1949

NEW ZEALAND

WORLD WOOD PULP CONFERENCE

(REPORT OF THE NEW ZEALAND DELEGATION TO THE) AT MONTREAL, CANADA, 25TH APRIL TO 4TH MAY, 1949

Laid Before Both Houses of Parliament by Leave

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LETTER OF TRANSMITTAL FROM THE HON. COMMISSIONER OF STATE FORESTS TO THE RIGHT HON. THE PRIME MINISTER

The Right Hon. the PRIME MINISTER.

SIR,—

I have the honour to transmit a report on the work of the New Zealand delegation which attended the World Wood Pulp Conference at Montreal, Canada, from 27th April to 4th May. The delegation comprised—

Major the Hon. C. F. Skinner, Commissioner of State Forests, Chief Delegate.
Mr. S. J. Robinson, Managing Director, B. J. Ball (N.Z.), Ltd., Auckland, Delegate.
Mr. A. R. Entrican, Director of Forestry, Delegate.

The services of Mr. S. J. Robinson, who represented the pulp and paper importing and using interests in the Dominion proved invaluable in making contacts with prominent industrial executives throughout North America, and in directing critical inquiries into paper-marketing problems.

Following the decision in principle taken by the Government in April to proceed with the establishment of an integrated sawmill and pulp and paper plant at Murupara, on the Rangitaiki River, in the Bay of Plenty district, the delegation also conferred with the Government Sawmill Consultant, Mr. W. H. Rambo, Industrial Engineer, of Portland, Oregon, and with its Pulp and Paper Consultant, the Rust Engineering Co., of Pittsburgh, Pennsylvania. Co-ordination and investigation of the work of these consultants was carried on by the Director of Forestry.

The delegation is indebted to His Majesty's Canadian Government, to the Canadian Pulp and Paper Association, and to FAO for the facilities and courtesies provided for its convenience at Montreal, and to numerous organizations in the North American pulp and paper and sawmilling industries, and to their executives, both for constructive criticism and for inspiration and assistance in the investigation of current economic and technical trends.

At Montreal on 25th April I had the privilege and honour of representing New Zealand at the observance of the solemn rites of Anzac Day.

I have, &c.,

C. F. SKINNER,
Commissioner of State Forests.

Office of the Commissioner of State Forests,
Wellington, New Zealand.

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SUMMARY

THE report reviews the work of the New Zealand delegation to the World Wood Pulp Conference held at Montreal, Canada, from 25th April to 4th May, 1949, and convened by and conducted under the auspices of the Forestry Division of the Food and Agriculture Organization (FAO) affiliated to the United Nations Organization (UNO). Part I covers the events leading up to the Government's decision to participate in this Conference in order to improve its background to the question of establishing large-scale pulp and paper manufacture in New Zealand. Part II covers the organization and conduct of the Conference, and Part III its recommendations and conclusions. Part IV reviews the subsequent studies of the delegation and presents its own recommendations and conclusions.

The general finding of the Conference was that, having regard to existing plans for the expansion of production (including those in Australia and New Zealand), there is likely to be an approximate equilibrium between world production and requirements for the period 1948 to 1955, and that unless interim developments operate to the contrary there should be no major wood-pulp surplus or deficit during the period under review. As a result of its subsequent investigations the delegation has satisfied itself that the forward world pulp and paper position favours the early establishment of a large-scale sawmill and pulp and paper plant in the Rotorua Conservancy.

PART I—INTRODUCTION

NATIONAL PULP AND PAPER SCHEME

(1) Early in 1949 the New Zealand Government was faced with making one of the most momentous decisions in the history of the national forest policy—whether or not to proceed with the establishment of an integrated sawmill and pulp and paper scheme on such a scale as would ensure its ability to compete both on the local and Australian export markets at world parity. For over twenty years the New Zealand Forest Service, in conjunction with English consultants, had planned the development of such a unit and had established the forests necessary for its operation at Murupara, on the Rangitaiki River, thirty-three miles south-east of Rotorua. As the economic size of pulp and paper plants had increased meantime, and unit capital investment costs had actually doubled, the Government rightly felt that the departmental proposals should be critically examined by independent authoritative consultants.

INDEPENDENT REPORTS BY CONSULTANTS

(2) Arrangements were made accordingly for the Rust Engineering Co., of Pittsburgh, Pennsylvania, and Mr. W. H. Rambo, Industrial Consultant, of Portland, Oregon, to report respectively on the pulp and paper and sawmill sections of the proposed plant. The Rust Engineering Co. was selected on the advice of other world-famous consultants in the pulp and paper industry because of its experience not only in construction, but in the economic planning and designing of important pulp plants in the southern States of the United States of America. Many of the mills planned, designed, and built by this firm are using young second-growth pine timber very similar in character to the insignis and other pines which must be used in the New Zealand plant. Similarly, Mr. W. H. Rambo was selected as the foremost designer of log yards and sawmills in the Pacific North-west. The reports by the two independent investigating authorities were received this year. Both confirmed the soundness of the departmental proposals, and the Government accordingly arrived at a decision in principle to proceed with the establishment of an integrated sawmill and pulp and paper mill at Murupara.

Invitation to World Wood Pulp Conference

(3) Just previous to this the Government had received an invitation from the Director-General of FAO for the attendance of a New Zealand delegation at a "Preparatory Conference on World Pulp Problems" to be held from 25th April to 4th May, 1949, at Montreal, Canada. The text of the official invitation and accompanying memoranda are published as Exhibit A to this report (see pages 74–76). As the adequacy or otherwise of both pulping and newsprint-manufacturing facilities to meet world demands over the period 1949–60 was to be the main theme of the Conference, the Government decided that before finally confirming its decision to proceed with the Murupara project it should send a representative New Zealand delegation, led by the Ministerial Head of the Forest Service, to North America. The delegation, however, was instructed not only to attend the Montreal Conference, but to make such other investigations as would assist the Government in arriving at a final decision on the Murupara project.

Composition of Delegation

(4) The delegates appointed were—

Hon. C. F. Skinner, Commissioner of State Forests, Chief Delegate.
Mr. S. J. Robinson, Managing Director, B. J. Ball (N.Z.), Ltd., Auckland, Delegate.
Mr. A. R. Entrican, Director of Forestry, Delegate.

The selection of Mr. S. J. Robinson as a member of the delegation was made not merely as a result of the suggestion by the Director-General of FAO that each delegation should, if at all practicable, include representation of trade interests, but because Mr. Robinson has been the outstanding authority for many years on pulp and paper importations and their use in New Zealand. It was felt that he, more than any other individual in the Dominion, was best qualified to advise the Hon. C. F. Skinner as Chief Delegate regarding consumer markets and trends. The Director of Forestry was likewise appointed as adviser on local economic factors affecting the proposed production of pulp and paper in New Zealand.

Itinerary En Route to Montreal

(5) The delegation left Auckland on 12th April by British Commonwealth Pacific Airways aeroplane and proceeded to Portland, Oregon, where conferences were held with Mr. W. H. Rambo and visits paid to various sawmill and pulp and paper-making plants in the vicinity. Thence the delegation proceeded to Eastern Texas, where it visited the operations of the Southland Paper-mills at Lufkin, this being the only newsprint plant in the world to be successfully producing a high-quality sheet entirely from pine. A brief stop was made at Washington, D.C., in order to discuss with Mr. Charles A. Brannon, the Secretary of Agriculture, under whom the United States Forest Service functions, the practicability of organizing an exchange of New Zealand and United States forestry officers; and with the officials of the National Park Service the organization and development of recreational facilities in national park and other reserved areas. At Pittsburgh the delegation conferred with the Rust Engineering Co. in order to clarify various issues raised by its report on the pulp and paper section of the Murupara project.

Return Itinerary En Route to New Zealand

(6) The Conference itself comprised most of the days and some of the evenings between 25th April and 4th May inclusive, at the conclusion of which the delegation returned to Pittsburgh for further discussions with the Rust Engineering Co., also revisiting the Southland Paper-mills at Lufkin, Texas. From Texas the Hon. C. F. Skinner and Mr. S. J. Robinson returned to Portland for further conferences with Mr. W. H. Rambo and inspections of various logging and sawmilling and pulp and paper-making operations before returning to New Zealand on 17th May. The Director of

Forestry returned to Pittsburgh in order to co-ordinate work on the two separate sections of the Murupara project being planned and designed by Mr. W. H. Rambo and the Rust Engineering Co. He, too, later visited the Pacific North-west and British Columbia, and with Mr. W. H. Rambo examined various logging, milling, and pulp and paper-making operations not examined by the other two members of the delegation before his return to New Zealand on 3rd July.

PART II—ORGANIZATION AND CONDUCT OF CONFERENCE

A. DESCRIPTION OF CONFERENCE

General

(1) The Preparatory Conference on Wood Pulp assembled in the Windsor Hotel at Montreal, Canada, on Monday, 25th April, and remained in session until Wednesday, 4th May, 1949. It was attended by delegates from twenty-one Governments, by observers from ten Governments, and by representatives of UNESCO and ILO. They were welcomed by representatives of His Majesty's Canadian Government, the Canadian National FAO Committee, and the Canadian pulp and paper industry. The Director-General of FAO, Mr. Norris E. Dodd, opened the proceedings with an address on the main elements of the world situation which had caused his Organization to convene the Conference. Mr. R. W. Fowler, President of the Canadian Pulp and Paper Association, was elected Chairman of the Conference, and M. M. du Vignaux, of France, and Major C. F. Skinner, M.C., of New Zealand, as Vice-Chairmen.

Proceedings

(2) Only three plenary or bilingual sessions were held, the greater part of the remainder of the work being carried out by the Conference in committee. Only two technical committees were set up, one to consider the possibilities of using tropical woods for pulping, and the other to consider the pulping of straw. During the opening plenary session most of the participating delegates provided the Conference with statements outlining the main features of the wood-pulp situation in their respective countries, following which the Conference went into committee to assemble and discuss regional and world statistics relating to production and consumption and trend in wood-pulp and pulp-wood. Later during the Conference another plenary session was held to receive a message from the Director-General of UNESCO on the serious social and political repercussions of inadequate supplies of newsprint and printing-papers which existed in many lands, forming effective barriers to the development of education, restricting the freedom of the press, and hampering healthy political growth. Following the final assembly of regional and world statistics, the Conference in committee formulated a report for adoption at its closing plenary session.

Entertainment

(3) Official receptions were tendered by His Majesty's Canadian Government and by the Canadian Pulp and Paper Association. Numerous informal receptions were organized by various delegations in order to exchange views on points of common interest not covered by the Conference. The United Kingdom delegation entertained Commonwealth delegates on the occasion of the Indian agreement to remain within the Commonwealth. The New Zealand Minister in Canada, Mr. James Thorn, held a reception in honour of the Hon. C. F. Skinner in order that the New Zealand colony in Montreal might have an opportunity of meeting the Hon. the Commissioner of State Forests and other delegates to the Conference.

B. ORGANIZATION OF CONFERENCE

Preparatory Work

(1) Owing to the exploratory nature of the Conference, its short-term review of the future, and the urgency with which it was convened, any basic studies by delegates of economic and technical trends in the industry were dispensed with. Delegates were requested to bring as much information as possible about present and prospective pulp capacity and needs of their own countries as well as of their principal customers and suppliers. The New Zealand delegation had as a guide to future requirements the records of almost twenty years of importations, together with Mr. S. J. Robinson's intimate knowledge of both the New Zealand and Australian trade.

Administration

(2) The organization and administrative arrangements at the Conference itself were of a high order. The Secretariat for the Conference was provided from the staff of the Forestry Division of FAO. It worked with extraordinary efficiency and at extremely high pressure. The facility with which it produced the result of day-to-day deliberations in the form of numerous statements, statistical returns, and draft reports for consideration by the Conference reflects great credit on the entire staff from the Secretary-General downwards.

Accommodation

(3) By accommodating most delegates in the Windsor Hotel itself, the work of the Conference was much simplified. A list of members of each delegation, together with an official directory giving the address and telephone number of each delegate, proved invaluable in maintaining contact between delegates.

Steering Committee

(4) A Steering Committee composed ostensibly of the heads of delegations was too unwieldy to function normally. It met on the opening day of the Conference to adapt a standard set of rules of procedure used by FAO for such conferences to the requirements of the Montreal gathering, but its principal activity was to check and modify for adoption by the Conference in its closing plenary session the final draft report prepared by the Secretariat. Except for the small amount of work by two technical committees on the pulping of tropical hardwoods and of straw, the whole work of the Conference was carried out by a very full attendance of delegates, either in plenary sessions or in committee as a whole. All draft reports, however, were produced by the Secretariat as a basis for discussion and modification in accordance with the debated desires of delegates. Individual delegates with specialized experience and knowledge were placed in charge of various sections of the statistical work of the Conference, but final checking of basic data and the preparation of tables was also undertaken by the Secretariat.

Composition

(5) Many delegates were disappointed at the paucity of trade representation. Of the major pulp-producing countries, Canada was the only one with adequate representation, though for their size some of the minor countries, including New Zealand, had ample representation.

C. PROCEEDINGS OF CONFERENCE

PROCEDURE

(1) The rules of procedure adopted for the conduct of the Conference deserve no special mention, more especially as the whole of the Conference was conducted most pleasantly and informally under the able Chairmanship of Mr. R. M. Fowler, President of the Canadian Pulp and Paper Association. The freest possible discussion was the invariable rule of the Conference, and no question of the right of any delegate, observer, or other member of a delegation either to speak or to vote was debated during the proceedings.

AGENDA

(2) The amended agenda set out in Exhibit B was closely followed by the Conference. Delegates had first to sift, assemble, and present their wood-pulp statistics in usable form before proceeding to analyse them on either a regional or world basis, but because of lack of uniformity in their collection the Conference was forced to compromise on various objectives, and to judge such meagre statistics as were available in some cases in the light of the best available knowledge amongst the assembled delegates. The brief statement on the New Zealand wood-pulp position made at the opening session by the Hon. C. F. Skinner as Chief Delegate is attached as Exhibit C.

STATISTICAL WORK

(3) The statistical work of the Conference proved more time-consuming than had been anticipated, and in order to secure usable data for urgent analysis and critical examination it was decided to concentrate on the collection of the more important data, with emphasis upon the two broad classes of chemical and mechanical pulp. This was achieved by making individual delegates with specialized knowledge and experience responsible for the completion of the work in six sections :—

(*a*) Capacity and production.
(*b*) Consumption and requirements.
(*c*) Import requirements.
(*d*) Export supplies.
(*e*) Dissolving wood-pulp supplies and requirements.
(*f*) Pulp-wood requirements and supplies.

PART III—REPORT OF THE PREPARATORY CONFERENCE ON WORLD PULP PROBLEMS

(NOTE.—For convenience, all tables have been retained in their original form on the basis of metric tons (2,204 lb.). In subsequent sections of the report both short tons (2,000 lb.) and long tons (2,240 lb.) are variously used, but in all cases the basis is clearly defined. The Annexes referred to herein are not reprinted in this report.)

PREAMBLE

1. In 1948, world production of wood-pulp reached an all-time high of about 28,000,000 metric tons. At the same time, a number of new mills were under construction or in an advanced stage of planning in North America, Latin America and Oceania. In Europe and Japan, efforts were being made to restore, as far as possible, pre-war capacities of the pulp and paper industries. Towards the end of the year, however, the world market for pulp was beginning to show signs of at least temporary saturation, and this created some uncertainty among producers and consumers about the world situation and outlook for wood-pulp.

2. There is a general agreement regarding the continuing rise in requirements for pulp and its products, a trend which has repeatedly induced the Economic and Social Council of the United Nations and UNESCO to stress the urgent necessity of providing more newsprint and other papers for the promotion of education and the distribution of news. On the other hand, pulp-producers are sometimes encountering difficulties in selling their products, and, in consequence, question whether supplies have caught up with or even surpassed effective demand. The recent change-over from a sellers' to a buyers' market was accompanied by price reductions for all grades of wood-pulp. The situation is complicated by currency and exchange problems as well as by lack of purchasing-power in many countries.

3. Several major shifts in the world pattern of the wood-pulp industry have taken place during the past decade, most of these being attributable to the war and its aftermath. Other changes are in prospect for technological reasons. In November, 1948, the fourth session of the Conference of FAO therefore passed the following resolution :—

In view of the uncertain future outlook with regard to productive capacity and demand for wood-pulp, the Conference :

(*a*) Considers that more attention to this important commodity should be given.

(*b*) Approves of the organization in the very near future of a Preparatory Conference on World Pulp Problems, for the purpose of attempting a broad survey of the world situation and outlook, and of formulating a programme of regular international statistics.

(*c*) Greatly appreciates the co-operation of the Government of Canada and the Canadian Pulp and Paper Association in inviting the Conference to hold its first session at Montreal, and urges all countries having wood-pulp to participate actively.

4. In accordance with this recommendation, and at the invitation of the Canadian Government, FAO convened a Preparatory Conference on World Pulp Problems, which met at Montreal, 25th April to 4th May, 1949. It was attended by delegates from twenty-one Governments, by observers from ten Governments, and by representatives of UNESCO and ILO. Names of participants appear in Annex I.

5. Mr. R. M. Fowler, President of the Canadian Pulp and Paper Association, was elected Chairman of the Conference, and M. M. du Vignaux, of France, and Major C. F. Skinner, M.C., of New Zealand, as Vice-Chairmen.

6. Delegates were welcomed by representatives of the Government of Canada, the Canadian National FAO Committee, and the Canadian pulp and paper industry. Proceedings opened with an address delivered in person by Mr. Norris E. Dodd, Director General of FAO, who outlined the main elements of the world situation which had caused the Organization to convene the Conference and which it was hoped the Conference would more fully explore. A message from the Director-General of UNESCO drew attention to the very serious social and political repercussions of inadequate supplies of newsprint and printing-papers which exist in many lands and form effective barriers to the development of education, restrict freedom of the press, and hamper healthy political growth.

7. Most of the participating delegations provided the Conference with brief statements outlining the main features of the wood-pulp situation in their respective countries. The messages of the Director-General of UNESCO and the Director-General of FAO, and statements submitted by participating countries, comprise Annex II of this report.

8. During its sessions the Conference assembled and discussed regional and world statistics relating to production, consumption, and trade in wood-pulp and pulp-wood. Special attention was paid to requirements for the immediate future, and statistical summaries were prepared showing the regional and total effects of present estimates of projected consumption and production of wood-pulp and pulp-wood up to the year 1955. These statistics, subject to the qualifications made in subsequent sections of this report, provide the essential background for the conclusions of the Conference.

9. Because of the anticipated development in requirements for pulp and its products, special interest attaches to the possibilities for finding new sources of raw materials. For this reason the Conference established a special committee to consider the possibilities of using tropical woods for pulping, and also a committee on straw pulps. The reports of these committees appear in Annex III.

RECOMMENDATIONS

I

10. The review of present and prospective pulp production and requirements undertaken for the first time on a world basis by this Conference proved extremely useful.

The Conference therefore

EXPRESSES its appreciation to the Canadian Government and the Food and Agriculture Organization for having provided the opportunity for representatives of pulp producers and consumers to meet and to discuss their problems.

II

11. As to the future procedure, the Conference feels that periodic reviews of the world pulp situation such as the present meeting have a distinct value but that it would be premature at this time to make specific recommendations regarding a further pulp conference, and therefore

REQUESTS the Director-General of FAO, in accordance with his constitutional powers,

(*a*) To keep the world pulp situation under continuous review.

(*b*) To consider the time and place of any further international Wood Pulp Conference after consultation with the Council of FAO and the Governments which would be particularly interested as major producers or consumers, as was done in the case of the present Conference.

III

12. Prospective pulp-wood shortages in Europe and unavailability of adequate pulp-wood supplies in some other regions of the world direct growing attention to the development of high-yield pulping methods and to the search for alternative raw materials.

13. Considerable progress has been reported in the use of straw for the manufacture of pulp. Encouraging results have also been obtained from the experiments with the use of heterogenous tropical wood for pulp-making. These experiments were undertaken on an industrial scale for a large number of species such as could be obtained by the systematic exploitation of tropical forests.

The Conference therefore

RECOMMENDS

(*a*) That the application of high-yield pulping methods and the possibilities of large-scale use of straw and other substitute materials, including those hitherto considered unsuitable for pulp-making, be studied further in consultation with FAO's Committee on Wood Chemistry.

(*b*) The establishment, possibly with the assistance of competent international organizations, of demonstration plants for the industrial application of new pulping methods giving higher yield or permitting the use of materials hitherto considered unsuitable for the manufacture of pulp.

(*c*) The exchange of information through the FAO regarding results of studies undertaken in different countries.

IV

14. There exists a large body of international pulp and paper statistics compiled both by Governments and by industrial and trade associations. It is obviously desirable that these statistics be maintained and further developed and that any programme for world pulp statistics avoid unnecessary duplication and take maximum advantage of whatever existing material can be obtained from Government and private sources.

15. On the other hand, the work of the Conference has revealed considerable gaps in world pulp statistics, especially with regard to certain countries and areas which play an increasing part in world production and consumption but about which little statistical information is available. The Conference was also impressed by existing differences in the classification of wood pulp statistics which greatly reduce their international comparability.

The Conference therefore

RECOMMENDS

(*a*) That FAO's programme for wood-pulp statistics be reviewed with due consideration for the views of experts from Governments and private institutions and that arrangements be made for the necessary exchange of information designed to give FAO the benefit of available material with the least delay and the least additional work to Governments and industrial associations.

(*b*) That FAO's pulp statistics be primarily designed to provide an authoritative and homogeneous set of statistics on the production, consumption, stocks, and international trade of wood-pulp and pulp-wood, and thus to fill existing gaps of information, including statistics on pulp manufactured from straw and other non-wood materials.

(*c*) That FAO undertake special efforts towards the standardization of national pulp and pulp-wood statistics in order to improve their international comparability.

V

16. The Conference

(*a*) REQUESTS all participating delegations and observers to bring this report to the immediate attention of their Governments ;

(*b*) INVITES the Director-General of FAO to present this report to the forthcoming session of the Council of FAO, meeting in June, 1949, in Paris ;

(*c*) REQUESTS the Council of FAO to include world pulp problems in the agenda of the Fifth Annual Conference of FAO ;

(*d*) EXPRESSES the view that the problems connected with present and prospective consumer needs for pulp products be considered by the FAO Council next June, including the advisability of undertaking the preparation of a study of the facts by the staff of FAO in co-operation with UNESCO, to be presented to the fifth session of the Annual Conference of FAO. Some delegations reserved the right to question the jurisdiction of FAO and the advisability of its undertaking such a study at the present time ;

(*e*) RECORDS its appreciation for the message sent by the Director-General of UNESCO and for the continued attention that this Organization is giving to the educational and social aspects of newsprint and paper consumption ;

(*f*) DRAWS the attention of the Regional Economic Commissions of the United Nations to the present report and its findings ; and

(*g*) INVITES the Executive Secretary of ECE to consider, in co-operation with FAO, what further action may be necessary with regard to Europe's pulp and pulp-wood problems.

VI

17. The present report and annexes are herewith unanimously adopted for public release.

Conclusions

A. *General Summary*

18. In one sense, world needs for the products of pulp—newsprint, other printing and writing papers, wrappings, packaging material, and textile fibres—are far greater than existing supplies. This was the tenor of the message from UNESCO, with which the Conference agreed in principle. However, physical limitations as well as the economic and financial problems connected with the acquisition of desirable supplies seem to stand in the way of meeting consumer needs as disclosed by UNESCO. Accordingly, the Conference had to restrict its deliberations to the present and future effective demand of the pulp-using industries.

19. The Conference estimates show approximate equilibrium between world production and requirements for 1948 to 1955. If these figures are confirmed by subsequent developments there should be no major wood-pulp surplus or deficit during the period under review.

20. The war has brought about a major change in the distribution of pulp-production and pulp-consumption as between different regions of the world. North America, which in 1937 produced 44 per cent. and consumed 51 per cent. of the world output, now produces 68 per cent. and consumes 71 per cent. The production and consumption of Europe, on the other hand, have fallen from 50 per cent. and 42 per cent. respectively in 1937 to 27 per cent. and 25 per cent. in 1948. The relative and absolute importance of consumption in Asia and the Far East have been reduced, largely because of the changed situation of Japan. In Latin America, and in Oceania large percentage increases in output have occurred, but the tonnages in both regions are small in terms of world production.

21. Although 1948 production was the highest on record, it was estimated that there was in existence unused pulp-producing capacity to the extent of 4,300,000 tons in Europe and of more than 1,000,000 tons in other parts of the world, mainly in Japan. At the same time a large amount of new capacity was building or planned.

22. The increases for consumption and production of wood-pulp and pulp products forecast for 1955 are subject to limitations which, particularly in Europe and Japan, may place grave difficulties in the way of their fulfilment. On the continent of Europe, but with less application to the northern countries, forests have been heavily overcut during the war and post-war years, and these accelerated rates of cutting cannot be sustained indefinitely without disastrous results. Full use of the pulp-productive capacity which already exists would require an increase of more than 60 per cent. in Europe in the rate of cuttings achieved in 1947 if full reliance were to be placed on the forests of the region. This appears to be improbable because of the high level of demands for other and competitive forest products, such as saw timber and pit-props. The situation is made more acute by the cessation of exports of pulp-wood from the U.S.S.R. Current estimates for European pulp-production in 1955 would require net imports of pulp-wood in excess of 3,000,000 cubic metres (m.3). This figure is to be compared to a total European pulpwood cut expected to range from 40,000,000 to 50,000,000 cubic metres (m.3) around 1955. Yet this deficiency raises a difficult problem since it affects primarily the countries of eastern Europe, which, in view of the present state of their forest resources, have to rely on large pulpwood imports.

23. The Japanese Government desires to increase wood-pulp production substantially, in spite of the domestic forests being overcut twice their annual growth. This Japanese production plan does not have the approval of the Occupation Forces. Prospects for large imports of pulp-wood are not good because of the lack of adequate funds by the Japanese.

24. A further factor affecting paper-supplies is the increased manufacture of dissolving grades of pulp, mainly for the production of textile fibres. Although this diversion affects only a small proportion of the total production of chemical pulp at present, it tends to reduce the amounts available for the production of paper and paperboard whenever it occurs without the corresponding expansion of pulp-producing capacity as is true in some of the older pulp-producing areas.

TABLE I—PRELIMINARY WORLD PULP BALANCE*
(In 1,000 metric tons)

Region.	1937.		1948.		1949.		1950.		1955.	
	Consumption.	Production.	Consumption.	Production.	Requirements.	Production.	Requirements.	Production.	Requirements.	Production.
Europe	10,000	12,445	6,700	7,900	8,050	8,750	9,080	9,370	11,430	10,900
U.S.S.R. (for export)	..	..	..	40	..	50	..	75	..	200
Near East	15	5	15	10	20	15	20	15	25	30
North America	12,055	10,950	19,255	19,045	18,930	18,485	20,290	19,800	23,705	23,475
Latin America	245	25	470	190	540	295	570	315	700	440
Africa	..	..	15	15	15	15	15	15	35	30
Asia	1,525	1,190	520	505	630	545	715	660	925	865
Oceania	50	..	165	120	160	110	220	140	410	320
World	23,890	24,615	27,145	27,780	28,345	28,265	30,910	30,395	37,230	36,260

Apparent surplus (+) or deficit (−)

Region.	1937.	1948.	1949.	1950.	1955.
Europe	+2,445	+1,200	+700	+290	−530
U.S.S.R.	..	+ 40	+ 50	+ 75	+200
Near East	− 10	− 5	− 5	− 5	+ 5
North America	−1,105	− 210	−445	−490	−230
Latin America	− 220	− 280	−245	−255	−260
Africa	..	..	..	..	− 5
Asia	− 335	− 15	− 85	− 55	− 60
Oceania	− 50	− 45	− 50	− 80	− 90
World	+ 725	+ 635	− 80	−515	−970

* The forward estimates are based upon varying hypothetical assumptions as to prevailing economic conditions in the various countries of the world.

B. *Short-term Situation*

25. The figures appearing in Table I with regard to 1949 and 1950 are, on the whole, more reliable estimates than those shown for 1955. Yet even in interpreting these figures it should be remembered that they constitute maximum estimates which are both possible and desirable, but which might be substantially modified in the light of general economic conditions. Moreover, the fulfilment of these estimates must come in most countries from the action of individual producers and pulp-consuming industries, over which the Governments represented at this Conference exercise no direct control.

26. The world pulp-production in 1948 was some 3,000,000 tons higher than in 1937, the best pre-war year. Statistics assembled by the Conference indicated that this output was slightly in excess of current consumption. Although the apparent world surplus was less than 3 per cent. of production and may be due to statistical inaccuracies, it tends to explain the recent decline in prices, accumulation of stocks, and the difficulties encountered by producers in disposing of their pulp.

27. The estimates for 1949 and 1950 indicate a rapid restoration of equilibrium. World pulp requirements for 1949 are expected to exceed last year's consumption by 1,200,000 tons, while world production will only increase by 500,000 tons. For 1950 a further rise in requirements by 2,500,000 tons is anticipated, which would exceed current production by 500,000 tons. If these forecasts are confirmed by subsequent events, there might be a slight deficit by the end of 1950.

28. These world trends may be accompanied by certain shifts in the geographical distribution of wood-pulp production and consumption. Despite capacity increases, North America's output in 1949 is expected, for economic reasons, to remain almost 600,000 tons below the previous year; this reduction would be offset by a projected increase in European production of 850,000 tons. In 1950 European production is expected to expand by another 600,000 tons and North American production by 1,300,000 tons.

29. It is expected that European requirements will show a very much quicker expansion than European production, with the result that Europe's net surplus available for export from current production of wood-pulp would decline from 1,200,000 tons in 1948 to 700,000 tons in 1949 to some 300,000 tons in 1950. To the extent that currency considerations compel European producers to give priority to whatever they can sell for dollars, the supplies of wood-pulp available to Europe from European production might fall below effective requirements unless the production in northern Europe is correspondingly increased. If, on the other hand, European requirements were fully met, this might curtail substantially Europe's possibilities of securing dollars and other non-European currencies through pulp exports.

30. Also, in North America, market pulp requirements are likely to continue on a somewhat higher level than production. It is possible, however, that some of the resulting net import requirements may be met from accumulated stocks; it should further be remembered that North American requirements are calculated on the assumption of full employment and other economic conditions which may not occur.

31. It should be understood that the figures just quoted refer to net balances and do not indicate actual imports or exports. Indeed, in the case of North America, it is estimated that actual pulp imports from Europe might be in the order of 300,000 to 500,000 tons in both 1949 and 1950, while at the same time total North American overseas exports might be in the order of 250,000 tons, or about the same level as in 1947 and 1948. This suggests that no substantial quantities of North American pulp will be offered to the traditional markets for European pulp and that the fears of European producers in that connection are unfounded. American purchases of European wood-pulp are likely to be substantially larger than the quantities to be shipped from North America to continental Europe.

