

**CIHM
Microfiche
Series
(Monographs)**

**ICMH
Collection de
microfiches
(monographies)**



Canadian Institute for Historical Microreproductions / Institut canadien de microreproductions historiques

© 1997

Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming are checked below.

- Coloured covers / Couverture de couleur
- Covers damaged / Couverture endommagée
- Covers restored and/or laminated / Couverture restaurée et/ou pelliculée
- Cover title missing / Le titre de couverture manque
- Coloured maps / Cartes géographiques en couleur
- Coloured ink (i.e. other than blue or black) / Encre de couleur (i.e. autre que bleue ou noire)
- Coloured plates and/or illustrations / Planches et/ou illustrations en couleur
- Bound with other material / Relié avec d'autres documents
- Only edition available / Seule édition disponible
- Tight binding may cause shadows or distortion along interior margin / La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure.
- Blank leaves added during restorations may appear within the text. Whenever possible, these have been omitted from filming / Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.
- Additional comments / Commentaires supplémentaires:

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

- Coloured pages / Pages de couleur
- Pages damaged / Pages endommagées
- Pages restored and/or laminated / Pages restaurées et/ou pelliculées
- Pages discoloured, stained or foxed / Pages décolorées, tachetées ou piquées
- Pages detached / Pages détachées
- Showthrough / Transparence
- Quality of print varies / Qualité inégale de l'impression
- Includes supplementary material / Comprend du matériel supplémentaire
- Pages wholly or partially obscured by errata slips, tissues, etc., have been refilmed to ensure the best possible image / Les pages totalement ou partiellement obscurcies par un feuillet d'errata, une pelure, etc., ont été filmées à nouveau de façon à obtenir la meilleure image possible.
- Opposing pages with varying colouration or discolourations are filmed twice to ensure the best possible image / Les pages s'opposant ayant des colorations variables ou des décolorations sont filmées deux fois afin d'obtenir la meilleure image possible.

This item is filmed at the reduction ratio checked below /
Ce document est filmé au taux de réduction indiqué ci-dessous.

| | | | | | | | | | | | | |
|--|-----|--|-----|--|-----|--|-----|--|-----|--|-----|--|
| | 10x | | 14x | | 18x | | 22x | | 26x | | 30x | |
| | | | | | | | | | / | | | |
| | 12x | | 16x | | 20x | | 24x | | 28x | | 32x | |

The copy filmed here has been reproduced thanks to the generosity of:

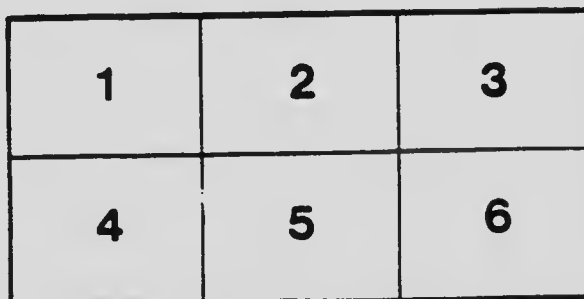
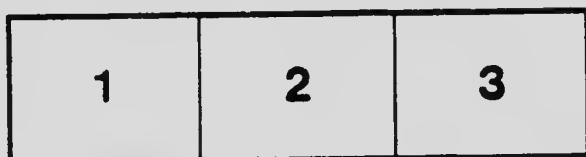
National Library of Canada

The images appearing here are the best quality possible considering the condition and legibility of the original copy and in keeping with the filming contract specifications.

Original copies in printed paper covers are filmed beginning with the front cover and ending on the last page with a printed or illustrated impression, or the back cover when appropriate. All other original copies are filmed beginning on the first page with a printed or illustrated impression, and ending on the last page with a printed or illustrated impression.

The last recorded frame on each microfiche shall contain the symbol \rightarrow (meaning "CONTINUED"), or the symbol ∇ (meaning "END"), whichever applies.

Maps, plates, charts, etc., may be filmed at different reduction ratios. Those too large to be entirely included in one exposure are filmed beginning in the upper left hand corner, left to right and top to bottom, as many frames as required. The following diagrams illustrate the method:



L'exemplaire filmé fut reproduit grâce à la générosité de:

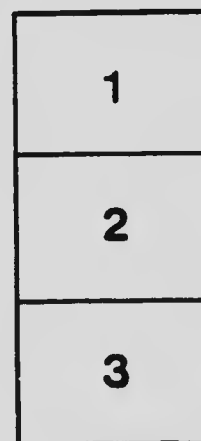
Bibliothèque nationale du Canada

Les images suivantes ont été reproduites avec le plus grand soin, compte tenu de la condition et de la netteté de l'exemplaire filmé, et en conformité avec les conditions du contrat de filmage.

Les exemplaires originaux dont la couverture en papier est imprimée sont filmés en commençant par le premier plat et en terminent soit par la dernière page qui comporte une empreinte d'impression ou d'illustration, soit par le second plat, selon le cas. Tous les autres exemplaires originaux sont filmés en commençant par la première page qui comporte une empreinte d'impression ou d'illustration et en terminant par la dernière page qui comporte une telle empreinte.

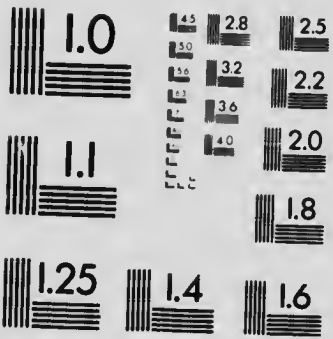
Un des symboles suivants apparaîtra sur la dernière image de chaque microfiche, selon le cas: le symbole \rightarrow signifie "A SUIVRE", le symbole ∇ signifie "FIN".

Les cartes, planches, tableaux, etc., peuvent être filmés à des taux de réduction différents. Lorsque le document est trop grand pour être reproduit en un seul cliché, il est filmé à partir de l'angle supérieur gauche, de gauche à droite, et de haut en bas, en prenant le nombre d'images nécessaire. Les diagrammes suivants illustrent la méthode.



MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No. 2)



