

**CIHM  
Microfiche  
Series  
(Monographs)**

**ICMH  
Collection de  
microfiches  
(monographies)**



**Canadian Institute for Historical Microreproductions / institut canadien de microreproductions historiques**

**© 1995**

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.

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 covers/  
Couverture de couleur

Covers damaged/  
Couverture endommagée

Covers restored end/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 end/or illustrations/  
Planches et/ou illustrations en couleur

Bound with other material/  
Relié avec d'autres documents

Tight binding may cause shadows or distortion along interior margin/  
Le reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure

Blank leaves added during restoration 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: / Includes text in French.  
Commentaires supplémentaires:

Coloured pages/  
Pages de couleur

Pages damaged/  
Pages endommagées

Pages restored end/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

Continuous pagination/  
Pagination continue

Includes index(es)/  
Comprend un (des) index

Title on header taken from: /  
Le titre de l'en-tête provient:

Title page of issue/  
Page de titre de la livraison

Caption of issue/  
Titre de départ de la livraison

Masthead/  
Générique (périodiques) de la livraison

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

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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

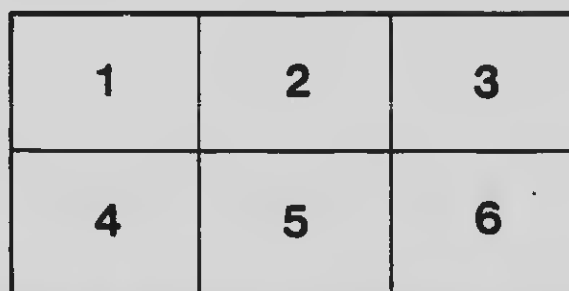
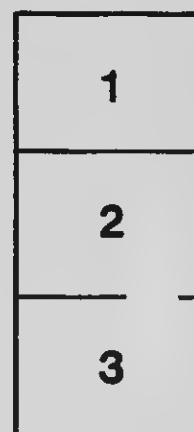
Législature du Québec  
Québec

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  $\nabla$  (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:

Législature du Québec  
Québec

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.

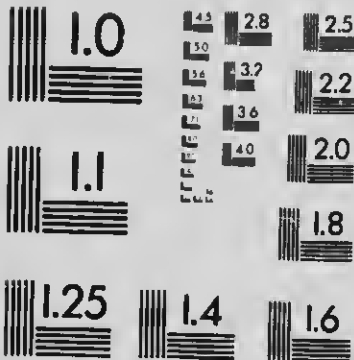
Les exemplaires originaux dont la couverture en papier est imprimée sont filmés en commençant par le premier plat et en terminant soit par la dernière page qui comporte une empreinte d'impression ou d'illustration, soit par le second plat, selon le cas. Tous les autres exemplaires originaux sont filmés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