32. It should be stressed that the temporary surplus experienced at the end of 1948 referred only to effective demand, and that Europe and large portions of Asia were actually suffering from shortage of paper and other pulp products, which were insufficient to meet the desires of the press and other consumers. Although the lack of purchasing-power and currency restrictions which accounted for this situation are likely to continue, reductions in the prices of pulps and larger available supplies should, in the near future, somewhat ease the acute shortage of newsprint and other papers in war-affected regions.

C. *Long-term Outlook*

I. *General Remarks*

33. The Conference devoted considerable attention to the prospective wood-pulp situation in 1955 and even attempted to make certain estimates, which are summarized by regions in the various tables of this report. These figures should be considered with extreme caution not only in view of their tentative nature, but because only a limited number of countries was prepared to present estimates. Hence the Conference had to

take on itself the task of assessing the future developments in a number of countries, some of which, like Sweden and Finland, are among the most important wood-pulp producers.

34. A further general qualification of all figures for 1955 is necessary as a result of the usual tendency in forward estimates to exaggerate future requirements and to underestimate prospective production. Allowance for this error suggests that the 3 per cent. deficit between world requirements and production in 1955 shown in Table I is not likely to occur, and that a satisfactory balance between production and requirements may be anticipated for 1955 if the assumptions underlying the estimates in Table I are realized and the necessary pulp-wood is available.

35. Finally, it should be stressed that the figures listed for 1955 do not represent forecasts in the usual sense, but rather indicate expectations for the production and consumption of wood-pulp in individual countries. These expectations are based for many countries on the assumption of full employment and continued economic expansion, and are bound to undergo modification under the impact of subsequent developments, including considerations arising from the balance of payments of various countries. Moreover, forecasts may be revised in some important respects in the light of the findings of this Conference. Since it was the purpose of the Conference to attempt a regional and world-wide review of programmes for wood-pulp production and distribution, a revision of those expectations as a result of its findings would implement one of the major purposes which it hopes to achieve.

II. *Consumer Needs**

36. Pulp requirements arise from the needs of paper and other industries manufacturing an ever-growing variety of pulp products such as newsprint, other printing and writing papers, wrappings, paper-board, building-boards, rayon, &c. The output and hence the requirements of these pulp-processing industries is in turn determined by the effective demand of consumers for their products.

37. Without attempting an assessment of consumer needs for paper and other pulp products, the Conference felt that the trend of pulp requirements for the period 1948–55 as shown in Table I appears adequate to cover the needs of consumers in different parts of the world in terms of effective demand and purchasing capacity. It appears unlikely that substantially larger amounts of paper and other pulp products could be imported and bought even if they were available. On the other hand, the Conference was not certain whether pulp-production in 1955 would actually reach the projected levels, mainly on account of raw-material shortages in Europe and Japan, which are discussed later in this report.

38. A more detailed examination of needs for pulp products was beyond the scope of the present Conference. To assess these needs it would be necessary to consider not only the desirable and the possible trends in the consumption of paper for educational purposes and for packaging, and in the manufacture of rayon for clothing and for industrial purposes, but also to determine the extent to which the purchasing-power of consumers and the balance of payment of countries that import paper and rayon would make it possible to meet these needs.

39. Moreover, increasing amounts of straw, bamboo, waste paper, and other raw materials are used in addition to wood-pulp for papermaking, and all these materials must be taken into consideration in any attempt to establish a balance for paper and other pulp products. These additional raw materials, although of agricultural or forestry origin, were not included in the terms of reference of the present Conference, which was therefore unable to give to them that thorough consideration which their importance may justify.

*" Needs " is used in this section to indicate consumer requirements, irrespective of economic or physical possibilities for meeting them.

40. The Conference, however, received a message from the Director-General of UNESCO concerning the world needs for newsprint and other papers and noted his concern about the fact that cultural progress in the less-developed countries is delayed through inadequate supplies of printing-papers, while, in many of the more advanced countries, post-war shortages of paper still interfere with the normal functioning of the press and the restoration of educational facilities.

41. The Conference was unanimous in appreciating the importance of adequate paper-supplies for mass education and information and agreed that larger paper-supplies for these purposes are eminently desirable. Many delegates believe that an assessment of present and prospective consumer needs for pulp products would constitute a valuable supplement to the information on wood-pulp contained in the present report. They expressed the view that this matter should be considered by the FAO Council next June, including the advisability of undertaking the preparation of a study of the facts by the staff of FAO in co-operation with UNESCO, to be presented to the Fifth session of the Annual Conference of FAO. Some delegations reserved the right to question the jurisdiction of FAO and the advisability of its undertaking such a study at the present time.

III. *Production and Requirements*

42. In addition to the general reservations that apply to all forecasts of requirements (see paragraphs 32 to 34), the estimates of wood-pulp requirements in 1955 attempted by the Conference call for further qualification. For many years pulp-producers have attempted to integrate their operations with the manufacture of newsprint, paper-board, and a few other mass products in a continuous-flow operation. This tendency is not only in line with the general economic policy of countries to produce fully-manufactured rather than partially-manufactured products, but also tends to render the production process more efficient and to reduce shipping costs.

43. In pursuance of this policy the major pulp-producing countries have undoubtedly included in their forward estimates for pulp requirements provision for additional exports of finished products. This may reduce the export possibilities of countries which had hitherto imported substantial amounts of pulp for re-export in the form of paper and similar products, but it is unlikely that these reductions were fully considered by the latter group ; the requirement estimates in Table I might therefore be on the high side.

44. It should also be remembered that a number of less-developed countries are about to set up their own pulp industries, which would supply local paper-mills, which hitherto had to import all their wood pulp from Europe and North America.

45. The Conference believes that these tendencies toward the local integration of pulp and paper manufacture, while perhaps inevitable, may endanger the continued existence of converting industries in a number of pulp-importing countries. The Conference envisages the maintenance of pulp exports at levels which would permit the continued activity of existing pulp-converting industries, but calls attention to the danger of any expansion of pulp-converting industries in countries which do not have an assured and continuous supply of pulp from domestic or nearby sources.

46. With due consideration to the preceding qualifications, Table I indicates that pulp requirements in 1955 will be roughly 10,000,000 tons, or almost 40 per cent., higher than in 1948. This increase at an annual rate of almost 6 per cent. is indeed very substantial, especially when compared to an increase of only 3,300,000 tons, or 15 per cent., between 1937 and 1948, corresponding to an annual expansion of 1½ per cent. It is true that the past eleven years have been disturbed by a world war, whereas the forecasts for 1955 assume a period of peaceful expansion.

47. The Conference estimates show approximate equilibrium between world production and requirements for 1948 to 1955. If these figures are confirmed by subsequent developments there should be no major wood-pulp surplus or deficit during the period under review.

48. On the other hand, the estimates indicate a significant change in the world distribution of wood-pulp, as shown in Table II :—

TABLE II—REGIONAL WOOD-PULP SITUATION
(In percentages)

Regions	1937.		1948.		1955.	
	Consumption.	Production.	Consumption.	Production.	Consumption.	Production.
Europe	42	51	25	28	31	30
U.S.S.R.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Near East	*	*	*	*	*	*
North America ..	50	44	71	69	64	65
Latin America ..	1	*	2	*	2	1
Africa	*	*	*	*	*	*
Asia	6	5	2	2	2	2
Oceania	*	*	*	*	1	1
	100	100	100	100	100	100

N.A. = not available. * Less than 1 per cent

49. The Conference estimates indicate a change in Europe's position in the world pulp picture. Before the war this Continent was the major source of wood-pulp exports to the rest of the world with a net export of roughly 2,500,000 tons. At present Europe is still a net exporter of wood-pulp, although on a smaller scale, but according to Table I European requirements by 1955 would be in excess of European production. Such a situation, if it should develop, could be corrected by smaller over-all requirements or by such increases in the wood-pulp production in northern Europe as may be necessitated by economic circumstances and by consideration of commercial policy. Yet, according to general trends, each of the major regions of the world would have to supply by 1955 most of its own pulp, notwithstanding the possible continuation of certain trans-oceanic pulp shipments.

TABLE III—PULP-WOOD: WORLD MINIMUM REQUIREMENTS AND SUPPLIES

(Thousands of cubic metres, solid volume)

Country and Region.*	1937.			1949.			1955.		
	Consumption.	Cut.	Net Trade: Export, +; Import, −	Consumption.	Cut.	Net Trade: Export, +; Import, −.	Consumption.	Cut.	Net Trade: Export, +; Import, −.
Europe—									
Austria	..	1,900	+ 500	1,400	1,250	− 150	2,000	2,000	0
Belgium	..	0	− 180	256	0	− 256	256	0	− 256
Czechoslovakia	..	2,300	+ 370	1,236	1,800	+ 564	1,488	1,800	+ 322
Denmark	17	17	0	3	3	0	11	11	0
Finland	..	10,400	+1,540	7,500	8,000	+ 500	8,000	8,500	+ 500
France	..	600	− 800	1,960	910	−1,050	2,360	1,510	− 850
Germany	..	5,700	−3,140	..	..	..	..	..	..
Bizone	..	..	..	2,590	2,150	− 400	3,500	1,500	−2,000
French Zone	..	..	..	660	2,210	+1,550	1,030	1,030	0
U.S.S.R. Zone	..	..	..	1,660	1,660	0	1,961	1,961	0
Hungary	..	..	− 25	15	15	0	15	15	0
Italy	..	800	..	850	850	0	1,200	900	− 300
Norway	..	5,300	− 560	3,950	4,000	− 50	5,000	5,000	− 50
Poland	..	1,200	+ 340	800	800	0	1,200	1,200	0
Sweden	20,000	18,200	− 170	17,000	17,000	− 200	17,000	17,000	− 200
Switzerland	360	240	− 120	450	450	0	450	400	− 50
United Kingdom	..	..	− 330	210	8	− 120	510	0	− 510
Others†	..	1,300	− 420	1,000	1,000	0	1,300	1,300	0
Totals, Europe	..	47,957	−2,995	41,540	42,106	+ 388	47,281	44,127	−3,394
U.S.S.R.	..	6,700	+2,820	..	..	..	..	..	..
North America—									
Canada‡	16,925	20,787	+4,057	26,118	30,884	+4,766	28,247	31,798	+3,549
United States	26,505	20,000	−3,820	50,490	45,645	−4,845	64,856	59,872	−3,549
Totals, North America	43,430	40,787	+ 237	76,608	76,529	− 79	93,103	91,670	0
Asia—									
Japan§	..	3,500	..	1,700	1,647	− 53	3,400	1,800	−1,600

Oceania—									
Australia	..	0	0	311	311	0	555	555	0
New Zealand ..	..	0	0	30	30	0	530	530	0
Totals, Oceania ..	..	0	0	341	341	0	1,085	1,085	0
Grand totals ..	..	..	..	120,189	120,623	+ 256	144,869	138,682	−4,994

* Countries named in this list are those specified in work-sheet No. 6. † "Others" includes Portugal, Yugoslavia, Bulgaria, Rumania. Some of these may have export surpluses; but the group also includes the Netherlands which will require imports of at least 500,000 cubic metres by 1955. ‡ Includes Newfoundland. § Japan proper.

The forward estimates are based upon varying hypothetical assumptions as to prevailing economic conditions in the various countries of the world.

50. The Conference has tentatively estimated wood-pulp exports of the U.S.S.R. at 200,000 tons for 1955. It believes that this is a cautious estimate and that a substantially larger supply might be forthcoming from this source.

51. Between 1948 and 1955, North America's wood-pulp requirements show an increase of 4,500,000 tons, or 23 per cent., compared to an estimated 80-per-cent. increase for Europe and even larger proportional increases for Oceania, Asia, and Latin America. The gradual levelling off of the rising curve in North America's pulp requirements must be attributed mainly to the exceptional increase during the first post-war years, whereas, conversely, European output from 1946 through 1948 was restricted by raw-material shortages and other post-war conditions.

52. In 1955 world pulp-consumption may be roughly 50 per cent. higher than in 1937; but Europe's requirements for the same period may only be expected to increase by 14 per cent. and Asia's requirements may still be down by 40 per cent.

IV. *Raw Materials*

53. The Conference was in unanimous agreement that no pulp-factory should be built without being assured of a continuous supply of raw materials based on sustained forest yield. In general, pulp should be produced where mills can be supplied with pulp-wood in an economical way.

54. There are exceptions to this rule—*e.g.*, the transport cost of wet pulp is so high that it is cheaper to import pulp-wood; it also might be necessary to maintain in existence for social, political, and humanitarian reasons established pulp-mills which have to rely on pulp-wood imported from considerable distances. Such mills may eventually be able to replace imported pulp-wood with other raw materials from nearer sources, although such a replacement would presumably entail considerable investment in new equipment.

55. In this connection, progress in the manufacture of pulp from temperate-zone hardwoods, tropical woods, residual straws, and grasses warranted particular consideration by special working groups of the Conference.

56. A report containing FAO's summary on the world outlook for supplies of pulp-wood is attached as Annex IV of this report.

57. Table III reveals for 1955 a prospective trade deficit of some 5,000,000 cubic metres (m.3); additional imports of that magnitude would be needed to achieve the anticipated pulp-production of 36,300,000 tons. This trade deficit and the shortages of pulp-wood supplies in Europe and Japan do not mean that it would be impossible to attain by 1955 a world production of 36,000,000 tons of pulp or even more. But the figures assembled in Table III indicate that, unless prospective supplies of pulp-wood or other fibrous materials can be increased through large imports from the Soviet Union, or by technical improvements such as integration of forest industries, a considerable change in the location of pulp capacity may have to take place if the anticipated production is to be reached. To explore this problem further the Conference decided to review the position by regions.

58. *Europe.*—Last year's pulp-production in Europe was not quite two-thirds of pre-war, but by 1955 European nations expect to regain 90 per cent. of their pre-war output. This would require approximately 48,000,000 cubic metres (m.3) of pulp-wood, which, according to Table III, exceeds European pulp-wood supplies by roughly 3,400,000 cubic metres (m.3). This situation exists in spite of the fact that for the Continent of Europe taken as a whole forests are at present being overcut to the extent of 20 per cent. of annual growth. In some cases, however, and in particular in northern Europe, annual drain is in line with annual growth.

59. In pre-war years, Europe's pulp industry relied on an annual import of 3,000,000 cubic meters (m.3) of pulp-wood, which came almost entirely from present area of the Soviet Union. The Conference feels that a resumption of pulp-wood exports from the U.S.S.R. on the pre-war scale is unlikely.

60. In that case, Germany, France, and, to a smaller degree, the United Kingdom and Switzerland might be compelled to reduce their production below the 1955 estimates.

61. It should be stressed that if lack of pulp-wood compels European nations to reduce pulp-production approximately 1,000,000 tons, these countries might need to import more pulp or paper from the Western Hemisphere. If such additional imports were to offset the reduction in pulp output, the result at present prices would be a deterioration of Europe's dollar position by an amount well in excess of $100,000,000. If, on the other hand, European countries could find the necessary pulp-wood or other raw material to maintain production, such imports, if obtained from eastern Europe, would cause no dollar drain; if the pulp-wood were supplied from North America, it would create a dollar liability at the maximum in the order of $20,000,000 to $30,000,000.

62. It is possible that an increase in the raw-material supplies for European mills can be achieved to some extent by closer utilization of sawmill waste, greater use of hardwoods and alternative raw materials, the introduction of high-yield pulping methods, and possible diversion of some fuel-wood or other timber to the pulp-mills. The active programmes of research under way in Finland, Scandinavia, and other countries may lead to more efficient use of raw materials. Further wood-pulp capacity, either newly built or transferred from other areas, might be supported in certain central and eastern European countries which at present do not make full use of smaller wood from their forests or the wood refuse from their sawmills.

63. *U.S.S.R.*—No detailed information is available with regard to the pulp capacity or production of the Soviet Union. Before the war that capacity amounted to approximately 1,000,000 tons annually, and it is understood that great efforts are being made to expand the pulp and paper industry as rapidly as possible. It is known that the undeveloped forests of the Soviet Union are of enormous extent, consequently the prospects for future output are very high. On the other hand, Soviet reports indicate that the forests of western Russia were seriously overcut for many years prior to 1936 and war damage in the region was undoubtedly great. In consequence it is not impossible that all the pulp-wood that can be produced west of the Urals will be needed for domestic production.

64. *North America.*—The consumption of pulp-wood in North America increased by 82 per cent. from 1937 to 1948, and a further increase of 15 per cent. is anticipated by 1955. Canada exports large quantities of pulp-wood to the United States and small amounts across the Atlantic, but no pulp-wood is imported from other regions. It is believed that forest resources now accessible are capable of maintaining supplies of wood adequate for current production levels. From the medium and long-term points of view, great opportunities exist for still further expansion as more and more of the forest area is subjected to improved forest management and to more adequate protection against fire, insects, and diseases, and the industry makes greater use of hardwoods and wood now wasted and introduces high-yield pulping methods. In addition, there remain large forest areas not yet fully utilized, notably in the northern parts of Canada, Alaska, and portions of the Rocky Mountain area. Plans for bringing the forests of Alaska into production are already far advanced.

65. *Near East and North Africa.*—There is no wood-pulp production in this region because of almost complete lack of forest resources. The only country where small-scale development might be possible is Turkey. All paper requirements of the region must be imported.

66. *Africa (Except North Africa).*—A small quantity of chemical pulp is produced in the Union of South Africa, wood-supplies being obtained from plantations of "exotic" species. While it is understood that some expansion of capacity is contemplated in the Union, all of it will be needed for home consumption. In the remainder of the continent there are estimated to be about 300,000,000 hectares of forests of productive quality, but virtually the whole area is occupied by broad-leaved species. Much of it is tropical

rain forest. The problems of adapting such species to the commercial production of pulp have not yet been fully solved, nor had a systematic programme of research been undertaken until recently. The conference noted with great interest a report by the French delegation regarding the successful conclusion of experiments for the pulping of a considerable number of species. Mixtures of as many as twenty-four tropical species have been successfully digested in a commercial plant in France and sample lots of good paper have been made from the resulting pulp. A pilot mill is under construction on the Ivory Coast to determine the practical possibilities on a commercial scale.

67. *Latin America.*—The population of this region, estimated to be 150,000,000 people, is about equal to that of North America, yet pulp-production is very small. The larger part of it is carried on in Brazil and Mexico, and is based upon raw materials from local coniferous forests. Latin America, however, contains about 715,000,000 hectares of productive forest land, although only 3½ per cent. of this vast area carries conifer. Here, as in Africa, the possibilities for augmenting world pulp-supplies are enormous, providing that the social, technical, and economic problems connected with the utilization of tropical forests can be solved.

68. *Asia and Far East.*—Pulp-production in Asia fell from 1,200,000 tons in 1937 to 500,000 tons in 1948, largely because of the changed situation in Japan. Reports indicate that Japanese forests have for some years been heavily overcut, and until the benefits of reforestation have been realized the prospects for obtaining more pulp-wood is negligible. Plans to increase Japanese pulp output to 770,000 tons by 1955 depend on the possibilities of securing large imports of pulp-wood not yet in sight or on developing alternative raw materials such as rice straw.

69. In India at least one new pulp-mill is planned for erection in the near future, but in most parts of the country the local forest resources appear insufficient to support a large wood-pulp industry in addition to other demands of the increasing population. The Conference was advised that there are large forest resources of species highly suitable for pulp-manufacture in the north, and that the real difficulty at the moment is the lack of accessibility to such regions.

70. The situation in China precludes any estimate of future possibilities. It is believed that here again there are substantial forests located in areas very remote and difficult of access, but in the thickly populated areas the supplies of wood which might be converted into pulp are small. It is possible that substantial pulp-production may eventually be developed on the basis of bamboo.

71. In other countries of Asia, including Burma, Siam, Indo-China, Malaya, and the Philippines, there are extensive forests, but most of these are broad-leaved types. Indonesia also has vast tropical forests and, in addition, a considerable area of pine. Plans for a sulphate mill to be supplied by this pine were interrupted by the war, but are once more under active study.

72. *Oceania (Australia and New Zealand).*—The Conference was informed that the present small production in New Zealand of 24,000 tons annually is to be increased to 155,000 tons by 1955, and may eventually reach 250,000 tons. This development is made possible by the extensive "exotic" forests of insignis pine and other conifers, whose rate of yield under New Zealand conditions is phenomenally high.

73. Australia produced in 1948 94,000 tons of pulp, and expects to increase her output to 180,000 tons by 1955. This will be done entirely on the basis of domestic forests. In view of the active forestry programmes it seems possible that the principal countries of this region may eventually be able to supply all or most of their own requirements for pulp.

TABLE IV—WORLD PULP SITUATION, BY GRADES

(Thousands of metric tons)

Region.	1937.			1948.			1955.		
	Consumption.	Production.	±	Consumption.	Production.	±	Requirements.	Production.	±
				(a) Sulphite Pulp					
Europe	4,220	5,410	+1,190	2,370	3,055	+ 685	4,500	4,680	+ 180
Near East	..	..	..	..	..	..	20	20	..
North America ..	3,780	3,240	— 540	4,980	4,590	— 390	5,180	4,995	— 185
Latin America ..	120	..	— 120	215	30	— 175	270	115	— 155
Africa	..	..	..	..	..	..	35	30	— 5
Asia	920	560	— 360	200	195	— 5	460	380	— 80
Oceania	45	..	— 45	15	..	— 15	85	..	— 85
World totals ..	9,085	9,210	+ 125	7,780	7,870	+ 100	10,550	10,200	— 300
				(b) Sulphate Pulp					
Europe	1,000	1,820	+ 820	1,120	1,600	+ 480	2,370	1,970	— 400
North America ..	2,780	2,230	— 550	6,440	6,200	— 240	8,930	9,285	+ 355
Latin America ..	20	..	— 20	115	45	— 70	180	45	— 135
Africa	..	..	..	..	..	..	5	..	— 5
Asia	75	75	..	15	25	+ 10	80	40	— 40
Oceania	..	..	..	75	40	— 35	165	175	+ 10
World totals ..	3,875	4,125	+ 250	7,765	7,910	+ 145	11,730	11,515	— 215
				(c) Mechanical Pulp					
Europe	4,040	4,320	+ 280	2,700	2,650	— 50	4,335	3,850	— 485
Near East	5	5	..	5	5	..	10	10	..
North America ..	4,875	4,800	— 75	6,295	6,240	— 55	6,370	6,385	+ 15
Latin America ..	60	..	— 60	120	115	— 5	235	205	— 30
Asia	415	455	+ 40	275	280	+ 5	360	400	+ 40
Oceania	..	..	..	45	45	..	140	125	— 15
World totals ..	9,395	9,580	+ 185	9,490	9,335	— 105	11,450	10,975	— 475

The forward estimates are based upon varying hypothetical assumptions as to prevailing economic conditions in the various countries of the world.

TABLE V—WORLD PULP SITUATION—DISSOLVING PULP: PRODUCTION AND CONSUMPTION

(Thousands of metric tons)

	1937.		1947.		1948.	
	Production.	Consumption.	Production.	Consumption.	Production.	Consumption.
Europe	490	400	494	453	599	538
North America	400	180	574	538	619	554
Latin America	..	5	5	25	3	29
South-east Asia	60	428	32	38	41	56
Oceania	..	..	..	..	..	..
Totals	950	1,013	1,105	1,054	1,262	1,177

	1949.				1950.				1955.			
	Production.		Consumption.		Production.		Consumption.		Production.		Consumption.	
	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.	Minimum.	Maximum.
Europe	704	754	677	719	981	981	781	832	1,159	1,159	1,119	1,149
North America ..	586	604	477	590	627	640	499	635	823	914	629	714
Latin America ..	3	3	35	35	5	5	40	40	15	15	64	64
South-east Asia ..	40	40	100	100	80	80	150	150	80	80	150	150
Oceania	..	..	..	..	..	..	..	..	..	..	5	5
Totals ..	1,333	1,401	1,289	1,444	1,693	1,706	1,470	1,657	2,077	2,168	1,967	2,082

The forward estimates are based upon varying hypothetical assumptions as to prevailing economic conditions in the various countries of the world.

V. *World Trade in Wood-pulp*

74. In 1948 world trade in pulp was still only around 70 per cent. of pre-war. The reduction was attributable entirely to Europe with exports below 60 per cent. of 1937 and imports on a slightly higher level.

75. Despite this decline, Europe remains the centre of world pulp export trade. In 1937 pulp exports came from only two regions, and, of these, Europe accounted for 80 per cent., with North America contributing the rest. It should be stressed that both in Europe and in North America most of the pulp trade takes place within each continent. Before the war only a very slight percentage of North America's pulp exports were exported from this continent, and less than one-third of European exports went overseas. Yet with these exports Europe, and in particular the Scandinavian countries, practically covered the pulp import needs of the rest of the world.

76. In 1948 Europe's pulp exports had fallen from 80 per cent. to 60 per cent. of the world total, but were still roughly twice as high as North America's. Since most of North America's pulp exports continued to move between Canada and the United States, Europe retained its position as the major source of market for all continents except North America.

77. Conference estimates indicate a gradual expansion of world pulp trade. In 1949 and 1950 it is anticipated that total exports will remain around 80 per cent. of pre-war, but they are expected to exceed the 1937 figures by some 10 per cent. around 1955. Of that total Europe would account for not quite 60 per cent. and the remaining 40 per cent. would be contributed by North American exports. If this assumption proves right, it would mean that North American pulp exports would no longer be mainly confined to intra-continental movements.

78. At present, monetary restrictions, currency fluctuations, and artificial exchange-rates are distorting the distribution of market pulps throughout the world. Until some over-all solution of these distorting factors is achieved, both producers and consumers of wood-pulp everywhere face constantly changing conditions which interfere with normal trade.

VI. *Supply and Requirements by Grades*

79. The figures of estimated production and requirements to 1955 show an equilibrium. When reviewed by regions, however, the same general tendency is revealed showing that Europe's requirements will rise more rapidly than prospective production and an apparent deficit for Europe is shown for 1955 in sulphate and groundwood. The apparent deficit in groundwood, on a basis of figures submitted as minimum requirements, is only 3 per cent., and as there are virtually no trans-oceanic exports of groundwood it is felt that this margin, which may well be a statistical margin, will correct itself.

80. The apparent deficit in sulphate is in the order of 3 per cent., on a basis of estimated minimum requirements. It is not clear how much of the stated requirement for sulphate is bleached or semi-bleached grades which are replaceable by sulphite. Possibly European production, especially in Finland, is underestimated, and a combination of this factor plus the interchangeability of some part of the requirements to sulphite might correct the deficit.

VII. *Dissolving Pulp*

81. If the estimates made by the Conference are realized, the largest percentage increases will be in dissolving pulp, consumption of which has increased from about 1,000,000 tons in 1937, and about the same figure in 1947, to approximately 1,200,000 tons in 1948, and is expected to increase to nearly 1,400,000 tons in 1949, to over 1,500,000 tons in 1950, and to the neighbourhood of 2,000,000 tons in 1955. In spite of this rapid increase in consumption, Table V indicates that production may be expected to keep pace with demand, any apparent differences between the two being well within

the margin of error of the estimates. The only major deficiency areas are likely to be Latin America and south-east Asia, but it would appear that their requirements can be met from North America and Europe.

82. In considering this apparent coincidence of supply and demand it must be remembered that both the production and the consumption estimates are subject to a considerable margin of error.

83. On the production side the figures assume that there will be a substantial revival of production in Germany and Japan, the former being assumed to produce two-thirds and the latter over half of its requirements of dissolving pulp. In Scandinavia the estimates, compared with 1937, show a large-scale diversion of sulphite capacity from paper grades to dissolving grades. As regards North America, account has been taken of contemplated increases in capacity which might not be implemented.

84. On the consumption side the possibilities of error appear to be equally great. In Germany, Italy, and Japan, both production and consumption expanded enormously during the war in order to make good the loss of supplies of natural fibres, imports of which were cut off. Much of this capacity still exists, but it is particularly difficult to estimate how far it will be used. Moreover, the estimates of consumption in most major rayon-producing countries are based on export estimates which will probably prove to be mutually inconsistent, in the sense that the sum of their projected exports may well exceed substantially the level of total world import demand.

PART IV—APPLICATION OF CONFERENCE CONCLUSIONS TO NEW ZEALAND

General

(1) It appeared to the New Zealand Forest Service on receipt of the original agenda providing for an inquiry into the adequacy or otherwise of pulp and newsprint supplies over the period 1949–60 that such an investigation could be soundly based only on studies of long-term trends not merely in *per capita* consumption and population growth, but also in the price of pulp-wood and substitute materials and of the manufactured products. Not until the opening session of the Conference did it become clear to the New Zealand delegation that, with the interim decision to limit the Montreal discussions to pulp alone over the restricted period 1949–55, its members must assume the responsibility for collecting the basic data upon which the Government could be recommended to confirm or otherwise its decision to proceed with the Murupara project for the production of newsprint and sulphate pulp. It was therefore agreed that, while the Director of Forestry should concentrate on the affairs of the Conference, the Hon. the Commissioner of State Forests and Mr. S. J. Robinson should take advantage of every opportunity which offered of conferring with prominent executives in the pulp and paper industry in the vicinity of Montreal, and of forming their conclusions regarding the future economics of the world pulp and paper industry in general and of newsprint and sulphate production in particular.

World Wood-pulp Trade, 1949–55

(2) Perusal of the preceding section of the report presenting the outstanding conclusions of the Montreal Conference adequately ventilates the complexity and uncertainty of the wood-pulp trade in the immediate future. The possible sources of error and the admitted unreliability of forecasts referred to throughout the findings of the Conference might be thought to negative the value of the conclusions in paragraph 19 that there is likely to be an approximate equilibrium between world production and requirements for 1948–55 and that unless interim developments operate to the contrary there should be no major wood-pulp surplus or deficit during the period under review. At first sight this statement could certainly not be regarded as encouraging the establishment of any new

pulp and paper project. On the other hand, it must be remembered that this particular finding is based on the assumption that numerous new projects, including those in New Zealand and Australia, will meantime come into production. The possibility cannot be ignored that even if effective demands have been overestimated, failure to proceed meantime with these new projects could create a significant deficit or shortage. It was concluded by the New Zealand delegation that, whilst this general finding of the Conference did not exactly encourage new projects in New Zealand, it should not discourage them. Under these circumstances it became of vital importance that the delegation itself should endeavour to make those long-term studies of consumption and price trends for both newsprint and pulp which it had originally anticipated would be undertaken by the Conference. It was convinced that only by such studies could the Government be recommended to proceed with the Murupara project.

