.

Mr. Bauer, Germany, declared that a National Commission had only recently been set up in his country and as a result it had not yet been possible to make the necessary arrangements for carrying out tests.

Mr. Janis and Mr. Chardonon imparted that a number of empirical tests had been made in France in accordance with the first version of the test form. These works resulted in a certain uniformity in the methods used by the different experimenters. On the other hand, the "Laboratoire National d'Essai de Bois" proceeded with standardized technological tests. On comparing results between empirical and standardized tests, it appears, at least as far as the study of black poplar is concerned, that they have many points in common. Mr. Chardonon found a correlation between suitability of the wood for peeling and its behaviour as regards the shearing test. These observations naturally encourage the adoption of standardized methods for studying the suitability of wood for peeling.

Experiments have been carried out in France by a "Hardwood Committee" on the use of poplar wood in paper and cardboard manufacture. The encouraging results achieved by Mr. Villars form the subject of a special communication.

No Belgian delegate being present, the Working Group took note of the reports presented by the Belgian National Commission called

"Utilization of the Poplar Wood" by Mr. Herbignat and "Technological Tests on two types of Poplar Wood" by Messrs. Fouarge and Sacre.

After taking cognisance of the remarks made about the proposed form by the Belgian Commission on Poplar Wood the members of the Working Group disagreed with the dimensions and methods advocated in the Belgian report, and did not think that they would be able to adopt in their country the differentiation of diameters which had been proposed.

Mr. Giordano stated that tests carried out in Italy during the past year have concerned samples of 8 different clones, all cultivated on the same station. It has, however, not been possible to complete these experiments made in close collaboration with industry and the results will therefore not be produced until the next meeting. It has, nevertheless, been possible to observe that physical and mechanical tests do not give very different evaluations of the wood qualities, whilst industrial tests are of great importance and prove that it is absolutely necessary to study this problem in close collaboration both with industry and silviculture: for certain defects which can reduce the maximum industrial yield can be avoided by using rational methods of cultivation. He pointed out, moreover, the importance of carrying out experiments on white and black poplars and on aspens, in order to determine the properties of these woods.

As a result of these different observations, the Working Group suggested that the following modifications should be made to the form: these modifications are based on the text of the report and the form adopted by the Working Group in 1951.

I - Selection and Number of samples

The three series of samples will be taken only if the trees under study are likely to be used in the three different ways envisaged. Samples will be taken, therefore, in accordance with the proposed uses of the trees, on condition that it is stated precisely where and how the samples have been taken. Branches must always be excluded, even in the case of paper manufacturing tests.

II- Laboratory Tests

Chemical Analysis : In the countries where colour reactions have not given good results as tests for tension wood, other methods could be studied.

Micrographic Studies : In consideration of the importance which these studies have particularly for paper manufacturing tests, it is suggested that the sample should be taken from 5 to 8 metres above ground level, and in any case, away from the point at which the branches join the trunk. The distance between annual rings should be measured in the sample and not at ground level. The consideration of the "pouvoir feutrant" should not be included in a micrographic study.

The enlargement of microphotos must be between 50 and 100, except for particular detail.

Physical and mechanical studies : For the study of strength, samples of 2 x 2 cm. should be preferred to those of 5 x 5.

III- Industrial Tests

The Chapter, "General Characteristics" could be sub-divided into two paragraphs:

A - Characteristics of the clone in the Station under consideration

- form of the trees
- frequency of frost-shakes
- frequency of ring-shakes
- collar swelling
- etc.

B - Characteristics of the sample under consideration

The sub-divisions will be inserted here which were originally planned in the paragraph "General Characteristics" of the form. In the description b) "Appearance of cuts taken", in the fourth line, the description of knots should be left but that of ring-shakes and other defects deleted. Add one line: "presence of tension wood visible to the naked eye".

In the machining test entitled "Suitability for gluing", state glue employed, conditions under which gluing was carried out, and moisture content of the wood.

Peeling tests should be made on wood with a moisture content of 12%.

In the report on paper manufacturing tests state whether the possible presence of tension wood noticeably modifies the yield and quality of paper. Appraise the "pouvoir feutrant" of the sample.

The Working Group would point out for the attention of delegates the importance of carrying out these tests on samples taken from black poplars as well as from white poplars and from aspens.

It stresses once again the necessity of continued collaboration between specialists in poplar cultivation and the poplar using industries.

It insists on the necessity of following up the suggestions made and wishes expressed by the International Commission at its last session, both as regards the setting up of small committees composed of at least one representative of industry and one of the laboratories, within the National Commissions; and as regards the presence of representatives of wood users in the delegations to the International Poplar Commission.

General Report - ANNEX 4

PROPOSAL of the FRENCH NATIONAL POPLAR COMMISSION
that a special item for Poplar be introduced in customs schedules.

Customs schedules include the poplar (black poplars and white poplars, including aspens) under miscellaneous woods.

The French National Poplar Commission has requested that the International Commission take action on a proposal for the separate listing of this species in customs schedules.

This amendment is of international import.

Separate classification of poplars (black and white poplars, including aspens) would serve a dual purpose.

As a result of the work of the International Commission and the action of the National Commissions, new international trends have evolved for poplar products. As matters stand, however, it is not possible to ascertain the exact extent of the contribution of this species to world markets. Listing poplars separately would foster the expansion of trade in this species, especially when trade agreements are concluded.

The considerable expansion of poplar planting in nearly every country will only be lasting in so far as producers supply the market with the products needed.

The International Commission can only effectively guide poplar producers and users if it can follow in detail the imports and exports of poplar wood.

In conclusion, the measure advocated by the French National Poplar Commission would tend to:

- 1) increase the marketing facilities at the international level,
- 2) enable production to be adapted to effective demand.