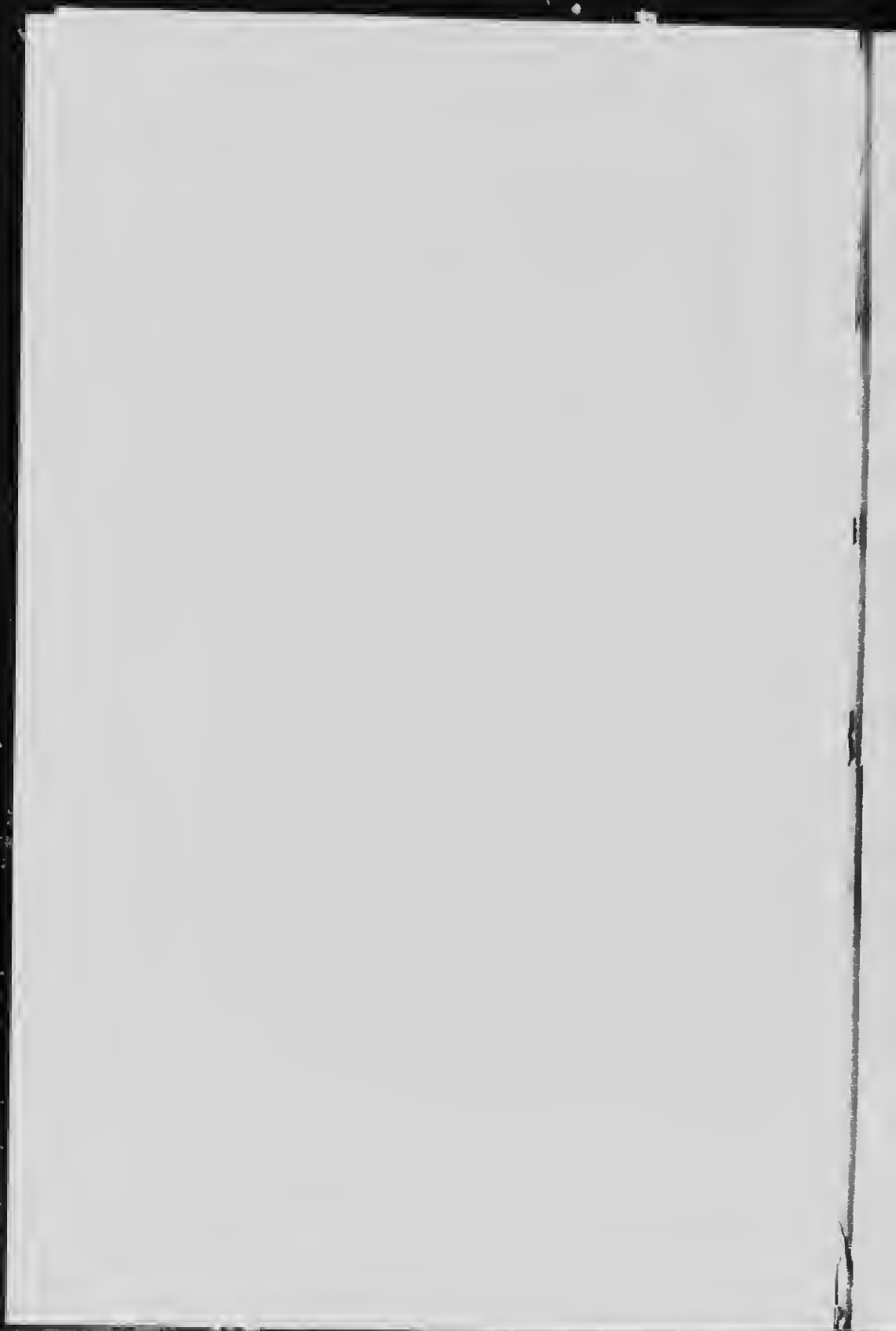
MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No. 2)



APPLIED IMAGE Inc

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



6808  
2

$\frac{1}{2}$

# FORESTRY AND COLONIZATION

—

A

## REPORT

—BY—

Hon. G. W. STEPHENS, K.C.

*Formerly Commissioner of Colonization, etc.  
for the Province of Quebec.*



MONTREAL.

JOHN LOVELL & SON, Printers.

1903

235.714

1111

1111

PL

### PREPARATORY NOTE.

---

On the 14th June, 1902, three Commissioners were appointed under the Act 2 Ed. 7, chap. 3, to form a commission to assist in the advancement of colonization, and in the development of woods and forests, etc.

One commissioner died and another resigned. The report, therefore, is the result of the labours of the remaining commissioner, and was forwarded in due course. The appendices which form a very important addition to the report were obtained subsequent to the completion of the report to Government.

Montreal, April, 1903.





## CHAP. I.

No Department of the Provincial Government has to solve such a variety and number of difficult and delicate questions of administration as the Crown Lands Department. It is the department which contributes the largest revenue to the Province, and consequently requires constant care and attention to protect the public treasury from loss, the public property from depredation and destruction.