1947–48 Investigations

(3) As a background to this study the delegation had the views of the Director of Forestry as a result of his investigations in both northern Europe and North America in 1947–48. On his return to New Zealand early in 1948 he had predicted that in the case of both pulp and paper products supply and demand would soon be in balance, and that prices accordingly could be expected to fall significantly within the near future. At the same time, it was doubtful if world capacity in the pulp and paper trade would be sufficient to meet world demand once currency difficulties were overcome and normal international trading relations restored. Although the basis contract price for newsprint (*$104 per short ton of 2,000 lb., delivered New York) has not altered meantime, the fantastic spot market for this product (reaching as high as $250 per short ton) which has ruled since the end of World War II has now virtually disappeared, and pulp prices generally have been materially reduced. It was necessary accordingly for the delegation to further examine the future of these important commodities.

Wood Pulp Conference and Newsprint

(4) Although the original agenda for the Montreal Conference had contemplated study of the newsprint position, the amended and final agenda adopted by the Conference confined discussions to wood-pulp. The only mention of newsprint during the Conference was in the official message from the Director-General of UNESCO urging the importance of making an adequate supply of newsprint available to all countries. This message served to highlight one of the apparent anomalies under which the Conference was convened and conducted. It was initiated by the Department of Economic Affairs of UNO, FAO, UNESCO, and ECE (Economic Commission for Europe) because of *fears of a continuing shortage of newsprint and pulp*, but held in a country—Canada—in which the pulp and paper producers *feared not a shortage, but a surplus.* As consideration of the findings of the Conference has shown, the explanation of these differing views lies in the time element. For the time being, while the effective demand due to currency difficulties is so much less than the potential demand, there is little doubt that with some recession in trade in the United States of America there is a very definite world surplus of pulp. If the current trade recession in the United States of America were to become really serious there would undoubtedly be a very large surplus of pulp and ultimately some temporary surplus of newsprint. In contradistinction, it is equally true that if currency difficulties were resolved and the full potential demand of all countries realized there would be little surplus pulp and a real shortage of newsprint.

* The equivalent price landed in New Zealand main ports is £52 15s. per long ton, *c.i.f.e.* (at $2·80 to the pound). It was only £36 15s. at $4·03 to the pound.

World Newsprint Supply

(5) On this subject the New Zealand delegation experienced little difficulty in arriving at sound conclusions. This was largely due to the enormous amount of valuable basic data published by both the Newsprint Association of Canada and the Newsprint Service Bureau of New York. The most important of this data is recorded for public information in the Appendix to this report (see pages 78–80). For the purposes of convenience all this data is retained in the original form of short tons (2,000 lb.), which are also the basis of price quotations on the world markets. As a result of studying this data and similar information collected by the Forest Service in connection with the newsprint position in New Zealand and Australia the New Zealand delegation observes as follows:—

(*a*) *Dominance by Canada*

That world newsprint-production is completely dominated by Canada with 46 per cent. of capacity and 55 per cent. of current production, and that there is little, if any, likelihood of this being significantly altered in the foreseeable future. The next most important producing group, with 11 per cent. of world capacity—the Baltic countries—is tending to conserve its pulp-wood supplies for the production of the higher grades of pulp and paper because of the greater margin of profit in converting them for such purposes. Great Britain and the United States of America each possess about 9 per cent. of world capacity. If Russia becomes a significantly larger producer, much of its increased production will be required domestically. Increased production will certainly develop in the southern States of the United States of America, but will be limited by the fact that, enormous though the forest resources of this region are, the greater part has already been taken up for the development of other sections of the pulp and paper industry, though the possibility cannot be ignored that if sulphate prices fall to fantastically low levels for a great length of time some production might switch ultimately to newsprint if its price remains relatively stable, as appears quite feasible. In any event, Canada possesses additional pulp-wood resources sufficient to maintain dominance for many years as demands increase.

(*b*) *Decreased World Capacity*

That world capacity which fell from 10,500,000 short tons pre-war to 9,400,000 in 1946, has recovered to only 10,100,000 short tons annually and that the manufacturing capacity of all important producing areas other than Canada and possibly Russia has decreased. This applies to both the United States of America and Scandanavia. The new manufacturing capacity in other countries has been of insignificant proportions. Loss of capacity has been due in both the United States of America and Europe to conversion of some machines to other purposes and in some European countries to war damage. The most startling fact, however, is that even in Canada itself only one new mill has been built since 1930, and in addition only two new newsprint machines installed in mills established prior to that date, though some further capacity has resulted from modernization and speeding up of old machines, &c. As shown in Table 1 of the Appendix, Canadian newsprint-mills operated at relatively low percentages of their capacity for many years. This same table shows that their capacity increased from 1,700,000 to 3,800,000 short tons between 1925 and 1931, but expanded to only 4,600,000 by 1949, or only about one-third the amount in a period three times as long. It was this basic fact which led the New Zealand Forest Service to believe that world demand had long ago overtaken surplus capacity.

(*c*) *Inadequate World Capacity*

That the Canadian authorities themselves estimate world newsprint-manufacturing capacity at 10,100,000 short tons, production at 8,600,000, and consumption or effective demand at 9,000,000, but the world potential demand on a basis of unrestricted trade

at 10,500,000 short tons. Capacity would therefore fall short of unrestrained demand by 400,000 short tons, but even with idle capacity of 1,500,000 short tons there is a shortage of 490,000 short tons due to the non-coincidence of capacity and demand in the same countries. This is shown in Table 3 of the Appendix. Lack of raw materials is the principal cause of idle capacity, and in view of the Conference conclusion (see paragraph 59) that a resumption of pulp-wood exports from the U.S.S.R. on the pre-war scale is unlikely it is not improbable that a significant portion of this idle capacity will convert to other purposes and further reduce world capacity below potential demand. On this basis world capacity may be more than 700,000 short tons below current potential demand.

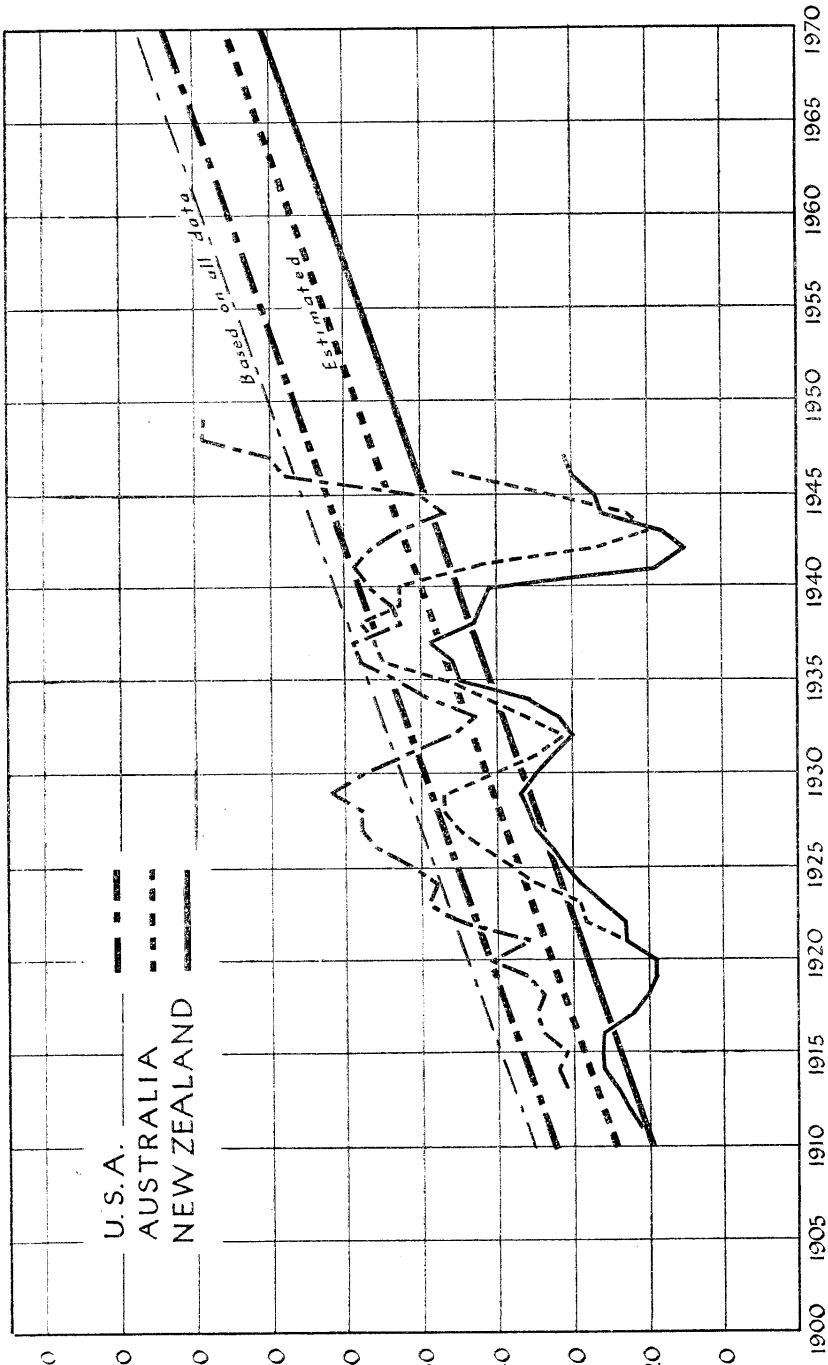
(*d*) *Increased Capacity Required*

That the foregoing facts alone offer strong *prima facie* evidence *that on the assumption that normal international trading relations will be restored within, say, seven years, a substantial amount of new manufacturing capacity will be required* to meet not only to-day's potential demand, but that increased demand which will arise from the continued growth in *per capita* consumption and population. As will develop later, this necessary extra capacity will be of the order of over 1,000,000 short tons.

(*e*) *Long-term Trends in Newsprint Consumption*

That *per capita* and population trends must be used as a basis for the study of future markets. Various long-term trend lines of newsprint consumption in the United States of America and New Zealand as mathematically developed by the New Zealand Forest Service are shown in Graph 1. The Australian data covers too short a period to be regarded as completely authoritative, but there appears to be little doubt that a trend line for that country will closely parallel those for the United States of America and New Zealand, and on this basis an estimated trend line for Australia has been developed. Their parallelism indicates that the basic factors affecting the use of newsprint were very similar in these countries for the period under review. World War II, however, had such widely differing effects upon newsprint-consumption in the three countries that, with the exception of that for the United States of America, trend lines inclusive of war period data show no approach to parallelism or normality. Those for both Australia and New Zealand, being based on discontinuous and non-homogeneous data, must, in accordance with statistical principles, be discarded in favour of the parallel trend lines based on pre-war data. An endeavour was made to develop a valid argument based on fundamental long-term economic trends in the United States of America, and on the impact of radio and television on newspaper advertising which would warrant the adaptation of a curve rather than a straight line to the United States of America data to indicate a falling off in the rate of increase in *per capita* consumption. That such an occurrence must develop sooner or later is inevitable, but no evidence that it will be in the near future was found, and, in any event, it would not materially reduce straight-line estimates of total consumption in the foreseeable future.

Studying the cyclic variation of the basic United States of America data, current consumption is above the pre-war trend line for the fourth year in succession, whereas in the last boom period it remained so for eight years. And in 1949, as in 1929, advertisers are using newsprint to bolster up declining sales of both durable and non-durable goods, so that the usual lag in newsprint consumption on the downturns of general trade may be expected to keep demand above the trend line for a year or two at the least. Certain basic factors indicate it should be even longer. In the previous boom period the decline in general trade set in early in 1928, so that newsprint demand did not recede to the trend lines for three years. But the preceding boom period was characterized by blue-sky stock exchange speculation on margins, by similar speculation in both rural and urban property, by excessive inventory accumulation, by non-payable farm prices, and



GRAPH 1—PER CAPITA CONSUMPTION OF NEWSPRINT IN AUSTRALIA, NEW ZEALAND, AND UNITED STATES OF AMERICA

Basic data and mathematically developed trend lines for New Zealand and United States of America. Basic data and estimated trend line for Australia. Except as noted for United States of America, trend lines are based on pre-war data.

by a weak banking position. On this occasion there is not one of these weaknesses which has not been materially strengthened meantime and for which there is not some form of governmental support or cushioning. The probability is that newsprint demand will not fall below the trend line for four years at the least.

By the same argument, these cushioning facilities should tend to hold any future dip below the trend line to a very moderate recession in *per capita* consumption. The whole purpose of modern economic and political planning is directed towards the attainment of normality and it is not unlikely that, as in the pre World War I period, the actual *per capita* rate will parallel the trend rate for a long period but very little below it. It is, of course, not impossible, as some Canadian producers fear, that a future dip below the trend line might be considerable in extent, but this could only occur in the event either of a war or of a slump of the magnitude of that of the " thirties." With Russia forced by internal policies to be continuously difficult in the international field and other countries thereby compelled to rearm, war is highly improbable. Another slump of the " thirties " vintage is even more improbable. No Administration would even dream of allowing such a recession to develop, but would suitably correct unemployment at a much higher level of consumptive power in order to arrest any dangerous drift to Communism such as would undoubtedly occur in the event of chaotic unemployment. On balance the evidence is clearly in favour of an approach to normality and not to a serious decline in newsprint consumption.

(*f*) *North American Capacity*

That a searching study of this subject is essential as a background to the study of future newsprint prices. As evidenced by Graph 2, North American producing capacity has remained virtually constant ever since 1930 at between 5,500,000 and 6,000,000 short tons annually. Meantime, the United States of America *per capita* trend figures show an increase of over 15 lb., giving a total consumption increase for both Canada and United States of America of over 1,200,000 short tons. In addition, other countries than the United States of America, despite their extreme difficulties in securing Canadian dollars, are now reported as buying from that Dominion and Newfoundland some 500,000 short tons annually, as compared with only 260,000 short tons during the depth of the depression. Whatever, therefore, may have been the true excess North American capacity in 1931, it is now less as judged by trend lines and increased supplies to other markets by 1,500,000 short tons. Some idea of that excess capacity may be obtained by a study of both United States of America and Canadian production around that period. As more Canadian mills were built with access to cheaper pulp-wood, so the American mills switched to other lines, America reaching its peak production in 1926 and Canada its temporary peak in 1929. As Canadian mills over this period had an operating ratio of over 86 per cent., but fell to 70 per cent. in 1930, it is probable that real surplus capacity was not created until the end of 1927. Probably the construction of much of this surplus was committed before the fall of prices in 1928 below the $67·5 level, confirming the conclusion that the real surplus is the difference between the 1927 and 1931 Canadian capacities, amounting to 1,350,000 short tons (see Table No. 1 of the Appendix). The subsequent increase of 775,000 short tons in Canadian capacity has been largely offset by further reductions in United States of America capacity, which now amounts to only 870,000 short tons, as compared with 1,770,000 in 1926 and 1927. It is clear that no excess capacity now remains in the North American industry, but has been converted into a deficiency.

When further account is taken of the importation of between 250,000 and 300,000 short tons of European newsprint, there is a real deficiency in North American capacity against current North American demand. Neither should sight be lost of the fact that

GRAPH 2—NORTH AMERICAN AND CANADIAN NEWSPRINT CAPACITY

The increase in Canadian capacity, which has been effected more by modernization of old plant than by new installations, has been offset by a corresponding decrease in United States of America capacity.

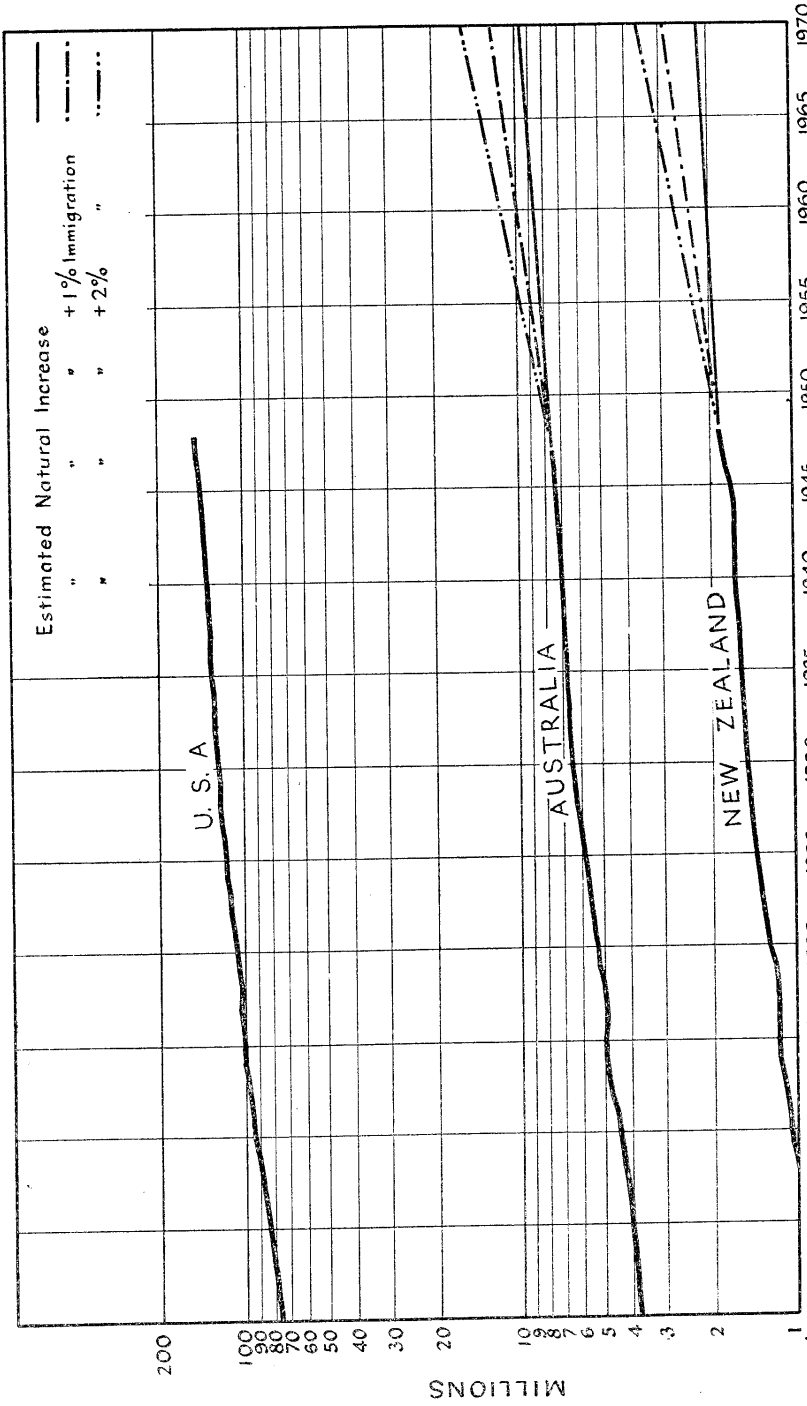
for three years the Canadian industry has been operating at about 102 per cent. of rated capacity and that for long-continued operation a 95-per-cent. ratio is probably as high as can be safely maintained, having regard both to equipment life and to the safeguard of consumer interests. Even now some equipment may have already been operated above capacity for so long as to endanger its future performance and may ultimately have to be retired or converted to other lines under the impact of high operating-costs and/or price reductions as well as of physical limitations. Again, only one or two years of bad logging-conditions could create a significant shortage if consumers continue to rely on an industry geared to such a high operating ratio. The average annual rate of Canadian expansion of capacity since 1925, amounting to about 110,000 short tons, is expected to continue until 1950, whilst, in addition, one new United States of America mill is expected to come into production that year with a capacity of 100,000 short tons. These developments will cover little more than increasing demands on a trend basis. An annual increase in population of over 1,000,000 at even the *per capita* trend figure of 70 lb. involves an increased annual consumption of about 40,000 short tons, whilst the annual trend increase of about 0·8 lb. *per capita* involves another 60,000 short tons.

Looking forward to 1953, the worst possible, even though improbable, condition is that Canada and Newfoundland would be unable to sell elsewhere any more than the 400,000 to 500,000 short tons now currently exported. If at the same time the United States of America *per capita* demand were to fall to the trend line in that year the United States of America would still require 5,140,000 short tons (based on 69½ lb. and 148,000,000 people). This would give a total business of about 5,850,000 short tons (inclusive of a reduced Canadian demand) to North American mills with a rated capacity of about 6,400,000 (presuming capacity continues to increase during the interim at the rate of 100,000 short tons annually). Under these conditions mills would still be operating at as high a ratio as 91 per cent. As Marshall Aid and the subsequent improvement in European-American trade must to some extent stimulate newsprint consumption in and exports to Europe, it is probable that mills will operate at a still higher ratio.

It is an inescapable conclusion that, taking a reasonably hopeful view for an eventual return to normal international trading conditions, newsprint capacity in North America is likely to prove quite inadequate. The end-of-1948 estimates by the Canadian newsprint interests showed a deficiency of about 280,000 short tons between supply and demand for 1949, even allowing for the importation of about 250,000 from Europe, making a total deficiency of 530,000. To this should be added a 5-per-cent. reduction (to a 95-per-cent. operating ratio) on the rated capacity of 6,000,000 short tons, making an additional 300,000, and bringing the total to 830,000. With a substantial increase in North American exports to world markets and to replace production lost elsewhere through lack of Russian pulp-wood, the real deficiency might well approach 1,000,000 short tons.

New Zealand and Australian Demand for Newsprint

(6) The most important conclusion to be drawn with complete confidence from the parallelism of the trend lines in Graph 1 on page 32 is that both New Zealand and Australia must plan against a material increase in newsprint consumption. The *per capita* usages and trend figures for the two countries are so far below those for the United States of America that this is an absolutely inescapable conclusion. The average New Zealander is barely using as much as the average American did pre World War I, and at his trend figure would still use only as much as the American in 1925. Usage by Australians is only the same as by American in 1925. Usage by Australians is only the same as by Americans in 1922, and at the trend figure the same as in 1927. New



GRAPH 3—POPULATION TRENDS IN NEW ZEALAND, AUSTRALIA, AND UNITED STATES OF AMERICA, WITH PROJECTION ON THREE ALTERNATIVE BASES FOR AUSTRALIA AND NEW ZEALAND

Zealand is now using in 1949 only just over 30 lb. *per capita* and Australia about 45 lb., as compared with 79 lb. in the United States of America. The trend requirements of the three countries are respectively 52 lb., 58 lb., and 66 lb. Graph 3 shows corresponding population trends.

On a total consumption basis New Zealand and Australia are using respectively only 24,000 and 150,000 long tons, compared with trend figures of 42,000 and 205,000 long tons. Independent support of these figures is forthcoming from one of the official publications of the Canadian Newsprint Association which estimates that, on a basis of unrestricted trade, New Zealand and Australia would require for 1949 37,000 and 224,000 long tons respectively, as compared with a likely restricted demand of 29,000 and 107,000 long tons.

The discrepancies between the Forest Service and Canadian estimates are due in the case of the New Zealand figures to the fact that current usage is less than anticipated by Canada, due to the interim worsening of the dollar exchange position, and the trend figure does not take account, as the Canadians may have done, of the prevailing tendency among New Zealand newspaper-proprietors to favour smaller papers than pre-war. The Forest Service, however, inclines to the view that once ample supplies of all consumer goods are available pressure by advertisers is likely to increase requirements at least to trend levels.

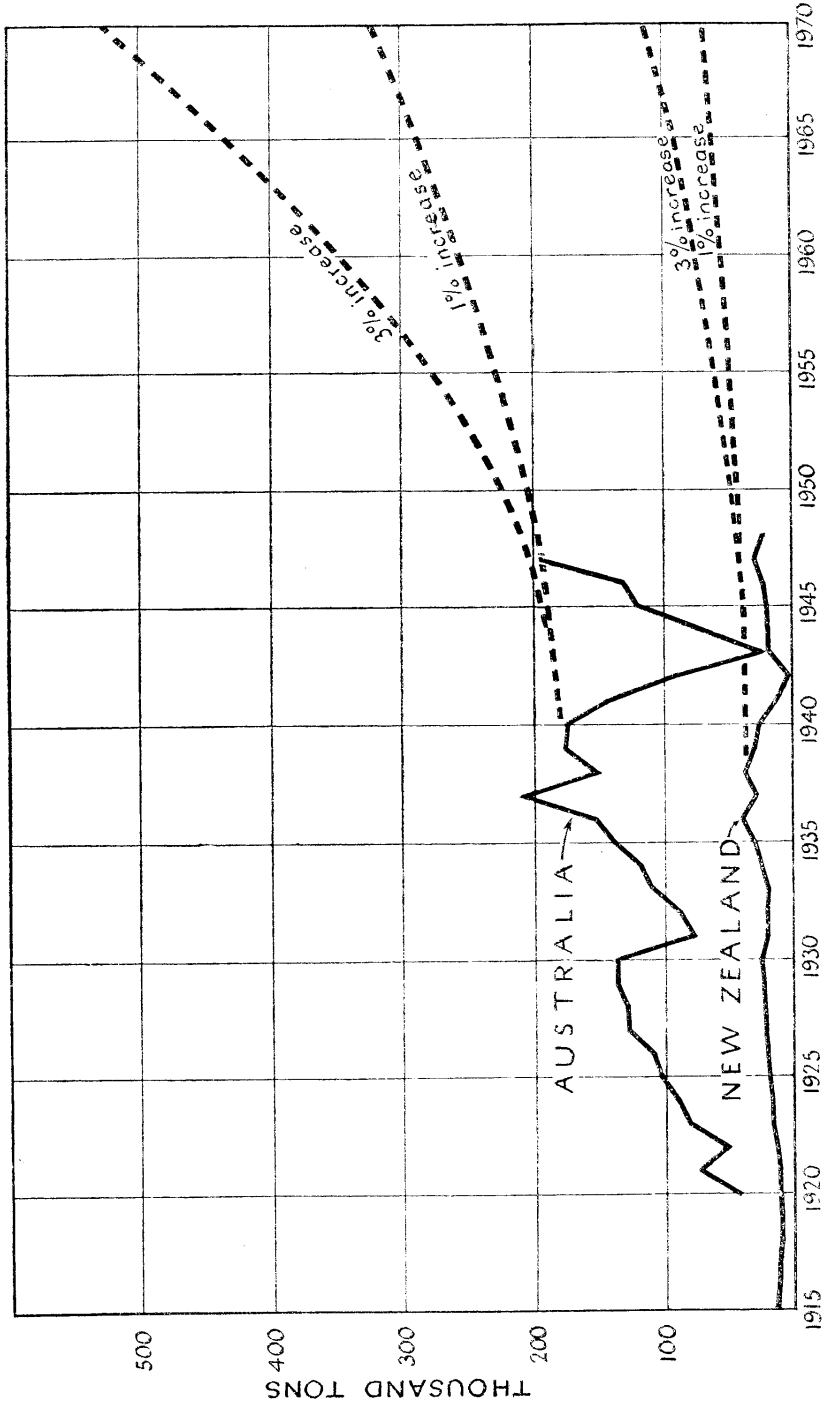
In the case of the Australian figures, current usage is higher than estimated by Canada, due to the fact that since the preparation of the estimates Commonwealth users have been able to purchase substantial extra quantities from Scandinavia. As to potential usage on an unrestricted demand basis, Australian newspaper authorities themselves estimate this at 300,000 long tons, which is well above the trend figure of 205,000 long tons, but resembles the present United States of America usage, which is 14 per cent. above its trend figure.

(*a*) *Shortage of Newsprint in New Zealand and Australia*

That the real significance of the preceding discussion on newsprint demand may best be gauged from the accompanying Table VI, which summarizes the various estimates used. It shows that *New Zealand to the extent of between 8,000 and 18,000 long tons annually* and *Australia to the extent of between 55,000 and 150,000 long tons now go without newsprint due to currency difficulties, &c.* Graph 4 further shows that over the period 1946–60 the average increase in annual tonnage required will vary for New Zealand from 1,000 tons for the expected natural increase in populaton alone to 2,000 tons for the natural plus a 2 per cent. immigrational increase, and for Australia on the same basis 5,000 tons and 10,000 tons respectively.

(*b*) *Extra Newsprint Capacity Required in South Pacific*

That these figures also offer strong *prima facie* evidence that extra *manufacturing capacity is required where both New Zealand and Australia may freely purchase newsprint even if normal international trading is not revived.* At this stage in its argument the delegation uses the word " required " and not " warranted." Again as a complementary conclusion it would appear that with demand so much in excess of restricted supply, *users should be prepared to pay a reasonable premium above world parity if this be essential in order to ensure the installation of extra local capacity.*



GRAPH 4—NEWSPRINT CONSUMPTION IN NEW ZEALAND AND AUSTRALIA

Basic data and projections based on population and *per capita* trends shown in Graphs 1 and 3.

TABLE VI—CURRENT SHORTAGE OF NEWSPRINT IN NEW ZEALAND AND AUSTRALIA DUE TO CURRENCY DIFFICULTIES, ETC.