General Report - ANNEX 5

LIST OF THE DOCUMENTS SUBMITTED AT THE 6th SESSION

- "The Transmission of Poplar Diseases from One Country to Another", by R.ROL, H.van VLOTEN and T.R.PEACE (Doc.FAO/CIP/38).
- Provisional Agenda of the 6th Session. (Doc.FAO/CIP/39)
- "A Study of Aspens on a Regional Basis", by Dr.C.HEIMBURGER. (Doc.FAO/CIP/40-Rev.1).
- Report on Aspen Poplars in Great Britain, by T.R. PEACE and J.JOBLING. (Doc. FAO/CIP/41).
- Annual Report of Work on Poplars and Poplar Cultivation in Great Britain - 1951, by T.R. PEACE and J. JOBLING. (Doc. FAO/CIP/42).
- Note on the Activities of the Commission and the Secretariat Since the 5th Session. (Doc. FAO/CIP/43).
- Note du Secrétariat sur les Séances de la Commission, l'Excursion et le Séjour à Rome des Délégués. (Doc. FAO/CIP/44) (French only).
- Note by the Secretariat on the Future Activities of the Commission. (Doc. FAO/CIP/45).
- Report on the Activities of the French National Poplar Commission, submitted by R. ROL. (Doc. FAO/CIP/46).
- "Brief Review of the Technical and Laboratory Investigation of Poplar Timber - 1949-1952", by Prof.Dr.G. HOUTZAGERS and Ir. F.W. BURGER (Doc/FAO/CIP/47) (English only).
- Report on the Activities of the Austrian National Poplar Commission, submitted by Dr. W.WETTSTEIN. (Doc. FAO/CIP/48).
- "Sélection et Multiplication du Tremble (Populus tremula L.)", Note submitted by R.ROL (Doc. FAO/CIP/49 and FAO/CIP/49 Add.1)(French only).
- Note sur l'Accroissement de Différents Types de Peupliers, présentée par R. ROL. (Doc. FAO/CIP/50). (French only).
- "Espèces et Variétés Indigènes du Genre Populus en Italie", by E. ALLEGRI (Doc. FAO/CIP/51). (French only).
- Note of the Secretariat on the Study Tour. (Doc. FAO/CIP/52).

- "Utilisation du Peuplier - Essais de Laboratoire et Observations au Déroulage en France", by Mr. CHARDENON. (Doc. FAO/CIP/53) (French only).
- "Utilisation du Peuplier en Papeterie - Etudes faites en France", by A. JANIS. (Doc. FAO/CIP/54) (French only).
- Rapport d'Activité de la Suisse, by F. FISCHER and E. GAILLARD. (Doc. FAO/CIP/55) (French only).
- Report of the Working Group on the Utilization of Poplar Wood. (Doc. FAO/CIP/56).
- "Un Nouvel Ennemi des Peupliers en Europe: Hyphantria cunea Drury (Lepid).", by Dr. R. REGNIER. (Doc. FAO/CIP/57) (French only).
- Rapport sur l'Activité de la Commission Nationale Italienne du Peuplier, by G. SACCHI. (Doc. FAO/CIP/58) (French only).
- Report on the Activities of the National Poplar Commission in the Netherlands-1951-1952, by Prof. Dr. G. HOUTZAGERS and F.W. BURGER. (Doc. FAO/CIP/59).
- "Hybrid Poplar Research at the Northeastern Forest Experiment Station (USA)", by Ernest J. SCHREINER. (Doc. FAO/CIP/60) (English only).
- "Parasites des Peupliers en France", by Mr. JOLY. (Doc. FAO/CIP/61) (French only).
- "Surface Sterilization of Poplar Cuttings", by Alma M. WATERMAN and Kenneth F. ALDRICH (Ref. FAO/52/5/2708) (English only).
- "The Vegetative Propagation of Poplar by (1) notch-grafted (stem) cuttings and (2) bent shoot cuttings", by I. PODHORSKI. (Ref. FAO/52/5/2619). (English only).
- "L'Hybridation des Peupliers en URSS", by A.V. ALBENSKI. (Ref. FAO/52/5/2709) (French only).
- Rapports présentés par la Commission Nationale Belge du Peuplier. (French only).
- "Atti presentati alla IV Sessione della Commissione Nazionale del Pioppo" (Italian only).

Note: 1) Request can be made to the Secretariat of the International Poplar Commission for documents bearing the reference "FAO".

2) Documents which are not specified as being in either French or English exist in both these two languages.

II - TECHNICAL REPORTS

- a) Report on Poplar Identification and Cultivation in Southern Italy (Observations made during the Study Tour, 29-31 May 1952), by Messrs. R. ROL, A. HERBIGNAT and E. ALLEGRI.

- b) Report on Poplar Diseases and Pests Observed During the Study Tour in Southern Italy - 29-31 May 1952, by Messrs. T.R. PEACE, R. REGNIER and W. VIVANI.

- c) Notes on the Development of Poplar Growing in Southern Italy, particularly in the Salerno Region, and Work of the "Ente Nazionale per la Cellulosa e per la Carta" in this zone, by Mr. L. CHIANESE.

REPORT ON POPLAR IDENTIFICATION AND CULTIVATION
IN SOUTHERN ITALY

(Observations made during the Study Tour, 29-31 May, 1952)

by

Messrs. R. ROL, A. HERBIGNAT and E. ALLEGRI

The field trip organized by the Forestry Department of the Ministry of Agriculture and Forestry took place in Campania, with the object of providing an opportunity to study a particular and little known aspect of Italian poplar cultivation.

Poplar cultivation in Southern Italy encounters serious drawbacks to its development, owing to environmental conditions and the climate in particular. The climate is characterized by mild winters and very hot summers; the rainfall is usually concentrated in a small number of days (in the period end of autumn-winter) and is followed by a long period of drought (from spring to autumn); some sites (especially in flat country) are also wind-swept. For this reason, fungus diseases are less widespread than in the Plain of the Po, while, on the other hand, animal parasites find a more favorable environment, not having to suffer from the winter cold.

Campania has also other very special environmental conditions; a very fertile soil (largely of volcanic origin); great light intensity, due to the great purity of the atmosphere and the greater height of the sun above the horizon; and also the fact that irrigation is possible in many localities. The combination of these favorable factors has made it

possible to develop an intensive agriculture, which is remarkable for cultivation at several levels, where wood and fruit trees and highly productive herbaceous plants are associated one above the other. The density of the tree plantings is such that one has the impression of being in a real forest rather than in a field planted with trees.

In this region, from the standpoint of poplar cultivation, a distinction must be made between the old plantations (most frequently consisting of native black poplars), on which the vines climb in the fields, or in rows along the roads, and the new plantations of Euramerican hybrids, along ditches and alongside roads and fields, sometimes used as windbreaks or even forming true poplar stands, especially in recently "reclaimed" areas.

The native black poplar (Populus nigra L.) continues to be today of great importance. It is chiefly utilized for the purpose of serving as a live support for vines (cultivated in festoons, sometimes very high above the ground). Formerly it was also used to supply industrial wood and even timber for building (in many old houses in Naples one can still see today beams of black poplar derived from field plantations); moreover, during the summer, the lowest branches are stripped of their leaves, which are used as green fodder for livestock.

The two forms of black poplar most used for these field plantings were the var. caudina (Ten.) and the var. neapolitana (Ten.) both characteristic of Southern Italy (and also to be found in the Balkan peninsular and a part of the Near East). These two forms are distinguished by their straight habit, sometimes very straight, resembling that of the Italian poplar "pioppo cipressino", a form very frequently used in roadside plantings.