Each successive government and parliament has devoted time and ability to questions concerning forest production and the colon. Much eloquence has been devoted to the subject. It was the practice formerly on the item of "Colonization Roads" for every member who had rural constituents to make his sessional speech upon this question. There was a Hansard then. Since official reporting of speeches has ceased the "colon" day has vanished. Any person familiar with the trials of the settler, who clears a farm out of the forest and devotes a lifetime to the providing a comfortable home for his wife and children, will appreciate the respect the courage and indomitable pluck of the man who wields the axe. The prairie farm presents no such difficulties as does the forest clearing. It is of the greatest consequence therefore that the settler whose intention is to establish for himself a home should be encouraged, and the difficulties in his path removed as much as possible.

A Forest Reserve should be established as soon as possible. The Laurentian chain of mountains or hills intersected by numerous rivers and dotted over with beautiful lakes seem to have been created for the especial growth of trees. There is an abundance of hills which are for the most part rocky and covered with a light depth of soil. There are few farms in the hill district which are not intersected by hills, which when cleared

of the timber and exposed to the rain are spotted with bare rock. The land, as a rule, as you ascend the rivers, becomes unprofitable for agriculture. The farmers, in this section, are for the most part supported by wintering in the shanties, or where a good water power exists and is improved, a centre of population is collected. Farming in the Laurentides as a rule is not a very remunerative occupation, only the Canadian brought up on the border of the forest and possessing an experience and training in the chantier of the lumbering camp seems to possess the pluck and vitality to attempt it, and he deserves a better field for his indomitable perseverance and energy.

Men clear up a farm and establish a home only to discover after many years of labour, early and late, that the soil which at first produced fairly good crops, will no longer support the family. The farmer has become hopelessly in debt, and migrates with his family to some manufacturing town over the border.

The government should direct colonization to good land, so that when a settler has cleared up his farm he can enjoy the profits of his labour and hand down to his children a property susceptible of continued improvements.

An extremely valuable paper read before the Canadian Forestry Association in 1901, by J. C. Langelier, Esq. demonstrates the fact that farming in the Laurentians produces a return of 7.36 per acre, while the same quantity of lands would produce \$61.25 per acre in pulpwood. It is clearly in the best interests of our people that they should be settled upon the land favourable for agriculture and that the land which is profitable only for forest culture should be set apart exclusively for that purpose. There are sections of the Province where settlement has taken place on lands absolutely unfit for culture. Considerable portions of each lot have been cleared, farm buildings and parishes erected, and villages established.

For a time the traffic in wood has enabled the inhabitants to live comfortably. The soil is now exhausted, Larren sand has taken the place of the thin coating of productive soil, which had been deposited by the decaying leaves through years of time. These farms are being abandoned. The forest which supported the inhabitants has disappeared. The only alternative for the settler in such districts is emigration. It is largely from this class that the United States derives its Canadian population. The remedy for this evil lies in the selection of the fertile lands of the Province for settlement, and directing our surplus population to such localities only.

A forest reservation is easy of accomplishment in our province. Nature has set aside large and compact sections of the country specially adapted to forest culture and unprofitable for agriculture. Other sections are eminently fitted for occupation by settlers.

It happens frequently that the surveyed lines of lot include a hill or mountain unprofitable for agriculture, but well wooded with timber of value. The settler on such lots should be allowed to take up sufficient ground in the valley where it is profitable, and clear and till the ground. The mountainous portion should be constituted a forest reserve forever.

The late coal strike has elicited a great deal of discussion on the subject of fuel supply, and it has been stated that the exhaustion of many of the mines is within measurable distance.

If every farm in the Province had a wood lot of ten or twenty acres, our farming population at least would be independant of the great coal combine.

In 1897 the Ontario Government appointed a Commission to enquire into and report upon forest preservation, and in 1898 the Forest Reserve Act was passed empowering the administration to set apart tracts of land in forest

reserves. They have set aside in the Counties of Frontenac and Addington 80,000 acres, 45,000 acres in the township of Sibley.