(Long tons)

Country. (1)	Basis of Estimate. (2)	Current Usage. (3)	Potential Usage. (4)	Shortage. (5)
New Zealand ..	Trend	24,000	42,000	18,000
	Canadian	29,000	37,000	8,000
	New Zealand newspapers ..	24,000	37,000	13,000
Australia	Trend	150,000	205,000	55,000
	Canadian	107,000	224,000	117,000
	Australian newspapers	150,000	300,000	150,000
New Zealand & Australia	Trend	174,000	247,000	73,000
	Canadian	136,000	261,000	125,000
	Australian and New Zealand newspapers	174,000	337,000	163,000

(c) Extra Newsprint Capacity Essential to Security of South Pacific

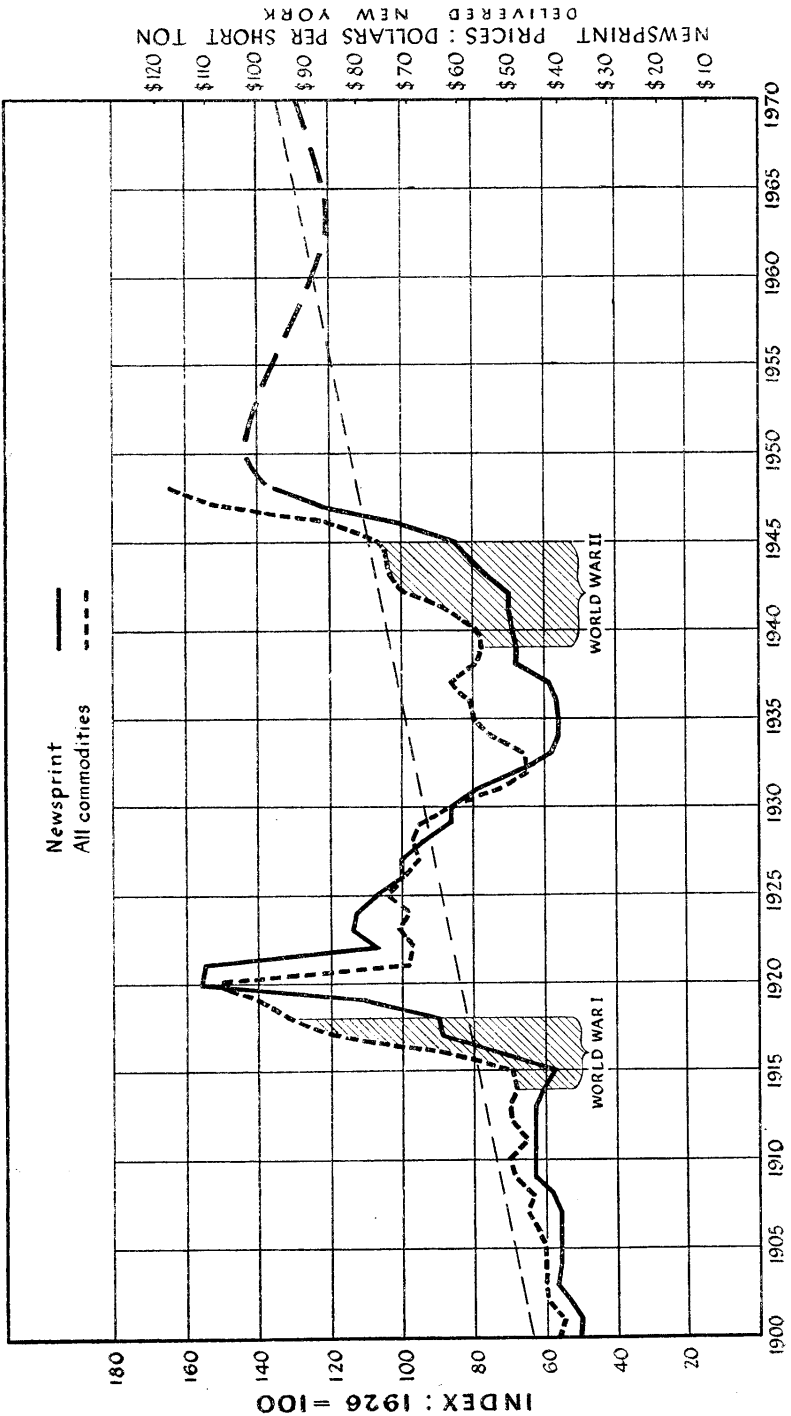
That, aside from normal economic considerations, the desirability of greater newsprint capacity in the interest of security in the South Pacific indicates that the Murupara project deserves special consideration as offering a more assured and concentrated supply of pulp-wood than any other location in either New Zealand or Australia. No other area possesses either as high a standard of fire protection or such a wide diversity of species and reserve supplies for the sustained operation of a pulp and paper plant as the Murupara working circle of Kaingaroa State Forest.

WORLD NEWSPRINT PRICES

(7) The extraordinary volume of basic data again available from the Newsprint Association of Canada and the Newsprint Service Bureau of New York and, in addition, from United States of America Government sources facilitated the inquiries of the New Zealand delegation. As the basis contract price for Canadian newsprint delivered New York City has been almost universally used for many years as the basis of sale for most exports of the Canadian product to other markets and in turn for competing British and Scandinavian newsprint, it has been necessary to study only the long-term trend of delivered New York prices. Table No. 2 in the Appendix, which shows that over the last twenty-two years the United States of America has used a minimum of 39·4 per cent. and now uses over 60 per cent. of the world supply, serves to explain why the New York delivered price dominates the newsprint-supply situation. The New Zealand delegation observes :—

(a) Long-term Newsprint and General Price Trends

That any basic approach to the subject of future newsprint prices must include a study of long-term trends in both newsprint and general commodity prices. In the "thirties" Professor Streyffert, who is now head of the Royal School of Forestry at Stockholm, made a monumental analysis of the long-term price movement of sawn wood goods and general commodities in Europe. As a result it was conclusively proved that prices of forest products moved in sympathy with general commodity prices and that in spite of widespread fears from time to time that forest resources were being exhausted these were not reflected by any long-term tendency for prices of forest products to increase at a greater rate than general commodity prices. Graph 5 shows the movement of newsprint and general commodity prices from 1900 onwards. With negligible exceptions newsprint prices have lagged consistently and appreciably



GRAPH 5—PRICE MOVEMENTS IN UNITED STATES OF AMERICA: NEWSPRINT AND GENERAL COMMODITIES
Basic data, together with mathematically developed trend line for general commodity prices.

behind the movement of commodity prices. The explanation appears to be that on the upturns increased sales of general commodities with inherent price increases are required to stimulate sales of newsprint, behind which lags its own inherent price increase, while on the downturns sellers of general commodities still persist with their efforts to stimulate sales on a falling market, so temporarily maintaining newsprint demand and price at a higher level than that of general commodities. The same tendencies further explain the lack of sensitivity or response of newsprint prices to very short-term movements in general commodity prices.

It will be observed that the only period during which newsprint prices remained consistently above general commodity prices was from 1921–27, confirming the conclusion already arrived at that real excess capacity was not created until after 1927, by which year Canadian capacity had increased to only 2,475,000 short tons, as compared with the 3,825,000 which it attained in 1931—a difference of 1,350,000 short tons. Referring also to Graph I and Table 1 of the Appendix, it is to be noted that for the period 1930–31, where the United States of America trend lines cross the basic data line, the average idle capacity is 1,350,000 short tons. It was this enormous excess capacity (now en' ely wiped out) which accounted for the huge lag and disparity between newsprin' nd general commodity prices over the 1932–46 period.

(*b*) *Newsprint Prices in Immediate Future*

That with general commodity prices already well past their peak there is some apprehension regarding an early fall in newsprint prices, but that the strong statistical position disclosed by current studies indicates rather the reverse. The current deflationary movement has been characterized by an entire absence of loss of confidence or panic by any industry or section of the community and is much in the nature of an orderly readjustment. Although more cautious in their buying, consumers are taking advantage of the better selection and supply of many goods to fulfill long-delayed wants. This has maintained newsprint sales, and current statistical reports indicate that the immediate future demand will be significantly greater than anticipated. It may even be sufficient to cause an increase in price.

A repetition of the commodity price collapse of the 1920–21 period appears most improbable. The supporting and cushioning factors now operating must tend to spread any fall over a much longer period than previously. This likewise would tend to maintain newsprint demand at high levels with little likelihood of any fall in price. The President's four-point policy of assistance to backward nations, including the supply of newsprint as so earnestly advocated by UNESCO at the Montreal Conference, will tend to have a similar effect.

The extent to which newsprint prices are likely to fall in the immediate future is difficult to determine, but a valuable indicator is available from a study of previous experience in the movement of both commodity and newsprint prices interpreted in the light of interim developments. The general labour force has now become so highly organized since World War I as to introduce an entirely new rigidity into the wage structure. Concurrently there have been onerous forms of price control and profit limitation, both direct and indirect, through taxation and the operation of anti-trust laws. There has been some fear that both would react to create a sharp depression of considerable magnitude, driving commodity prices down close to or even well below the trend line. Some economists and industrialists have even tended to favour such a type of readjustment as preferable to a more gradual one necessitating considerable patience and difficult planning, but national feeling is definitely crystallizing in favour of the latter as essential to any form of political stability acceptable to the American people. The weight of evidence indicates a strong probability that not only will commodity prices move down gradually, but that by virtue of the strong statistical postion of the industry newsprint prices will move significantly above commodity prices and remain above them

for many years, though gradually approaching them and falling slightly. The sharp initial fall of 1921–22 in the post World War I period is unlikely to be duplicated in the present one, but otherwise the adjustment of newsprint to general commodity prices will probably resemble that of 1922–27, though likely to be spread over a longer period, with the basis delivered price indicated by the trend line for commodity prices still as high as $90 per short ton even in 1960. The Canadian industry is inherently in a sound position to resist any serious price fall meantime.

The only condition under which any substantial fall in newsprint price could occur would be a trade recession of the order of the "thirties," but even if the 19 lb. fall in *per capita* consumption experienced between 1929 and 1933 (see Graph I) were to be duplicated, North American mills would probably still be operating at 80 per cent. of capacity in place of the 50 per cent. level of 1932. At the former level it is most improbable that the basis price would fall below $80 per short ton. It would be more likely to be $85. The discussion is believed to be academic because of the inherent danger of such a depression to the entire democratic and/or capitalistic system. Under these circumstances it is extremely unlikely that any Administration would hesitate to apply suitable correctives. The depression of the "thirties" took four years to fully develop, and now that the symptoms are recognizable there is little risk of being unable to halt dangerous developments through organization of capital works for the temporary absorption of surplus labour.

(c) Stabilized Prices for Newsprint

Ultimate adjustment of newsprint prices to a normal relationship with general commodity prices is inevitable, but, as already stressed, there is at present no excess capacity whatsoever and little extra capacity either planned or in sight. Not until substantial excess capacity is created either by establishment of new plants or by a permanent recession in demand is it likely that newsprint prices will fall below commodity prices. The period is likely to be a protracted one. The longer newsprint prices remain near present levels the greater will be the confidence in the future of the industry and the more certain it is that some new plants will be installed, but with even only a gradual fall in price it is not improbable that concurrently a significant capacity will either have ceased operation or transferred to other lines of manufacture. The net gain in capacity may therefore be small even by 1960, and it is highly improbable that the newsprint price index will fall below the commodity price trend line before that year. When it does so the likelihood is, as a result of both economic and political planning being directed towards the restoration of normality, that both newsprint and commodity price indices will agree closely and move parallel to the trend line of commodity prices, but even closer to it than the commodity price index did in the 1900–15 period. On this reasoning a line has been plotted on Graph 5 showing the likely general movement of the newsprint price index up to 1970 from which it has been estimated that for the first twenty years of full production of the Murupara scheme the average world parity price with which it will have to compete will be $91 per short ton delivered New York. The reasoning may be speculative, but it is believed to be based on sounder conclusions than any other available and can therefore be accepted with reasonable confidence. If anything, it appears to be on a conservative basis, more especially in respect to prices in the immediate future, which, referring to Graph 5, previous experience indicates should increase materially before showing any recession.

(d) Production Costs and Selling Prices

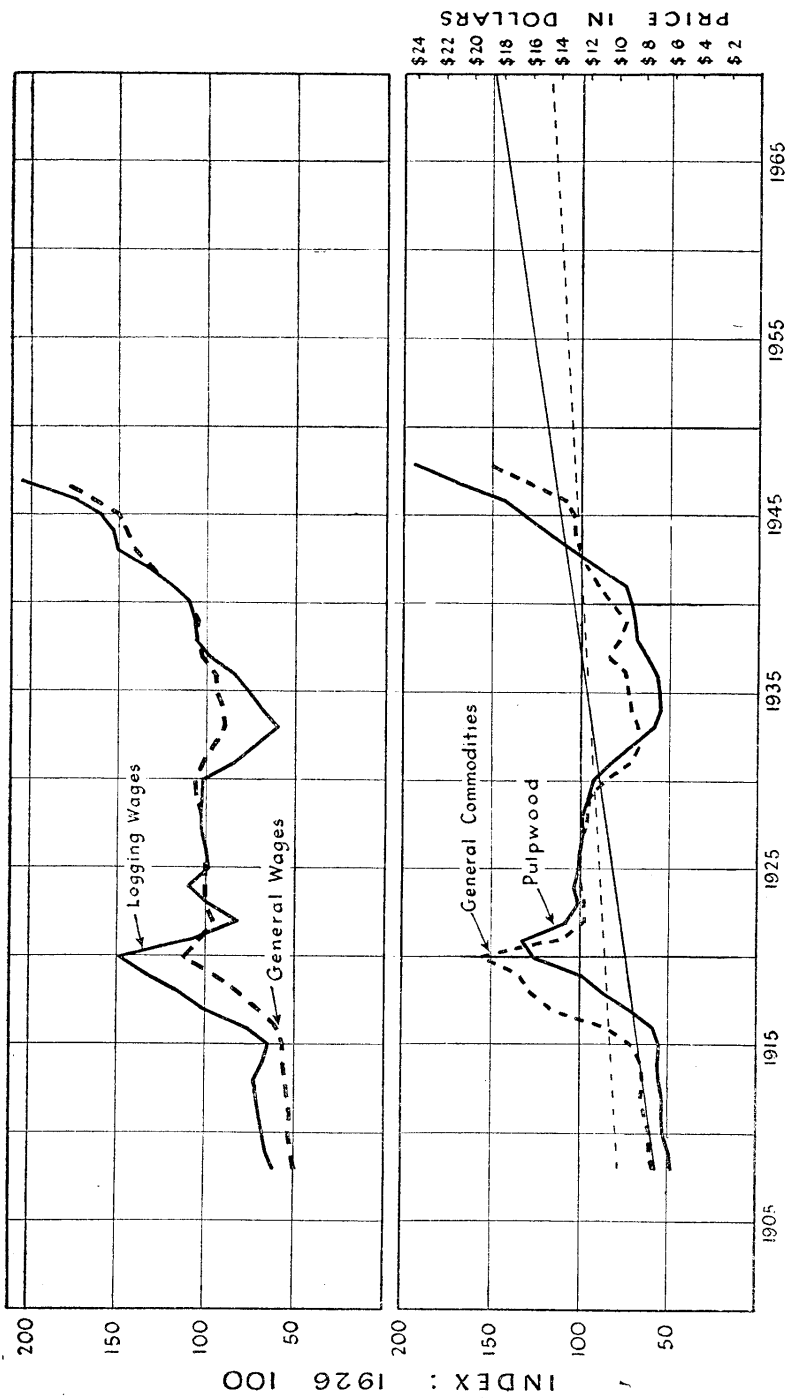
Another approach to the question of future newsprint prices is to study possible reductions in current newsprint-production costs. The two largest single cost items are pulp-wood and mill labour, which in some operations exceed $50·00 per short ton and thus amount to about 50 per cent. of the current basis delivered price of $104.00 per short ton.

Pulp-wood costs are of paramount importance. Graph 6 shows price indices for both pulp-wood and general commodities. The graph may also be used for a study of price variations in newsprint pulp-wood, as the value of eastern Canadian spruce is sufficiently close to the average value of all pulp-wood for the purpose of the present analysis. Thus whereas in 1939 the average delivered contract price for newsprint was $49·00, the average value of pulp-wood was only $8·45 per cord, so that on the basis of $1\frac{1}{3}$ cords of rough unpeeled wood being required per ton of newsprint, wood costs amounted to $11·27, or approximately 23 per cent. of the selling price. In contrast, pulp-wood costs for 1949 are estimated between $25·00 and $30·00 per cord, say, $27·50, giving a total cost of $36·67, representing about 37 per cent. of current average contract price, estimated to be $100·00 per short ton. That pulp-wood costs per ton of newsprint have more than trebled over this period is supported by the index figures published by the Newsprint Association of Canada and shown in Table 4 of the Appendix. The index figures for 1939 and 1948 are 118 and 367 respectively, a ratio of 3 : 1.

The question of future pulp-wood costs was discussed with various executives in the North American pulp and paper industry. Few Canadians were optimistic regarding any substantial decrease, though it was admitted that by reducing contractor's profits and through better value for wages paid it did appear practicable to anticipate a reduction of $5·00 per cord. Recent press advices from North America indicate that reductions of this order have already been effected, and it is therefore reasonable to suppose that, due to some production by owner-labour, pulp-wood may eventually be reduced to $18·00 per cord.

According to the trend line in Graph 6, pulp-wood should be reduced still further in value, but two factors must operate to maintain spruce pulp-wood prices at higher levels. The first is the comparative ridigity of the wage structure in the modern economic set up, and the second is the increasing dependence of eastern Canadian newsprint-mills upon more distant supplies of pulp-wood. The conclusion is that pulp-wood prices are likely to stabilize at the higher figure of $20·00 per cord, but even the $18·00 level will represent an increase in cost of over $12·00 per short ton above the 1939 level.

Whilst mill labour costs as shown by Table 4 of the Appendix have almost trebled since 1939 and now amount to about $20·00 per ton, the opportunities for price reductions are more limited than in the case of pulp-wood. Due to the rigidity of the wage structure in the mills there appears to be little doubt that future costs will be at least $8·00 per short ton higher than pre-war. Allowing an additional increased cost of at least $5·00 per short ton to cover other items, newsprint-producers have a minimum total added cost of $25·00 per short ton over their 1939 figures. This suggests that, irrespective of other considerations, it might be possible to sell newsprint at $74·00 per short ton—that is, at $25·00 above the 1939 average delivered price of $49·00 per short ton. It was, however, the consensus of opinion over the 1938–42 period that a minimum price of $60·00 was required in order to allow companies, after proper allowance for expansion and depreciation reserves, &c., to pay even a nominal return on their already written down investment following the depression period. On this basis a minimum price of $85·00 per short ton would be required, and if a reasonable dividend, together with an adequate addition to companies' surplus funds for expansion, &c., is to be allowed for, then it is clear that a basis price of $90·00 per short ton is required. It is significant that in 1947 when the average contract delivered price of newsprint was $88·50 producers were complaining that they were worse off than when newsprint sold for $50·00 per short ton. Whilst, however, a $90·00 price might be payable in the immediate future, the fact connot be ignored that on a long-term basis pulp-wood costs as shown in Graph 6 are likely to have a rising tendency relative to general commodity prices because of ever-increasing inaccessability for many years.



GRAPH 6—PRICE MOVEMENTS IN CANADA
Upper: Logging and general wages—basic data only.
Lower: Pulp-wood and general commodities.
Basic data and mathematically developed trend lines.

These basic factors, it is believed, confirm the conclusion previously arrived at that over the period 1955–75 the Murupara scheme for its first twenty years of full production must be prepared to compete at an average world parity level of $91 per short ton basis delivered price New York. It is pertinent to remark that, due to currency difficulties between Canada and United States of America, it would be impracticable for the Governments of the two countries to allow prices to fall below the levels suggested. The New Zealand delegation does not believe that it is impossible for a very acute shortage to develop once the United States actively enters the field of international investment as the only solution to the dollar crisis. Under such circumstances prices might easily return to the existing level of $104 per short ton, at least until capacity is substantially increased.

Cost Price of Newsprint in New Zealand

(8) Table VII shows the cost of Canadian newsprint landed on wharf main ports New Zealand, converted from a dollar per short ton to a pounds shillings and pence per long ton basis at the new exchange rate of $2·80. Column A gives the cost on the present price level, column B the cost if prices fell to the $80 level, and column C the cost at $85. Column D shows that at the long-term average of $91 the cost landed on wharf main ports New Zealand would be £45 14s.

Table VII—New Zealand Prices for Newsprint Converted from Dollars Per Short Ton in New York to Pounds Per Long Ton f.o.b. New Zealand Main Ports

Items.	A.	B.	C.	D.
	$	$	$	$
F.o.b. New York, per short ton	104·00	80·00	85·00	91·00
Less rail freight	9·00	7·00	7·50	8·00
Ex mill Canada, per short ton	95·00	73·00	77·50	83·00
Ex mill Canada, per long ton	106·40	81·75	86·80	92·95
Freight to New Zealand	36·00	25·00	27·50	30·00
Insurance (½ per cent. on)	70	55	60	65
c.i.f. price	$143·10	$107·30	$114·90	$123·60
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Converted at $2·80* to £1(N.Z.)	51 2 6	38 6 5	41 0 8	44 3 0
Bank charges (1½ per cent.)	0 11 6	0 8 7	0 9 4	0 10 0
Wooden heads	1 1 0	1 1 0	1 1 0	1 1 0
Cost on wharf per long ton, New Zealand currency	52 15 0*	39 16 0	42 11 0	45 14 0

* At $4·03 to £1(N.Z.) the cost was £36 15s. per long ton.

The current cost of £52 15s. per long ton corresponds to a cost of £36 15s. before the exchange-rate was varied from $4·03 to $2·80 to the pound. On the speculative nature of newsprint prices over the period during which the Murupara project has been developing it is pertinent to record the following observations :—

(*a*) In 1927 after completion of the initial tests on making newsprint from New Zealand woods it was a commonly accepted view in North America that no new mills then being built could be operated profitably on a lower New York basis price than $65 per short ton, but within five years it was down to $40 and the New Zealand import values* for 1928 and 1933 were £16 11s. and £12 6s. per long ton respectively.

* Import value equals value in country of origin plus 10 per cent.

(*b*) In 1932 in the depths of the depression at least one Finnish producer installed newsprint machines in the implicit belief that, purchased as the equipment was at bedrock prices, the mills would be able to compete on the world's markets in the next depression even if prices fell to as low as £6 per long ton f.o.b. Helsingfors. Meantime Finnish labour costs in logging have gone up to seventeen times, delivered log prices by over ten times, &c., so that the forest-products industries are barely able to operate profitably even at current high prices.

(*c*) In 1946 Australian interests decided to instal an extra newsprint machine on the supposition that foreign newsprint would not in future be landed c.i.f. & e. Australian main ports at less than £29 10s. per long ton. At $104 basis New York price it will be over £50, and even if the basis price were to fall as low as $70 would still be nearly £35.

Effects of General Currency Revaluations

(9) In addition to affecting the cost of Canadian newsprint to New Zealand and other consumers as covered by paragraph (8), the general currency revaluation is likely to stimulate newsprint-production in Europe—not improbably at the expense of chemical pulp production in Scandinavian countries—by the diversion of suitable pulp-wood-supplies. Not only Scandinavian newsprint-mills, but also British and other European newsprint-mills, should benefit, the latter group by increased supplies of mechanical pulp. Most European countries are likely to use more newsprint, and there is little doubt that the exporting countries should be able to compete strongly with Canadian producers and to secure a proportion of the overseas markets formerly dominated by Canada. Due, however, to the high quality of the Canadian product and to the eternal hope that the Canadian producers may sell at lower prices than to the United States of America in order to maintain their position on these markets, overseas consumers are still likely to order significant quantities of Canadian newsprint.

According to Canadian sources the productive capacity of Scandinavian countries is about 1,100,000 short tons, as compared with an anticipated 1949 production of only just over 800,000 short tons. Considering the poor forward position for chemical pulp as discussed later in this report, it would appear that ample pulp-wood should be available to allow of an immediate substantial increase in newsprint-production by the Scandinavian mills.

According to a mid-year announcement, the British newsprint-mills, which Canadian sources assess as having a productive capacity of 896,000 short tons, were to work at 55 per cent. of pre-war capacity, again assessed by Canadian sources at 1,100,000 short tons. To bring these mills up to 100 per cent. production approximately 350,000 tons of pulp would require to be secured from Scandinavian countries. No difficulty should be experienced in securing the sulphite supplies, but certainly much more difficulty would be encountered in securing 300,000 tons of mechanical pulp. Unused capacity in other European countries is, of course, very much smaller.

As to competition between Scandinavian and British mills, the Tariff preference of 10 per cent. held by the latter is likely to enable them to dominate the New Zealand markets so far as imported supplies are concerned.

In making comparisons between New Zealand and British as well as North American mills it should also be noted that whereas New Zealand publishers are faced with significantly high costs of storage covering anything up to eighteen months' supply, in other countries they carry insignificant stocks, those in the United States being only forty to fifty days. The delegation believes that the advent of a local newsprint-mill at Murupara would enable publishers to appreciably reduce stocks and, if necessary, pay a correspondingly higher price for the local product.

There can be no doubt of the ability of the European producers to compete with the Canadian product so long as it is sold on the American basis price. Taking the British mills, which are in a less advantageous position than the Scandinavian, their mid-year price for newsprint was established at £36 3s. 9d. per long ton, and British producers contended that if left free to purchase their own supplies of pulp they could operate at a still lower figure. It follows that if their mills were to operate at full capacity substantial economies could be achieved, but it is not unlikely that prices of mechanical pulp will be advanced materially by Scandinavian producers. Not until Canadian sales policy has been established is price stability likely to be achieved by European producers, but the interim conclusion is that the Murupara product is unlikely to receive the full benefit of the currency revaluation as applied to the New York basis price shown in Table VII.

Economic Size of Newsprint Units

(10) That, as quoted by Royal S. Kellogg, Secretary of the Newsprint Service Bureau, " a complete newsprint plant of 300 tons daily capacity is the smallest economic unit." Such a unit requires annually about 11,000,000 cubic feet of pulp-wood, whereas the integrated sawmill and pulp and paper plant for Murupara will have an annual consumption of 23,000,000 cubic feet in the initial stage, and ultimately 28,000,000 cubic feet when it will be producing, in addition to 400 short tons daily of newsprint and other papers, 50 tons of surplus pulp and 300,000 board feet of sawn timber. Considered in conjunction with the fact that its pulp-wood should average as cheaply as Canadian, the possibilities of economic operation appear very favourable.

Bearing of Conference Conclusions on World Sulphate Position

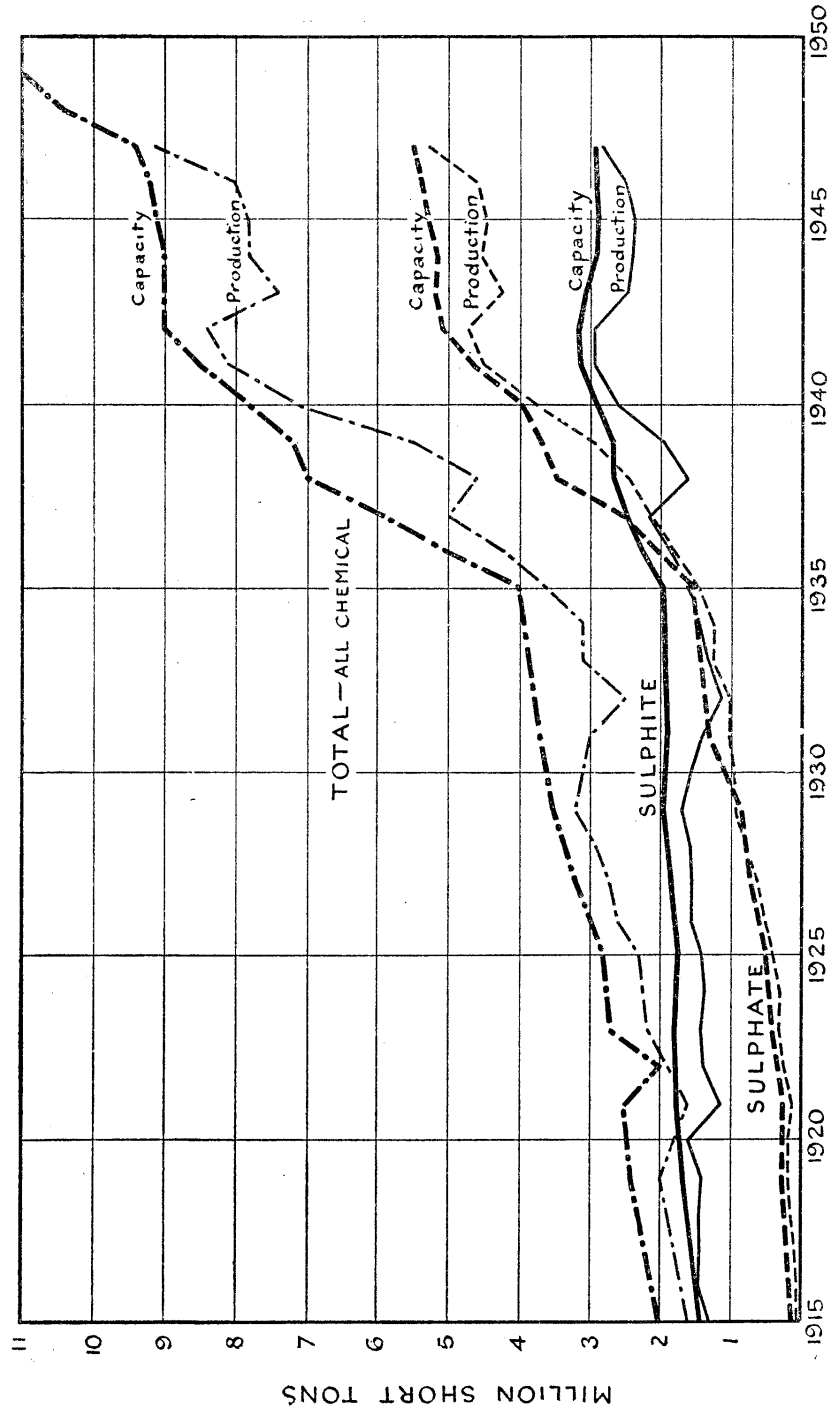
(11) The subject is extremely complex because of the ever-increasing interchangeability in use not only of sulphate, sulphite, soda, and even semi-chemical wood-pulps, but also of those produced from grasses, bamboo, and straw, &c. This explains why the Conference proceedings and findings set out in the preceding section of this report are so largely concentrated on the over-all supply and demand position for wood-pulp in general, and why such scant reference is made to sulphate pulp in particular.

(a) General Wood-pulp Position

As will be seen by reference to paragraph (25), the Conference was dubious of its finding that, based upon the figures in Table I, total pulp requirements, estimated at 37,000,000 metric tons in 1955, will be 10,000,000 metric tons, or almost 40 per cent., higher than in 1948. What is of peculiar significance is that the over-all deficiency of nearly 1,000,000 metric tons for all pulps also apparent from Table I was nevertheless premised on an expansion of pulping capacity by over 6,000,000 metric tons, of which over 5,000,000 were to be in chemical pulp, representing a 27-per-cent. increase on existing chemical pulp capacity of over 19,000,000 metric tons in 1948. With world trade likely to be still in process of readjustment to normal over practically the whole of this period, such an increase in capacity appears even more dubious than a 40-per-cent. increase in effective demand.

(b) General Chemical Pulp Position

Referring to Table 4 (*a*) and (*b*) covering sulphite and sulphate, it may be gathered from a study of production in 1937 and 1948 that most of the extra capacity planned for 1955 is envisaged in sulphate. Whatever that extra capacity may eventually amount to, it will probably be significantly less than the new capacity to be installed owing both to the interim closing down of some European plants as a result of pulp-wood shortages and to the replacement of others destroyed during the war. As will be



GRAPH 7—UNITED STATES OF AMERICA CAPACITY AND PRODUCTION OF SULPHITE AND SULPHATE AND TOTAL CHEMICAL WOOD-PULP (INCLUSIVE OF SODA AND SEMI-CHEMICAL PULP)

Note coincidence of expansion in both sulphite and sulphate between 1935 and 1942.

evident from Table 4 (*a*), much of the forward world requirements in sulphite could be met from existing European capacity if adequate pulp-wood supplies can be organized. With restoration of normal coal-supplies to Scandinavian countries it is certain that considerable wood hitherto diverted as fuel during and since the war will become available to the pulp industry, and in sufficient quantities to significantly expand production of sulphite in particular, though not to pre-war levels owing to the probable continuing absence of pulp-wood supplies from Russia, especially from territories seized during the war. As the estimated North American production of 5,000,000 metric tons for 1955, representing 50 per cent. of world production, is less than 10 per cent. above current production but equal to current consumption, the delegation concludes that sulphite pulp is likely to remain in a strong statistical position over the period 1949–55 reviewed by the Conference.