In row plantings one finds both old black poplars of fastigate habit, either Populus nigra L. var. italica du Roi, or old hybrids between black poplars of fastigate habit (perhaps P.n. var. italica or P.n. var. caudina) and poplars of American origin introduced a long time ago by botanists or amateur dendrologists. These hybrids are recognized by the presence of small glands at the base of the leaf blade.

In some places (particularly in the Vallo Caudina between Benevento and Naples) there still exists among the peasants the very ancient tradition, perhaps of pre-Roman origin, of planting, at the birth of each daughter, a hundred poplars alongside the fields in order to provide her with a modest dowry when she marries. The great defect of all these plantings is that they are always too close (a meter and even less between the trees); the stems are consequently too slender and cannot attain large diameters. In all these plantations local types of black poplar are still used.

Still keeping to the old methods (with a tendency to plant too closely), recent plantings have been made with Euramerican hybrids, unfortunately ill-defined and designated under the comprehensive name of "canadesi" (Canadian poplars), in reclamation areas, along canals and in the ancient moats around the city of Capua.

In the "Bonifica del Volturno" (Volturno land reclamation district) we also saw windbreaks formed by poplars (in this case rightly planted close together) in a single row alongside the roads, and in several rows along the drainage ditches.

Throughout Southern Italy the Ente Nazionale per la Cellulosa e per la Carta (National Organization for Cellulose and Paper) is conducting

an intensive publicity campaign, setting up nurseries, distributing young poplars of selected clones and disseminating technical rules with a view to a more rational cultivation.

We visited the Eboli nursery of the E.N.C.C. (in the province of Salerno), where the clones selected by the Istituto di Sperimentazione per la Pioppicoltura (Poplar Cultivation Experiment Institute) of Casale Monferrato, and which seem to be the most suitable, are being cultivated (Clones I-154, I-214, I-262, I-455, etc.). In this nursery, where environmental conditions are very favorable and cultivation well cared for (high temperature, accurate working of the soil, abundant manuring, frequent irrigation), plants of such dimensions can be raised in a single growing season, that they can be planted out right away. 70% of the young plants reach a height of 4 to 6 meters, and a girth of 8 to 12 cm., at the height of 1 meter above the ground (approximately 20% reach a girth of 12 to 14 cm.). Hence it is possible to speed up the production of young poplar plants fit for planting out and it also becomes superfluous to transplant them while in the nursery for one or two years as is done in the Plain of the Po.

As regards the species observed during the trip, the majority of the trees belonged to the Populus nigra L. species and to intermediate types between the var. caudata (only one specimen with the typical features of this variety, according to the descriptions given by Dode and A. Fiori, was seen between Maddaloni and Montesarchio, in the province of Caserta) and the var. neapolitana (no specimen with the typical features of this variety was encountered). Several poplars with a fastigiate habit (planted alongside roads) looked like Euramerican

hybrids, but a predominance of the European nigra type could be observed.

The white poplar (more likely to be found along watercourses) was rarely encountered; some intermediate types between the various varieties characteristic of Southern Italy were however seen, but were hard to identify.

Five or six aspens only were noticed along the road from Castellamare to Monte Faito.

As regards selected clones of Euramerican hybrids, it is still too early to make any comment, as their introduction is much too recent.

REPORT ON POPLAR DISEASES AND PESTS OBSERVED DURING
THE STUDY TOUR IN SOUTHERN ITALY, 29-31 May, 1952.

by

Messrs. T.R. PEACE, R. REGNIER and W. VIVANI.

There are few poplar plantations in Southern Italy, where land improvement and afforestation operations are under way. The remarks that follow, therefore, often refer to single trees or small stands.

Pests:-

Melasona populi L. - Sporadic attacks of this insect occur with the well-known symptoms. In the nurseries in the Paestum area it is rather common, but not any more so than in Northern Italian nurseries where direct control measures have to be taken almost every year - measures which are very successful.

Phyllosecta sp. - Sporadic attacks as in the case of Melasona.

Dicranura vinula L. - Some larvae are found in the Paestum area nurseries but do very little damage.

Trochilium apiforme Cl. - Some attacks by this insect also occur in the nurseries mentioned above.

Cladobius populneus Koch - Sporadic colonies of Cladobius with many aphids, parasitized, probably by Aphidius.

Tettigoniella viridis Jac. - Already reported in Italy on the poplar, this leaf hopper found in the Paestum area is however not common; as one of us had seen, it has caused some damage in France in the Marais Poitevin (Niort area).

Pemphigus sp. - We noted many galls on adult poplars (P. nigra var. caudina Ten.) in the Caudina Valley (Arpaia).

Wood-eating insects:

Attacks by wood borers observed almost everywhere seemed to us to be fairly light and did not appear to be more frequent than in Northern Italy, visited previously.

Generally speaking, the poplars appeared to be in a fairly healthy condition: we did not find the poplar aphid (Phloeomyzus passerinii Sign.) which is such a threat to Northern Italian poplar plantations, especially to those forms allied to P. deltoidea f. virginiana Foug. These poplars are so susceptible that, particularly between the 5th and 8th year of growth, colonies of this aphid forming a kind of sleeve, succeed in killing the part of the bole or the branches above the place attacked. The absence of this aphid should be stressed, since according to Theobald, it comes from Egypt.

One of us had previously had the opportunity of visiting several areas further South, including the islands, but had never seen this insect although its presence had been reported, at least once, in the vicinity of Naples. The question arises whether the absence of this insect in the areas visited is due not so much to unfavorable climatic conditions as to the fact that the poplar is not yet widely grown. It would seem that in Northern Italy the insect follows the development of poplar cultivation. Actually only the parthenogenetic wingless forms of this aphid can live and breed, at least in Northern Italy.

This insect finds it difficult to travel long distances where no poplars grow or to live on either lone trees or small stands on very sunny sites. It is to be feared that the future intensification of poplar-growing in the areas visited, whether in stands or in row plantings, will facilitate the spread of the aphid throughout Southern

Italy. For this reason it would be wise to choose aphid-resistant types of poplars. We may add that the nurseries of the "Ente Nazionale per la Cellulosa e per la Carta" which we visited have stock grown from wellknown clones, all of which are guaranteed resistant to the poplar aphid by the Italian National Poplar Commission.