In 1901 the pine-bearing region around Lake Temigami containing one million four hundred thousand acres was set aside. All this in addition to the Algonquin Park, which contains over a million acres of what may be regarded as forest reserve. For no settlements are allowed within its limits. The total amounts to 2,600,000 acres of forest reserve.

The Ontario Act contains this wise provision, that although an order in Council only is required to establish a Forest Reserve, an Act of Parliament is required to reopen such lands for sale or settlement.

Lands under license would not of course be interfered with, but exhausted limits and burnt districts could be withdrawn from the license and placed in the reserve.

In 1883 the Quebec statute chapter 9 of 46 Vic. was enacted; it provided for a forest reservation. It was repealed by 51, 52 Vic., chap. 15, section 4, and a reserve of 20 per cent. of each lot as a timber reserve was established. In 1892 this provision of the law was repealed.

A forest reserve of all land unprofitable for agriculture would remove many of the difficulties and complaints now so frequent in the administration of the department. It would facilitate the enactment of a more perfect system of fire protection. It would also enable the government to adopt a better system of forestry in the direction of a perpetuation of the supply of merchantable timber.

If our Government desires to perpetuate the supply it must regulate and control the system effectively.

Manitoba has set aside a reserve of forty-five townships, comprising about one million acres, which serves the double purpose of protecting the timber and water supply.

The State of Idaho has set aside 5,300,000 acres as a forest reserve, an area as large as the State of Massachusetts.

The forest reservations of the United States situated in various states of the Union from Oregon and California are estimated to contain over forty-six millions of acres.

It is estimated that there are 2,300,000,000,000 feet B. M. in the United States, and the total annual cut is estimated at 40,000,000,000 feet B. M. or a supply for 57 years. The value of the products is 1,352,742,000 annually. The consumption will no doubt increase every year. There is no account taken of the extent that reproduction of the young forest will replace this consumption. This will depend upon the measures taken by the Forestry Department to foster and protect the young growth of trees.

Germany protects her forests and about thirty per cent. of her area is occupied by forests. Her revenue from this source amounts to the handsome sum of twenty millions of dollars. The forests of Germany are regarded as a trust for the benefit of the German people. They are placed in charge of trained foresters, graduates of the Government Forestry Schools. Private forests are subject to the Government regulations regarding waste and denudation.

France was the first to institute a system of forestry. Her legislation in this direction dates back to the year 1215, which culminated in the Code Forrestiere of 1669 of Colbert, an admirable code, but too elaborate for our country. A new code was enacted in 1827, which is much simpler than the former code. France has steadily increased her forest areas. In the forty years preceding 1892 the increased home production was seven million acres. No less than nine millions of acres of waste mountain lands were planted in that time. In 1868 the area of forest was eighteen millions of acres, and the value of their product about fifty millions of dollars. Paris alone requires the product of one million of acres for her supply of firewood.

France produces about two thirds of her supply. "La France perira faute des Bois" was the expression of the great

Colbert. Notwithstanding the admirable legislation of that day abuses on the part of Crown Lands Agents were numerous. One, Boisson dit Labrosse, was condemned to do penance in his shirt, head and feet bare, a rope round his neck, followed by the public executioner, and holding in his hands a torch two pounds in weight, and to be banished forever from the county of Poitou and Guyenne. If a remedy of this kind were adopted in our Province for Agents who neglect their duty the Crown would benefit. The method adopted to preserve the forests was "La methode a tire et aire," which was simply to divide the forests into sections of 100 acres each, to each of which in succession cutting was confined, and leaving on each lot trees to bear seed and re afforest the lot. France imported in 1891 251,257,000 francs in value of products of the forest.

It is true that considering the present state of public opinion it is impracticable to adopt the forestry systems of France and Germany, but we can profit by the lesson these systems teach, and by arousing public opinion to the fact that there is a mine of wealth in our Province more valuable than the gold mines of the Yukon. We can obtain support for an advanced policy of protection and perpetuation of our forest wealth.