APPLIED IMAGE Inc

1653 East Main Street
Rochester, New York 14609 USA
(716) 482 - 0300 - Phone
(716) 288 - 5989 - Fax

DEPARTMENT OF THE INTERIOR, CANADA

HON. W. J. ROCHE, Minister: W. W. CORT, Deputy Minister

FORESTRY BRANCH—BULLETIN No. 38

R. H. CAMPBELL, Director of Forestry

FOREST PRODUCTS OF CANADA

1912

PULPWOOD

COMPILED BY

R. G. LEWIS, B.Sc. F.

ASSISTED BY

W. GUY H. BOYCE

STATISTICS
AND
GENERAL
INFORMATION

JUL 9 1913

LIBRARY
OF
THE
DEPARTMENT
OF
THE
INTERIOR

OTTAWA:
GOVERNMENT PRINTING BUREAU
1912

41387

DEPARTMENT OF THE INTERIOR, CANADA

Hon. W. J. Roche, Minister; W. W. Cory, Deputy Minister

FORESTRY BRANCH—BULLETIN No. 38

R. H. CAMPBELL, Director of Forestry

FOREST PRODUCTS OF CANADA

1912

PULPWOOD

COMPILED BY

R. G. LEWIS, B.Sc. F.

ASSISTED BY

W. GUY H. BOYCE

OTTAWA:
GOVERNMENT PRINTING BUREAU
1913

41387

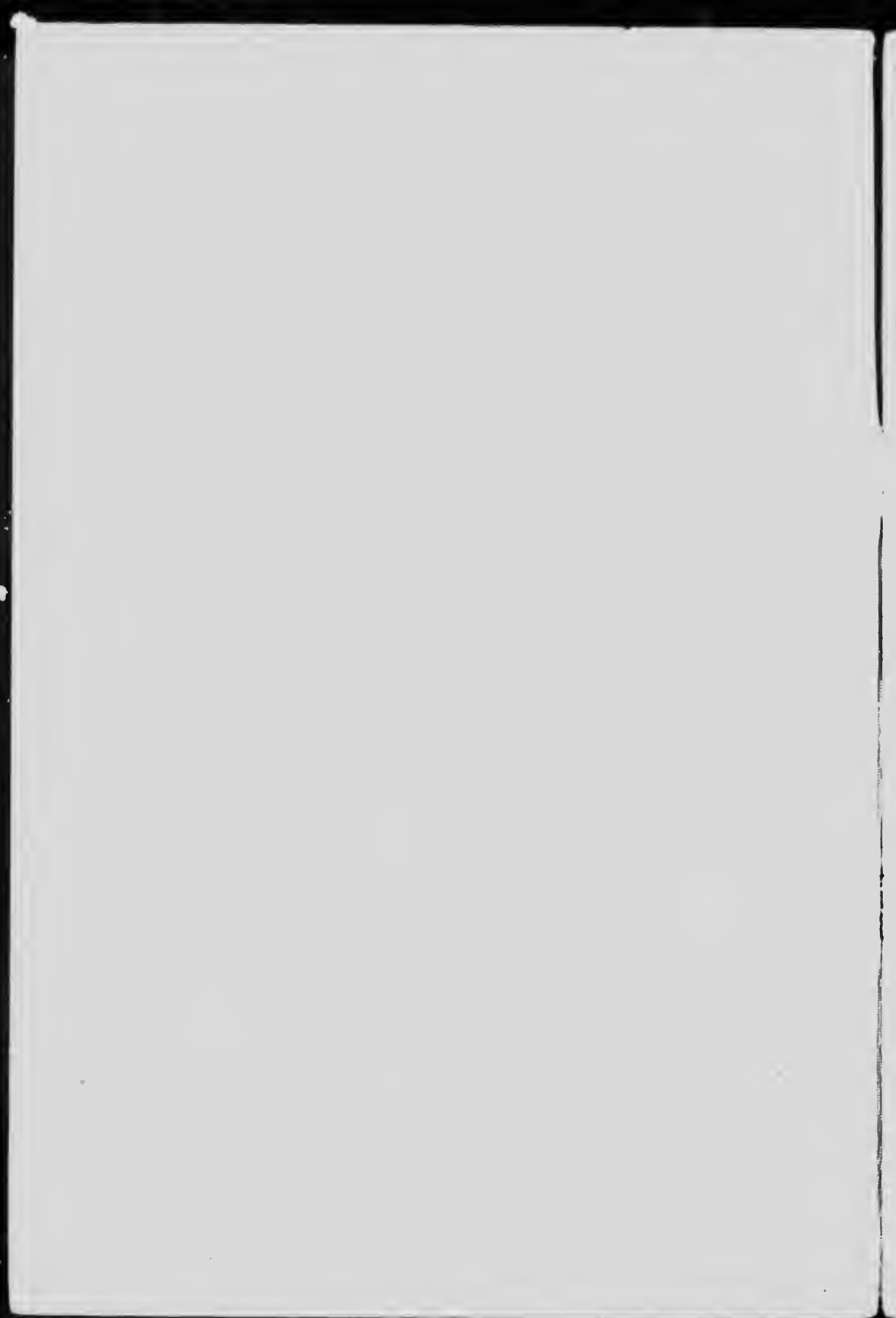
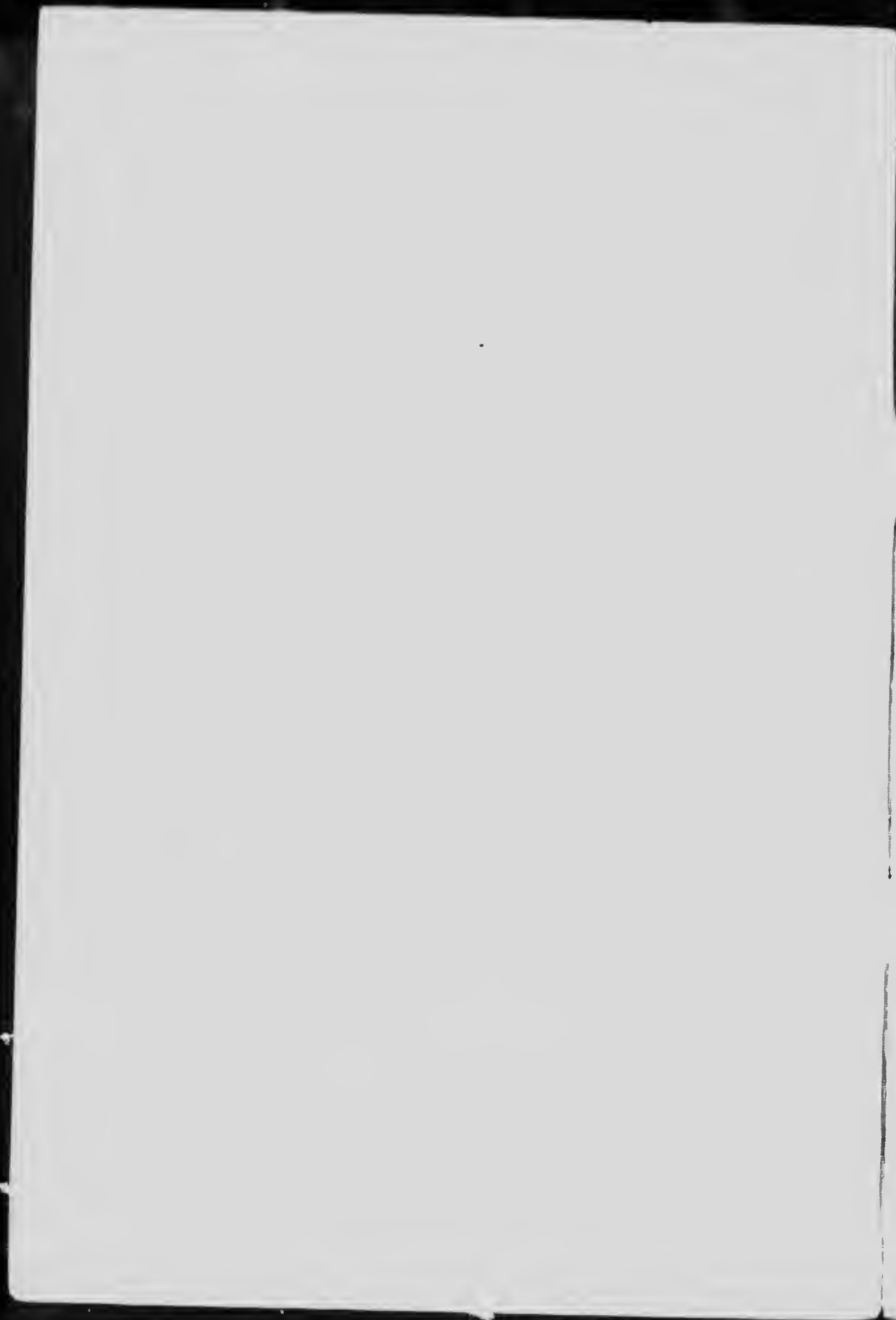


TABLE OF CONTENTS.

| | PAGE. |
|--|--------|
| Introduction | 1 |
| Pulpwood— | |
| Pulpwood, 1911 and 1912, by provinces | 1 |
| Diagram: pulpwood, 1912, by provinces | 8 |
| Pulpwood, 1911 and 1912, by kinds of wood | 8 |
| Diagram: pulpwood, 1912, by kinds of wood | 9 |
| Pulpwood, 1911 and 1912, by provinces, kinds of wood and processes | 12 |
| Diagram: pulpwood, 1912, by processes | 13 |
| Pulpwood exported <i>vs.</i> pulpwood manufactured in Canada | 17 |
| Wood-pulp— | |
| Export of wood-pulp, 1911 and 1912 | 18 |
| Import of wood-pulp, 1911 and 1912 | 19 |
| Appendix— | |
| List of Canadian pulp-mills | 20 |
| Map— | |
| Map of Canada, showing location of pulp-mills | 10, 11 |



LETTER OF TRANSMITTAL

FORESTRY BRANCH,

DEPARTMENT OF THE INTERIOR,

OTTAWA, April 25, 1913.

Sir,—I beg to transmit herewith a report on the pulpwood manufactured in Canada during the calendar year 1912, and also of that exported from the Dominion during the year specified; also of the wood-pulp imported into Canada and that exported therefrom during the period. I would recommend its publication as Bulletin No. 38 of this Branch.

The report, like similar ones in previous years, contains an account of the quantity and value of the pulpwood produced in the Dominion according to the provinces in which it was produced, the species used and the method of manufacture, of the pulp exported from the Dominion and that imported, and of the pulpwood exported from the Dominion and the several provinces in an unmanufactured state.

The report contains also a map showing the location of the pulp-mills of the Dominion.