Fungi and Bacteria:-

Nothing sufficiently interesting to be included in this report was noticed except the absence of "Spring leaf-fall" (Pollaccia elegans Serv.) and "poplar bacterial infection" ^{1/} These two diseases, which have obliged Northern Italian poplar-growers to give up all types of poplar allied to P. deltoides f. virginiana Foug., including P. euramericana f. robusta, are so virulent that in new plantations clones recommended by the Italian National Poplar Commission have been used. These new types have shown, at least in nursery tests and compared to old forms, greater vigor and more resistance to the drying action of

^{1/} Italian phytopathologists have not taken a definite stand concerning a name for this disease. Ciferri calls it "bacterial canker of the poplar" (records of the National Poplar-Growing Congress - Pavia, 25-26 April 1951). Servazzi and Vivani have called this disease "bacterial infection" because no true cankers have ever been observed. On the other hand, it is admitted that the term "bacterial infection" is indefinite. Schizomycetes are certainly involved, but their culture and study are very difficult and it has not yet been possible to identify the parasite. Concerning this, Peace rightly notes: "It should be noted that this disease is quite distinct from the bacterial canker due to Pseudomonas syringae forma populea, which occurs in Northwest Europe. In the former cankers are only of annual duration and heal over, leaving nevertheless damaging cavities in the wood, whereas the so-called "bacterial cankers" are perennial, spreading from year to year and causing dieback or even death".

wind, which in Southern Italy is one of the chief adverse factors 1/.

The satisfactory condition of the trees was confirmed by our examination of the poplar wood in the yards of the paper mill (S.A. Cartiere Meridionali) at Isola Liri; no T-shaped black spots characteristic of wood damaged by bacterial infection were noted nor were there many galleries of wood-eating insects. The wood examined came from poplars in the vicinity and from the Volturno Valley, two regions of Southern Italy where industrial poplar-growing has made a good start.

1/ G. Quattrocchi and V. Vivani - Experimental poplar-growing in Central and Southern Italy. Supplement to "Agricoltura Napoletana" (Neapolitan Agriculture) No. 7-8, July-August 1952.

NOTES ON THE DEVELOPMENT OF POPLAR GROWING IN
SOUTHERN ITALY, PARTICULARLY IN THE SALERNO REGION

and

WORK OF THE "ENTE NAZIONALE PER LA
CELLULOSA E PER LA CARTA" IN THIS ZONE *

by

L. CHIANESE

A few years ago, on the occasion of the Second International Poplar Congress, many of the delegates visited part of Northern Italy - Piedmont and Lombardy, along the river Po - and thus had the opportunity of studying poplar cultivation in the richest and most highly industrialized plain of Italy.

Today, after crossing the Itri mountains and before reaching Formia, we enter Southern Italy. From Battipaglia southward lies that part of the territory which the Italian Government is resolved to rehabilitate and transform by applying agrarian reform, and through the activities of the "Cassa del Mezzogiorno" (fund for the development of Southern Italy) and the "ConSORZI di Bonifica" (land reclamation and improvement consortia); we are, therefore, in a region entirely different from the rest of Italy. Here all sorts of difficulties are met with: the social problem created by the over-population of rural centers has to be solved; and also that due to bad hydro-geological conditions which are responsible for malaria. These conditions were brought about by deforestation in the Middle Ages and by damage due to uncontrolled grazing. There is also the climatic problem characterized by heavy rainfall of a few days' duration alternating with windy periods and prolonged drought during

* These are the notes of Mr. Chianese's statement made during the study tour of the International Poplar Commission, 29-30-31 May, 1952.

the spring and summer.

These factors, which are unfavorable to agricultural development and industrial progress, have been tackled and plans for improving the situation in so far as is possible, are being implemented. Wherever it has already been possible to rehabilitate areas the results have been unexpectedly successful, as you will see on visiting the Sele Land reclamation project,

You will, in fact, see the highest crop yields in both quantity and quality. The appearance, vigor, vitality, consistency, hardiness, and foliage of the plants are far better than in the rest of Italy and in many European countries. In this region we find the finest tobacco, the best tomatoes and the most delicious fruit.

To return to the poplars, it may be noted that they too feel the effect of these special conditions. In this district the poplar is not properly cultivated. You, who are experts, will notice the mixture of species, as, for instance, in that fine avenue of barely fourteen-year old poplars starting just out of Battipaglia - the Salerno-Reggio Calabria highway. The cuttings were supplied by the "Ente Nazionale per la Cellulosa e per la Carta" at a time when selection, genetics and cultivation studies were neglected, and when the International Poplar Commission, which has and will continue to contribute so greatly toward solving this important and difficult problem, had yet to be set up.

Unlike Northern Italy, fungus diseases are here rare and do but little damage, but Fungi cannot in fact thrive and multiply in a dry climate. The spring leaf-fall caused by Pollacea elegans Serv., and the poplar canker (Dothichiza populea Sacc.), to mention the diseases which so severely damage poplar growing in other regions of Italy, are unknown here.

On the other hand, the trees are attacked by insects (especially borers) and in fact a number of technicians maintained that this area was not suitable for the development of rational poplar growing. This is not true. If properly identified clones are planted and given preventive treatment in the nursery for the first few years, the success of the subsequent plantations will be ensured. This work, however, must be entrusted to specialized technicians and diligently pursued during the growth of the plants.

Rational poplar cultivation was started in this region in 1950 by the "Ente Nazionale per la Cellulosa e per la Carta" which set up a nursery at Eboli (which you will soon be visiting) for the production of Euramerican clones, and established, in collaboration with the land reclamation and improvement consortia, the first poplar plantations like the one on the left of the Sele, the object of our excursion.

You poplar specialists have an interesting field of study: there are many natural Euramerican hybrids, hybrids of the Italian black poplar, many of which can be mistaken for the American black poplars grouped under the name of deltoides.

The Italian black poplar, variety Neapolitan, which you saw along the "Capus-Villa Lirerno" highway, was greatly prized at the epoch of the Kingdom of the Two Sicilies; it was then used for furniture making, construction and for building the warships and trading vessels of the Bourbon Fleet, traditional and valued ally of the British Fleet.

These black poplars - there are still some specimens growing - attained exceptional dimensions; they were planted far apart in the fields and served as supports for grapevines. The vine grown in this

region is still Vitis vinifera europea since it does not suffer greatly from phylloxera (Peritymbia vitifolii F.), and in addition, its development is much greater than that of the American vine. A high grade white grape is produced which was formerly exported to France and used for making wines much appreciated by the French themselves.

The Nurseries

As you will be able to see for yourselves, the development of the young plants in the nursery is not the same as in Northern Italy. Here the cuttings develop directly into young poplars without going through the intermediate, rooted cutting stage. This phenomenon is due to the greatly accelerated biological process which takes place within the plant under the influence of light: the assimilating organ of the plant undoubtedly derives a greater quantity of energy from the sun's rays than in other parts of Italy. The nutrients are dissolved through the action of heat and of the water available to the plant and are more easily assimilated and converted into sap, particularly apt for tissue formation; consequently the growth of the cutting is really astounding.