I would recommend the foundation of a professorship for a class of Forestry at Laval. A competent teacher could be obtained from the Forestry School of Nancy, in France, or the Government could select from amongst its Land Agents a capable person to follow a course at the School at Nancy which would take three years. The expense would be a trifle, when the importance of the interests at stake are considered. The lands department is the most important revenue producer of the Province.

The services of a trained forester would be of great service in directing reforms and suggesting improved methods

of forestry. The department is continually occupied with questions concerning the lots which are taken up under pre-  
tence of settlement. The decision of a skilled forester would be final and would relieve the department of a difficult and embarrassing duty.

The large industrial corporations require and secure the best trained experts to conduct their undertakings. If the forest property of the Province were absorbed by private enterprise it would be placed in control of skilled experts, and would be conducted on business principles to protect and perpetuate such a great source of wealth. Surely the Government ought to adopt a similar course of action.



## CHAP. II.

## FOREST WEALTH OF QUEBEC.

The Provincial Treasurer in his budget of 1902 fixes the approximate extent of the forest asset at about two hundred million acres of which there are thirty-six under license leaving one hundred and sixty-four millions yet to dispose of.

Every estimate of the supply of timber remaining in the Province of Quebec is conjectural. A correct estimate could only be ascertained and calculated by the skilled woodsman and timber explorer. The brule, the muskeg and swamp lands must be taken into the account in any such estimate.

The Hon. Mr. Joly de Lotbiniere, in his report to the Minister of Agriculture in Ottawa in 1887, says: "In a very short time since the beginning of the century we have over-run the forests picking out the pine, and we have impoverished them to a serious extent. There still remains to us a great deal of spruce and second-rate pine, which for generations to come will be in excess of our wants, if we are careful, but the really fine pine is getting very scarce and inaccessible, and I feel that we must prepare for a serious falling off." When this was written the pulp industry had not developed to its present importance. Spruce has become as valuable a source of wealth to the Province as pine.

Whatsoever differences of opinion there may be in regard to the quantity, there seems to be a general consensus that the Province of Quebec is one of the richest sources of spruce supply in the world, and with proper regulations as to protection against fire, and re-afforesting waste spaces the supply may be made inexhaustible.

Dr. Robert Bell, of the Geological Survey, tells us that "The northern forests of Canada stretch from Labrador to

Alaska, a distance of 3,700 miles, and have an average breadth of 700 miles, and the area of our forests is forty-four times greater than England, which is 59,000 square miles in extent. In Labrador we have an area of 1000 miles wide from East to West, by 1000 miles from North to South, equal to the whole of Western Europe, mostly covered with timber."

I have calculated, says Dr. Robert Bell, that about one-third of the country may be considered as brule, that is, under a second growth up to about ten years of age; one-third as intermediate, including trees between ten years of age and upwards; and one-third, including trees assuming the character of those of one hundred years or more. As already stated the area of our northern forests may be reckoned as forty-four times as great as that of England. Any one of these forty-four parts will produce wood enough to supply the ordinary demands of the present population of Canada, that is, five million people could get what is required for mining, fuel, etc., by taking the timber from a space the size of England and would be able to allow the other forty-three equal parts to be in reserve or used for export. Spruce trees grow much more rapidly up to about thirty years than they do afterwards. The addition made between thirty and one hundred years is much slower. The older the tree the slower the increase.

It must be remarked however, that the brule is not always covered with spruce but the crop is Bouleau and Tremble, and the easy seedling, or weed trees; sometimes it is a heavy crop of wild cherry which succeeds a fire burnt district.

It must not be forgotten that for two hundred years and more the settler's axe, the chantier, and the forest fire, have been reducing the forest supply.

The ordinary receipts of the Province for 1901-1902 were \$4,515,169; of this amount \$1,234,072 was collected from

woods and forests. This represents the interest on a capital sum of thirty millions of dollars at four per cent. In 1901 the value of the domestic products of the forests of Canada exported amounted to over twenty-three millions of dollars. In the year 1867 the revenue from Crown Lands in Quebec was \$96,160. In 1891 the revenue was \$623,997.