(*c*) *General Sulphate Pulp Position*

With world production both in 1947 and 1948 not much in excess of capacity, the increase in new plant required to meet the Conference's estimates of production and requirements for 1955 as set out in Table I appears very large. This seems particularly so when viewed against the background both of the enormous expansion in United States of America capacity between 1935 and 1942 and of a steadily weakening market, even though, as already discussed, this may be regarded as an orderly readjustment of the United States of America markets to a more normal condition. Referring, however, to Table IV, it would appear that if only half of the Conference's forward estimate of 4,000,000 metric tons expansion in sulphate demand were to be realized and only half of this met by new plants, it would still be necessary to increase annual productive capacity by almost 1,000,000 metric tons, and *the New Zealand delegation has concluded, therefore, that the New Zealand proposals to produce locally some 70,000 long tons annually are not prejudiced by the 1955 world wood-pulp position as judged by the Montreal Conference.*

Though there is little doubt that sooner or later both Sweden and Finland must reduce their forest cut significantly below pre-war peak figures, there would still appear to be some possibility of increased sulphate-production from milling waste, and the same comment applies to some countries of Central Europe. In both Canada and the United States of America similar possibilities of using both logging and milling waste would allow an enormous expansion in sulphate-production, and to the extent that sulphate prices remain attractive, new plants based upon such developments are likely to predominate in the satisfaction of expanding demands.

The delegation was forced to conclude that on the over-all statistical position the prices of sulphate were likely to be weaker than those of either sulphite or newsprint and should accordingly be very closely studied.

GENERAL ASPECTS OF SUPPLY-DEMAND POSITION IN CHEMICAL WOOD-PULP

(12) As all new pulping projects should be based upon long-term developments rather than the short period 1949–55 covered by the Conference, it was necessary for the New Zealand delegation to extend its investigations into the world position of all chemical wood-pulp as well as of sulphate over a very much longer period. As in the case of newsprint, an attempt has been made to evaluate past and current trends in the industry with a view to determining the future supply-demand position and its influence on world parity prices over the period 1949–75. As compared with the data available on newsprint, that relating to sulphate as well as to chemical pulp was definitely poorer,

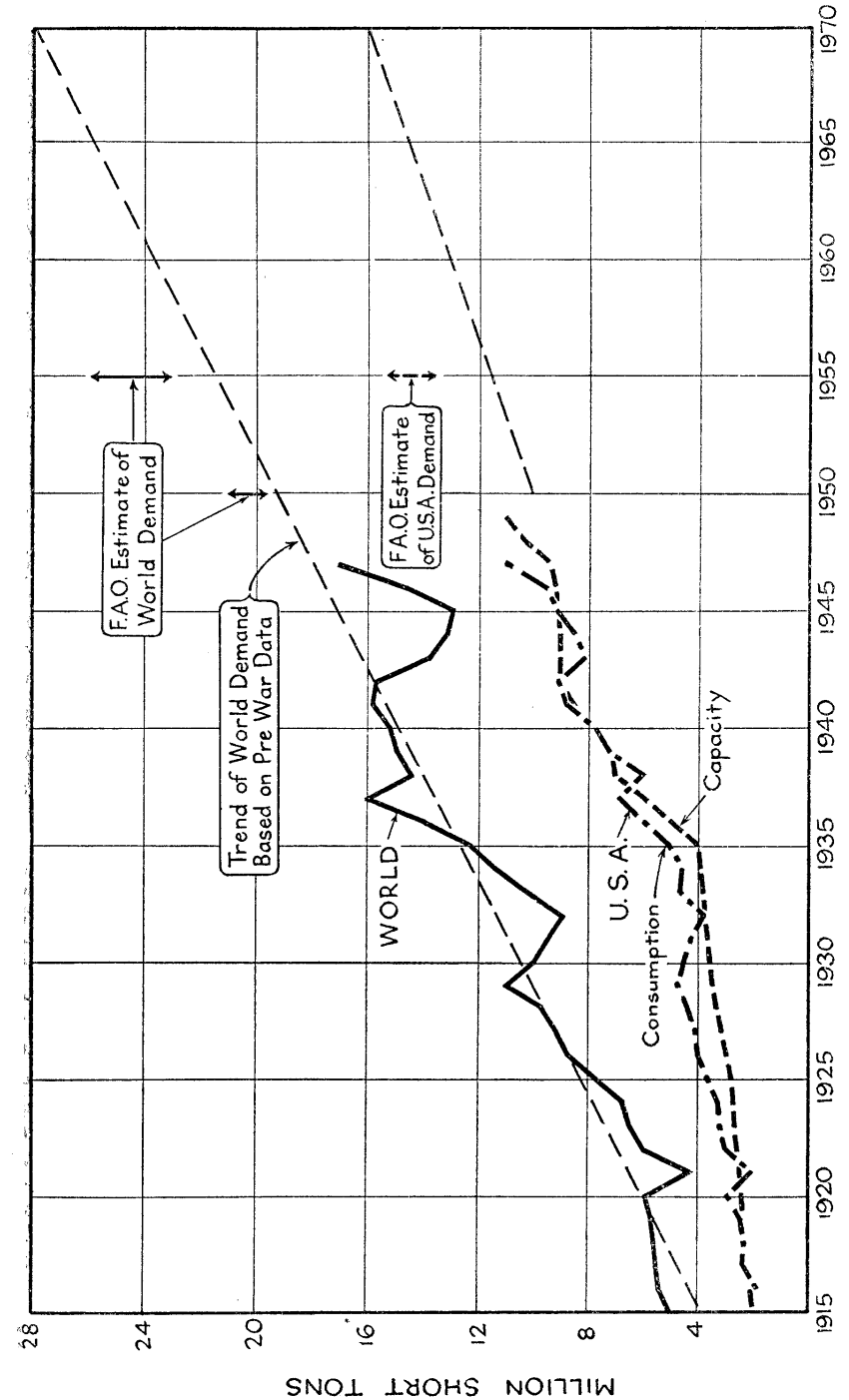
and, due to the interchangability factor already referred to, the delegation experienced much more difficulty in arriving at as sound a conclusion as in the case of newsprint. The annual statistics on both United States of America and world pulp production, &c., published by the American Pulp Producers' Association, together with various bulletins issued by the United States of America Government, have formed the background to this study, the results of which, however, have also been based upon discussions with numerous executives in the North American pulp and paper industry. The more important statistics are published in the Appendix. The results of the study are substantially as follows :—

(*a*) *Wide Applicability of Sulphate Process*

One basic fact pertinent to the discussions of interchangability as well as of supply-demand and price relationships is the applicability of the sulphate process to a very much wider variety of woods than the sulphite process. As this widens the field of raw material supply, it follows that the industry is much more widely distributed throughout the world than the sulphite industry. Another result is that sulphate pulp-wood tends to be much cheaper than sulphite pulp-wood. This is nowhere better demonstrated than in North America, where spruce for the eastern Canadian sulphite-mills was costing in 1948 between $25 and $30 per cord, whereas southern pine pulp-wood for United States of America sulphate-mills for the same period was costing less than $15 per cord. It is for this reason that sulphate pulps are able to compete so strongly with sulphite for many purposes, though not, by any means, for all. Bleached sulphite is still superior to bleached sulphate for the highest grade of papers requiring a permanent high blue-white tone, though it should be noted that bleached sulphate usually commands a small premium over bleached sulphite because of its superior strength properties. Nevertheless, bleached sulphite is steadily improving its competitive position through higher yields per cord and lower bleaching-costs. Similarly, bleached sulphite is still virtually the undisputed master of the dissolving-pulp field. In all other fields of long-fibred-pulp use, sulphate grades are finding an ever-increasing usage in replacement of sulphite pulps, due largely to the two factors of cheapness and superior strength already referred to.

(*b*) *World Demand for Chemical Wood-pulp*

The most remarkable feature of world capacity in chemical wood-pulp has been its almost uninterrupted record of expansion over the last thirty years. Even during the depression period there was a significant increase, though largely concentrated in the United States of America. Again, during World War II, Canada expanded plant facilities, and in the United States of America a substantial increase in capacity was recorded both to meet expanded demand for war purposes and as a means of securing local supplies in substitution for those previously obtained from the Scandinavian countries cut off by the war. Graph 8 shows the progress since World War I of world and United States of America consumption. As judged by the trend lines, the Conference's estimates of future requirements appear realistic for 1950 but unduly optimistic for 1955. The explanation of the long-continued upward trend undoubtedly lies in the fact that during the last thirty years many entirely new bulk usages have been developed for chemical pulps, typical of which are rayon and similar products, multi-wall paper bags, and many new types of paper board. As to the future, while there is little doubt that research may develop entirely new usages for cellulose pulp, this does not appear highly probable, and the conclusion is that future demand and development of the industry must depend largely upon the expansion of existing usages.



GRAPH 8—WORLD CONSUMPTION OF CHEMICAL WOOD-PULP COMPARED WITH UNITED STATES OF AMERICA CONSUMPTION AND CAPACITY
Projections of future demand by mathematically developed trend lines are based on pre-war data and indicate that FAO Conference estimates are altogether too high.

(c) *Chemical Pulps Other Than Wood-pulp*

A number of cellulostic raw materials other than wood are used for the production of chemical pulp, but largely in areas where forest supplies are scarce or costly. Several hundreds of thousands of tons of esparto grass grown in Spain and northern Africa are used annually in England and France for high-grade pulps and papers; savai grass and bamboo are widely used in India also for high- and medium-grade pulps and papers; and straw from wheat, rye, oats, and flax is variously employed in numerous countries, in some cases for high-grade bleached pulps and white papers and in others for low-grade course products such as strawboard. Altogether they probably amount to less than 5 per cent. of world usage of chemical wood-pulp, &c., taking into account rags, waste papers, &c. (see Table 5 of the Appendix). Bamboo and straw appear to be the only materials to have any potentialities by virtue of bulk supply, but the extent to which they are likely to develop in world trade is largely bound up with the prices of competing wood-pulps, and, as will develop later in this report, it is highly improbable that these will remain sufficiently above the general level of commodity prices to allow either bamboo or straw-pulp to compete outside their own immediate area of supply.

(d) *World Production and Capacity: Chemical Wood-pulp*

As indicated by Graph 8, from less than 4,500,000 short tons in 1910, annual production of chemical wood-pulp of all kinds expanded to about 5,750,000 in 1920, to 10,500,000 in 1930, and to about 19,000,000 in 1948. Table 6 of the Appendix, based upon information from various sources, serves to focus attention upon the production by different producing countries and areas. With the exception of war periods and of the depression years of 1921, 1931, and 1932, the industry as a whole probably operated at not less than 80 per cent. of capacity, often at over 90 per cent., and even in the depression years at not much less than 70 per cent.

(e) *Relative Importance of North America and Europe in Chemical Wood-pulp Production*

On a continental basis there has been a profound change over the last forty years, for the first thirty of which European capacity and production outrivalled that of North America. Almost uninterrupted by the depression of the "thirties," plant expansion both in the south and west of the United States of America made rapid progress until, in 1948, North American capacity of 13,500,000 short tons has become almost double that of European capacity at 7,250,000 the corresponding figures for production at 13,250,000 and 5,750,000 short tons showing an even greater contrast. As to the far-distant future, both Canada and Russia possess resources which, though now largely inaccessible, may eventually allow both countries to expand production on a large scale.

(f) *Predominance of United States of America in World Production of Chemical Wood-pulp*

From Table 6 of the Appendix it will be seen that even from pre World War I the United States of America has ranked as the largest producing country, its annual out-turn of 1,500,000 short tons representing 35 per cent. of the world total at that time, as compared with 10,000,000 in 1948, representing over 50 per cent. of world production. Similarly Sweden consistently maintained second place until 1940, increasing its production from 750,000 to 2,700,000 short tons over this period. Though its annual output fell as low as 1,100,000 during World War II, it has since recovered to 2,500,000, and may eventually attain the recorded capacity figure of just over 3,000,000 short tons if sufficient pulp-wood becomes available. Meantime, Canada has succeeded to second place with a current production of just over 3,000,000 short tons, but there is a distinct difference between these two producing countries in that, normally, whereas Canada exports only about 50 per cent. of its production in the form of chemical wood-pulp, Sweden exports more like 75 per cent. of its out-turn. Canada exports a greater proportion than Sweden in the form of paper, principally newsprint.

(*g*) *Predominance of United States of America in Consumption and Importation of Chemical Wood-pulp*

As shown by Table 7 of the Appendix, the United States of America has used for many years an even larger proportion of world production of chemical wood-pulp than produced in its own mills. Pre World War I it consumed 1,750,000 short tons, or 42 per cent. of world consumption (or production), but by 1948 had increased this to 11,750,000, or 63 per cent. of current world usage, though the proportion would be more like 55 per cent. if all other importing countries could afford to secure their full requirements and all other producing countries could secure sufficient pulp-wood to meet them.

In view of the enormous consumption of chemical wood-pulp by the United States of America, it is not surprising that this country has become the largest importer of this commodity, its share amounting to approximately one-third of the total, with the United Kingdom ranking second with about half this amount, as recorded in Table VIII.

TABLE VIII—IMPORTS OF CHEMICAL PULP BY MAJOR CONSUMING COUNTRIES

(Source: Statistics published by United States Pulp Producers' Association)

(Tons of 2,000 lb.)

Year. (1)	United States of America. (2)	Great Britain. (3)	Other Countries. (4)	Total. (5)
1936	2,050,000	1,080,000	2,110,000	5,240,000
1937	2,180,000	1,190,000	2,480,000	5,850,000
1938	1,560,000	1,070,000	1,760,000	4,390,000
1939	1,800,000	1,090,000	1,570,000	4,460,000
1940	1,050,000	520,000	1,320,000	2,890,000
1941	960,000	300,000	1,700,000	2,960,000
1942	1,020,000	410,000	1,210,000	2,640,000
1943	1,070,000	360,000	930,000	2,360,000
1944	900,000	310,000	740,000	1,950,000
1945	1,530,000	520,000	1,090,000	3,140,000
1946	1,560,000	610,000	1,340,000	3,510,000
1947	2,020,000	570,000	1,320,000	3,910,000
1948	1,880,000	960,000	1,340,000	4,180,000

(*h*) *Pre World War II Predominance of Scandinavia and Sweden in the Export Trade in Chemical Wood-pulp*

Table IX shows the pre World War II predominance of Scandinavian countries in general and Sweden in particular in the world export trade in chemical wood-pulp. Based on the average 1934–38 figures, Scandinavia supplied nearly 3,500,000 out of a total of less than 5,000,000 short tons, or 70 per cent. of the world exports, and Sweden over 2,000,000 tons, or nearly 42 per cent. Relating these exports to their markets, it will be noted from Table X that whereas both Norway and Finland shipped most of their chemical pulp to the United Kingdom and other European and overseas markets and only about 20 per cent. to the United States of America, Sweden shipped about 40 per cent. of its exports to the United States of America. Referring also to Table 8 of the Appendix, it is seen that pre World War II the United States of America chemical wood-pulp imports of about 1,800,000 short tons included 900,000 from Sweden, 400,000 from Norway and Finland, and 400,000 from Canada, representing about 50, 20, and 20 per cent. respectively, the remaining 10 per cent. being secured from other European countries.

TABLE IX—EXPORTS OF CHEMICAL PULP BY MAJOR PRODUCING COUNTRIES
(Source: Statistics published by United States Pulp Producers' Association)
(Thousands of tons of 2,000 lb.)

Year.	Canada.	Scandinavia.					World Total.
		Sweden.	Norway.	Finland.	Total.		
					Tons.	Percentage of World Exports.	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1930 ..	528	1,517	260	524	2,301	64	3,577
1931 ..	444	1,434	141	693	2,268	65	3,493
1932 ..	329	1,181	285	834	2,300	69	3,329
1933 ..	460	1,765	268	879	2,912	71	4,125
1934 ..	473	1,851	275	884	3,010	69	4,389
1935 ..	519	1,972	307	1,018	3,297	69	4,747
1936 ..	598	2,166	356	1,192	3,714	71	5,237
1937 ..	680	2,424	391	1,300	4,115	70	5,850
1938 ..	422	1,855	285	1,126	3,266	75	4,382
Average, 1934–38	538	2,054	323	1,104	3,481	71	4,921
1939 ..	527	2,232	354	1,205	3,791	84	4,500
1940 ..	857	1,020	249	279	1,548	53	2,900
1941 ..	1,122	800	134	539	1,473	49	3,000
1942 ..	1,214	699	33	259	991	37	2,700
1943 ..	1,260	475	41	228	744	31	2,350
1944 ..	1,156	316	28	186	530	27	1,950
1945 ..	1,146	1,516	23	291	1,830	58	3,140
1946 ..	1,131	1,697	93	509	2,299	65	3,506
1947 ..	1,357	1,736	116	705	2,557	63	4,090

TABLE X—DESTINATION OF CHEMICAL WOOD-PULP EXPORTS BY SCANDINAVIAN COUNTRIES
(Source: Statistics published by the United States Pulp Producers' Association)
(Tons of 2,000 lb.)

Exporting Country.	Year.	Total Export.	United States of America.		Great Britain.		Other.	
			Quantity.	Percentage.	Quantity.	Percentage.	Quantity.	Percentage.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Sweden ..	1937	2,424,000	1,056,000	44	400,000	17	968,000	39
	1947	1,736,000	574,000	34	278,000	16	884,000	50
Norway ..	1937	391,000	92,000	24	102,000	26	197,000	50
	1947	116,000	7,000	6	36,000	31	73,000	63
Finland ..	1937	1,300,000	266,000	21	603,000	46	431,000	33
	1947	705,000	216,000	30	223,000	22	266,000	38

(i) Constitution of Pre-war United States of America Import Trade in Chemical Wood-pulp

Analysing the total United States of America imports of chemical pulp shown in Table 8 of the Appendix, it is clear that whereas Sweden dominated the trade in unbleached sulphite and unbleached sulphate, Canada was even more pre-eminent in the supply of bleached sulphite both for dissolving and for papermaking purposes and equally important as Sweden in the supply of bleached sulphate. *It was the result of these conditions that Swedish prices for unbleached sulphite and sulphate pulps on the United States*

of America market determined world parity values on all other world markets. Virtually the same comment applied to bleached sulphate and even to paper grades of bleached sulphite, as Canada had only small or residual quantities of these pulps for sale to European markets, which were wholly dominated by Scandinavian producers.

Effect of World War II and Post-war Developments on United States of America Sulphite Wood-pulp Trade

(13) Pre-war the United States of America used over 3,000,000, or about 30 per cent. of the world production of nearly 9,000,000 short tons of sulphite pulp. Currently it is estimated to be using almost 4,000,000, or 50 per cent., of the 8,000,000 to be produced in 1949. Almost 2,500,000 will be in bleached grades and only 1,500,000 in unbleached.

(*a*) *Imports from Canada*

Meantime, by expansion of capacity, Canada has been able, as shown by Table 8 of the Appendix, to increase its exports of unbleached sulphite to the United States of America by about 300,000 short tons, equal to half the quantity previously imported from Scandinavia and to threequarters that secured from Sweden. At the same time, by trebling its exports of bleached sulphite for dissolving purposes and increasing slightly its exports of paper grades in bleached sulphite, Canada has increased its exports of bleached grades by 200,000 short tons, making a total increase in sulphite exports of about 500,000 short tons.

(*b*) *United States of America Production*

Concurrently, United States of America sulphite capacity, as shown by Table 9 of the Appendix, has also increased by some 300,000 short tons, but practically the whole of the apparent extra supply of 800,000 short tons has been offset by the increased demand for dissolving and special pulps amounting to over 400,000 and for bleached paper grades amounting to over 300,000 short tons, leaving the present supply of unbleached sulphite at about the maximum pre-war figure of 1,600,000 short tons.

(*c*) *Imports from Scandinavia*

As it might reasonably be anticipated that there would be some war and post-war increase in consumption in United States of America for unbleached sulphite based on an increase in both population and *per capita* usage, it would appear as if Scandinavian countries and Sweden could reasonably expect to ultimately regain the level of their pre-war exports to the United States of America. But concurrently with other markets unable to purchase anything like their pre-war requirements it appears as if, until currency difficulties are resolved and normal international trading conditions re-established, Scandinavian countries may lack sufficient markets to maintain the sulphite industry at a payable level.

(*d*) *Future of Sulphite Markets*

On a long-term basis the opposite is likely to arise. However much sulphate may succeed in competing with sulphite, those uses for which sulphite is inherently superior—that is, dissolving and special chemical pulps, high-grade permanent papers, and cheap printings—are steadily expanding. There is every likelihood that they will exceed the available supply based on existing forest resources, even taking into account that further expansion based on the utilization of logging and milling waste in the Pacific North-west and in British Columbia is still in progress. The probability is that both new and some existing capacity will be concentrated on the bleached grades, for which the North American pulp-woods appear inherently superior to the Scandinavian. Only in the now

inaccessible spruce resources of Canada and Russia does hope reside for any distant future expansion of this industry for world trade. Meantime, restoration alone of pre-war *per capita* consumption levels in countries other than the United States of America would not merely tax current surplus capacity, but *create a very significant shortage, no inconsiderable portion of which would probably be met—at least, meantime—in substitute grades of sulphate pulp.*

EFFECT OF WORLD WAR II AND POST-WAR DEVELOPMENTS ON UNITED STATES OF AMERICA SULPHATE WOOD-PULP TRADE

(14) Pre-war the United States of America used almost 2,500,000, or over 60 per cent., of the world production of only 4,000,000 short tons of sulphate pulp, but is now estimated to be using 6,000,000, or 75 per cent., of the current production of 8,000,000 short tons. About 1,500,000 will be bleached grades and 4,500,000 unbleached. In bleached sulphate, Canada has increased its exports to the United States of America by over 100,000 short tons, but already Sweden is supplying this market with as much as pre-war. In unbleached sulphate, Canada has likewise increased its exports to the United States of America by almost 100,000 short tons, but of itself this would not be likely to prejudice the pre-war Scandinavian exports of 500,000 short tons, of which about 400,000 were Swedish.

(a) Growth of United States of America Sulphate Pulping Capacity

But what of United States of America capacity and production ? By the end of 1949 United States of America annual capacity will have increased by 3,000,000 short tons (from about 4,000,000 in 1940 to 7,000,000 in 1949) and maximum bleaching capacity by about 800,000 short tons (from about 900,000 in 1940 to over 1,700,000 in 1949). *This constitutes the great imponderable in the sulphate as well as the chemical pulp world in general.* Although by far the greater part of this expansion has occurred in the southern States, more of the mills in the Pacific North-west—as in British Columbia—have been erected for the sale of pulp, some to affiliated companies in the east but others for general domestic and foreign sales as well. In contrast, most of the southern pulp plants have been integrated with paper or board mills for the production of speciality papers, wrappings, and containers, &c., though some have surplus pulp capacity for supplying affiliated rather than independent paper or converting mills to the north. The burning question is, " To what extent has surplus capacity been created ? " It can be posed in other words : " To what extent has the war and the post-war period created an abnormal demand which cannot be sustained ? "

(b) Growth of United States of America Chemical Pulping Capacity

Examining the curves shown on Graph 7 covering capacity and production of sulphate pulp, these considered alone would appear very alarming, both being of a type indicating an abnormal expansion. Related, however, to the comparable curve for sulphite a less alarming position is revealed. The curve for sulphite, flattening out as it does, bears out the conclusion already arrived at that, having regard to the new bulk usage of sulphite for rayon, &c., expansion of capacity and production has not kept pace with requirements, which have therefore been met to a large extent by substitute grades in sulphate, more particularly in bleached pulp, virtually the whole 1,500,000 tons of which can be so regarded. In turn, however, the curves combining not only sulphite and sulphate but also soda and semi-chemical pulps are again of a disturbing type, due to the coincidence in expansion of production over the 1935–42 period for both sulphite and sulphate. A basic study of *per capita* consumption was therefore found necessary, even though consumption has closely approached capacity over recent years.

(c) *Future United States of America Import Demand for Sulphate Pulp*

Meantime it is also necessary to examine the question of sustained demand because of its possible effects on future Scandinavian and Swedish imports. In the first place, in spite of some increase in sulphite-production in the west, substitution by sulphate in bleached grades particularly will increase. Again, an ever-increasing quantity of sulphate may be used in combination with soda and semi-chemical pulps to improve the technical performance of products; whilst, in turn, sulphate hardwood pulp is already being used as a substitute for soda pulp for magazine and book papers. Secondly, more independent converting mills in the east and middle west will cover some portion of their sulphate requirements from the west as well as from the south against the possibility of future interruption of supply from Scandinavia. Still other pulp and paper mills already affiliated with western and southern plants will probably increase their commitments and usage as local pulp-wood supplies dwindle and/or become more costly. While all these considerations support the previous conclusion that expansion has not been as abnormal as appears at first sight, *nevertheless most of them do point to a contraction of Scandinavian and Swedish imports of sulphate, though not perhaps of bleached-paper grades, since these, in contrast to the dissolving grades, are equal to the best Canadian and domestic pulps and distinctly superior to the southern and western products. This is a doubly important conclusion, because to the extent that the Scandinavian countries can sell increasing quantities of bleached sulphate to the United States of America they increase their ability to sell unbleached grades on other markets at lower competitive prices than would otherwise be possible.*

(d) *Concentration of Sulphate-production in South and West*

Only the position of the integrated pulp and paper mills both in the west and in the south remains to be considered. *Inter alia*, both regions include speciality, wrapping, and board or container plants, whilst, in addition, the south has newsprint installations. The speciality—in contrast to the other plants—are characterized by a wide range and variety of relatively high-priced products earning a good profit rate. They manufacture pulps especially adapted to the use requirements of their end products and are not likely to be significant in putting surplus pulp-supplies on to the open market as a means of dealing with fluctuating demands for their end products. Some, however, have affiliated plants elsewhere to which surplus pulp is regularly shipped, sometimes in exchange for other pulp required to meet the technical requirements of their customers.

(e) *Use of Sulphate Pulp for Packaging Purposes*

It is perhaps in the wrapping and board or container plants, which concentrate upon the production of a very few bulk lines, that expansion may have been more abnormal than elsewhere. There is little doubt that a significant proportion of the increased demand for their products over the war period was required for the packing of the munitions of war, including enormous quantities of foodstuffs for foreign destinations. Admittedly much of this replaced normal packaging for peacetime consumption of other goods, but—equally important—it has been the post-war overtaking of the accumulated wartime shortages of peacetime consumer goods which has maintained the demand for wrappings and container products. Without wishing to be pessimistic, the delegation believes that the continuing post-war production of consumer goods is likely to exceed demand and that a subsequent recession in trade, even though of only minor severity, will seriously curtail demand for packaging products and thus depress pulp prices. Again in turn this will force a general reduction in pulp-wood prices and allow such plants as produce pulp for sale to resist competition from Scandinavian suppliers.

(*f*) *Place of Sulphate Pulp in Southern Newsprint Developments*

As referred to in that section of the report dealing with newsprint, the full potentialities of the south have not yet been generally recognized by the United States of America newspaper publishers. Only one mill—that of the Southland Paper Mills, Ltd., at Lufkin, in Texas—is yet operating. It produces about 350 short tons daily of a high-quality sheet surpassing all the western products and equal on balance with the eastern Canadian sheet. Another of similar size but with surplus pulp capacity of 130 short tons daily is to operate early in 1950.

PER CAPITA AND TOTAL CONSUMPTION TRENDS IN THE USE OF CHEMICAL WOOD-PULP

(15) As in the case of newsprint, it was felt that, so far as practicable, general conclusions regarding the world sulphate position should be checked by a study of *per capita* and price trends in the United States of America once it was demonstrated that this market held the key position in world trade in that commodity. Similar studies of these trends in New Zealand and Australia were also deemed necessary. The results are presented for public information.

(*a*) Per Capita *Consumption of Chemical Pulps in the United States of America*

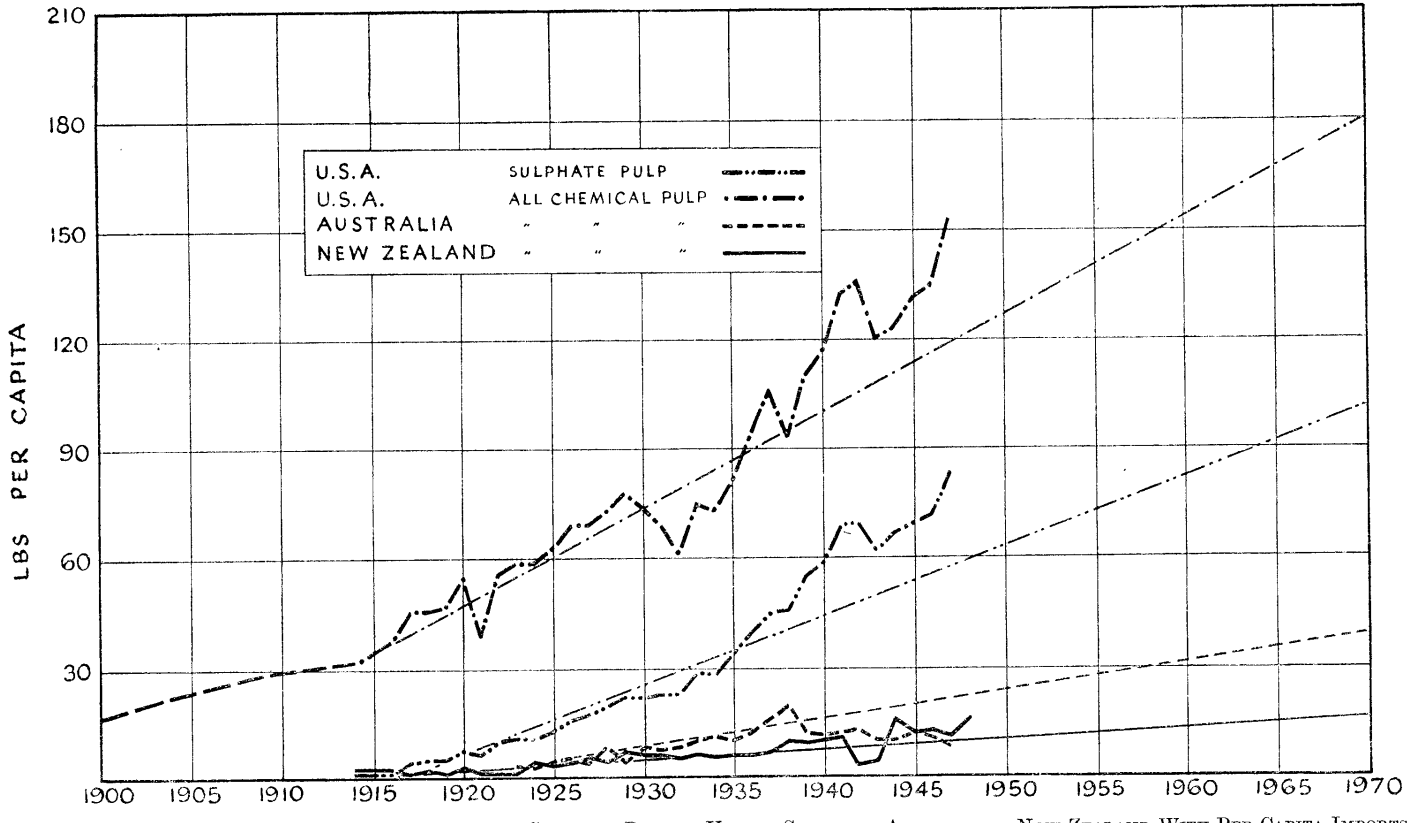
The *per capita* curves shown in Graph 9 are quite reassuring in indicating that, while recent and probably current consumption are above the various trend lines, the disparities are not as large as had appeared possible merely by studying the increases in capacity shown in Graph 7. In considering this data there would appear to be no good reason why the trend line computed on the complete series inclusive of the war years should not be used in preference to that computed on pre-war data.