A cutting 20-30 cm. long, planted in February or March, leaving one bud above ground has reached, in November of the same year, that is, 8 months later, the following stage of development:

a) The root system is well developed, equal to if not better than that of a 1-year plant in the Piedmont or Lombardy nurseries after transplanting from the rooted cutting bed.

b) Increment. 50% of the plants are 4-6 meters high, sturdy, and have a girth at one meter from the ground of 8-12 cm.;

20% have a girth of 10-12 cm.;

and only 30% have a girth of 6-10 cm.

The young plants are irrigated every ten days until the middle of August. Irrigation is then stopped, and in that connection I noted a most interesting phenomenon. The plant, although keeping its leaves, which fall off easily, goes into a dormant stage and terminates almost completely its first growing period. With the first rains, about the end of September, the roots become active again, the old leaves fall, while the dormant buds, which provide the next year's leaves, swell greatly. The roots undoubtedly continue to nourish the stem from the early rains until the end of November, and a considerable increment of the ligneous parts of the plant may be observed during this period. I thus found that, owing to the mildness of the climate, plants in the nurseries in Southern Italy have two, even if incomplete, growing periods in one year.

When the first cold weather begins, about mid-December, the swelling of the buds goes down and only then can the actual growth of the plant be measured, since then, and not before, does it really start the rest period.

Usually, however, even in the nurseries in Northern Italy managed by the "Ente Nazionale per la Cellulosa e per la Carta", the cutting becomes a tree ready for planting out within a year without going through the intermediate rooted cutting stage. This is because long years of experience have taught that, in order to get first class two-year old plants, only a third of the available area should be used as a nursery in rotation, while the remaining two-thirds should be grown to legumes and other herbaceous soil-improving plants.

Land to be used for nurseries must be carefully prepared and the same cultivation methods used as for vegetable gardens. Only with this

attention will the plants grow healthier, stronger, and more disease-resistant, and be able to withstand the adverse conditions they will encounter on the plantation sites.

The pH of the very diverse soils in Italy has a considerable influence on poplar growth. You will realize this when you visit the experimental nursery of the "Ente Nazionale per la Cellulosa e per la Carta" in Rome on your return. This nursery is particularly interesting because on a piece of land the size of a pocket handkerchief, you will find several different types of soil and you will notice from the development of the young plants how differently, but always how well, the poplar grows; this is a confirmation that the poplar adapts itself to the most widely varying soils provided that it has plenty of light and well-aerated soil.

III - MISCELLANEOUS

- a) "Poplar Plantations in Yugoslavia", by
Mr. Jean POURTET.

- b) "Aspen in Finland", by Mr. Risto SARVAS.

POPLAR PLANTATIONS IN YUGOSLAVIA *

by
Mr. Jean POURTET.

Poplars are not comparable with other afforestation species; the very special conditions that govern their use and reproduction, their requirements in minerals, water and growing space and their rapid growth, ally them much more with agricultural and horticultural plants. Consequently, foresters in every country of the world have paid very little attention to these trees which, moreover, grow in the valleys, on land generally belonging to private owners rather than to communities.

In France where it originated and in Italy where it has become very extensive, poplar cultivation was promoted exclusively by private initiative.

Still, the ever-increasing demand for softwoods and the ready use of the poplar for both veneers and woodpulp production have drawn the attention to it of official bodies in many countries of Western Europe and the Near East, while the international congresses organized by the International Poplar Commission assemble delegates from over 42-nations.

Yugoslavia has followed a comparable evolution but there were extremely few plantations before the war; for some years now several

* This is an extract from the report of Mr. Jean Pourtet (FAO Expert) to the Yugoslav Government on rapid growing forest species. It is reproduced here by courtesy of the Yugoslav Government.

forestry officers have studied the documents issued by the International Poplar Commission and compared their contents with the little knowledge they had. Plantations were inspected and nurseries established, but in practice the techniques have not yet been perfected and the choice of types is still unsatisfactory.

Now, unlike what we see in Western Europe, much State owned land along the rivers in the north of the country is covered by a hygrophilous forest association consisting chiefly of Salix species, and is very suitable for growing poplars. Such land along the Danube (Dunav), Sava and Drava, covers about 100,000 hectares; in addition, very large areas in widely diversified regions are inundated. Lastly, there is ample room for row planting of poplars.

Yugoslavia, therefore, has exceptional prospects for promoting poplar growing and of producing, within 25 or 30 years, a timber crop of great value to its domestic wood industry or to its export trade.

I - Spontaneous poplars and willows in Yugoslavia

(A) Section Leuce: This section of the genus Populus comprises the white poplars and the aspen (Populus tremula). I shall disregard the latter which is common and sometimes of very fine habit at the fir zone (Fagetum), because of its difficult reproduction and special ecology.

It is interesting, however, to note the frequency of Populus bachofenii in the valleys of the Deliblatskog Peska dunes in northeastern Serbia near the Rumanian frontier; generally considered to be a hybrid of P. alba L. and P. tremula L., it appeared to me to be much more akin to the latter. The exact classification of this very straight tree remarkable for its fine habit, and slender branches, calls for a very detailed study. It is therefore worth experimenting on a larger scale

with cultivation methods and technological uses.

Attention should be paid to white poplars proper because of their frequency in the valleys where the black poplar can be cultivated, and because of their great wood yield; their classification is very difficult, owing to the existence, on the one hand, of a number of forms of Populus alba L. and, on the other, of many hybrids of this species and P. tremula L. (grouped under the name of P. canescens Sm.). Consequently, they could not possibly be classified accurately from the few brief inspections I made of their sites.

It seemed to me, however, that there were three main groups:

(a) Populus alba L.: Southern form with rather small leaves, slightly lobate even on the long branches, but having a thick white tomentum. It is common in the Vardar valley in Macedonia, mixed with Platanus orientalis. It seeds abundantly on the sandy banks of the river. The trees can attain a fairly large size; I did not see any with very good habit. They receive no care and are only utilized in rural districts.

This form seems to be fairly closely related to the Hispano-Moroccan form P. hickeliana Dode.

(b) Populus alba L.: Variety with very large palmate-lobate leaves on the long branches and with a persistent silvery tomentum even on the leaves of the short branches. It occurs in the upper valley of the Neretva in Bosnia and is widely distributed in northern Bosnia on the banks of the Bosna and Sava: it certainly covers a large part of the valley of this river where it seeds abundantly.

It is often a very handsome tree: technologically it is valued for uses other than carpentry when "red-heart" and "cupshake" are absent.

It is not cultivated.