I have the honour to be, sir,

Your obedient servant,

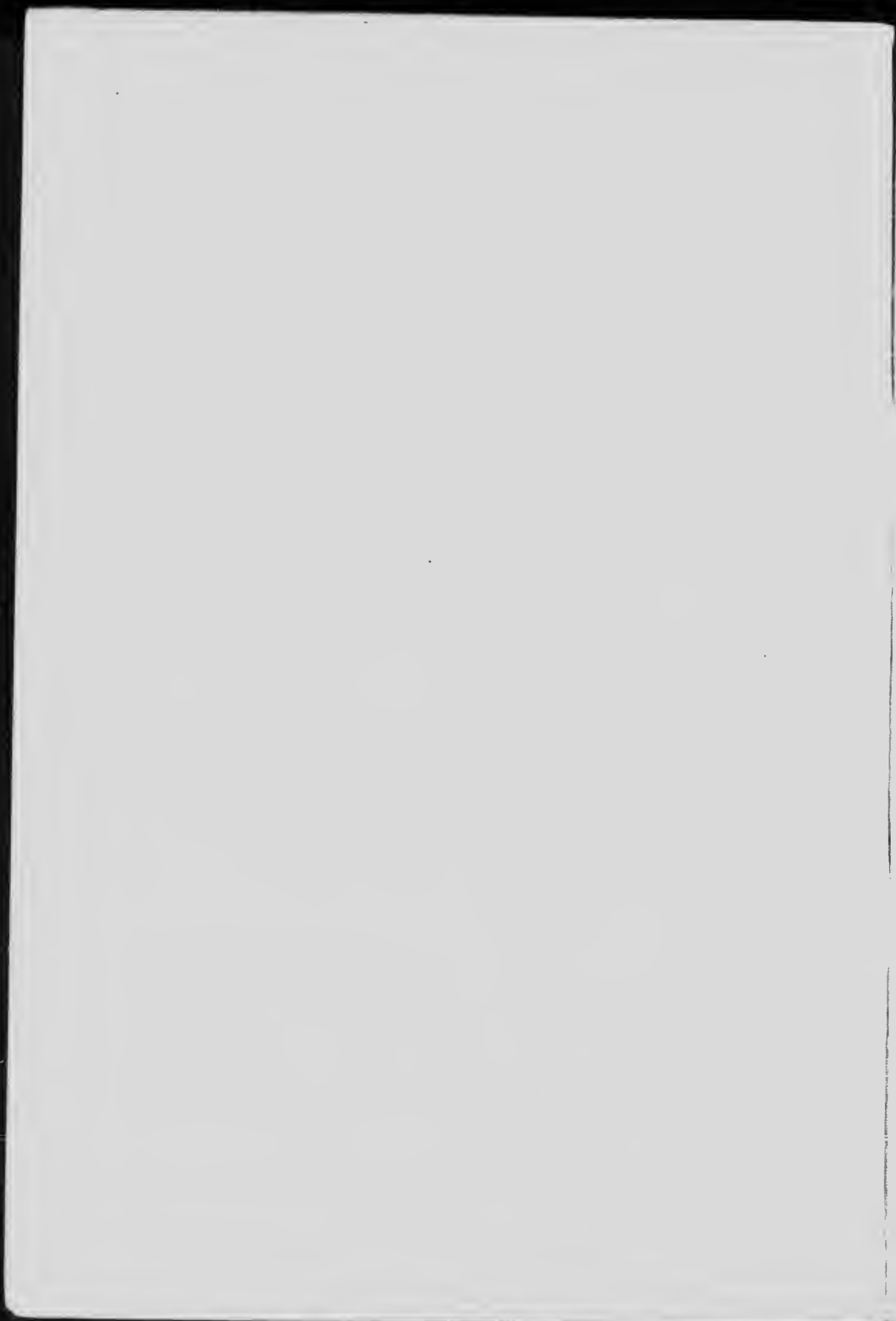
R. H. CAMPBELL,

Director of Forestry.

W. W. CORV, Esq., C.M.G.,

Deputy Minister of the Interior,

Ottawa.



PULPWOOD CONSUMPTION, 1912.

The statistics in this bulletin have been compiled from reports received from 48 pulp mills operating in Canada in 1911.

In addition to these active mills, reports were received from four mills under construction (one in Quebec, two in Ontario and one in British Columbia) and from eight mills that had discontinued the manufacture of wood-pulp. This makes a total of sixty pulp-mills known to exist in Canada at the present time.

Some of the Eastern mills purchase pulpwood in the open market, but the majority of the mills cut from their own limits.

The forty-eight active mills reporting in 1912 consumed a total of 866,042 cords of raw material, valued at \$5,215,582. The total cut of pulpwood in Canada in 1912 was 1,846,910 cords valued at \$11,911,415. The remaining 980,868 cords—over half the total—were exported unmanufactured to the United States.

PULPWOOD.

Table 1 shows the quantity, total value and average value per cord of the pulpwood used in each of the provinces for the years 1911 and 1912, and the number of active mills in each case.

TABLE 1.

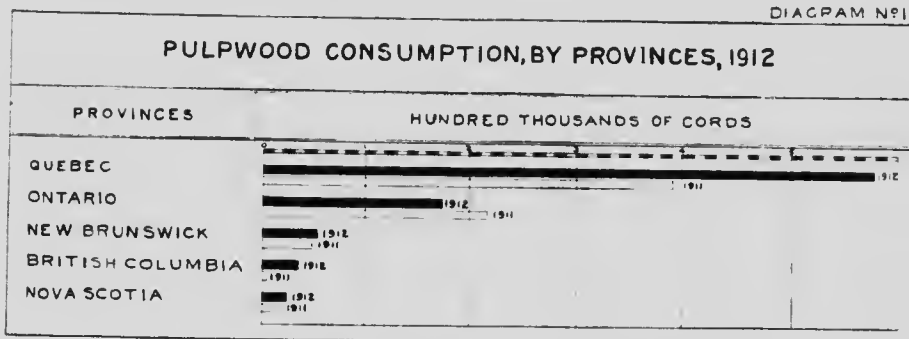
PULPWOOD, 1911 and 1912, BY PROVINCES: Total Quantity of Wood Used, Total Value, Average Value per Cord, and Number of firms reporting.

| Province. | 1911. | | | | 1912. | | | |
|-----------------------|-------------------|-----------------|-------------------------|-------------------------|-------------------|-----------------|-------------------------|-------------------------|
| | Wood Used. | Value. | Average Value per Cord. | Number of Active Mills. | Wood Used. | Value. | Average Value per Cord. | Number of Active Mills. |
| Canada..... | Cords. 672,288 | \$ 4,338,024 | \$ cts. 6 45 | 47 | Cords. 866,042 | \$ 5,215,582 | \$ cts. 6 02 | 48 |
| Quebec..... | 390,426 | 2,516,683 | 6 45 | 23 | 578,856 | 3,386,705 | 5 85 | 24 |
| Ontario..... | 213,667 | 1,457,224 | 6 82 | 12 | 173,903 | 1,235,343 | 7 10 | 11 |
| New Brunswick..... | 45,824 | 251,858 | 5 50 | 4 | 52,041 | 287,060 | 5 52 | 4 |
| British Columbia..... | 150 | 1,140 | 7 60 | 1 | 35,067 | 193,265 | 5 51 | 2 |
| Nova Scotia..... | 22,221 | 111,119 | 5 00 | 7 | 26,176 | 113,209 | 4 32 | 7 |

The pulpwood consumption of 1912 showed an increase of 28.8 per cent over 1911. This resulted in an increased value of the industry of 20.2 per cent, in spite of the reduction of 43 cents per cord in the average price of raw material.

Quebec, Ontario and New Brunswick, in the order named, still lead the provinces in pulpwood consumption. British Columbia is rapidly increasing the manufacture of pulp, having in 1912, consumed 35,067 cords of material—half spruce and half hemlock—thus displacing Nova Scotia on the list. Every province increased its consumption with the exception of Ontario. The increases were:—Quebec 48.3 per cent, New Brunswick 13.6 per cent, and Nova Scotia 17.8 per cent. The decrease in Ontario was

18.6 per cent. The consumption in British Columbia was practically all increase, the 1911 consumption being a negligible quantity.



The average value per cord of pulpwood in Canada decreased by 43 cents. The decrease was noticeable in British Columbia, Quebec and Nova Scotia. On the other hand, the price increased quite noticeably in Ontario, where a large quantity of wood is purchased in the open market. The price in New Brunswick remained practically stationary.

Up to 1912 the pulpwood in British Columbia was used mostly for experimental purposes, and this state of affairs exists, to a greater or less extent, at the present time. The apparent success of manufacturers of pulp in that province in the use of Western hemlock should help to solve the problem of finding an economic use for this material, which is very abundant and has hitherto been misunderstood and consequently little used.

Table 2 shows the quantity, value and per cent distribution of the kinds of wood used in making pulp in Canada in 1911 and 1912.

TABLE 2.
PULPWOOD, 1911 AND 1912, BY KINDS OF WOOD: Total Quantity, Total Value and Per Cent Distribution.