(*b*) *Future Consumption of Chemical Pulp in United States of America*

Taking the information on population and *per capita* trends in Graphs 3 and 9, a projection has been made on Graph 8 to show future probable total requirements. There seems to be little doubt that, due to the expanding demand based on a steady increase both in *per capita* consumption and in population—existing United States of America capacity will be insufficient on a long-term basis to meet requirements for very many years. A temporary glut is probable, of course, if trade recedes much further than at present. With *per capita* consumption of sulphate increasing at the trend rate of $2\frac{2}{3}$ lb. annually as disclosed by Graph 9 and population at a rate of over 1,000,000 annually, total consumption must increase annually by 250,000 short tons, so that even a surplus capacity of 1,000,000 would be overtaken in four years. Even with further expansion of both United States of America and Canadian capacity, the Scandinavian countries may expect eventually to largely regain their pre-war levels of importations not merely because of the over-all supply position, but on account of the marked superioity of their sulphate pulps in particular.

(*c*) *Future World Consumption of Chemical Wood-pulp*

The trend line for world consumption shown on Graph 8 is based only on the past data recorded in this graph and is not projected, as in the case of the United States of America data, on *per capita* and population trends. Nevertheless it has some significance in indicating that future demand does favour the restoration of Scandinavian and European production to near pre-war levels if pulp-wood supplies can be organized and normal international trading conditions restored. Graph 8 is of peculiar interest in that the Conference's estimates of consumption for 1950 and 1955 have been plotted for comparative purposes. The fact that they all lie significantly above the projected trend line indicates an optimistic basis of estimation by the Conference.



GRAPH 9—COMPARISON OF PER CAPITA CONSUMPTION OF CHEMICAL PULP IN UNITED STATES OF AMERICA AND NEW ZEALAND WITH PER CAPITA IMPORTS OF CHEMICAL PULP INTO AUSTRALIA

Per capita consumption in Australia would be virtually the same as the imports plotted on this graph up to 1938, but since that date Australia has manufactured large quantities of short-fibre chemical pulp which, together with the decreased importations, gives a much higher *per capita* consumption than in New Zealand.

Nevertheless, the delegation concludes that both the United States of America and the world supply-demand positions necessitate on any long-term basis a very definite expansion of world productive capacity and that this provides a distinctly favourable background to the establishment of the Murupara project. This is not to be interpreted as implying that without the Murupara project New Zealand and Australia could not obtain pulp-supplies. Even during the war and since, when supplies have been extremely short, both countries have secured some shipments. But they have been far from adequate, judged even by local pre-war standards. If, as hoped for, both countries are to more nearly approach American standards of living, then pulp requirements as shown in Graph 9 must be very materially increased, but unless a fair proportion of these are covered by local production in New Zealand, then the two countries have little hope of commanding a high sustained usage of paper at reasonable prices, particularly in times of war.

(*d*) Per Capita *Consumption of Sulphate for Wrappings and Boards*

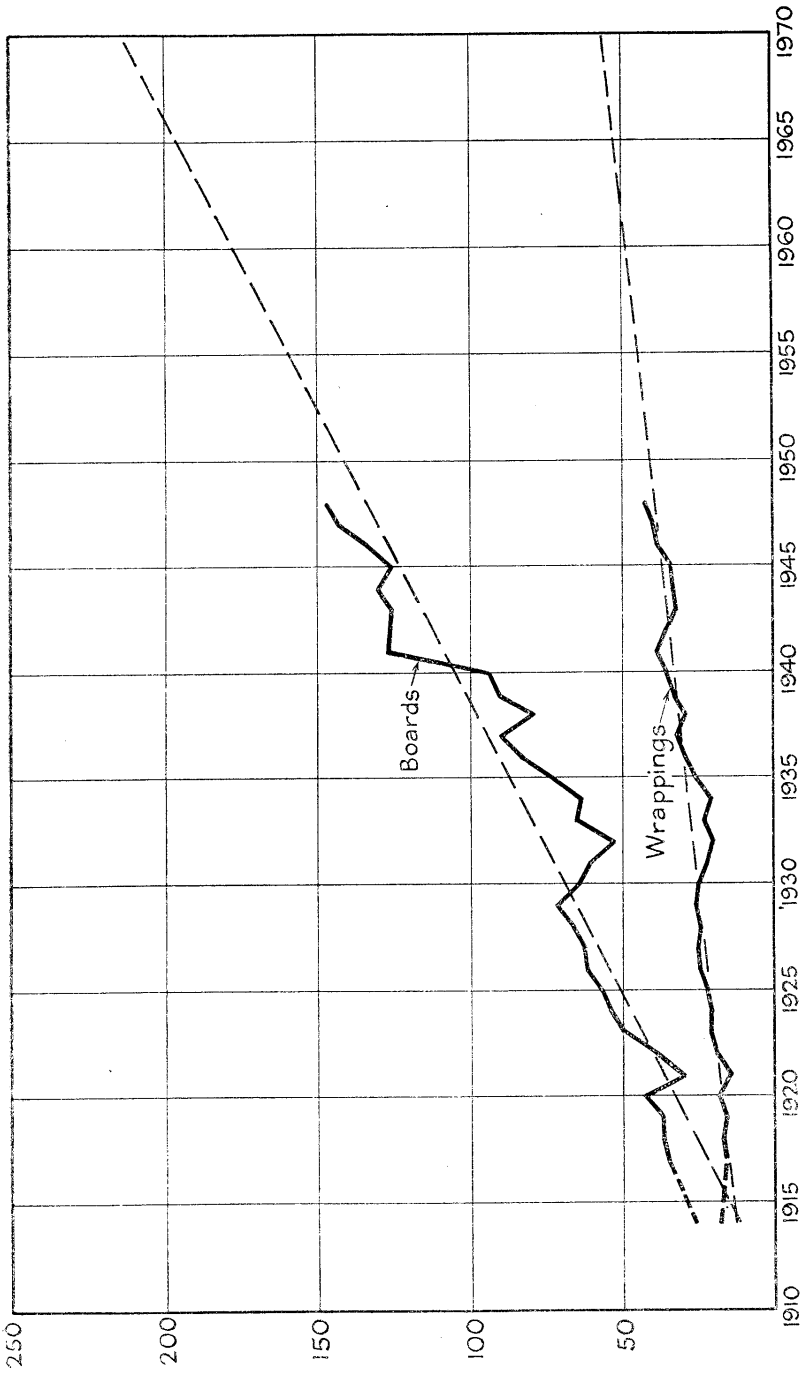
As a further check upon the validity of its conclusion that sulphate demand and production is not abnormal even in the United States of America, a study has been made of the *per capita* consumption of wrapping and boards, for which sulphate pulp is so widely employed. Both of the curves appearing in Graph 10 are of a normal character, and while recent and current consumption figures are above the trend line, the departure is by no means excessive, and confirms the belief that even if trade recedes still further for an appreciable period of time it will be only a few years before the decrease in total pulp demand will be overtaken by an improvement in *per capita* consumption and an increase in population. With trend increases of 0·78 lb. and 3·6 lb. *per capita* respectively for wrapping and boards and the usual increase in population, the annual trend expansion in demand amounts to 400,000 short tons, confirming the previous conclusion that any surplus capacity which may be created in the United States of America by a trade recession will be rapidly reabsorbed.

Possible Markets for Chemical Wood-pulp in New Zealand and Australia

(16) With no chemical wood-pulp production in New Zealand, it is possible to study past usage from the records of importations. The annual import figures have been reduced to a *per capita* basis and shown in Graph 9, thus allowing of a direct comparison with those for the United States of America. Similar figures are recorded for Australia. Having due regard for the relatively small differences in the ways of living in the two areas, the outstanding feature of these graphs is the enormous disparity between *per capita* rates of consumption for the United States of America and the two South Pacific countries. At the same time, there is little doubt that had there been ample local production of pulp in the South Pacific during the war years the *per capita* consumption figures would probably have been twice as high both in New Zealand and in Australia. Every citizen is still conscious of the paper shortage which was so acute during the war and is still significant.

(*a*) *Nature of Pulp Importations into New Zealand*

Paper-production in New Zealand has for all practical considerations been limited to wrappings and boards, and for this reason sulphate has always dominated the import pulp trade. It is doubtful if sulphite has ever attained 20 per cent. of the imports. Except during the war, when only North American pulp was available, most of the pulp imported came from Scandinavia, for many years from Sweden, but more recently pre-war from both Finland and Sweden. North American pulps, usually from the West Coast, have not been as highly regarded for quality as the Scandinavian. Even allowing for the



GRAPH 10—PER CAPITA CONSUMPTION OF WRAPPINGS AND PAPER BOARD IN UNITED STATES OF AMERICA
These are the principal products absorbing sulphate pulp.

maximum possible substitution of sulphite by sulphate in both bleached and unbleached grades when local production is fully organized, it is most likely that some imported sulphite will still be required for special purposes and that even some very high-grade sulphate may likewise be needed, both pulps in the unbleached as well as in the bleached form.

(*b*) *Nature of Pulp Importations into Australia*

The same comments apply to Australia as to New Zealand up to the pre-war period when Australia commenced the production of newsprint, necessitating the importation of an additional 7,000 long tons of sulphite for long-fibred furnish, and of writings and fine printings from short-fibred woods, also requiring an additional quantity of long-fibred furnish. Concurrently with the expansion of Australia's marvellous wartime industrial effort, large importations of sulphate were required to supplement its own production of sulphate hardwood stock. As the Commonwealth's huge immigration plans gather momentum, increased local production of hardwood pulps for a wide diversity of end products will necessitate correspondingly large importations of long-fibred stock, including both sulphite and sulphate.

(*c*) *Estimates of Future Demand for Long-fibred Chemical Wood-pulp in New Zealand*

In interpreting the New Zealand *per capita* trend shown in Graph 9 it must be remembered that the figures upon which it has been based have referred to importations for a very restricted field of production—largely kraft and ordinary wrappings pre-war, but since supplemented by board products using a preponderance of ground wood and waste paper with only a small content of chemical pulp, except in a few special lines. Looking to the future, there are two bulk lines alone which will much increase the Dominion's requirements for chemical pulp. Firstly, multi-wall bags should absorb at least 2 lb. *per capita*, while fibreboard butter-boxes should increase consumption by at least 4 lb. *per capita*. In addition, with local supplies of bleached sulphate, opportunities should also develop for the increased production of more specialty wrappings and boards.

Taking all these factors into account and using only the trend figures in Graph 9, the total *per capita* consumption should be at least 18 lb. by 1954 and 25 lb. by 1970. With populations respectively of 2,000,000 and 2,500,000, which are very conservative estimates as judged by Graph 3, the country's requirements, exclusive of pulp for newsprint and printings, &c., to be produced by the Murupara schemes, would therefore amount to about 16,000 and 28,000 long tons for 1955 and 1970. Probably 90 per cent. will be in sulphate pulp, virtually the whole of which could be met by locally-produced pulp. Taking into account the 19,000 long tons of bleached pulps required for newsprint, &c., by 1955, the total sulphate pulp requirement becomes 33,000 long tons. The contemplated New Zealand production of 70,000 long tons from the Murupara and Tokoroa schemes leaves 37,000 long tons for export until 1957, when expansion of newsprint-production will reduce the exportable surplus to 22,000 long tons, about half each from the two schemes.

(*d*) *Estimate of Future Demand for Long-fibred Pulp in Australia*

Australia, by virtue of its greater industrialization, its wide diversification of products, and a local chemical wood-pulp industry, is a very much larger *per capita* consumer of chemical pulp than New Zealand. The production of printings and writings, using 90 per cent. of bleached eucalyptus soda pulp and 10 per cent. of imported long-fibred bleached pulp, is to be increased from 25,000 to between 40,000 and 50,000 long tons annually. Likewise, the annual production of newsprint, using about 80 per cent. eucalyptus ground wood and 20 per cent. imported long-fibred pulp, is to be stepped up from 30,000 to 80,000 long tons. Wrapping and board production, now rated at 130,000 long tons annually, consumes, in addition to large quantities of waste paper, over 40,000

tons of eucalyptus sulphate pulp, from 15,000 to 20,000 tons of straw pulp, and some 30,000 tons of imported long-fibred pulp. Present extension proposals covering an increase to 200,000 tons annually involve over a 50-per-cent. increase in sulphate-pulp production. The Commonwealth's requirements in long-fibred pulp will therefore become substantial.

Referring to the Australian trend line of *per capita* importations shown in Graph 9, the values for 1955 and 1970 are 28 lb. and 40 lb. respectively. Corresponding populations, on a conservative basis as judged by Graph 3, are 9,000,000 and 11,000,000, giving an apparent possible consumption of 110,000 and almost 200,000 long tons, but due to the success achieved by Australian technicians in the partial adaptation of hardwood short-fibred pulps to uses normally met by softwood long-fibred pulps it is not improbable that importations of these latter will be between 60 and 70 per cent. of the above figures derived from trend data. This is confirmed by a recent indication that about 1955 Commonwealth requirements in unbleached sulphate will be about 37,000 long tons, with the further possibility that 8,000 long tons of bleached sulphate might be used in substitution for bleached sulphite, of which an equal quantity will still be required.

(*e*) *Ability of New Zealand Sulphate Pulp to Meet New Zealand and Australia Requirements*

Excepting for papers requiring superlative strength properties, there appears little doubt that, based on extensive tests by various authorities, sulphate pulps manufactured from New-Zealand-grown insignis pine will meet most New Zealand and Australian requirements. Nevertheless, it is only an elementary trade precaution for consumers to spread their purchases over different sources of supply, and on this basis New Zealand cannot expect and certainly would not be justified in attempting to meet much more than 50 per cent. of Australia's demand unless, of course, suitably guaranteed of a larger market. *Having regard to the price implications reviewed later in this report, the delegation does not believe that present plans providing for about 20,000 tons exportable surplus against a potential total Australian demand of 45,000 tons in the middle "fifties" should be expanded.*

LONG-TERM PRICE TRENDS IN SULPHATE PULP

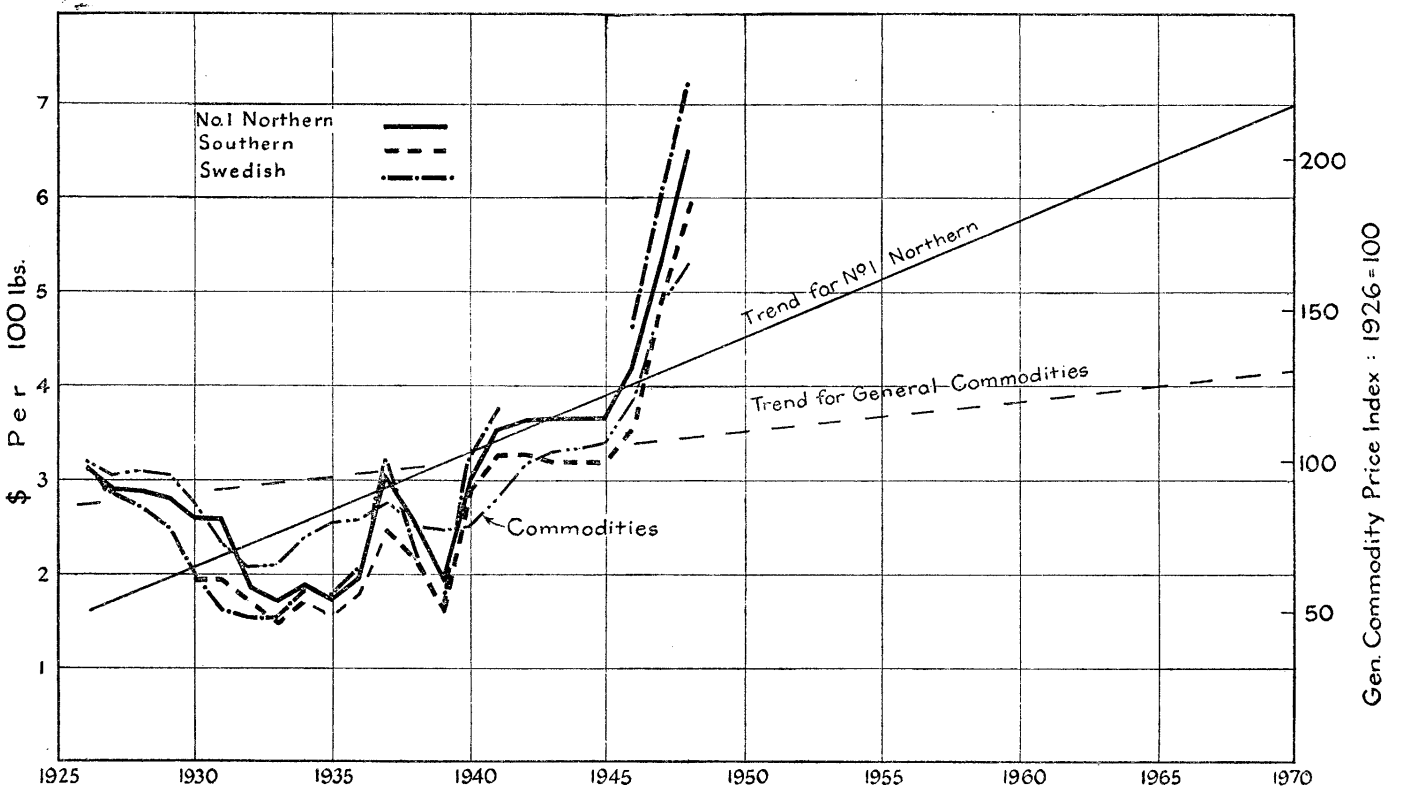
(17) It has already been established that the United States of America markets for the Swedish product virtually determine world parity values for unbleached sulphate pulp. Graph 11 has been prepared to show fluctuations in price not only for Swedish kraft, but also for United States No. 1 Northern, which is similar to Canadian kraft, and for southern pine kraft pulp.

(*a*) *Difference in Sulphate Pulp Prices*

The prices of these three pulps should reflect their basic qualities, but tend to do so only during period of acute shortage. There is no vestige of doubt that both the spruces and the pines of the northern temperate zone yield fibres of greater intrinsic strength than those of more tropical origin—for one reason, if for no other, that in the slower-growing species the proportion of shorter and thinner-walled fibres in the final product is very much less than in the rapidly-growing pines of which the United States of America southern pines are typical of indigenous pulp-woods and the New Zealand insignis pine is typical of exotics.

(*b*) *Comparison with New Zealand Pulp*

If high strength be the sole criterion of value, it must be admitted that the New Zealand product would more resemble southern-pine pulp than either Northern or Swedish, and for admixture with sulphate hardwood for strong wrapping it would appear to be somewhat inferior to the Finnish or Swedish pulps so widely favoured by Australian paper-manufacturers. On the other hand, in either the semi- or fully-bleached form for admixture with semi-or fully-bleached hardwood sulphate for specialty or printing papers requiring a close finish it will probably prove equally valuable as Swedish, if not even more valuable.



GRAPH 11—PRICE MOVEMENTS IN UNITED STATES OF AMERICA: COMPARISON BETWEEN PRINCIPAL SULPHATE PULPS (UNBLEACHED) AND GENERAL COMMODITIES

Basic data for No. 1 Northern, Southern, and Swedish kraft pulps and for general commodities, together with mathematically developed trend lines for No. 1 Northern and general commodities. The trend line for general commodities covers much earlier data than shown in this graph (see Graph 5, page 40).

(c) *Relationship Between Pulp and General Commodity Prices*

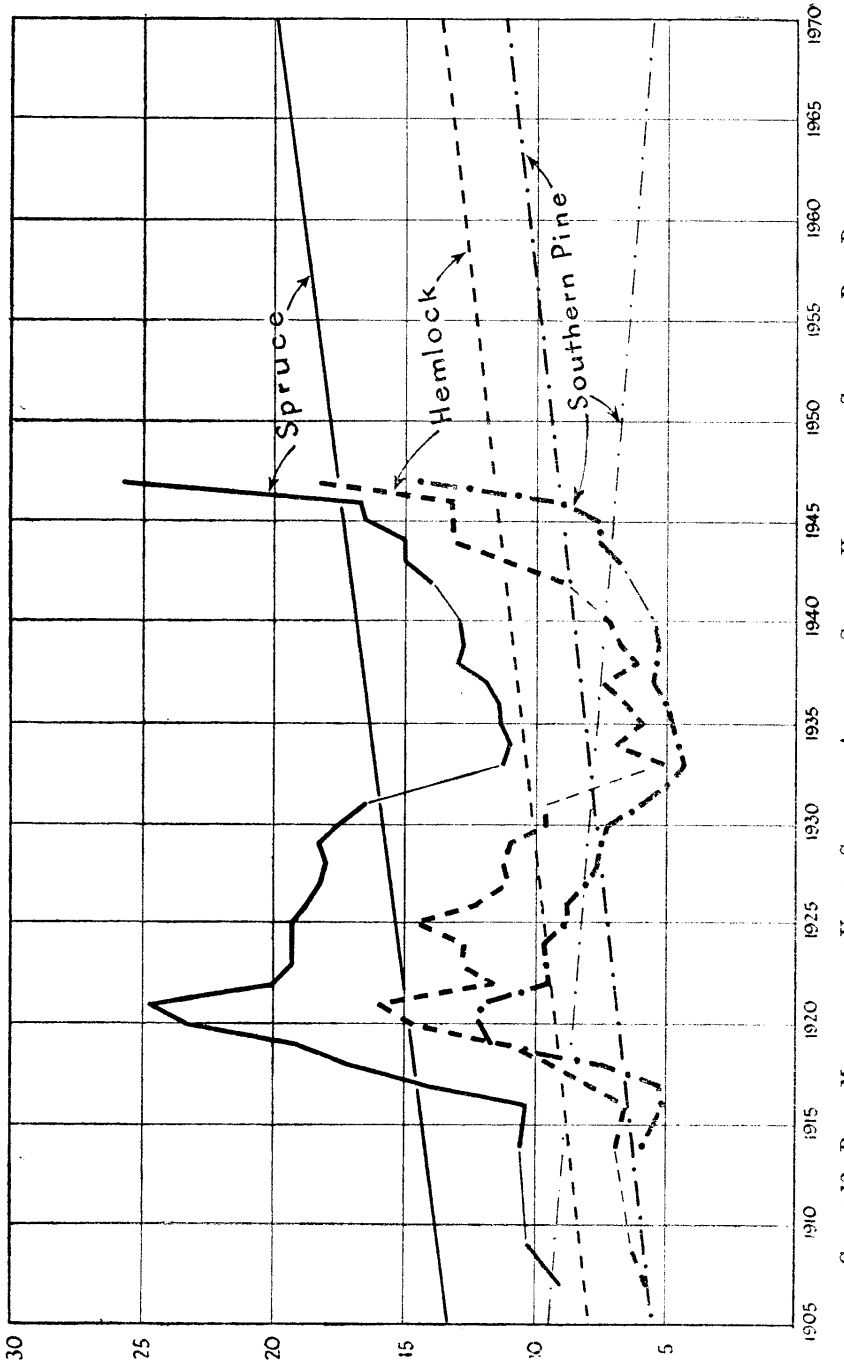
As in the review of newsprint prices, an effort has been made to relate the movement of pulp prices to that of general commodity prices. Unfortunately only the basic data on No. 1 Northern has been sufficiently continuous over a fairly long period to allow the determination of a trend line. In view of Professor Streyfertt's conclusion that on a long-term basis prices of forest products do not tend to rise at a greater rate than those of general commodities, the divergence of this trend line from parallelism with the trend line for the commodity price index makes it suspect on the basis of an insufficient period.

(d) *Influence of Diminishing Accessibility of Eastern Canadian Spruce Supplies*

Everything does point to spruce pulp-wood prices rising on a long-term basis more than southern pine pulp-wood prices. Established units in the eastern newsprint and sulphite pulp industries have little if any surplus capacity and must expand within the near future or see extra production organized elsewhere. This can be avoided only by developing at considerable cost more distant and currently inaccessible forests of low stocking and facing up to the use of more costly pulp-wood. Again, woods labour is now very much better organized then previously, and will be even more so as resort to more northerly limits will be by company operations, which will reduce materially the proportion of pulp-wood secured from small private owners and operators. The net effect will be to increase materially the cost of spruce pulp-wood.

(e) *Influence of Southern Pine Resources*

Any attempt to relate the future of southern pine kraft prices to the trend line for No. 1 Northern kraft is made even more impossible by the contrasting raw-materials position in the southern States. Not only are their resources easily accessible, but they allow year-round instead of only winter logging. The rate of growth is up to four times as great as that of eastern Canadian spruce, and southern pine forest can accordingly be converted over to a state of maximum productivity in a very short period. Added to these considerations is the fact that labour rates are the lowest in North America, and of even greater importance is the large proportion of pulp-wood secured from owner or contract cutters, enabling many companies to conserve their own standing supplies and in some cases to materially improve their stands. The conclusion is that pulp-wood costs in the southern States are likely to fall much nearer to pre-war levels than elsewhere and on a long-term basis most unlikely to increase at a greater rate than general commodity prices. This is turn means that as pulp-wood forms the major cost item in southern pine kraft, pulp prices will follow a similar movement. The only factor operating to strengthen the prices of southern pine kraft will be the growing scarcity of sulphite and its increasing replacement by sulphate. Graph 12 presents variations in the delivered to mill cost of spruce, hemlock, and southern pine pulp-wood. The trend lines for spruce and hemlock are almost parallel and appear to conform closely to the rise in price of general commodities. That for southern pine pulp-wood shows a downward trend and must remain suspect, again on the basis of an insufficient period. Even though the wage level is lower and more elastic than elsewhere, it has improved proportionately in comparison with other regions and will retain much of the improvement, and on this basis it is reasonable to suppose that with time the trend line will approach parallelism with those for spruce and hemlock. Such a parallel line has been adopted for consideration of future pulp price trends.



GRAPH 12—PRICE MOVEMENTS IN UNITED STATES OF AMERICA: SPRUCE, HEMLOCK, AND SOUTHERN PINE PULP-WOOD

Basic data and mathematically developed trend lines. Supplementary trend line for southern pine has been estimated by rotating the original through the centre point of the basic data to give parallelism with trend lines for spruce and hemlock.

(f) Future Prices for Southern Pine Kraft

Referring to Graph 11, the commodity price index trend line has been related to the basic pulp price data by reference to the figures for both 1927 and early 1938. The former was chosen because, although commonly regarded as a boom trade year, it was, in respect to price levels, representative of a fairly stable period lasting from 1922 to 1929 during which most commodity prices had no opportunity of adjusting themselves to one another. Similarly, 1938 marks what appears to have been a recovery level from the depression period of the early " thirties " after a brief boom period in late 1937. In both 1926 and early 1938 the prices of various sulphate pulps were in close proximation, and these periods are believed to be typical of those relatively stable conditions which may be expected to dominate world trade for at least a decade after restoration of normal international trading relations in about seven years time. During such a period it is probable that there will be a market for all pulp produced, as over the interim years conditions are unlikely to be sufficiently promising to ensure that capacity is increased commensurate with expanding potential demand. On these assumptions, the price for No. 1 unbleached southern pine kraft is expected to be of the order of $74 per short ton in 1955, increasing to a figure of the order of $86 in 1975.

(g) Future Prices for Swedish Kraft

The most significant feature of Swedish kraft prices has been their competition strength at all times. This is not altogether clear from Graph 11, which presents only average prices for each year. If, however, weekly prices are studied it will be found that even though the Swedish product is equal in quality to or better than the domestic product as represented by No. 1 Northern or Canadian and much superior to southern kraft, it has commanded suitable premiums only in periods of acute shortage. During periods of weak demand it has undersold not only No. 1 Northern kraft but southern pine as well. Following this policy, as they did during the inter-wars period when currency difficulties were relatively small, it is highly probable that Swedish producers will continue along the same lines now that dollar earnings have become so much more important.

(h) Future Prices for Swedish Pulp in Australia

The New Zealand delegation is forced to the conclusion that if New Zealand sulphate pulp is to compete with the Swedish or Scandinavian product on the Australian market the price level will be determined by that of southern pine kraft since it is the huge bulk supply of this pulp with which the Swedish unbleached product must compete. Subtracting the internal United States of America freight allowances of $7·50 and the Atlantic shipping rate of $9·00 from the trend figures of $74·00 and $86·00 per short ton established by paragraph (*f*) and adding £4 per long ton shipping rates from Baltic ports to Australia, it would appear that the most New Zealand pulp could command c.i.f. & e. main Australian ports would be £27 per long ton around 1955, and £32 around 1975. Admittedly the corresponding costs of southern pine pulp shipped to Australia would work out on these trend values at £35 and £40 on a conversion rate of $2·80, but the delegation feels that owing to the likelihood of continued surplus capacity and low pulp-wood prices actual values are more likely to be $54 and $66 per short ton, corresponding to the £27 and £32 for long-ton values already mentioned. Meantime, even lower prices for Scandinavian pulp will probably rule on the Australian markets. It is assumed in making this estimate that Australian currency will return to parity with sterling and that exchange-rates will otherwise remain at the new levels recently established (£2·80 and 14·485 kroner to the £1).