(c) Populus canescens Sm.: I share the views of the forestry officers (Mr. Podhorski at Zagreb and Mr. Jovanovic at Novi Sad) who studied the poplars, and who link most of the white poplars in the Danube and Drava valleys to this hybrid. Their habit is rather varied, sometimes fair, but occasionally very satisfactory. They are of little value technologically since "cupshake" is common and because of their unsuitability for use in carpentry.

All these white poplars, however, have some value because of their adaptability and, in particular, their remarkable tolerance of drought and peat soil, their vigorous growth and their root sprouting capacity. They can therefore be a valuable source of cellulose.

(B) Section Aigeiros: The black poplars - these occur everywhere in fair numbers, both in the mountain valleys and in the broad river valleys in the Pannonian plain. The species is the typical Populus nigra L. characterized by its relatively small coriaceous leaves, more or less rhomboidal in shape, the branches without suberous edges, its early rhytidome, its tendency to form burls, and the short, dense clusters of spherical capsules on the female trees.

As all species however, and also because of the extent of the area, it shows very appreciable variety and a very wide ecological adaptability.

Many specimens are outstanding in habit and, in particular, remarkably vigorous; on the young trees the bark is smooth and light colored, and there is often 1 or even 1.50 m. between two knots.

I saw some very beautiful trees in the Ibar valley in Serbia where the absence of any cultivated poplar guarantees the purity of the species;

in the valley of the Danube near Apatin and in the Drava valley near Osijek where the black poplar displays a remarkable adaptation to changes in the water level, and lastly in the Sava valley between Samac and Brcko. In this region where the water level varies considerably from 4 meters above to 4 meters below, P. nigra forms natural stands with P. alba (and Salix alba); patches of seedlings, saplings and vigorous 25-30 year old stands are found side by side. The peasants make thinnings empirically. I found a few outstanding trees which seemed completely pure; near Samac, a male tree 1.80 m. in girth with a cylindrical and smooth bole; other specimens had a very handsome habit and no burls, etc.

These black poplars are highly prized locally and are very important in the rural economy for carpentry, various household uses and also as fuel-wood. No artificial reproduction is practiced.

(C) The willows. Associates of the poplars and belonging to the same family, they held my attention because of their quality and their utilization in the valleys of the Pannonian plain; usually mixed with poplars, they become dominant and even form pure stands in the lowest-lying sites which remain flooded for part of the growing period. They easily tolerate this immersion by putting out temporary roots from all the immersed part of the trunk.

Salix Alba alone seems to be represented among the trees attaining large dimensions and which constitute a very diversified stand. Some have a very fine habit.

These willows are greatly valued by the match-making industry which has a large plant at Osijek.

They are very rarely cultivated.

II - The cultivated poplars belong exclusively to the section Aigeiros and are still of minor importance.

(a) Populus nigra L. Two varieties with erect branches are cultivated in Yugoslavia and are merged under the name of "pyramidal poplar" (Jablan).

In the north, Populus nigra L. italica, male, widely distributed throughout the world, is sometimes planted in rows along roadsides (road from Belgrade to Novi Sad) and in the parks.

The female form occurs in the south, in Macedonia, Dalmatia and Bosnia Herzegovina, and is much superior to the male for its fast growth and fine habit; the bark remains smooth for a long time and is very white, the trunk is perfectly cylindrical at the base, even in old trees, without edges as in the case of the Italian poplar. This female poplar is very frequently planted in rows in Macedonia, along avenues (Ohrid) and watercourses and bordering the cultivated fields. It is used in the same way in some villages in Herzegovina, for instance at Gorica on the Dalmatian frontier, where all the land is divided into plots by poplar belts.

These poplars appear to be able to endure drought remarkably. Their wood is of some importance in rural economy; it would be worthwhile extending their cultivation, and technological tests should be made.

(b) Populus euramericana (Dode) Guinier - I only saw hybrid poplars belonging to this group and did not notice any specimen of the American species P. deltoides.

All these hybrid poplars are called "Kanadski Topola" (Populus canadensis) in Yugoslavia; an exception is P. robusta which is known by

that name.

The name P. canadensis should no longer be used as it does not conform to the rules of international nomenclature, and again, it is indefinite and covers different poplars. In fact, while a late male poplar (foliation occurs two weeks after P. robusta) is most frequently cultivated, during my trips I saw other male poplars, probably different, at Ohrib in Macedonia in particular, and especially several types of female poplars in the parks of Belgrade, on the banks of the Vardar at Skopje and along the banks of different rivers.

I particularly noted a female poplar by the Danube (near Batina), along the banks of the Drava near Osijek and near Mostar in Herzegovina: its leaves betray hybrid features, but are markedly wedge-shaped at the base and the capsules open into 2 and more often 3 and 4 valves. I have never come across this hybrid in western Europe.

These different poplars are only to be found in a few row plantings or as isolated trees in the parks south of the Belgrade parallel. It is only in the valleys in the North that they are of any commercial value.

Even there, however, the plantations usually established on land that before 1939 belonged to private individuals, are forest plantations into which the poplar was introduced to improve stands of Quercus pedunculata Willd., ash, elm, etc.; this is a sound criterion but much more frequently the poplar is planted in thick stands with other species to a density of 2,000 plants per hectare, and results are very poor.

A very serious effort has been made in the last few years to propagate poplars in the nursery, to make a comparative study of their development and to compare them with new types, including the poplars of the Tacamahaca section (P. candicans, trichocarpa, Simonii, yunnanensis, etc.)

Nevertheless the very special features of rational cultivation of poplars and the very considerable differences with that of forest species require a series of studies or coordinated measures which I shall now set out.

III- Poplar Survey and Experimentation

(a) Survey. It is essential that the genetic stock available to poplar growers in Yugoslavia be thoroughly known.

A survey should therefore be made in all the services to ascertain what species of poplars there are and their respective properties: a standard questionnaire should be drawn up for the whole country and the study begun at the end of next winter.

For all poplars: importance, economic value, growth, origin, habit, sex, etc.

For white poplars: characteristics of the adult leaves on both long and short branches; aspect of the short branch leaf tomentum in July. Extent of root sprouting, manner and ease of propagation.

For spontaneous black poplars: date of foliation, distribution of sexes, rapidity of growth, variability, technological properties (burls etc.).

For Euramerican poplars: sex, date of foliation compared with that of P. nigra f. italica, habit, rapidity of growth, length of fruit clusters and number of valves in the capsules of the female trees.

At the same time, by closely inspecting nurseries at favorable periods (autumn and spring) aberrant specimens can be eliminated or at all events sorted out in stool and planting stock nurseries.

(b) Experimentation. It is essential for the main types identified during the survey and apparently of economic value, to be tried out side by side and compared with some of the poplar types cultivated in

Western Europe.