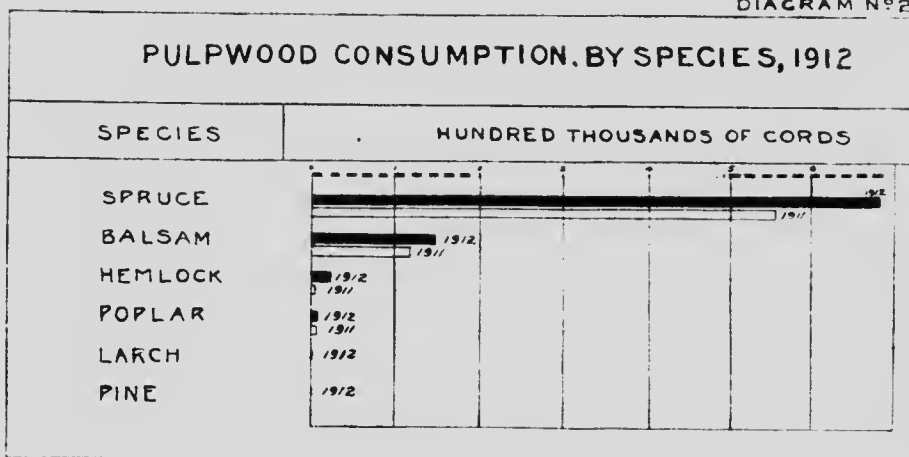
| Kind of Wood. | 1911. | | | 1912. | | |
|--------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| | Quantity. | Value. | Per Cent. | Quantity. | Value. | Per Cent. |
| | Cords. | \$ | | Cords. | \$ | |
| Total ¹ | 672,288 | 4,338,024 | 100.0 | 866,042 | 5,215,582 | 100.0 |
| Spruce..... | 548,276 | 3,548,824 | 81.6 | 677,747 | 4,125,605 | 78.2 |
| Balsam Fir..... | 117,400 | 750,950 | 17.5 | 164,587 | 955,950 | 19.0 |
| Hemlock..... | 1,670 | 8,640 | 0.2 | 19,178 | 105,988 | 2.2 |
| Poplar..... | 4,186 | 25,830 | 0.6 | 4,405 | 27,335 | 0.5 |
| Larch..... | | | | 85 | 454 | 1 |
| Pine..... | | | | 40 | 160 | 1 |

¹ Less than one tenth of one per cent. Total contains small quantity of unspecified wood in 1911 only.

Among the six kinds of wood used each kind showed an increase in 1912. The greatest increase in actual quantity was in the use of spruce, where 129,471 more cords were used in 1912 than in 1911. The percentage increase was only 23.6 in this case, while the percentage increase for balsam fir was 40.2 per cent and of hemlock over ten thousand per cent. This last is accounted for by the increased use of hemlock in British Columbia. By comparing the proportions of the different kinds of wood used in the two years it is evident that a smaller percentage of spruce is being used, the proportion falling from 81.6 per cent of the total in 1911 to 78.2 per cent in 1912. The proportion of balsam fir increased from 17.5 to 19.0 per cent and of hemlock from 0.2 to 2.2 per cent.

The proportion and quantity of poplar both remained about the same, only 219 cords more being used in 1912 than in 1911. The use of Western larch in British Columbia was reported for the first time and a small quantity of pine was used in Nova Scotia.

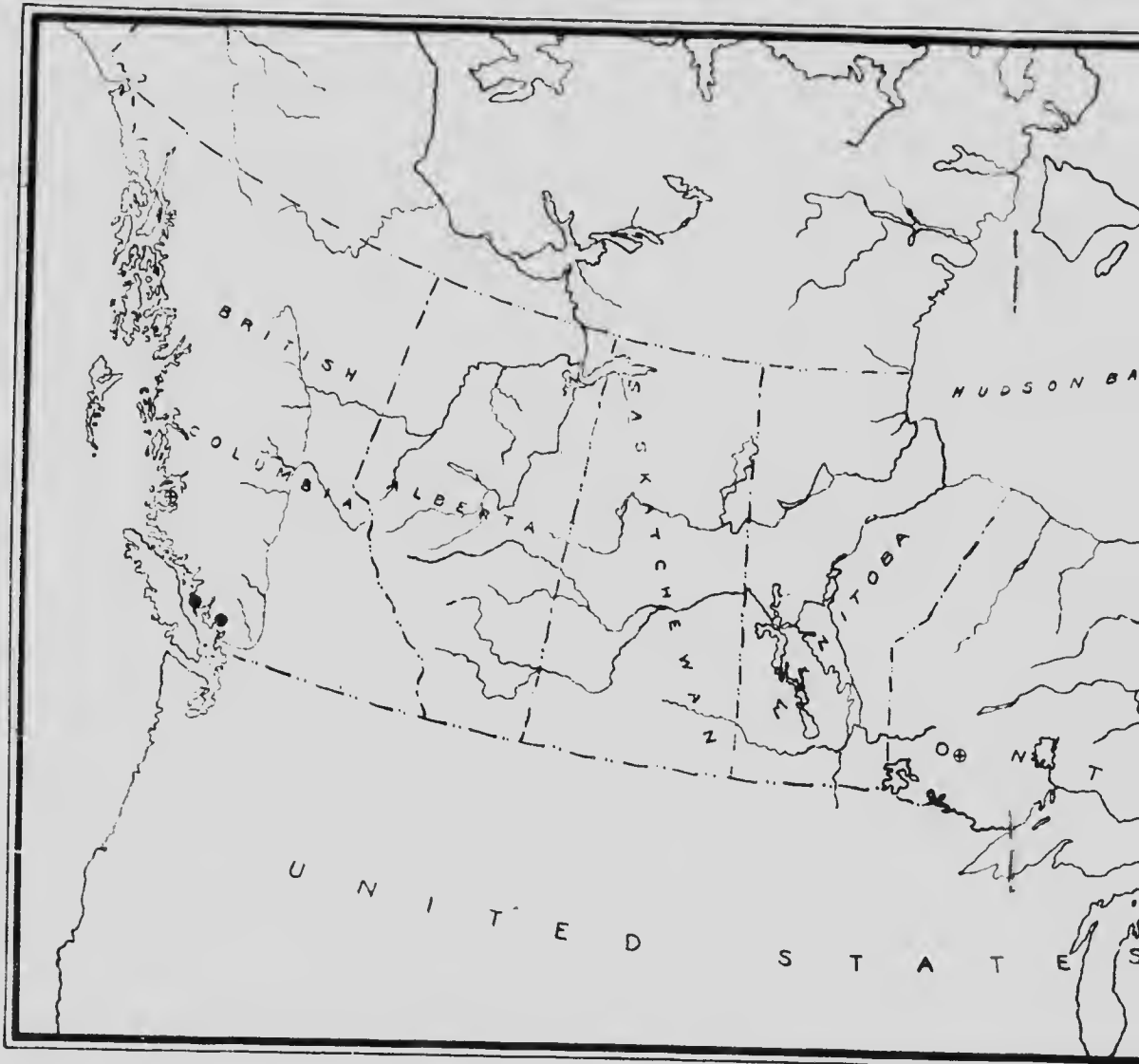
DIAGRAM NO. 2



There is no doubt that much of the wood reported as spruce and balsam fir, and purchased or used by the pulp-mills as such, contains a larger percentage of balsam fir than the diagram above would indicate. In most cases a small proportion of pine, hemlock and larch is also included, although these latter three kinds of wood are not used extensively.

It has been stated that news print paper can be satisfactorily manufactured from a mixture containing over forty per cent balsam fir and the remainder spruce, and there is no doubt that the prejudice against the use of balsam fir is rapidly disappearing. Except in the Maritime Provinces, balsam fir is little used for lumber, and, as it occurs over large areas and in enormous quantities all over Canada, it will probably become more and more important as a pulp material in the future. A small quantity of Alpine fir (*Abies lasiocarpa*) was reported from British Columbia, and is included under "balsam fir" as the wood of these two species is practically identical.

Table 3 shows the extent to which the different kinds of wood were used in each province, in the different processes of pulp manufacture.