(i) Sulphate Production Costs

There appears to be little doubt of the ability of both southern pine and Swedish producers to sell their products at even lower figures than those derived from the study of long-term price trends. Probably because of the low labour element, conversion costs in the sulphate industry have tended to remain fairly stable over many years, including both the depression period of the " thirties " and the war and post-war years. The development of larger units with lower fixed charges and greater efficiency in man-power, chemical recovery, &c., has tended to offset increasing capital costs and labour rates.

Because of a 50-per-cent. greater pulp-wood requirement than newsprint and a smaller labour element, wood costs are of even greater importance than in the case of newsprint. According to the downward trend line of Graph 12, southern pine pulp-wood should have a value of about $6·50 per cord in 1955 and only $5·50 in 1975. As previously discussed, it is believed that the true trend line must be upwards, and in accordance with the accepted statistical procedure another trend line has been shown on the graph drawn through the mid-point of the basic data to parallel the trend lines for spruce and hemlock. The 1955 and 1975 figures derived from this trend line—$10·00 and $11·30 respectively—appear too high. Averaging the two trend values gives a 1955 figure of $8·25 and a 1975 figure of $8·40, which means that wood costs per short ton would be under $15·00. With conversion costs between $20·00 and $30·00 giving total production costs of between $35·00 and $45·00, it is clear that southern pine producers have a good rate of margin at figures well below $74·00 per short ton even after subtraction of more than $10·00 for delivery costs.

Similarly, there is little doubt as to the ability of Swedish producers to operate profitably at even lower prices than those under review.

Even supposing that current pulp-wood costs fall by one-third to a figure still twice as large as that ruling during the depression of the " thirties," pulp-wood costs per long ton would amount to only about £6. Allowing for conversion costs at £9 per long ton, which is over 50 per cent. in excess of depression figures, the total cost of landing pulp in Australia would amount to £19 per long ton, as compared with a selling price of £27 per ton. It is obvious that Swedish producers can still secure a reasonable margin of profit even if pulp-wood and conversion costs increase above the foregoing figures to which it is believed they may fall in the interim.

If any other evidence were needed of the ability of southern pine and Swedish producers to meet low selling prices, it is only necessary to refer to Graph 11. Both southern pine and Swedish kraft were sold as low as $26·00 per short ton in 1939, and it is significant that the average United States of America imported value of Swedish pulp per short ton was $34·92, $36·95, and $28·89 for 1937, 1938, and 1939 respectively. Likewise, pulp brought into New Zealand from Scandinavia had an import value of only £11 15s., £11 8s., and £8 3s. per long ton for these same years.

(j) Production and Sale of Bleached Sulphate

It is apparent that the production of bleached sulphate carries a substantially larger margin of profit than the unbleached product, the premium usually obtained being very much larger than the extra cost involved in bleaching. To this extent the Murupara project should endeavour to sell bleached rather than unbleached pulp, but from the figures already reviewed it would appear that the Australian market for this class of product is not yet significantly large, certainly not large enough to absorb the whole of the 26,000 long tons of surplus pulp production during the first phase of development.

Comparison Between Newsprint and Sulphate Pulp

(18) The future marketing position for newsprint both in Australia and New Zealand appears very much stronger than for sulphate pulp, either unbleached or bleached. Newsprint manufactured from New-Zealand-grown insignis pine requires only about 130 cubic feet of pulp-wood per long ton of product, whereas even the unbleached sulphate required about 200 cubic feet, or 50 per cent., more per long ton. On the realization side it appears that on a long-term basis newsprint will realize over £40 per long ton ex-mill, as compared with only £24 ex-mill for sulphate pulp. Even if the margin were much smaller it would appear that it is advisable for New Zealand to concentrate, as far as practicable, upon the production of newsprint. The Murupara project envisages two phases of development. The first provides for paper-production of 60,000 tons annually with a surplus sulphate pulp production of 26,000 long tons. The second phase provides for the doubling of paper-production, with consequential reduction of surplus pulp by 15,000 long tons, giving a final surplus of only 11,000 tons. It is clear that the second phase of development should proceed immediately the first phase is completed, with final building requirements as part of the first phase development in order to expedite completion of the second phase.

Forestry Conditions in Pulp-producing Countries and in New Zealand and Australia

(19) Although any conclusive review of forestry conditions even in Canada and the United States of America was outside the scope of the delegation's activities, nevertheless it was necessary to secure an adequate appreciation of fundamental conditions in the more important pulp-producing countries, and data and extracts from various authoritative statements are presented for public information.

(a) Canada

The following is an extract from a publication by the Canadian Pulp and Paper Association, the source of the information being the Dominion Forest Service :—

Complete estimates of rate of growth of Canadian forests have not been compiled, but the following facts are known :—

	Cubic Feet Per Acre.
While there is but a small growth in many areas, over considerable tracts growths have been recorded by the Dominion Forest Service of	25–40
Managed forests in Scandinavia produce	28
Replacement of annual depletion in the accessible productive forest areas requires an annual average growth of	12

The foregoing figures by no means indicate that there is no cause for anxiety regarding the future maintenance of the forests and their proper conservation for use.

Other factors affecting these figures include :—

(i) While the annual increment appears to exceed the annual depletion, no comprehensive and proper estimate of forest increment in Canada as a whole has yet been prepared or is under way.

(ii) Insects and diseases in the forests periodically reach epidemic proportions ; unless checked they will affect the existing balance between depletion and increment.

(iii) In many instances the depletion is concentrated in the more accessible areas. Growth that accrues in more remote areas is not used.

(iv) Repeated fires retard and often make impossible the proper regeneration of the forests.

(v) Land tenures are often such that there is no economic or other urge upon some loggers to operate along scientific methods.

(vi) The fire hazard is greater in the more accessible forests, a situation naturally having a bearing on the cutting methods pursued by owners or operators,

(*b*) *U.S.A.*

The forestry position in the United States of America is not as favourable as in Canada. The annual cut undoubtedly exceeds the annual growth by a substantial margin, though this applies more to saw logs than to pulp-wood. Appreciable supplies of pulp-wood ranging usually between 1,000,000 and 2,000,000 cords annually have also been imported from Canada for many decades, the principal species being spruce for mechanical and sulphite pulp and poplar for soda. Whilst cessation of these imports may be expected sooner or later with some embarrassment to eastern pulp-producers, there appears to be little doubt that by better integration of sawmilling and pulping activities in all sections of the United States of America the country could probably meet its own future requirements of pulp for many years. The economic advantages enjoyed, however, by established mills in the form of extremely low capital costs, &c., are likely to prevent the attainment of such a possibility for several decades.

Table XI, taken from a 1938 report by the United States Tariff Commission on wood-pulp and pulp-wood, shows the estimated average cords recoverable from uncut and cut-over lands held by United States pulp-mills. Except in the case of the Pacific coast and British Columbia, the stands are extremely light. The Canadian figures undoubtedly apply to the eastern sections of that Dominion. The annual rates of growth are generally higher than in Canada, those for the southern pines being about 100 cubic feet per acre. On the western coast of the continent, however, douglas fir has a similar rate of growth in both Canada and the United States of America, and western hemlock an even higher rate of 150 cubic feet. It is confidently anticipated that the value of hemlock will appreciate materially as a source of sulphite rather than sulphate pulp.

TABLE XI—PULP-WOOD: ESTIMATED AVERAGE CORDS RECOVERABLE FROM UNCUT AND CUT-OVER LANDS HELD BY UNITED STATES PULP-MILLS

(Source: Report to United States Senate on wood-pulp and pulp-wood)

Region.	Estimated Average Quantity Recoverable Per Acre.
	Cords
New England	2·7
Middle Atlantic	4·6
Lake and central	5·0
Southern	5·0
Average, four regions ..	3·6
Pacific coast	77·2
Average, all regions	5·3
Canada	4·9

(*c*) *Sweden*

The following statements are taken from an article entitled "The Situation and Prospects of the Swedish Pulp Industry" in the June, 1949, issue of *Index*, published by the Swedish Bank of Commerce.

Production in the pulp industry rose very rapidly in the inter-war period. However, it was obvious already during the second half of the 1930's that the Swedish forest industries had reached the production limit fixed by the natural regrowth of the forests, the increasing shortage of pulp-wood becoming a major obstacle to further expansion. Pulp-production reached its peak in 1937 at a total of 3,500,000 metric tons, a volume of production that has never been equalled since. During the war a considerable portion of the yield from the forests had to be used as fuel, and even if mainly low-grade timber was utilized for this purpose it still meant to some extent a further deterioration in industry's supplies of raw materials. However, the reduced industrial wood consumption during the war gave the forests a much needed period of rest as far as concerned the normal and more valuable industrial assortments. Since the war the output of pulp has again shown a rising tendency, but in 1948 it was still 10 per cent. below pre-war level. Even so, the present volume of production must

be considered far too high compared with the maximum which the annual regrowth of pulp-wood permits. According to estimates drawn up by the State Forest Research Institute, lumbering in Upper and Central Norrland, an area which is responsible for the bulk of the Swedish pulp-production, will have to be reduced by no less than 30 per cent. of the annual cutting during the period 1936–39 if the Swedish forests are to be maintained on a sustained-yield basis. The situation is better in Central and South Sweden, where lumbering can be carried on at the same level as in the above-mentioned period, or might even be not inconsiderably increased. It might be added that in fact the long-term programme for Sweden's economy up to the year 1952 recently submitted to the O.E.E.C. foreshadows a certain decline both in the production and in the export of chemical and mechanical pulp . . . .

According to the Forest Research Institute's estimates it is within the bounds of possibility to raise the cutting in Norrland by 50 per cent. and in Southern Sweden by 30 per cent. in the course of the next eighty years.

As the industry was already over-dimensioned during the 1930's, manufacturers in Norrland have in recent years decided to close down mills with a total capacity of about 150,000 tons (metric). Following upon this well-remembered " death of the saw-mills " around the turn of this century, it looks as if the Swedish pulp industry is now undergoing a more or less similar experience . . .

It is also obvious that since 1939 the root value of pulp-wood is far lower in the United States and Canada than in Sweden. In the Swedish climate the forest grows twice or three times more slowly and is therefore more expensive than the rapidly growing forests in the southern States, where the world's biggest sulphate industries have latterly grown up. On the other hand, it can hardly be denied that the costs of transport are lower in Sweden than in any other country thanks to the highly developed network of natural floating channels provided by the Swedish rivers. This factor will increase in importance as the most favourably situated forests in North America are gradually exhausted and more remote forests have to be exploited. Moreover, the costs of labour are higher in North America, in certain districts at any rate, than in Sweden. Finally, the rapidly growing American tree species yield a cellulose the fibre strength of which is some 30 per cent. lower than that of the Swedish " kraft " pulp. Although the difference in this respect is being reduced, as the quality of the American southern State " kraft " pulp is being constantly improved, the unbleached Swedish " kraft " pulp has so far succeeded in competing successfully with the American article.

Table X illustrates the variation in capacity and production of the sulphate and sulphite industry in Sweden since 1937.

(*d*) *Finland*

Likewise, an article on Finland's forest resources and their utilization by Professor Ilvessalo published in the Finland *Monthly Bulletin* for April–June, 1948, indicates that the annual forest cut is not only greater than the annual growth, but considerably larger than the normal cut required to restore the forests to a state of maximum productivity. Thus in Table XII it will be seen that even pre-war the annual cut though less than the annual growth was still in excess of the normal removal. The serious deterioration since the war is due to the cession of forested territory to Russia, and in the past two felling seasons the annual cut has greatly exceeded not only the normal cut, but also the actual growth. It is an inescapable conclusion that the annual cut must be seriously reduced in order to protect the future productivity of the Finnish forests.

The average annual growth per acre of forest land is 26·9 cubic feet. It fluctuates between 60 cubic feet in the best forest regions and 15 cubic feet in the northernmost forests. This figure is practically the same as in Sweden (27·3 cubic feet), but higher than in Norway (19·3 cubic feet).

(*e*) *Australia*

The softwood resources of the Commonwealth, both indigenous and exotic, are far too small and likely to remain so for the satisfaction of anything but a very small proportion of the country's timber and long-fibred pulp requirements. Opportunities undoubtedly exist for an expansion of Australia's soft-wood resources, but it is doubtful if they will even be able to keep pace proportionately with the increase in population now being aimed at by mass immigration schemes. Only its exotic stands make any contribution to the local pulp industry at the present time, but as the area is less than 200,000 acres the supplies are insignificant.

TABLE XII—ANNUAL CUT, ANNUAL GROWTH, AND NORMAL ANNUAL REMOVAL REQUIRED TO RESTORE FINNISH FORESTS TO MAXIMUM PRODUCTIVITY

(All figures in million cubic feet)

Period.	Annual Cut.	Annual Growth.	Normal Removal.
1924–37	1,448	1,625	1,342
1935–39	1,342	1,625	1,342
1940–44	1,060	1,625	1,342
1945–47	1,695	1,448	1,201

(f) New Zealand

For pulp-wood supplies the Dominion must depend upon an intensive form of exotic forestry in contrast to the extensive types of indigenous forestry characteristic of the older pulp-producing countries. This carries with it numerous economic and technical advantages, of which the delegation considers the most imortant to be as follows :—

(i) Greater concentration of forest stands, allowing of more intensive, more effective, and cheaper fire protection ;

(ii) Higher annual rates of growth, varying from over 200 cubic feet per acre for insignis pine down to 100 cubic feet for other pine, larch, and fir species. These rates exceed considerably the growth rates in all major pulp-producing countries, notably the 25 to 40 cubic feet in Canada and the 28 cubic feet in Scandinavia referred to in paragraph (*d*), and thus ultimately mean lower growing costs in New Zealand ; and

(iii) Heavier stands per acre. Twenty-five-year-old stands of insignis pine have yielded up to 8,000-odd cubic feet or 100 cords per acre, which is in striking contrast to most of the yields of only 2·7 to 5·3 cords shown in Table XI. This means both lower logging costs and lower transportation charges, especially having regard to the fact that year-round logging and hauling reduces pulp-wood inventories to negligible proportions compared with over twelve months' stock piles carried by Canadian and Scandinavian pulp-mills.

(g) The Murupara Project

The net result will be significantly lower pulp-wood costs than in the major pulp-producing countries. The one inherent disadvantage is the greater risk of insect and fungal epidemic attack, but in the Murupara project this has been guarded against more effectively than in any other New Zealand project through the use of a wide diversity of species. No other forest or group of forests in New Zealand has a significant volume of pulp-wood other than insignis pine to ensure a continuous supply of raw material in the event of an epidemic attack of the main insignis pine stands. The Murupara working circle, which is that portion of the Kaingaroa State Forest allocated for the Murupara project, represents one of the greatest concentrations of forest growth in the world for the maintenance of a pulp and paper plant. The average haul is probably one-fifth the average distance over which most pulp and paper plants secure their supplies. An equally important advantage is that of integration with an extremely large sawmill, which by paying more for large high-quality logs can allow the pulp-mill to secure its smaller pulp-wood timber at a correspondingly low price. With a rail haul to port of only eighty miles, the delegation believes the Murupara project possesses an extremely favourable set of forest conditions for economic operation.

CONCLUSIONS AND RECOMMENDATIONS OF THE DELEGATION

(20) In accordance with the foregoing discussions, the New Zealand delegation has come to a number of conclusions, and recommends accordingly:—

(*a*) *World Wood-pulp Statistics*

The necessity for computation of standardized statistics covering the production of both pulp and paper products is essential.

(*b*) *World Wood-pulp Position*

The estimates of the World Wood Pulp Conference in respect to future requirements have been proved too high, but nevertheless it is still true that considerable new or extra annual capacity in sulphate of the order of 1,000,000 tons is required to meet even the reduced demands estimated by the delegation.

(*c*) *World Newsprint Position*

Due to currency and other financial difficulties, current effective demand is much less than unrestrained or potential demand. Nevertheless, there is still a small shortage, though much idle capacity due largely to a scarcity of pulp and pulp-wood supplies, &c. If both the financial and raw-material problems could be resolved, the world newsprint capacity would be insufficient to meet current potential demand. Both New Zealand and Australia are unable to secure adequate supplies on account of currency difficulties, and are likely to remain in this position for many years. It is therefore an inescapable conclusion that, whether or not normal international trading conditions are restored within the near future, New Zealand and Australia should have a sufficiently large local production of newsprint in order to be certain of securing a significant proportion of requirements. The security of the two countries also favours such a development against the possibility of future dislocations in supply during periods of emergency. The general supply-demand position indicates that newsprint prices are not likely to recede to any marked extent other than on a purely temporary basis. The restricted supplies of suitable pulp-wood constitute a limiting factor to any sustained price reduction of a marked character.

(*d*) *World Sulphate Position*

The world sulphate position is in marked contrast to the world newsprint position. There appears to be ample pulp capacity for current and immediate future requirements, but with the increasing substitution of both bleached and unbleached sulphate for sulphite pulp it is believed that some extra capacity will be required within five years even if normal international trading relations have not been completely restored by that date. If, of course, all currency and financial difficulties can be resolved meantime, a very material increase in sulphate capacity amounting to as much as 2,000,000 tons is likely to be required. The general supply-demand position, however, is likely to be very much easier than in the case of newsprint, due largely to the abundant supply of suitable pulp-wood in many parts of the world. It is therefore the considered opinion of the delegation that the future prices for sulphate pulp are likely to stabilize at much lower levels than for newsprint, indicating the necessity for caution in expanding sulphate-pulp production without adequate guarantees for its absorption in Australia. It is believed that the Commonwealth should be vitally interested in covering a significant proportion of its long-fibred chemical-pulp requirements against the possibility of emergency dislocation of overseas supplies.

(*e*) *Exotic Timber Resources in New Zealand*

After considering forestry conditions and the supply of raw forest material in the principal pulp- and paper-producing countries, the delegation believes that the exotic forest position in New Zealand favours the development of the pulp and paper industry, provided that units are sufficiently large in size and completely integrated with large sawmills as to secure the economic benefits of low operating and fixed charges. The delegation was impressed with the increasing tendency towards complete integration between sawmills and pulp and paper plants.

(*f*) *The Murupara Development*

As the Murupara project meets completely the basic requirements of an economic integrated plant, the delegation concludes that it should be persevered with as rapidly as possible, with emphasis upon newsprint production, and with surplus unbleached sulphate-pulp production reduced to a minimum unless suitable guarantees for its marketing at a profitable price can be secured.

EXHIBIT A—OFFICIAL INVITATION, MEMORANDA, AND AGENDA FOR WORLD WOOD PULP CONFERENCE

P.M. 104/6/32

Food and Agriculture Organization of the United Nations,
1201 Connecticut Avenue, Northwest,
Washington 6, D.C.,
C/F–X/19,

31 December, 1948.

SIR,

I have the honour to invite your Government to be represented at a "Preparatory Conference on World Pulp Problems", to be held from 25 April to 4 May 1949 at Montreal, Canada. The Conference is being organized jointly by FAO and the Canadian Government, and with the assistance of the Canadian Pulp and Paper Association, which has kindly consented to make available the necessary meeting facilities.

The organization of this Conference was approved by the Fourth Session of the FAO Conference, held at Washington in November 1948, and all countries directly interested were urged to participate.

A draft agenda and a memorandum setting out the background and major objectives of the Conference are attached for your consideration. Any observations or suggestions that you may care to make will be welcome. It would be appreciated if they could reach Washington by 15 February, 1949.

In view of the exploratory nature of this Conference, invitations to send official delegations are being addressed only to those countries that play a significant part in the production, trade, or consumption of wood pulp. However, all member-Governments of FAO are being informed of the meeting so that they may, if they so desire, designate representatives to be present.

All official delegations will have equal status at the Conference, irrespective of their Government's membership in FAO. The United Nations Secretariat, UNESCO, and other International organizations interested in the problem are also being asked to send observers.

I should be grateful if you would inform me at your earliest convenience whether your Government wishes to be represented at this Conference and advise me of the names of your delegates. Meeting preparations are being made on the assumption that each participating country will send not less than two delegates and usually not more than five. A minimum of two delegates is deisrable so that sessions of the full conference and meetings of working parties can be held simultaneously.

I might add that preliminary conversations between members of FAO's staff and governmental and industrial bodies in several interested countries have produced favourable response. They have also evidenced the desirability of including, wherever possible, the representatives of industrial and trade organizations amongst the delegates sent by participating countries.

Details regarding transportation, hotel accommodation and similar points will be sent to you shortly. You are no doubt aware of the general ruling made by the last session of the FAO Conference, that when delegates are appointed by Governments to attend meetings convened for the benefit of member countries, their expenses will be defrayed by their Governments. FAO and the Canadian Pulp and Paper Association will, however, gladly furnish any assistance desired by your delegation in making necessary arrangements.

Accept, Sir, the assurance of m h hest consideration.

(Sgd.) N. E. Dodd

NORRIS E. DODD,
Director-General.

The Right Honourable The Minister of External Affairs,
Wellington, New Zealand.

Food and Agriculture Organization of the United Nations.

MEMORANDUM REGARDING WORLD PULP PROBLEMS

UNDER the terms of reference laid down at the first FAO Annual Conference at Quebec, pulp is one of the primary forest products for which responsibility has been assigned to FAO. Pressure of work has prevented FAO taking up this important problem earlier. Continuing pulp shortages in certain parts of the world and changes in the international pulp situation now make a general review desirable.

A study prepared by the Department of Economic Affairs of the United Nations, after consultation with FAO on statistical questions, points to a continuing shortage of newsprint. UNESCO, at a meeting held in August 1948 in Paris, expressed serious concern about the newsprint outlook and made a number of recommendations, which call for consideration by FAO. The Industry and Materials Committee of the Economic Commission for Europe has also been requested by several Governments and by UNESCO to take up the European pulp problem and has instructed the Executive Secretary "to consult with the Timber Committee and the Director-General of FAO and to prepare a preliminary study of the main problems involved . . . ."

Furthermore the Fourth Session of the FAO Annual Conference held November 1948 declared that—

In view of the uncertain future outlook with regard to productive capacity and demand for wood pulp,

(*a*) It considered that more attention to this important commodity should be given.

(*b*) It approved the organization in the very near future of a preparatory conference on World Wood Pulp Problems.

(*c*) And it expressed appreciation of the co-operation of the Government of Canada and the Canadian Pulp and Paper Association in inviting the Conference to hold its first session at Montreal, and urged all countries directly interested to participate.

The main purpose of the proposed conference in Montreal is to give experts in the field of pulp production and distribution an opportunity to review the world position of this important commodity and to decide whether any steps are needed to achieve, both for the immediate and the more distant future, the necessary equilibrium between requirements and supplies.

To facilitate such discussions, the secretariat will be ready to supply delegates with worksheets and memoranda in connection with items 5–8 of the draft agenda. It seems important, however, that delegates should come with a maximum of information about the present and prospective pulp capacity and needs of their own countries, as well as of their principal customers and suppliers.

It is known that new pulp mills are under construction or are being planned in a number of countries. While this constitutes an obviously desirable development, it is equally important that the capacity of pulp industries should always be considered and planned with due regard to the permanent capacity of forests to yield the necessary raw materials. It should also take into account present and prospective market requirements in order to forestall the risk of surpluses, once the immediate needs of the next few years have been met.

The projected conference cannot be expected to provide immediate solutions to all these problems. It will attempt, however, to provide opportunity for a first discussion amongst competent experts and to arrive at an agreed view about the world situation and steps that might be recommended for national and international action.

The following countries have been invited to participate in the "Preparatory Conference on World Pulp Problems":—

Argentina.	Czechoslovakia.	Japan.	Sweden.
Australia.	Finland.	Mexico.	Union of South Africa.
Austria.	France.	Netherlands.	United States.
Brazil.	Germany.	New Zealand.	United Kingdom.
Belgium.	India.	Norway	USSR.
Canada.	Italy.	Poland.	Yugoslavia.
Chile.			

Food and Agriculture Organization of the United Nations.

PROPOSED DRAFT AGENDA, PREPARATORY CONFERENCE ON WORLD PULP PROBLEMS

1. Opening speech of representative by the Director-General of FAO.
2. Adoption of Rules of Procedure.
3. Election of Conference Chairman.
4. Adoption of Agenda.
5. Prospective world pulp requirements, 1949–1960 :—
   Groundwood.
   Sulphite.
   Sulphate.
   Dissolving.
6. World pulping capacity and prospective production. 1949–1960 :—
   Groundwood.
   Sulphite.
   Sulphate.
   Dissolving.
7. World newsprint situation and outlook, 1949–1960.
8. Pulpwood needs and prospective supplies by regions, with due regard to growing capacity of forests and to competing requirements for other uses.
9. Conclusions with regard to—
   (*a*) Prospective surpluses or deficits of pulp by categories and regions.
   (*b*) Need for additional pulping capacity by categories and regions.
10. World pulp statistics.
11. Further procedure :—
   (*a*) Date and place of next Conference.
   (*b*) Other arrangements.
12. Other business.

EXHIBIT B—AMENDED AGENDA

PROPOSED DRAFT AGENDA, PREPARATORY CONFERENCE ON WORLD PULP PROBLEMS

1. Opening speech by representative of the Director-General of FAO.
2. Adoption of Rules of Procedure.
3. Election of Conference Chairman.
4. Adoption of agenda.

Situation and Outlook (National, Regional and World)

5. Prospective world pulp requirements, 1949–55 :—
   Groundwood.
   Sulphite.
   Sulphate.
   Dissolving.
6. World pulping capacity and prospective production, 1949–55 :—
   Groundwood.
   Sulphite.
   Sulphate.
   Dissolving.
7. Pulpwood needs and prospective supplies by regions, with due regard to growing capacity of forests and to competing requirements for other uses.
8. World pulp products situation (to enable general consideration to be given to different commodities made from pulp.)
9. Dissolving pulp.

Conclusions

10. Prospective surpluses or deficits of pulp by categories and regions.
11. Need for additional pulping capacity by categories and regions.

Further Procedure

12. World pulp statistics.
13. Date and place of next Conference.
14. Other arrangements.
15. Adoption of report.

EXHIBIT C—INTRODUCTORY CONFERENCE RÉSUMÉ OF NEW ZEALAND WOOD-PULP POSITION

New Zealand National Position

1. Pre-war consumption of pulp and paper products in New Zealand was between 80,000 and 90,000 metric tons annually, but of these only 10,000 metric tons were produced locally, the remainder being imported.

2. Post-war consumption has been between only 50,000 and 70,000 metric tons annually, but local production has now increased to over 25,000 metric tons.

3. Current local products consist of—

(*a*) Wrappings made from imported chemical pulp, mostly sulphate, plus locally collected waste paper, flax fibre, &c., the annual production approximating to 9,000 metric tons.

(*b*) Paper board products made largely from mechanical pulp produced from the locally-grown exotic soft-wood *Pinus radiata*, plus some imported chemcial pulp, plus locally-collected waste paper; current production being about 15,000 metric tons.

4. New Zealand, however, has forest supplies of such magnitude and so concentrated as to allow the establishment of the pulp and paper industry on such a scale as will not only meet the entire local demand for bulk products such as newsprint, printings, wrappings, &c., but provide a significant surplus for export.

5. The sustained yield of the exotic softwood forests surplus to New Zealand domestic needs for lumber and pulp products is of the order of 50,000,000 cubic feet annually. If converted wholly into chemical pulp the annual yield would be 250,000 metric tons, but it is the objective of national forest policy to completely integrate pulp and paper manufacture with sawmill, plywood-manufacture, &c., with the expectation that pulp and paper production for export would use only 30,000,000 cubic feet annually.

APPENDIX

TABLE 1—CANADIAN NEWSPRINT CAPACITY AND PRODUCTION, 1925–49

(From *Newsprint Data*, 1948, published by Newsprint Association of Canada, 1st October, 1948
(In thousands of short tons of 2,000 lb.)

	Rated Capacity.	Actual Production.	Idle Capacity.	Operating Percentage.
1925	1,715	1,522	193	88·8
1926	1,931	1,882	49	97·5
1927	2,475	2,087	388	84·3
1928	2,993	2,381	612	79·6
1929	3,225	2,729	496	84·6
1930	3,600	2,504	1,096	69·6
1931	3,825	2,221	1,604	58·1
1932	3,840	1,914	1,926	49·9
1933	3,847	2,012	1,835	52·3
1934	3,861	2,597	1,264	67·3
1935	3,914	2,751	1,163	70·3
1936	3,869	3,209	660	82·9
1937	3,883	3,648	235	93·9
1938	4,204	2,625	1,579	62·4
1939	4,293	2,869	1,424	66·8
1940	4,368	3,419	949	78·3
1941	4,341	3,426	915	78·9
1942	4,400	3,177	1,223	72·2
1943	4,315	2,983	1,332	69·1
1944	4,359	2,992	1,367	68·6
1945	4,301	3,259	1,042	75·8
1946	4,279	4,143	136	96·8
1947	4,350	4,447	Nil	102·2
1948*	4,478	4,575	Nil	102·2
1949*	4,600	4,675	Nil	101·6

* Estimate.

Sources—Capacity: 1925–35 N.P.S.B.; 1936–48 N.A.C. standard ratings: 1949 N.A.C. estimates from company reports. Production: 1925–35 N.P.S.B.; 1936–47 N.A.C. monthly reports; 1948–49 N.A.C. estimates from company reports.

Explanation of "Rated Capacity."—The figures for "rated capacity" in the first column of this table are necessarily different from actual production shown in the second column. Since 1936, "rated capacity" figures have been based on a performance standard established by N.A.C. engineers and adopted by the Canadian Government for purposes of wartime controls. The totals represent the result of combining for each newsprint machine in Canada the best sustained speed in any one of the previous ten years with the best trim attained in any one of the previous five years. The capacity figure for 1949 is an estimate made by N.A.C. engineers on this standard basis, allowing for known increases.

In a period when newsprint demand does not permit full operation of newsprint machines, rated capacity will obviously exceed actual production. When demand is higher than productive ability and strenuous efforts are being made to increase speeds, rated capacity will lag behind actual production. Thus, the rated capacity figure for the year 1948 was based on machine performance up to 30th September, 1947, and any improvements in speed or trim introduced during the preceding year or subsequent to that date would not be fully reflected in rated capacity figures until a year later. Meanwhile, unless machines are idle through mechanical breakdown, adverse weather conditions, or from other causes, the industry will be reported as operating in excess of 100 per cent. of its rated capacity.