A suitable area of 2-4 ha. should be selected for this purpose in each region where poplar-growing is to be extended: the poplars will be planted in rows and spaced 7 x 7 m. according to the techniques described further on. 50 trees of each type will be planted in several rows using the replication method in order to eliminate the effect of differences in soil conditions. The trees will be girdled at 1.30 m. from the ground with a coat of paint in a different color for each type and measured at the time of planting and regularly afterwards. Detail maps and index cards will be prepared.

Here are the main poplar arboreta that could be established:

PANNONIAN PLAIN

1. In the vicinity of Osijek - P. nigra italica as control
 - 2 P. nigra spontaneous, handsome habit
 - P. euramericana f. robusta
 - P. id. [↑] O called
"Kanadaka Topola"
 - P. id. O cultivated
+ locally
 - P. euramericana f. serotina, Champagne
 - P. euramericana f.I. 214
 - P. canescens, spontaneous, handsome habit
 - Salix alba, idem
2. In vicinity of Sombor same types
3. Banks of the Sava at Croatia-Bosnia frontier
 - P. nigra italica
 - 2 P. nigra, spontaneous, handsome habit
 - P. euramericana f. robusta
 - P. euramericana O [↑] called "Kanadska Topola"

P. euramericana f. regenerata

P. euramericana f. serotina, Champagne

P. euramericana f. I. 214

P. alba, spontaneous, handsome habit

4. Neretva Valley near Metkovic in Dalmatia and

5. Kara-Otok estate in Herzegovina

P. nigra f. italica

P. nigra f. pyramidalis O † cultivated
locally

P. nigra, from the banks of the Sava,
handsome habit

P. euramericana O called 'Kanadska Topola' ↗

P. euramericana O from the banks of the
Neretva near † Mostar

P. euramericana f. I. 214

P. euramericana f. I. 154

P. euramericana f. serotina, Champagne

P. alba L. from the banks of the Sava

P. alba L. from the banks of the Neretva

Populus yunnanensis Dode

6. Valley of the Vardar at Skopje

P. nigra f. italica

P. nigra f. pyramidalis O † cultivated
locally

P. nigra, handsome habit (Ibar valley?)

3 P. euramericana, different types
cultivated in Macedonia

P. euramericana f. I. 154

Populus alba, handsome habit, from
Macedonia

Populus alba, handsome habit, from the
banks of the Sava in Bosnia

Populus yunnanensis

Platanus orientalis, from the Vardar

This list is a minimum and it would be worth while increasing the number of types tested, although there should never be more than about 15 in each arboretum, so as not to dissipate efforts.

The efficacy and the value of a survey as well as of the said experiments depend on their being supervised by a federal body which can alone have a comprehensive view.

It would be desirable for this body to be a "National Poplar Commission" grouping producers and users, as in other countries.

This Commission could eventually send observers to the meetings of the International Poplar Commission and apply for membership. This would facilitate exchange of documentation and of stock for cultivation.

IV - Poplar-growing techniques

Pending the outcome of the experiments in progress, industrial poplar plantations can be started with the types that now give satisfactory results. The majority are already grown as stools in nurseries and can produce the necessary cuttings. It will suffice to add the 2 or 3 types recently identified: the pyramidal black poplar ♀ for the southern areas, the female Euramerican poplar from the banks of the Danube, etc.

(A) Propagation in the nursery: the poplar nurseries should be selected for the fertility, depth and moistness of the soil and irrigation and watering facilities should be available.

Cuttings 0.25 to 0.35 m. long are pushed into the soil for practically their entire length according to the method correctly practiced at present, but the spacing should be changed: the rows should be 0.80 to 1 m. apart and the cuttings should be spaced 0.40 m. apart in the row. The plants will attain over 1 m. in height in a year as at present, but will have a decidedly larger diameter and above all can be kept two years in the nursery. In fact, experience shows that two-year old plants recover more easily after transplanting and stand up much better to competition by adventitious vegetation and to their different enemies (game or livestock; insects and parasitic fungi).

(B) Plantations:

a) Kinds of plantations. Three main types can be envisaged.

1) Row plantations: Although differing from real stands and serving frequently as windbreaks, their yield is of some importance.

Such plantations can be established alongside roads and canals by applying to the competent administrative service (which could be represented on the Poplar Commission): plants could be supplied by the forest nurseries.

Bordering meadows, crop fields and streams: it is chiefly in the southern regions, where few areas have a sufficient water supply for good poplar growth, that row plantations should be promoted. The best method to adopt will be to supply plants and proffer advice to private owners.

The female pyramidal poplar will be the most frequently employed, except along roadsides under the favorable conditions where the male Euramerican poplars, that flourish in the region, could be utilized.

Two-year old plants will be set 5 m. apart alongside crop fields and streams and at least 10 m. apart along roadsides.

2) Plantations in the bottomland of the Pannonian plain

The Drava, Sava and Dunav valleys offer exceptionally favorable conditions for poplar growing which do not occur over such large areas elsewhere in Europe.

The Yugoslav foresters will have to determine the best sites, characterized by great soil depth and homogeneity, regular water supply and flooding of short duration in the growing season.

It seemed to me that the best conditions occurred near Osijek on the banks of the Drava and especially on the left bank between the dyke and the river (Darda Inspectorate).

The banks of the Danube are slightly less favorable because of the frequency and duration of the summer floods dangerous for young plantings.

The Sava valley soil is sandier and is more likely to dry out owing to the appreciable lowering of the water table in the summer.

Plantings will be made in these different valleys along the following lines, with the variations that a detailed study of the sites will indicate:

(i) Introduction of poplars into forests of oak (Quercus pedunculata Willd), ash and elm; the poplars will be planted in the clearings left after felling; their growth will be relatively slow in this mixed forest and they will have to be left standing 45 to 50 years (two coppice rotations) before being logged. They will then be very large trees, 0.70 to 0.80 m. in diameter, and have a considerable market value. This system has long been practiced in the Belje estate on the right bank of the Danube and furnishes high-grade timber for export.

The number of trees to be introduced per hectare will vary greatly and will depend on the number of precious species present: when plots can be planted, each tree should have a growing space of about 50 m^2 .

(ii) Planting of stands: Such plantations established according to the different systems set out below will always have to meet the requirements of cultivated poplars, that is, of selected hybrids that require the same attention a farmer gives to his crops or to his livestock.

Poplars are not social and cannot be cultivated in dense stands like forest trees; moreover there can be no struggle for existence with survival of the fittest, since being propagated asexually, they belong to the same clone and therefore are absolutely identical.

Cultivated poplars are hybrids that grow quickly due to the heterosis, provided they have plenty of space and nutrients from an early age; they do not in fact profit from thinnings, even when very young.