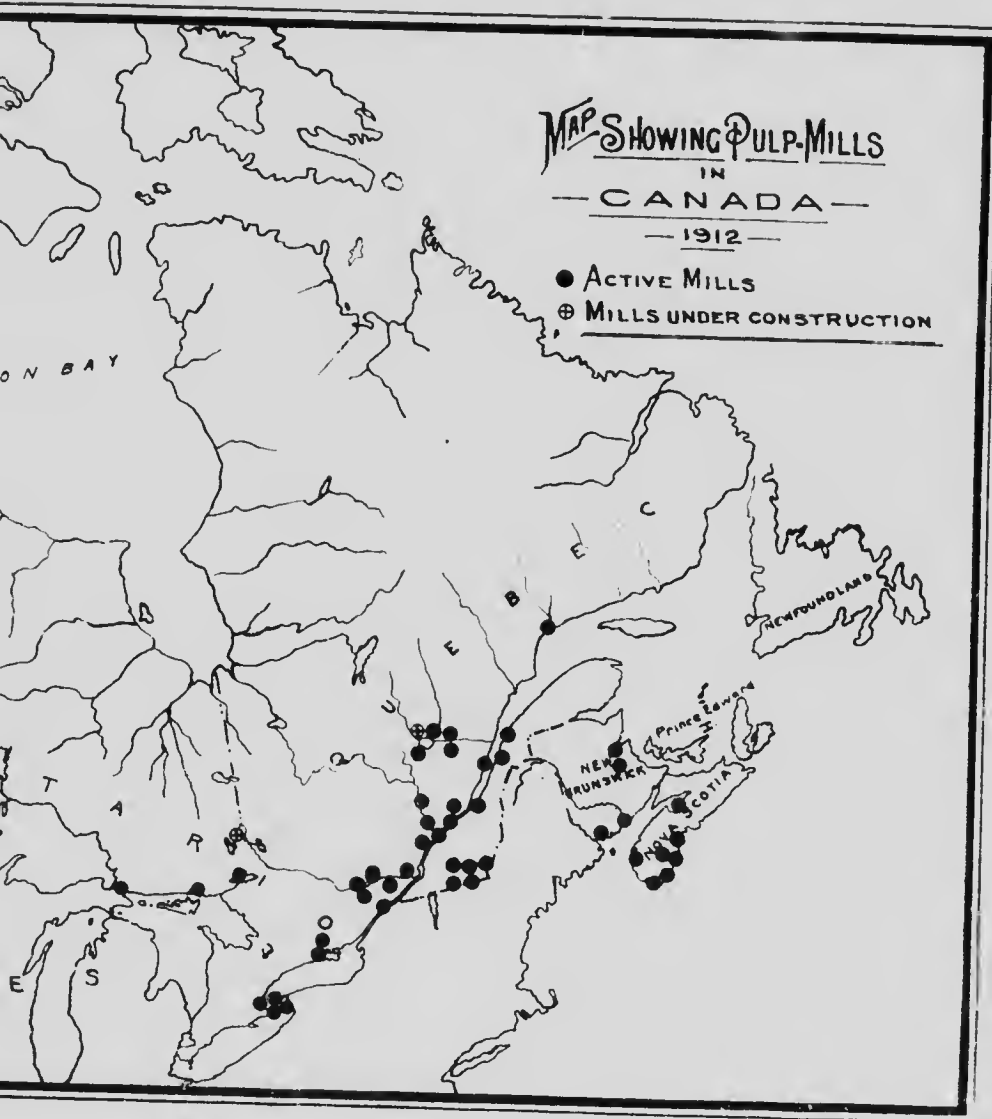


TABLE 3.
PULPWOOD, 1912, BY PROVINCES, KINDS OF WOOD AND PROCESSES: Quantity of Wood Used.

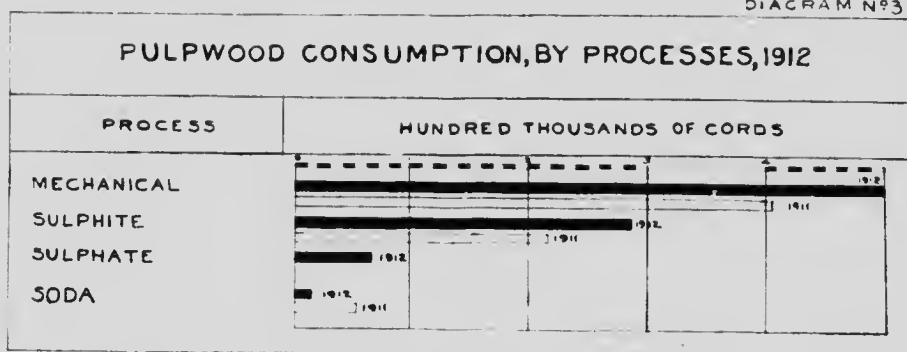
| Provinces. | Total. | Spruce. | Balsam Fir. | Hemlock | Poplar. | Larch. | Pine. |
|------------------------|---------|---------|-------------|---------|---------|--------|--------|
| TOTAL—ALL PROCESSES. | | | | | | | |
| | Cords. | Cords. | Cords. | Cords. | Cords. | Cords. | Cords. |
| Canada | 866,012 | 677,747 | 164,587 | 19,178 | 4,405 | 85 | 40 |
| Quebec | 578,855 | 433,670 | 141,395 | | 3,790 | | |
| Ontario | 173,903 | 157,685 | 5,130 | 528 | 560 | | |
| New Brunswick | 52,041 | 47,381 | 4,660 | | | | |
| British Columbia | 35,067 | 17,224 | 8 | 17,750 | | 85 | |
| Nova Scotia | 26,176 | 21,787 | 3,394 | 900 | 55 | | 40 |
| MECHANICAL PROCESS. | | | | | | | |
| Canada | 499,226 | 381,476 | 111,518 | 5,492 | 615 | 85 | 40 |
| Quebec | 339,387 | 245,283 | 94,704 | | | | |
| Ontario | 110,612 | 98,792 | 11,260 | | 560 | | |
| Nova Scotia | 26,176 | 21,787 | 3,394 | | 55 | | 40 |
| British Columbia | 15,441 | 19,764 | | 4,592 | | 85 | |
| New Brunswick | 7,010 | 4,850 | 2,160 | | | | |
| SULPHITE PROCESS. | | | | | | | |
| Canada | 285,950 | 225,536 | 44,337 | 13,686 | 2,400 | | |
| Quebec | 166,011 | 125,652 | 37,959 | | 2,400 | | |
| Ontario | 63,291 | 58,893 | 3,870 | 528 | | | |
| New Brunswick | 37,031 | 34,531 | 2,500 | | | | |
| British Columbia | 19,626 | 6,460 | 8 | 13,158 | | | |
| SULPHATE PROCESS. | | | | | | | |
| Canada | 66,938 | 58,885 | 8,053 | | | | |
| Quebec | 66,938 | 58,885 | 8,053 | | | | |
| SODA PROCESS. | | | | | | | |
| Canada | 13,919 | 11,850 | 679 | | 1,390 | | |
| New Brunswick | 8,000 | 8,000 | | | | | |
| Quebec | 5,919 | 3,850 | 679 | | 1,390 | | |

Over half the pulpwood consumed in Canada in 1912 (57.6 per cent) was used in the mechanical process for making ground-wood pulp. The sulphite process was used in converting one-third of the total (33.0 per cent). These two processes were thus used for 90.6 per cent of the total. The remainder was divided between the sulphate process (7.7 per cent) and the soda process (1.6 per cent.) The use of the soda process

decreased by 72.9 per cent, 57,549 tons less being manufactured by this process than in 1911. The sulphate process was used practically for the first time in Canada during 1912 by three mills in Quebec, utilizing 66,938 cords of pulpwood and producing at least 33,469 tons of air-dry pulp. This process was first introduced by Dahl in 1883 for the treatment of straw, but has been adapted for use with coniferous woods. The name sulphate is derived from sulphate of soda, which is used in the process as a source of alkali.

This process yields an excellent pulp and by its use the soda recovery is greatly facilitated. The firms using this process reported being well satisfied with the results. Spruce was used to the greatest extent with a small percentage of balsam fir. The fibre of poplar is not strong enough for use with this process, the success of which depends on the strength of the paper made.

DIAGRAM NO. 3



In Quebec 74.9 per cent of the wood used was spruce, together with 24.4 per cent of balsam fir and 0.6 per cent of poplar. Hemlock was not reported from Quebec in 1912. Spruce in Ontario formed 90.7 per cent of the total, balsam fir making 8.7 per cent. Poplar, with 0.3 per cent, and hemlock, with 0.3 per cent, made up the remainder. New Brunswick used only spruce and balsam fir, the proportions being about 91.0 per cent of spruce to 8.9 per cent of balsam. British Columbia used more hemlock than all the other provinces combined, consuming 92.5 per cent of the total for all Canada. Approximately equal quantities of Western hemlock and spruce were used in this province, with a small proportion of Alpine fir and Western larch. This was the only province in which spruce did not head the list of woods used. The percentage of spruce in Nova Scotia was 83.2, balsam fir forming 13.0 per cent. Small quantities of hemlock and poplar were also used. Pine was recorded only from this province; small quantities of this material, however, are mixed with spruce and balsam fir in the other provinces, but are not recorded or reported.

Quebec heads the provinces in each of the three chief processes employed, but in the manufacture of soda pulp was passed by New Brunswick. Quebec consumed, in 1912, 68.1 per cent of the wood used in the mechanical process, 58.0 per cent of the wood used in the sulphite process and all the wood used in the comparatively new sulphate process.

Ontario made only ground-wood and sulphite fibre, consuming 22.1 per cent each of the totals of the wood used for these two processes. New Brunswick made much more sulphite than ground-wood fibre, consuming 12.9 per cent of the wood used for sulphite and only 1.4 per cent of the wood used by the mechanical process. This province, however, manufactured over half of the soda pulp made in Canada in 1912. British Columbia used both the mechanical and sulphite processes, producing 3.1 per cent of the ground-wood and 6.9 per cent of the sulphite fibre produced in Canada in 1912. Nova Scotia manufactured ground-wood pulp only, producing 5.2 per cent of the total for Canada.

In each of the four processes used in Canada, spruce was consumed in greatest quantity, although the proportion of the material is decreasing on the whole. Spruce was used in making more than three quarters (76·4 per cent) of the mechanical pulp, over three quarters (78·9 per cent) of the sulphite pulp and 89·0 per cent and 85·1 per cent, respectively, of the sulphate and soda pulp.