TABLE 2—UNITED STATES OF AMERICA SHARE OF WORLD NEWSPRINT SUPPLY, 1927–49

(From *Newsprint Data*, 1948, published by Newsprint Association of Canada, 1st October, 1948)

(By available supply: thousands of short tons)

	Divisions, in Tons.			Percentages.	
	United States of America.	Rest of World.	Total.	United States of America.	Rest of World.
1927	3,461	2,896	6,357	34·4	45·6
1928	3,563	3,228	6,791	52·5	47·5
1929	3,796	3,483	7,279	52·2	47·8
Average	3,607	3,202	6,809	53·0	47·0
1930	3,551	3,494	7,045	49·6	50·4
1931	3,212	3,427	6,639	48·4	51·6
1932	2,793	3,527	6,320	44·2	55·8
1933	2,818	3,676	6,494	43·4	56·6
1934	3,223	4,172	7,395	43·6	56·4
Average	3,119	3,659	6,778	46·0	54·0
1935	3,230	4,377	7,607	42·5	57·5
1936	3,705	4,554	8,259	44·9	55·1
1937	4,279	4,838	9,117	46·9	53·1
1938	3,000	4,618	7,618	39·4	60·6
1939	3,534	4,517	8,051	43·9	56·1
Average	3,549	4,581	8,130	43·7	56·3
1946	4,330	2,837	7,167	60·4	39·6
1947	4,850	2,993	7,843	61·8	38·2
1948*	5,230	3,001	8,231	63·5	36·5
1949*	5,425	3,111	8,536	63·6	36·4
Average	4,959	2,985	7,944	62·4	37·6

* Estimate.

Sources of the figures in Table 2 above are N.A.C., N.P.S.B., and other reports of supply actually available in the years 1927–47 inclusive. Figures for 1948–49 are N.A.C. estimates based upon reports obtained.

Available supply represents tonnage from domestic production plus imports less exports and differs slightly from actual consumption because of variations in stocks on hand and tonnage in transit at the end of each year.

The significant feature of this table is the reversal of the pre-war trend in the current sharing of supply. Through the thirteen years preceding the war (1927–39) the United States used a diminishing part of total world consumption, falling from 54 to 44 per cent. of total consumption. Since 1946 the United States supply has risen both in volume and percentage, while the rest of the world has fallen in both; the United States percentage of the total is now over 64 per cent., with the rest of the world using less than 36 per cent. In 1948 the total world supply is about 100,000 tons in excess of the average supply pre-war (1935–39), but the distribution of the total is very different. United States consumers will this year receive 1,680,000 tons more than they received pre-war, and the rest of the world will receive 1,580,000 tons less.

TABLE 3—NEWSPRINT: WORLD CAPACITY, PRODUCTION, DEMAND, AND SUPPLY, 1939–49

(Source: *Newsprint Data*, 1948)
(In thousands of short tons)

—	—	Pre-war.	1946.	1947.	1948.	1949.
1	Existing machine capacity ..	10,496	9,431	9,693	9,844	10,079
2	Capacity actually in use or production	8,140	7,161	7,750	8,267	8,576
3	Idle machine capacity (line 1 minus line 2)	2,356	2,270	1,943	1,577	1,503
4	Demand, no restrictions	8,130	8,792	9,343	10,208	10,478
5	Government restrictions	Nil	1,075	1,163	1,284	1,452
6	Probable actual demand (line 4 minus line 5)	8,130	7,717	8,180	8,924	9,026
7	Supply obtained	8,130	7,167	7,843	8,231	8,536
8	Shortage from actual demand (line 6 minus line 7)	Nil	550	337	693	490
9	Idle capacity (line 3)	2,356	2,270	1,943	1,577	1,503
10	Shortage (line 3)	Nil	550	337	693	490
11	Excess idle capacity (line 9 minus line 10)	2,356	1,720	1,606	884	1,013

TABLE 4—INDICES OF CANADIAN NEWSPRINT COSTS AND PRICES, 1935–48

(Source: *Newsprint Data*, 1947)

—	1935.	1939.	1946.	1947.	1948.
Cost of wood per ton	100	118	256	323	367
Mill labour per ton	100	103	208	260	..
Canadian prices at New York	100	125	195	225	260*

* Based on $104.

TABLE 5—CONSUMPTION OF FIBROUS MATERIALS IN PRODUCTION OF PAPER AND PAPER BOARD IN UNITED STATES OF AMERICA, 1939–47

(Source: Statistics published by United States Pulp Producers' Association)
(In tons of 2,000 lb.)

Year. (1)	Wood-pulp. (2)	Other Fibrous Materials.			Total Fibrous Materials. (6)
		Waste Paper. (3)	Rags. (4)	Other. (5)	
1939	8,650,423	4,366,257	468,287	692,315	14,177,282
1940	9,781,739	4,667,502	402,600	640,967	15,492,808
1941	11,363,600	6,075,129	529,976	887,581	18,856,286
1942	11,038,020	5,494,959	480,614	844,337	17,857,930
1943	10,635,320	6,367,854	425,910	770,358	18,199,442
1944	10,502,204	6,859,332	427,837	957,389	18,746,762
1945	10,825,412	6,799,683	414,083	929,453	18,968,631
1946	12,093,093	7,278,097	402,506	979,755	20,752,451
1947	13,325,974	7,844,968	453,102	1,025,567	22,649,611

TABLE 6—WORLD PRODUCTION OF CHEMICAL PULP AND CONTRIBUTION BY MAJOR PRODUCING COUNTRIES, 1911–47

(Source: *Index*, Vol. VII, No. 79, 1932; and statistics published by United States Pulp Producers' Association)

(Thousands of tons of 2,000 lb.)

Year. (1)	United States of America. (2)	Canada. (3)	Sweden. (4)	Norway. (5)	Finland. (6)	All Countries. (7)
1911	1,531	134	782	231	130	4,372
1912	1,493	183	893	310	138	4,684
1913	1,500	253	948	335	142	4,959
1920	2,274	849	1,073	335	188	5,735
1921	1,606	613	644	160	218	4,386
1922	2,070	897	1,100	306	313	6,183
1923	2,203	1,012	1,095	360	349	6,581
1924	2,113	986	1,373	302	379	6,834
1925	2,322	1,084	1,426	410	437	7,713
1926	2,616	1,251	1,598	364	488	8,510
1927	2,686	1,278	1,729	410	545	9,092
1928	2,866	1,400	1,498	445	628	9,540
1929	3,098	1,501	2,074	489	677	10,676
1930	3,056	1,264	2,043	469	781	10,531
1931	2,950	1,116	1,795	222	785	9,471
1932	2,557	937	1,651	461	959	9,027
1933	3,074	1,121	2,151	433	1,013	10,428
1934	3,138	1,242	2,427	490	1,128	11,408
1935	3,566	1,305	2,538	509	1,253	12,347
1936	4,212	1,501	2,761	556	1,465	13,961
1937	4,963	1,757	3,075	609	1,633	15,932
1938	4,596	1,147	2,620	502	1,622	14,493
1939	5,541	1,370	2,697	546	1,368	15,000*
1940	7,107	1,923	1,850	444	588	15,000*
1941	8,211	2,171	1,238	439	649	15,750*
1942	8,496	2,298	1,627	360	555	15,500*
1943	7,407	2,239	1,150	336	556	13,750*
1944	7,796	2,158	1,106	268	478	13,000*
1945	7,769	2,220	1,644	165	542	13,000*
1946	8,026	2,493	2,279	256	815	14,500*
1947	9,087	2,856	2,409	359	1,052	17,500

* Partly estimated.

TABLE 7—WORLD CONSUMPTION OF CHEMICAL PULP BY MAJOR COUNTRIES, 1911–47

(Source: *Index*, Vol. VII, No. 79, 1932; and statistics published by United States Pulp Producers Association)

(Thousands of tons of 2,000 lb.)

Year. (1)	United States of America. (2)	Great Britain. (3)	Total, All Countries. (4)	Year. (1)	United States of America. (2)	Great Britain. (3)	Total, All Countries. (4)
1911 ..	1,796	494	4,296	1932 ..	3,803	..	9,027
1912 ..	1,810	540	4,647	1933 ..	4,731	..	10,428
1913 ..	1,830	539	4,961	1934 ..	4,613	..	11,408
				1935 ..	5,141	..	12,347
1920 ..	2,880	694	5,880	1936 ..	6,076	1,080	13,961
1921 ..	2,059	280	4,325	1937 ..	6,826	1,190	15,932
1922 ..	3,058	479	6,229	1938 ..	6,011	1,070	14,493
1923 ..	3,226	588	6,658	1939 ..	7,208	1,090	15,000*
1924 ..	3,331	647	6,908	1940 ..	7,952	519	15,000*
1925 ..	3,590	639	7,680	1941 ..	9,131	297	15,750*
1926 ..	3,977	688	8,495	1942 ..	9,072	410	15,500*
1927 ..	4,044	785	9,058	1943 ..	8,641	355	13,750*
1928 ..	4,300	670	9,486	1944 ..	8,557	308	13,000*
1929 ..	4,543	899	10,602	1945 ..	8,758	522	13,000*
1930 ..	4,500	839	10,478	1946 ..	9,749	610	14,500*
1931 ..	4,293	..	9,471	1947 ..	10,736	569	17,000

* Partly estimated.

TABLE 8—IMPORTS OF CHEMICAL PULP INTO UNITED STATES OF AMERICA BY PRINCIPAL COUNTRIES OF ORIGIN, 1937–39 AND 1945–47

(Source: Statistics published by the United States Pulp Producers' Association)
(Tons of 2,000 lb.)

Pulp Category. (1)	Year. (2)	Country of Origin. Canada. (3)	Sweden. (4)	Finland. (5)	Norway. (6)
Total	1937	539,413	1,103,087	268,472	101,891
	1938	345,107	787,592	242,036	69,851
	1939	475,765	827,995	316,470	95,536
	1945	886,939	644,416	..	..
	1946	1,024,308	430,695	100,240	..
	1947	1,258,443	542,777	209,677	6,877
Bleached sulphate	1937	55,212	47,450	9,163	..
	1938	33,992	53,254	2,617	310
	1939	46,139	53,637	8,196	280
	1945	44,760	27,235	..	..
	1946	56,213	23,484	..	..
	1947	176,917	64,103	..	..
Unbleached sulphate	1937	58,841	454,049	88,764	17,798
	1938	48,181	297,305	69,051	12,060
	1939	58,116	335,500	121,819	15,595
	1945	104,179	276,253	..	..
	1946	137,472	206,859	53,575	..
	1947	152,968	205,366	118,953	229
Bleached sulphite	1937	286,504	62,100	47,433	55,614
	1938	167,024	44,822	53,201	52,589
	1939	252,414	64,855	70,611	65,516
	1945	332,586	55,870	..	..
	1946	384,887	28,171	11,787	..
	1947	454,653	47,928	27,936	6,648
Unbleached sulphite	1937	128,535	539,488	123,112	28,479
	1938	86,505	392,211	117,167	4,892
	1939	110,144	374,003	115,844	14,145
	1945	372,279	285,018	..	..
	1946	411,512	172,181	34,878	..
	1947	438,447	225,380	62,788	..

NOTE.—Column (3) includes small quantities from Newfoundland and Mexico.

TABLE 9—THE ANNUAL CAPACITY OF CHEMICAL WOOD-PULP INDUSTRY IN UNITED STATES OF AMERICA BY PROCESSES, 1936–49

(Source: Statistics published by United States Pulp Producers' Association)
(In thousands of tons of 2,000 lb.)

Year.	Sulphite.		Sulphate.		Soda.	Semi-Chemical/ Chemical Fibre.	Total.
	Total.	Maximum Bleaching.	Total.	Maximum Bleaching.			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1936 ..	2,256	..	2,035	..	656	126	5,073
1937 ..	2,494	..	2,531	..	703	196	5,924
1938 ..	2,661	..	3,471	..	703	198	7,033
1939 ..	2,665	..	3,682	..	665	154	7,166
1940 ..	2,891	..	3,990	..	680	185	7,746
1941 ..	3,138	..	4,661	..	546	220	8,565
1942 ..	3,189	..	5,093	..	492	247	9,021
1943 ..	3,040	..	5,185	..	473	253	8,951
1944 ..	2,907	1,917	5,162	1,168	482	357	11,993
1945 ..	2,880	1,934	5,299	1,236	495	376	12,220
1946 ..	2,908	1,954	5,377	1,266	494	354	12,353
1947 ..	2,892	1,981	5,495	1,413	505	482	12,768
1948 ..	2,953	2,065	6,314	1,563	540	530	13,965
1949 ..	2,976	2,118	6,981	1,728	520	605	14,928

TABLE 10—CAPACITY AND PRODUCTION OF CHEMICAL PULP IN SWEDEN, 1937–47

(Source: Statistics published by United States Pulp Producers' Association)
(Tons of 2,000 lb.)

Year.	Sulphite.			Sulphate.		
	Capacity.	Production.		Capacity.	Production.	
		Bleached.	Unbleached.		Bleached.	Unbleached.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1937	1,901,000	514,030	1,289,511	1,268,000	95,794	1,175,810
1938	1,929,000	447,147	1,115,131	1,295,000	108,724	948,637
1939	1,929,000	511,176	1,120,018	1,323,000	140,061	925,640
1940	1,962,000	359,807	590,436	1,345,000	86,781	749,752
1941	1,973,000	402,832	127,822	1,345,000	37,677	359,204
1942	1,973,000	450,559	218,272	1,334,000	36,907	337,461
1943	1,896,000	361,695	224,218	1,334,000	40,191	375,820
1944	1,874,000	307,817	351,763	1,334,000	54,014	372,526
1945	1,890,000	374,782	596,628	1,312,000	47,397	603,011
1946	1,863,000	542,651	809,760	1,246,000	116,689	784,456
1947	1,808,000	614,604	800,667	1,246,000	187,253	781,711

TABLE 11—ANNUAL NEW ZEALAND IMPORTATIONS

Imports of Pulp and Paper Into New Zealand During Calendar Years 1928–34 (by Customs Items)

(Value = Value in country of origin plus 10 per cent.)

Article.	Average, 1928–30.		Class and Item No.	1931.		1932.		1933.		1934.	
	Quantity.	Value.		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
(1)	(2)	(3)		(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Tons.	£		Tons.	£	Tons.	£	Tons.	£	Tons.	£
Total value	..	1,190,894	..	..	884,714	..	848,089	..	761,112	..	1,167,647
Estimated total quantity	52,000	..	..	39,000	..	42,500	..	43,500	..	59,000	..
Wood-pulp	3,490	40,026	236	3,814	31,814	3,100	23,235	4,270	30,545	3,641	32,539
Bags, printed or lithographed	..	1,114	657	..	620	..	557	..	112	..	..
Seed packets, printed or lithographed	..	2,756	658	..	1,665	..	2,134	..	3,112	..	2,369
Paper bags, n.e.i.	..	3,918	659	..	4,089	..	1,500	..	1,377	..	3,005
Bookbinders' materials	..	2,135	660	..	456	..	624	..	563	..	1,601
Carbon	27	7,924	661	17	5,532	13	4,529	35	7,130	27	9,153
Cardboard	..	129,341	662	..	95,647	..	106,415	..	93,950	..	131,676
Cardboard-box materials	..	829	..	..	..	..	..	..	..	..	102,256
Carpet felt and paper felt	..	833	663	..	430	..	181	..	112	..	235
Emery-paper and glass-paper	..	15,903	664	..	8,667	..	7,863	..	7,828	..	14,218
Filter paper and filter pulp	..	1,275	665	..	1,277	..	685	..	1,456	..	1,470
Monotype paper in rolls	..	..	666	..	279	..	67	..	287	..	187
Paperhangings	..	95,836	667	..	49,473	..	36,962	..	36,724	..	57,327
Printing: Newsprint	23,994	386,170	668, 669	20,851	326,427	20,598	301,848	19,942	245,364	24,979	299,379
Printing: Other	6,350	218,824	670, 671	4,586	146,142	4,107	125,307	4,237	117,966	5,918	199,446
Vegetable parchment and greaseproof	1,479	57,677	672	1,504	52,314	2,080	68,842	1,868	65,672	2,145	81,615
Waxed paper	110	9,298	673	97	7,894	84	6,189	138	8,549	131	15,901
Wrapping: Larger sizes	1,150	49,040	674	965	28,262	872	26,730	911	27,133	1,198	41,098
Wrapping: Smaller sizes	92	4,409	675	44	2,265	38	1,957	35	1,396	501	2,753
Wrapping: Orchardists'	367	16,030	676	380	14,632	402	14,512	321	7,643	427	11,468
Writing: Not less than 20 in. by 15 in.	2,141	89,540	677, 678	1,855	69,159	2,196	76,441	1,965	61,404	2,439	92,280
Paper for use in manufacture	..	7,974	679	..	7,380	..	10,031	..	12,789	979	24,444
Paper, n.e.i.: Not less than 20 in. by 15 in.	812	42,460	680, 681	555	26,964	523	27,766	520	25,631	632	36,703
Paper, n.e.i.: Less than 20 in. by 15 in.	..	7,582	682	..	3,326	..	3,714	..	4,169	..	6,521

TABLE 11—ANNUAL NEW ZEALAND IMPORTATIONS—*continued*

Imports of Pulp and Paper Into New Zealand During Calendar Years 1935–42 (by Customs Items)

(Source of data : " Statistical Report on Trade and Shipping ")

Article.	1935.		1936.		1937.		1938.		1939.		1940.		1941.		1942.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Tons.	£	Tons.	£	Tons.	£	Tons.	£	Tons.	£	Tons.	£	Tons.	£	Tons.	£
Total value	..	1,331,456	..	1,599,715	..	1,877,231	..	1,971,989	..	1,739,690	..	2,103,323	..	1,446,829	..	844,020
Estimated total quantity	73,000	..	89,000	..	87,000	..	92,000	..	75,000	..	66,000	..	39,000	..	14,000	..
Woodpulp	4,246	37,148	4,408	47,788	5,030	59,227	7,478	85,170	6,220	50,647	7,090	142,729	7,770	169,302	2,040	48,072
Seed packets	..	3,249	..	2,999	..	2,906	..	2,276	..	1,980	..	5,226	..	3,428	..	7,716
Bags, celluloid, &c. ..	..	..	..	821	..	1,398	..	1,104	..	588	..	278	..	282	..	47
Paper bags, n.e.i. ..	..	6,341	..	6,827	..	9,469	..	6,621	..	2,473	..	189	..	2,194	..	30,911
Bookbinders' materials ..	..	1,550	..	1,015	..	886	..	1,103	..	952	..	2,183	..	1,160	..	40
Carbon	34	12,134	39	12,812	47	16,891	45	16,944	850	14,966	57	22,675	61	20,120	57	21,290
Wallboard .. }	..	168,513	..	193,150	{ 4,526	88,494	4,498	102,986	4,395	105,507	2,201	90,601	913	37,863	73	2,478
Cardboard .. }					{ 11,691	222,626	9,863	209,246	9,221	212,413	8,222	264,848	4,838	191,112	617	41,274
Box material (cardboard)	..	164,246	..	188,243	..	256,410	11,500	244,325	8,000	185,635	..	..	..	..	..	3,702
Felt	..	316	..	102	..	991	..	691	..	248	..	24	..	1,011	..	3,547
Emery and glass paper	..	19,952	..	24,626	..	31,386	..	27,626	..	25,560	..	33,681	..	31,608	..	40,925
Filter paper	..	1,909	..	2,364	..	2,856	..	2,259	..	2,502	..	3,597	..	7,836	..	6,149
Monotype paper ..	..	357	..	442	..	142	..	184	..	300	..	396	..	205	..	864
Wallpaper	..	64,638	..	74,783	..	74,244	2,000	74,036	2,000	77,595	..	80,295	..	75,271	..	46,911
Newsprint	30,363	327,310	39,688	444,953	28,355	344,109	37,001	527,355	28,828	447,686	26,112	419,308	12,312	202,650	2,391	41,060
Other printing ..	6,483	222,966	7,263	240,487	8,895	332,234	7,786	285,129	6,975	262,586	7,953	441,600	3,267	248,686	1,885	132,588
Parchment and greaseproof	2,115	80,490	2,581	101,162	2,327	96,224	1,960	85,127	1,769	68,640	3,228	237,800	1,658	131,302	1,783	189,552
Waxed paper ..	190	15,215	202	14,984	271	22,651	215	20,095	235	19,138	181	19,954	23	2,583	8	1,456
Wrapping : Large ..	1,130	38,387	1,786	59,859	1,894	64,881	1,524	54,662	1,158	38,110	923	41,610	822	33,704	162	17,365
Wrapping : Small ..	43	2,924	45	2,706	47	3,329	51	3,927	73	16,071	68	22,980	81	17,861	95	29,443
Wrapping : Orchardists'	436	11,985	398	9,802	334	17,528	499	22,614	228	10,281	515	32,424	90	5,795	109	5,929
Writing	2,259	86,132	2,768	95,617	3,164	121,041	2,214	98,363	2,126	91,267	2,706	166,901	1,253	109,809	698	56,051
Paper for manufacturers	..	17,526	..	23,908	..	33,685	..	31,735	..	35,817	..	77,246	..	95,650	..	44,535
Paper, n.e.i. : Large ..	726	41,782	784	44,520	1,047	59,075	683	42,683	896	51,018	474	42,320	304	37,101	560	47,234
Paper, n.e.i. : Small ..	..	6,386	..	5,743	..	14,550	..	17,728	..	17,321	..	14,458	..	20,296	..	24,881

TABLE 11—ANNUAL NEW ZEALAND IMPORTATIONS—*continued*

Imports of Pulp and Paper Into New Zealand During Calendar Years (by 1943–48 Customs Items)

(Source of data: Customs Department)

Article.	1943.		1944.		1945.		1946.		1947.		1948.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Tons.	£	Tons.	£	Tons.	£	Tons.	£	Tons.	£	Tons.	£
Total value	..	1,849,585	..	1,853,450	..	1,557,735	..	2,507,881	..	5,409,737	..	5,196,437
Estimated total quantity	47,500	..	51,500	..	45,000	..	66,500	..	92,000	..	81,500	..
Wood-pulp	2,707	61,281	12,492	269,651	9,300	231,149	10,665	302,941	9,113	383,800	13,506	611,657
Seed packets	..	6,113	..	5,935	..	5,749	..	5,925				
Bags, celluloid, &c.	..	..	..	23	..	2,225	..	..				
Paper bags, n.e.i.	..	22,500	..	596	..	377	..	1,683	See "Other Paper."			
Bookbinders' materials	..	216	..	126	..	4,142	..	923				
Carbon	32	17,795	23	13,701	23	13,117	41	21,824				
Wallboard	4,032	136,116	4,080	154,717	3,873	162,401	15	644	1,104	55,691	1,898	87,169
Cardboard							8,959	383,651	15,859	993,243	11,559	782,534
Box material (cardboard)	..	1,147	..	5,041	..	3,840	..	4,665				
Felt	..	1,269	..	735	..	1,443	..	4,521				
Emery and glass paper	..	57,275	..	42,226	..	52,744	..	41,645	See "Other Paper."			
Filter paper	..	5,715	..	8,005	..	3,523	..	5,226				
Monotype paper	..	71	..	85	..	80	..	620				
Wallpaper	..	38,519	..	55,360	..	66,568	..	209,017	..	231,561	..	134,083
Newsprint	18,046	301,933	19,235	336,351	19,763	365,943	22,971	515,291	28,629	209,141	23,419	789,950
Other printing	9,580	620,310	7,663	463,344	5,515	308,270	5,438	375,335	13,644	1,369,568	9,858	1,058,909
Parchment and greaseproof	1,888	141,519	1,483	130,556	971	110,878	1,045	117,411	2,165	209,509	3,039	330,570
Waxed paper	13	1,736	5	1,120	31	2,691	13	1,209	See "Other Paper."			
Wrapping: Large	797	36,855	956	44,139	233	10,331	153	7,791				
Wrapping: Small	105	44,797	72	30,230	48	26,005	42	25,718	1,691	175,484	3,325	300,654
Wrapping: Orchardists'	243	14,070	329	20,391	236	15,841	294	21,159				
Writing	1,383	96,103	1,056	77,773	340	38,404	1,275	141,524	2,390	274,844	2,175	291,679
Paper for manufacturers	..	105,721	..	79,797	..	82,386	..	231,720				
Paper, n.e.i.: Large	917	75,960	..	51,386	..	10,393	..	50,414	See "Other Paper."			
Paper, n.e.i.: Small	..	17,636	692	54,182	502	39,233	..	44,036				
Other paper (detailed analysis not yet available)	..	..	..	..	..	..	..	..	..	806,896	..	809,232

ADDENDUM

SINCE this report, which quotes verbatim in Chapter 3 the preliminary report of the Montreal Conference, was laid before Parliament the published version of the latter report has been received and the following significant amendments to Chapter 3 of this report should be noted. Nevertheless, while statistical discrepancies between the original and published versions of the Conference report confirm the inaccuracy of the statistical work as commented upon by the delegation, they do not invalidate any of the delegation's conclusions.

Page	Para.	
11	4	*For* " twenty-one Governments " *read* " twenty Governments." *For* " ten Governments " *read* " nine Governments."
14	20	*For* " produced 44 per cent." *read* " produced 46 per cent." *For* " world output " *read* " world output, excluding U.S.S.R." *For* " consumes 71 per cent." *read* " consumes 70 per cent." *For* " from 50 per cent." *read* " from 49 per cent." *For* " to 27 per cent." *read* " to 29 per cent."
14	22	*For* " of more than 60 " *read* " of about 60." *For* " of Eastern Europe " *read* " of Western Europe."
15	Table I	(disregarding individual countries and correcting totals only) :— *For* " 23,890 " *read* " 23,765." *For* " 24,615 " *read* " 23,895." *For* " 27,145 " *read* " 27,475." *For* " 27,780 " *read* " 27,980." *For* " 28,345 " *read* " 28,690." *For* " 28,265 " *read* " 29,020." *For* " 30,910 " *read* " 31,265." *For* " 30,395 " *read* " 31,170." *For* " 37,230 " *read* " 37,635." *For* " 36,260 " *read* " 36,940." *For* " + 725 " *read* " + 130." *For* " + 635 " *read* " + 505." *For* " — 80 " *read* " + 330." *For* " — 515 " *read* " — 95." *For* " — 970 " *read* " — 695."
15	26	*For* " some 3,000,000 tons " *read* " almost 4,000,000 tons."
16	27	*For* " increase by 500,000 " *read* " increase by about 1,000,000." *For* " production by 500,000 " *read* " production by 100,000."
16	28	*For* " almost 600,000 tons below " *read* " remain below." *For* " of 850,000 tons " *read* " of 900,000 tons."
16	29	*For* " from 1,200,000 tons " *read* " from 1,000,000 tons." *For* " 700,000 tons in 1949 " *read* " to 550,000 tons in 1949." *For* " some 300,000 tons in 1950 " *read* " some 200,000 tons in 1950."
17	34	*For* " the 3 per cent. deficit " *read* " the 2 per cent. deficit."
18	46	*For* " only 3,300,000 tons " *read* " only 3,700,000 tons."
20	Table III	(disregarding countries and correcting grand totals only) :— *For* " 120,189 " *read* " 120,285." *For* " 120,623 " *read* " 120,680." *For* " + 256 " *read* " + 295." *For* " 144,869 " *read* " 145,565." *For* " 138,682 " *read* " 138,955." *For* " — 4,994 " *read* " — 6,610."
22	52	*For* " by 14 per cent." *read* " by 19 per cent."
22	57	*For* " some 5,000,000 cubic " *read* " from 6,000,000 to 7,000,000 cubic." *For* " of 36,300,000 tons " *read* " of 36,900,000 tons."
22	58	*For* " roughly 3,400,000 " *read* " roughly 3,600,000."
23	62	*For* " in Finland, Scandinavia " *read* " in Finland, Sweden."
23	64	*For* " by 82 per cent. . . . 1948 " *read* " by 75 per cent. . . . 1949." *For* " increase of 15 per cent." *read* " increase of 20 per cent."
24	68	*For* " from 1,200,000 tons " *read* " from 1,500,000 tons." *For* " to 770,000 tons " *read* " to 880,000 tons."
24	72	*For* " increased to 155,000 " *read* " increased to 135,000."
24	73	*For* " 94,000 tons of pulp " *read* " 136,000 tons of pulp." *For* " 180,000 tons by 1955 " *read* " 210,000 tons by 1955."

Page	Para.	
25	Table IV	(disregarding countries and correcting totals only):
		Sulphite Pulp—
		For " 9,085 " *read* " 9,055."
		For " 9,210 " *read* " 9,025."
		For " + 125 " *read* " — 30."
		For " 7,780 " *read* " 7,910."
		For " 7,870 " *read* " 7,865."
		For " + 100 " *read* " — 45."
		For " 10,550 " *read* " 10,630."
		For " 10,200 " *read* " 10,245."
		For " — 300 " *read* " — 385."
		Sulphate Pulp—
		For " 3,875 " *read* " 3,970."
		For " 4,125 " *read* " 4,130."
		For " + 250 " *read* " + 160."
		For " 7,765 " *read* " 8,055."
		For " 7,910 " *read* " 7,925."
		For " + 145 " *read* " — 130."
		For " 11,730 " *read* " 11,705."
		For " 11,515 " *read* " 11,620."
		For " — 215 " *read* " — 85."
		Mechanical Pulp—
		For " 9,395 " *read* " 9,360."
		For " 9,580 " *read* " 9,560."
		For " + 185 " *read* " + 260."
		For " 9,490 " *read* " 9,445."
		For " 9,335 " *read* " 9,305."
		For " — 105 " *read* " — 140."
		For " 11,450 " *read* " 12,335."
		For " 10,975 " *read* " 11,565."
		For " — 475 " *read* " — 770."
26	Table V	(disregarding countries and correcting totals only):
		For " 950 " *read* " 960."
		For " 1,013 " *read* " 1,015."
		For " 1,105 " *read* " 1,130."
		For " 1,054 " *read* " 1,105."
		For " 1,262 " *read* " 1,290."
		For " 1,177 " *read* " 1,240."
		For " 1,333 " *read* " 1,398."
		For " 1,401 " *read* " 1,335."
		For " 1,289 " *read* " 1,445."
		For " 1,444 " *read* " 1,290."
		For " 1,693 " *read* " 1,705."
		For " 1,706 " *read* " 1,690."
		For " 1,470 " *read* " 1,650."
		For " 1,657 " *read* " 1,465."
		For " 2,077 " *read* " 2,170."
		For " 2,168 " *read* " 2,080."
		For " 1,967 " *read* " 2,075."
		For " 2,082 " *read* " 1,960."
27	79	*For* " The apparent deficit in groundwood, on a basis of figures submitted as minimum requirements, is only 3 per cent. . . . " *read* " The apparent deficit in groundwood, on a basis of figures submitted as maximum requirements, is 8 per cent.; on a basis of minimum requirements there is a slight surplus."
27	80	*For* " The apparent deficit in sulphate is in the order of 3 per cent., on a basis of estimated minimum requirements " *read* " While on a basis of maximum requirements there is an apparent European sulphate deficit in 1955, minimum requirements are in balance with production."

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