Furthermore, the forestry engineer Podhorski, Zagreb, clearly indicated in his recent study of the very dense plantations in the Darna Inspectorate (Drava valley) both the extraordinary growth of poplars on these soils and the economic failure of plantations spaced $2 \times 2 \text{ m}$.; in the Topolje district P. euramericana f. robusta attains 25 to 28 m. in height in 14 years; in the Repnjak district on a slightly more drained soil there were only 880 trees left out of 2,500 P. euramericana f. "Kanadska Topola" 20 years after planting and without any intervention. A thinning removed 540 very poor and unhealthy trees which totalled 74 m^3 , or 0.15 m^3 per tree, and were completely valueless.

The 340 remaining trees are 25 to 27 m. high and have a volume of 226 m^3 , but even two years after thinning no growth improvement has yet occurred.

I may add that when the branches are dead, no natural pruning occurs and there are knots in the wood all of which greatly diminishes its value.

This remarkable corroboration of observations made in the countries of Western Europe by the International Poplar Commission, calls for the following rules:

Spacing 7 x 7 m. or a maximum of 200 poplars per hectare.

Planting of two-year old poplars in which only the lateral branches have been reduced to lessen evaporation: they will be 2.50 to 3.50 m. tall and 8 to 12 cm. in girth.

Mound planting to prevent grass competition, to increase wind firmness, and in particular to enable the young tree to develop roots above the natural level of the soil which is often too moist.

Working of the soil and cleaning during the first two years.

Artificial pruning flush with the trunk by sawing, on the lower third of the trunk during the first 10 years, then on half the trunk and later on two-thirds.

When planting is to be made on very moist land, its success can be facilitated by suppressing the roots and pushing into the soil the base of the stem which will behave like a 3 m. long cutting: results are excellent.

(b) Planting methods

(1) Plantations associated with crop-growing in areas near densely populated urban centers where farmland is inadequate (e.g. around Osijek in the Drava valley; in the vicinity of Brecko in the Sava valley); the broadleaved spontaneous or artificially improved forest is practically clearcut and the land is either allotted free or rented to peasants. They undertake the laborious job of clearing and then cultivating the land to maize and melons for 1 to 4 years according to

the region before planting it densely to poplars and ash-trees.

With poplars planted in rows spaced far apart crops can be grown for 4 or 5 years at least: the trees will benefit from soil cultivation and their deep roots will not compete with the food crops.

This type of poplar cultivation in association with crop-growing is frequent in France (valley of the Garonne), and especially in Italy (Po valley).

When the tree canopy is too compact to allow crop-growing, Alnus glutinosa will be underplanted as ground cover.

Such a method of planting and the subsequent production of fuelwood by the alder understory and the broad poplar crowns will be very popular among the inhabitants of the region who will appreciate the immediate benefit.

2) Poplar stands on forest land. In districts further away from the urban centers, plantations will be established without preliminary elimination of the varied existing species. Eventually either Alnus glutinosa or A. incans, Fraxinus excelsior or F. oxyphylla, Acer pseudo-platanus will be underplanted, depending on conditions (the Black locust which competes with the poplar should not be utilized). The number of trees introduced where there is no natural understory will be about 1,000 per ha. (3 x 3 m.): they will be rapidly outstripped by the poplars because of the difference in initial dimensions.

This understory should always keep to this role and be cut regularly when it tends to crowd the tree tops: during the poplar rotation (20 to 30 years to obtain timber 0.50 in diameter required by the veneer industry) the understory will be cut 2 or 3 times and production will obtain a total of at least 200 or 300 steres of fuelwood per ha.

Carefully selected Salix alba will be utilized in the sites inundated for longer periods.

3) Poplar plantations on fairly marshy grassland. Such is the case in the Neretva valley near Metkovic in Dalmatia, the Kara Otok marsh near Capljina and some "polja", including Mostarsko Blato in Herzegovina.

The problem here is much more complicated because in addition to the requirements already mentioned, poplars grow poorly in compact, clay soil or peat; in fact the absence of air through lack of soil porosity or the absorption of oxygen by strong reducing organic substances causes asphyxia of the roots and failure of the plantation.

A soil analysis will have to be made to ascertain that the percentage of clay is not over 25 to 30%; if it is, it should be determined whether a mixture of the horizons would improve the soil conditions.

Efficient drainage will facilitate aeration of the soil and the first plantations will be established on mounds made of earth withdrawn sufficiently long beforehand from the drainage ditch and well turned over.

Under the least favorable conditions the only thing to do while awaiting the outcome of experiments, is to plant Euramerican poplars in rows along drainage ditches; and use the much more adaptable Populus nigra and P. alba for filling in, together with Salix alba, Alnus glutinosa, and where climatic conditions are mild, Taxodium distichum.

ASPEN IN FINLAND

by Risto Sarvas

The poplar situation in Finland is very similar to that in Sweden, on which Mr. Johnsson has already reported.

Black poplars are not native to Finland, and their area of cultivation is also very small, at the most a few tens of hectares. The aspen (Populus tremula) is instead much more important and will undoubtedly remain so for a long time as the area suitable for black poplars is very limited.

According to the Second National Forest Inventory of 1936 - 1938, the volume of the growing stock of aspen in our forests totalled 19 million cu.m. and its annual growth 1 million cu.m. (Due to the territorial cessions after the Second World War the true figures are today some 15% lower). These figures may seem quite considerable, but the former represents only 1.4% of the total growing stock and the latter 2.0% of the total annual growth. In spite of this aspen is fourth in order of importance of tree species in the forests of Finland, and is being given increasing attention from year to year.

Aspen grows most frequently in mixed forests with coniferous species and birch, but it is the predominant tree in some 40,000 ha. of forests whose correct silvicultural treatment is still in many respects an unsolved problem. The main adverse factor is the very frequent stem rot caused by various injurious fungi. Logs suitable for sawing and as raw material for the match industry, are successfully grown on the best sites and require heavy thinnings.

As for utilization, it may be worth mentioning that in 1949, for instance, the total industrial consumption of aspen wood amounted to approximately 126,000 cu.m., including some 50,000 cu.m. of timber for building. Matchwood has been the most valuable and fetched the highest price.

With regard to international collaboration on poplar and aspen the following points are of the greatest interest to Finland: silviculture, including pest control and breeding work; nursery practices; spacing for plantations; management and yield of pure and mixed forests; artificial pruning; rot control particularly in medium-aged forests. In this connection the important question of the effect of the different silvicultural treatments on the technological properties of wood should also be mentioned.

In forest tree breeding work with aspen, we started the selection of superior phenotypes and have crossed our aspen with the American Populus tremuloides in order to take advantage of the remarkable heterosis of this hybrid.