The use of balsam fir is increasing steadily, especially in the manufacture of sulphite pulp. In 1911 balsam fir formed only 12·6 per cent of the wood used in this process, whereas in 1912 the percentage was increased to 15·5 per cent. In the mechanical process balsam fir formed 22·3 per cent, in the sulphate process 12·0 per cent and in the soda process 4·9 per cent. This last was the only decrease reported in the use of this material in any one process.

The use of hemlock in the sulphite process has greatly increased owing to the consumption of this material in British Columbia. Where this wood formed only a negligible percentage in 1911, it formed 4·8 per cent of the total quantity of wood used in this process in 1912. Hemlock also formed 1·1 per cent of the wood used in the mechanical process. While poplar is employed to a small extent (0·1 per cent) in making ground-wood pulp, it is more adaptable to the sulphite and soda processes. Poplar was used to make 0·8 per cent of the sulphite pulp and 10·0 per cent of the soda fibre. It was not used in the sulphate process, as its fibres lack the necessary strength.

Western larch and pine formed a small proportion of the mechanical pulp made in 1912.

Table 4 gives a summary of the information contained in the first three tables and some more detailed information in addition.

TABLE 4.

PULPWOOD, 1912, BY PROVINCES, KINDS OF WOOD AND PROCESSES: Number of Mills Operating, Quantity of Pulpwood Used, Quantity of Pulp Produced, Quantity of Each Kind of Wood Used in Each Process, Total Cost and Average Cost per Cord.

| | Total. | Quebec. | Ontario. | New Brunswick | British Columbia | Nova Scotia. |
|---------------------------|--------------|--------------|--------------|---------------|------------------|--------------|
| Number of Mills operating | 48 | 21 | 11 | 1 | 2 | 7 |
| Pulp Produced— | | | | | | |
| Aggregate..... tons | 682,632 | 459,420 | 142,257 | 29,525 | 25,254 | 26,176 |
| Mechanical..... " | 490,226 | 339,987 | 110,612 | 7,019 | 15,441 | 26,176 |
| Sulphite..... " | 112,978 | 83,005 | 31,645 | 18,515 | 9,813 | ..... |
| Sulphate..... " | 33,469 | 33,469 | ..... | ..... | ..... | ..... |
| Soda..... " | 6,559 | 2,959 | ..... | 4,000 | ..... | ..... |
| Wood Used— | | | | | | |
| Aggregate..... Cords. | 866,042 | 578,855 | 173,903 | 52,041 | 35,067 | 26,176 |
| Aggregate Cost..... | \$ 5,215,582 | \$ 3,386,705 | \$ 1,235,343 | \$ 287,070 | \$ 193,265 | \$ 113,209 |
| Average Cost..... | \$ 6.02 | \$ 5.85 | \$ 7.10 | \$ 5.52 | \$ 5.51 | \$ 4.32 |
| Spruce— | | | | | | |
| Total..... Cords. | 677,747 | 433,670 | 157,985 | 47,381 | 17,224 | 21,787 |
| Total Cost..... | \$ 4,125,695 | \$ 2,558,903 | \$ 1,116,324 | \$ 291,960 | \$ 94,977 | \$ 93,531 |
| Average Cost..... | \$ 6.09 | \$ 5.90 | \$ 7.08 | \$ 5.53 | \$ 5.51 | \$ 4.29 |
| Mechanical..... Cords. | 381,476 | 245,283 | 98,792 | 4,850 | 10,764 | 21,787 |
| Sulphite..... " | 225,536 | 125,652 | 58,893 | 34,531 | 6,400 | ..... |
| Sulphate..... " | 58,885 | 58,885 | ..... | ..... | ..... | ..... |
| Soda..... " | 11,850 | 3,850 | ..... | 8,000 | ..... | ..... |
| Balsam Fir— | | | | | | |
| Total..... Cords. | 164,587 | 141,395 | 15,130 | 4,660 | ..... | 3,394 |
| Total Cost..... | \$ 955,950 | \$ 804,052 | \$ 111,963 | \$ 25,100 | \$ 42 | \$ 14,793 |
| Average Cost..... | \$ 5.81 | \$ 5.69 | \$ 7.40 | \$ 5.39 | \$ 5.25 | \$ 4.36 |
| Mechanical..... Cords. | 111,518 | 94,704 | 11,260 | 2,100 | ..... | 3,394 |
| Sulphite..... " | 44,337 | 37,959 | 3,870 | 2,500 | ..... | ..... |
| Sulphate..... " | 8,053 | 8,053 | ..... | ..... | ..... | ..... |
| Soda..... " | 679 | 679 | ..... | ..... | ..... | ..... |
| Hemlock— | | | | | | |
| Total..... Cords. | 19,178 | ..... | 528 | ..... | 17,750 | 900 |
| Total Cost..... | \$ 105,988 | ..... | \$ 3,696 | ..... | \$ 97,792 | \$ 4,500 |
| Average Cost..... | \$ 5.53 | ..... | \$ 7.00 | ..... | \$ 5.51 | \$ 5.00 |
| Mechanical..... Cords. | 5,492 | ..... | ..... | ..... | 4,592 | 900 |
| Sulphite..... " | 13,686 | ..... | 528 | ..... | 13,158 | ..... |
| Poplar— | | | | | | |
| Total..... Cords. | 4,405 | 3,790 | 560 | ..... | ..... | 55 |
| Total Cost..... | \$ 27,335 | \$ 23,750 | \$ 3,360 | ..... | ..... | \$ 225 |
| Average Cost..... | \$ 6.20 | \$ 6.27 | \$ 6.00 | ..... | ..... | \$ 4.10 |
| Mechanical..... Cords. | 615 | ..... | 560 | ..... | ..... | 55 |
| Sulphite..... " | 2,400 | 2,400 | ..... | ..... | ..... | ..... |
| Soda..... " | 1,390 | 1,390 | ..... | ..... | ..... | ..... |
| Larch— | | | | | | |
| Total..... Cords. | 85 | ..... | ..... | ..... | ..... | 85 |
| Total Cost..... | \$ 454 | ..... | ..... | ..... | ..... | \$ 454 |
| Average Cost..... | \$ 5.34 | ..... | ..... | ..... | ..... | \$ 5.34 |
| Mechanical..... Cords. | 85 | ..... | ..... | ..... | ..... | 85 |
| Pine— | | | | | | |
| Total..... Cords. | 40 | ..... | ..... | ..... | ..... | 40 |
| Total Cost..... | \$ 160 | ..... | ..... | ..... | ..... | \$ 160 |
| Average Cost..... | \$ 4.00 | ..... | ..... | ..... | ..... | \$ 4.00 |
| Mechanical..... Cords. | 40 | ..... | ..... | ..... | ..... | 40 |

The average pulp-mill in Canada, in 1912, consumed 18,042 cords of pulpwood as compared with 12,450 cords in 1911 and 11,735 cords in 1910. Quebec with the largest number of mills had also the highest mill consumption, the average for that province

being 24,119 cords per mill. The average consumption per mill in the other provinces was as follows: Ontario, 15,809 cords; New Brunswick, 13,910 cords; British Columbia, 17,533 cords and Nova Scotia, 3,739 cords.

The figures given in the table above for pulp production are estimated from the quantities of pulpwood consumed and the process of manufacture. An allowance of one ton of air dry fibre per cord was made for the mechanical process and one half a ton per cord for each of the three chemical processes. The reports received varied so greatly in the ratio of wood used to pulp produced, and so many mills gave no figures at all for production, that this ratio was adopted.

Wood-pulp is usually measured in tons "air-dry". This is calculated from tests made from time to time in most mills. Small samples of pulp are weighed and then heated in an oven until they no longer lose weight from evaporation of moisture, or in other words until they are absolutely dry. They are then weighed again and the loss of water noted. From these data the percentage of actual fibrous material in a ton of pulp as it comes from the pressing machines can be calculated. It is assumed that "air-dry" pulp contains ten per cent of moisture, which it absorbs from the moisture in the air.

The weight of "air-dry" pulp is calculated from the absolute figure on the arbitrary basis that 90 parts of absolutely dry ("bone-dry") pulp give 100 parts of air-dry pulp, or that 100 parts of "air-dry" pulp contain ninety parts of "bone-dry" fibre and ten parts of natural moisture. This is, however, only an assumption, as the actual percentage of moisture varies over a wide range.

The average values per cord given in the above table show great variation. Among the general average prices for the whole country poplar heads the list at \$6.20 a cord, and pine appears to have been the cheapest wood at \$4. The fact that these prices do not represent the actual value of the materials, is shown in the case of balsam fir, which is valued at \$7.40 in Ontario and \$4.25 in British Columbia. These prices are the values at the mill, and are affected by too many outside factors to fairly represent the value of the material for pulp manufacture.

Table 5 shows the extent to which Canada exports raw or unmanufactured pulpwood. The figures are based on information received from the Department of Customs for the calendar years 1911 and 1912.

TABLE 5

CANADIAN PULPWOOD EXPORTED UNMANUFACTURED VS. THAT MANUFACTURED IN CANADA, 1911 AND 1912: Quantity, Average Value per Cord and Per Cent Distribution.

| | 1911 | | | | 1912 | | | |
|-------------------------|-----------|-----------|-----------------------|--------------|-----------|------------|-----------------------|--------------|
| | Quantity. | Value. | Value per Cord. | Per Cent. | Quantity. | Value. | Value per Cord. | Per Cent. |
| | Cords. | \$ | 8 cts. | | Cords. | \$ | 8 cts. | |
| Canada | | | | | | | | |
| Production..... | 1,520,227 | 9,678,616 | 6.37 | 100.0 | 1,846,910 | 11,911,415 | 6.45 | 100.0 |
| Manufacture..... | 672,288 | 4,338,924 | 6.45 | 44.2 | 866,012 | 5,215,582 | 6.02 | 46.9 |
| Export..... | 847,939 | 5,340,592 | 6.30 | 55.8 | 980,898 | 6,695,833 | 6.82 | 53.1 |
| Quebec | | | | | | | | |
| Production..... | 1,020,562 | 6,473,106 | 6.31 | 100.0 | 1,330,670 | 8,371,923 | 6.29 | 100.0 |
| Manufacture..... | 390,426 | 2,516,683 | 6.45 | 38.0 | 578,855 | 3,386,705 | 5.85 | 43.5 |
| Export..... | 630,136 | 3,956,423 | 6.22 | 62.0 | 751,815 | 4,985,218 | 6.63 | 56.5 |
| Ontario | | | | | | | | |
| Production..... | 302,717 | 2,028,222 | 6.70 | 100.0 | 246,282 | 1,692,662 | 6.87 | 100.0 |
| Manufacture..... | 213,967 | 1,457,224 | 6.82 | 70.6 | 173,903 | 1,235,343 | 7.10 | 70.6 |
| Export..... | 89,050 | 570,998 | 6.41 | 29.4 | 72,379 | 457,319 | 6.32 | 29.4 |
| New Brunswick | | | | | | | | |
| Production..... | 168,322 | 1,062,817 | 6.31 | 100.0 | 202,043 | 1,492,567 | 7.35 | 100.0 |
| Manufacture..... | 45,824 | 251,858 | 5.50 | 27.2 | 52,041 | 287,060 | 5.52 | 25.7 |
| Export..... | 122,698 | 810,959 | 6.61 | 72.8 | 150,002 | 1,205,507 | 7.99 | 74.3 |
| British Columbia | | | | | | | | |
| Production..... | 150 | 1,110 | 7.60 | 100.0 | 35,067 | 193,265 | 5.51 | 100.0 |
| Manufacture..... | 150 | 1,110 | 7.60 | 100.0 | 35,067 | 193,265 | 5.51 | 100.0 |
| Export..... | | | | | | | | |
| Nova Scotia | | | | | | | | |
| Production..... | 22,276 | 111,339 | 5.00 | 100.0 | 31,949 | 160,998 | 5.04 | 100.0 |
| Manufacture..... | 22,221 | 111,119 | 5.00 | 99.7 | 26,176 | 113,209 | 4.32 | 81.9 |
| Export..... | 55 | 220 | 4.00 | 0.3 | 5,773 | 47,789 | 8.28 | 18.1 |

The figures for total production in the above table are obtained by adding, to the export figures, the quantities estimated in Table 4. From these figures it is seen that Canada is manufacturing a greater proportion of her pulpwood into pulp in her own mills than she has done in the past. In 1911, only 44.2 per cent of the pulpwood cut in Canada was manufactured into pulp in Canadian mills. In 1912 this percentage increased to 46.9 per cent.

The effect of legislation restricting the export of unmanufactured pulpwood is quite noticeable in Quebec. Laws prohibiting the export of raw pulpwood from Crown lands in that province came into force on September 1, 1910. In 1911 the export of raw pulpwood was reduced by 142,864 cords. In 1912 the increased cut on both Crown and private lands somewhat obscured the effect of these laws. It is seen, however, that in 1911 Quebec exported 62.0 per cent of the pulpwood cut, while in 1912 only 56.5 per cent was sold out of the country in the unmanufactured state.

A similar law was brought into force in New Brunswick on October 1, 1911, but so far this does not seem to have had the desired effect, although the percentage of raw pulpwood exported from that province has increased but little since 1911. British Columbia manufactures into pulp in her own mills all the pulpwood cut in the province.

The exports from Nova Scotia increased considerably in 1912, although that province still manufactures over eighty per cent of her pulpwood within the province.

In Ontario, only pulpwood cut on privately owned lands can be exported unmanufactured. The early enforcement of this regulation has resulted in checking the export

of raw material. The percentage of unmanufactured pulpwood exported has remained constant in the last two years. Production, manufacture and export, all showed decreases from 1911 to 1912 in this province.

Canada exported in 1912 enough pulpwood to supply 51 mills of the average size operating in the country at present. For this quantity of raw material the owners received \$6,695,833 at an average price of \$6.82 a cord.

Had this 980,868 cords of pulpwood been manufactured in the Dominion, it would have produced approximately 773,140 tons of pulp. The average price per ton of exported wood-pulp in 1912 was \$17.10. This would give \$13,220,684 as the value of the pulp that could have been manufactured in Canada. The actual price received was \$6,695,833. The loss to the country (which would include profit to the manufacturer and the cost of converting the material into pulp) was thus \$6,524,866. This cost of manufacture, in the form of wages, material, etc., is all a source of wealth to the country at large.

WOOD-PULP.

Table 6 gives the details of the export of manufactured wood-pulp from Canada in 1911 and 1912. The figures have been furnished by the Customs Department.

TABLE 6.

EXPORT OF WOOD-PULP, 1911 AND 1912: Quantity, Total Value, Average Value per Ton, Per Cent Distribution and Countries to which Exported.

| Kind of Pulp and Countries to which Exported. | 1911. | | | | 1912. | | | |
|---|-----------|-----------|------------------------|-----------|-----------|-----------|------------------------|-----------|
| | Quantity. | Value. | Average Value per Ton. | Per Cent. | Quantity. | Value. | Average Value per Ton. | Per Cent. |
| | Tons. | \$ | \$ cts. | | Tons. | \$ | \$ cts. | |
| Wood-pulp exported, aggregate..... | 259,514 | 4,402,862 | 18 89 | 100 0 | 348,100 | 5,952,361 | 17 10 | 100 0 |
| Total Mechanical Pulp..... | 221,167 | 3,436,670 | 15 54 | 85 2 | 295,449 | 3,991,365 | 13 51 | 84 9 |
| Total Chemical Pulp..... | 38,347 | 1,466,192 | 38 23 | 14 8 | 52,651 | 1,960,995 | 37 24 | 15 1 |
| Total to United States..... | 257,519 | 4,872,790 | 18 92 | 99 2 | 218,936 | 4,525,569 | 20 67 | 62 9 |
| Mechanical..... | 219,240 | 3,408,885 | 15 55 | | 167,448 | 2,607,589 | 15 57 | |
| Chemical..... | 38,279 | 1,463,905 | 38 24 | | 51,488 | 1,917,980 | 37 25 | |
| Total to Great Britain..... | 1,915 | 28,472 | 14 87 | 0 7 | 127,981 | 1,384,893 | 10 82 | 36 8 |
| Mechanical..... | 1,817 | 26,185 | 14 48 | | 127,945 | 1,383,026 | 10 81 | |
| Chemical..... | 98 | 2,287 | 33 63 | | 36 | 1,867 | 51 86 | |
| Total to Japan..... | | | | | 1,046 | 36,665 | 35 05 | 0 3 |
| Mechanical..... | | | | | 56 | 750 | 13 39 | |
| Chemical..... | | | | | 990 | 35,915 | 35 28 | |
| Total to China..... | | | | | 116 | 4,294 | 37 02 | 1 |
| Chemical..... | | | | | 116 | 4,294 | 37 02 | |
| Total to New Zealand..... | | | | | 21 | 940 | 44 76 | 1 |
| Chemical..... | | | | | 21 | 940 | 44 76 | |
| Total to Newfoundland..... | 80 | 1,600 | 20 00 | 1 | | | | |
| Mechanical..... | 80 | 1,600 | 20 00 | | | | | |

¹ Less than one-tenth of one per cent.

Following a decrease from 1910 to 1911 the export of wood-pulp increased from 1911 to 1912 by 34.1 per cent. This increase was all in the eastern market, as the export to the United States decreased by 15.0 per cent in 1912.

In 1911 the United States purchased over 99 per cent of Canada's wood-pulp. In 1912 this proportion was reduced to less than two-thirds of the total export. The export to Great Britain increased from less than one per cent to over a third of a total. In addition to this increase, a considerable quantity of pulp was exported to Japan and smaller quantities to China and New Zealand, countries to which no pulp was exported in 1911. The proportions of mechanical and chemical pulp exported remained practically constant, on the whole, with a slight increase (14.8 to 15.1 per cent) in the percentage of chemical pulp. The export to the United States in 1912 contained a greater proportion of chemical pulp than that of 1911, and the exports to Japan, China and New Zealand were all chemically manufactured fibre. The export to Great Britain in 1912 was almost entirely of mechanical pulp. The total value of the export was \$5,952,361 with an average price of \$17.10 per ton. This average price is a decrease of \$1.79 from 1911, the decrease being in both mechanical and chemical fibre. The average value of \$20.67 for pulp exported to the United States is an increase over 1911. The value of pulp exported to Great Britain decreased on the whole, although the small quantity of chemical pulp exported to this country was valued at the high price of \$51.86. The exports to Japan, China and New Zealand, being all of chemical fibre, were valued at a price considerably above the general average.

Table 7 gives the details of the imports of wood-pulp into Canada from various countries. The figures were supplied by the Customs Department.

TABLE 7.

IMPORT OF WOOD-PULP, 1911 AND 1912: Total Value, Per Cent Distribution and Countries from which Imported.

| Countries from which Imported. | 1911. | | 1912. | |
|--------------------------------|--------|-----------|---------|-----------|
| | Value. | Per Cent. | Value. | Per Cent. |
| | \$ | | \$ | |
| Total Value of Imports | 94,971 | 100.0 | 172,797 | 100.0 |
| United States..... | 53,167 | 56.5 | 100,234 | 58.0 |
| Sweden..... | 20,558 | 21.8 | 64,419 | 37.3 |
| Great Britain..... | 17,261 | 18.3 | 4,764 | 2.7 |
| Germany..... | 1,720 | 1.8 | 2,546 | 1.5 |
| Austria-Hungary..... | | | 834 | 0.5 |
| Norway..... | 1,361 | 1.4 | | |

The total value of imports of wood-pulp in 1912 was \$172,797. The value of exports for the same year was \$5,952,361. Mills in Sweden, Germany and Austria-Hungary can probably manufacture wood-pulp more cheaply than mills in Canada. The imports from Great Britain and the United States are evidently of fibre of some special description not manufactured in Canada.

The total value of imports in 1912 was an increase of 83.7 per cent over 1911. The United States supplied over half the total as in 1911. Sweden supplied 37.3 per cent in 1912 as compared to only 21.8 per cent in 1911. The imports from Great Britain were reduced and no pulp was imported at all from Norway in 1912. Austria-Hungary was added to the list of countries exporting wood-pulp to Canada.

APPENDIX.**LIST OF CANADIAN PULP MILLS**

The following is a list of pulp manufacturers operating pulp mills in 1912, to whom the Forestry Branch is indebted for information furnished for this bulletin:—

QUEBEC.

| | |
|---|--|
| Basin Electric Light and Power Company, Ltd., Montmagny. | Laurentide Company, Ltd., Grand Mere. |
| Belgo-Canadian Pulp and Paper Company, Ltd., Shawenegan Falls. | Maclaren, James, Company, Ltd., Buckingham. |
| Brompton Pulp and Paper Co., Bromptonville. | News Pulp and Paper Company, Montreal. |
| Brompton Pulp and Paper Company, East Angus. | Nicolet Falls Pulp and Paper Co., Nicolet Falls. |
| Canada Paper Company, Ltd., Windsor Mills. | North Shore Power, Railway and Navigation Co., Clarke City. |
| Chicoutimi Pulp Company, Chicoutimi. | Oniatheouan Fall-Paper Co., Oniatheouan Falls. |
| Dalmas Pulp Company, Peribouca. | Price, Porritt Pulp and Paper Company, Rimouski. |
| East Canada Power and Pulp Company, Ltd., Mur- ray Bay. | Quebec and St. Maurice Industrial Company, La Tuque. |
| Eddy, E. B., Company, Ltd., Hull. | Riordon Pulp and Paper Company, Montreal. |
| Jacques-Cartier Pulp and Paper Co., Pont Ronge. | River du Loup Pulp Company, Fraserville. |
| Jouquiere Pulp Company, Jouquiere. | Wayagamack Pulp and Paper Company, Three Rivers. |
| Lake Megantic Pulp Company, Lake Megantic. | Wilson, J. L., Ltd., St. Jerome. |

ONTARIO.

| | |
|---|--|
| Booth, J. R., Ottawa. | Riordon Pulp and Paper Company, Ltd., Mer- ritton. |
| Colonial Wood Products Company, Thorold. | Spanish River Pulp and Paper Company, Ltd., Espanola. |
| Davy, James, Thorold. | Spanish River Pulp and Paper Company, Ltd., Sturgeon Falls. |
| Foley-Rieger Pulp and Paper Company, Thorold. | Toronto Paper Manufacturing Company, Cornwall. |
| Lake Superior Paper Company, Ltd., Sault-Ste. Marie. | Trent River Paper Co., Frankford. |
| Northumberland Paper and Electric Company, Campbellford. | |

NOVA SCOTIA.

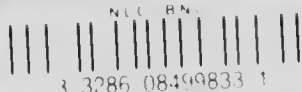
| | |
|---|---|
| Campbell Lumber Company, Ltd., Weymouth. | La Have Pulp Company, New Germany. |
| Clyde River Pulp and Paper Company, Ltd., Clyde River. | Macleod Pulp Company, Ltd., Milton. |
| Harmony Pulp and Paper Company, Ltd., Harmony Mills. | Nova Scotia Wood Pulp and Paper Company, Ltd., Mill Village. |
| | St. Croix Lumber Company, Eilershouse. |

NEW BRUNSWICK.

| | |
|---|--|
| Dominion Pulp Company, Chatham. | Partington, Edward, Pulp and Paper Company, Ltd., St. John. |
| New Brunswick Pulp and Paper Company, Ltd., Millerton. | St. George Pulp and Paper Company, St. George. |

BRITISH COLUMBIA.

| | |
|---|---|
| British Columbia Sulphite Fibre Company, Ltd., Mill Creek, Howe Sound. | Powell River Company, Ltd., Powell River. |
|---|---|



PUBLICATIONS ISSUED BY THE FORESTRY BRANCH.

Annual Reports—Director of Forestry—1904 and following years.

- Bulletin 1. Tree Planting on the Prairies.
- " 2. Planting and Care of a Forest of Evergreens.
- " 3. Dominion Forest Reserves.
- " 4. Forest Products of Canada (up to 1908).
- " 5. Forest Conditions in Crowsnest Valley, Alberta. (Out of print.)
- " 6. Riding Mountain Forest Reserve.
- " 7. Forest Fires in Canada, 1908. (Out of print.)
- " 8. Forest Products of Canada, 1908.
- " 9. Forest Fires in Canada, 1909. (Out of print.)
- " 10. The Farmer's Plantation.
- " 11. Forest Products of Canada, 1909: Lumber, Square Timber, Lath and Shingles.
- " 12. Forest Products of Canada, 1909: Pulpwood.
- " 13. Forest Products of Canada, 1909: Poles. (Out of print.)
- " 14. Forest Products of Canada, 1909: Cross-ties Purchased.
- " 15. Forest Products of Canada, 1909 (Bulletins 11, 12, 13, 14, 19 and 20).
- " 16. Forest Fires and Railways.
- " 17. Timber Conditions on the Proposed Route of the Hudson Bay Railway.
- " 18. The Rocky Mountains Forest Reserve.
- " 19. Forest Products of Canada, 1909: Tight and Slack Cooperage; and Box Shooks.
- " 20. Forest Products of Canada, 1909: Tanbark and Tanning Extracts.
- " 21. Forest Products of Canada, 1910: Poles.
- " 22. Forest Products of Canada, 1910: Cross-ties.
- " 23. Forest Products of Canada, 1910: Timber Used in Mining Operations.
- " 24. Wood-using Industries of Canada, 1910: Agricultural Implements and Vehicles, Furniture and Cars and Veneer.
- " 25. Forest Products of Canada, 1910: Lumber, Square Timber, Lath and Shingles. (Out of print.)
- " 26. Forest Products of Canada, 1910: Pulpwood. (Out of print.)
- " 27. Forest Products of Canada, 1910: Cooperage.
- " 28. Forest Products of Canada, 1910 (Bulletins 21, 22, 23, 24, 25, 26 and 27).
- " 29. Timber Conditions in the Lesser Slave Lake Region.
- " 30. Forest Products of Canada, 1911: Pulpwood.
- " 31. Forest Products of Canada, 1911: Tight and Slack Cooperage.
- " 32. The Turtle Mountain Forest Reserve.
- " 33. Forest Conditions in the Rocky Mountains Forest Reserve.
- " 34. Forest Products of Canada, 1911: Lumber, Square Timber, Lath and Shingles.
- " 35. Forest Products of Canada, 1911: Poles and Cross-ties.
- " 36. Wood-using Industries of Ontario.
- " 37. Forest Products of Canada, 1911 (Bulletins 30, 31, 34 and 35)
- " 38. Forest Products of Canada, 1912: Pulpwood.