Paper and pulp mills are rapidly springing up, from Hawkesbury in the West to Peribonca in the East. There are now in operation twenty-seven, and five in process of construction.

Many of these are attracting centres of population to new districts, affording to our surplus population an opportunity of obtaining employment at home, besides being the means of supplying capital to the future settlers.

Our forest property is also invaluable to the Province, inasmuch as it affords employment in winter to our population when work on the farm is not obtainable.

## CHAP. III.

## PRESERVATION OF THE FOREST.

The remark is frequently made that our supply of spruce and pine is inexhaustible. It is true that with a limit of cut at 12 inches diameter at the butt, the same ground may be gone over in twelve to fifteen years later and another crop of spruce 12 inches at the butt gathered, but it is entirely forgotten that for every spruce of 12 inches cut there must be a seedling planted or growing to replace the grown up tree. The diameter limit being 12 inches is no guarantee that a like quantity of seedlings are growing up to supply the places of the large trees which are cut.

The floor of the forest must be left in a favourable condition to receive the new seed which is being distributed by the wind. Lumbering, as presently conducted, covers the floor of the forest with tops covered with branches and trunks of trees, culls and rejected logs, and trees felled which were impediments to cut an eligible tree. All spruce or pine seeds falling under these obstructions are lost and will not push up through the standing branches. This system of lumbering adds greatly to the inflammability of the woods and is an added risk. Once a fire gets any headway in a forest covered with "embarras" or jobbers' abatis no amount of human labour can stop its course.

The remedy for this evil is to have the tops of trees cut so that the trunk will lie flat on the ground and the branches cut. Lying flat on the ground they become saturated with moisture and the trunk becomes covered with moss, and in the case of spruce, decay more speedily than if left in the air to dry and become food for a fire.

The present practice of leaving a top in the woods with

a short log attached is a waste of good material, which should be prevented if possible.

The lumberman objects to this proposal on the ground of expense. It takes five minutes to clear the branches off a spruce, which is more thickly branched than pine, and three minutes for a pine. The jobber would branch the pine without extra charge if the clause were inserted in his contract. The additional cost to the jobber for clearing spruce in this way would amount to one cent per top, which is an insignificant amount compared to the benefit which would accrue to the forest from lessened risk of fire extension and increased advantage in the re-afforesting by natural means.

The task of replanting the waste places created by fire and lumbering operations is too great for our Government to attempt at present.

It costs at least \$18 an acre to grow young trees. If, therefore, we can attain our object by care in cutting and keeping the forest floor as clear as possible of standing debris and protecting the young trees from fire it is a wise policy to pursue.

There are considerable portions of the settled countries where the pine trees have been completely cleared away in sandy soil. The sand has extended over wide spaces blown by the wind, and has even covered up and destroyed good farms. By replanting these sand dunes with pine seedlings the land, now a waste, could be covered with a valuable growth of pine. A section of this kind of soil may be seen on the line of the Canadian Pacific below Lanoraie, in the County of Joliette.

The experimenting of replanting sandy areas has been tried with success in France and also in Nebraska.

The brules or burnt spaces, which constitute at least fifty per cent. of the forest area in the province, which has already been lumbered over and abandoned, has been succeeded by a growth of Bouleau, Tremble and

wild cherry, could be brought back to spruce and pine by scattering seed in propitious places, when in a few years the young trees would distribute their seed far and wide over the surrounding country.

In this way the re-afforesting of large sections would be effected by nature's inexpensive process.

Young spruce and pine trees grow more rapidly where there is an abundance of air and sunshine.

The rate of growth of trees as stated by "Pinchot," in his valuable work on the Adirondack spruce, is as follows, in cut over land at Santa Clara, New York:—

Diameter of tree.	Number of years required to grow one inch in diameter.
5 inches	11 years
6 "	10 "
7 "	9 "
8 "	8 "
9 "	7 "
10 "	7 "
11 "	7 "
12 "	6 "
13 "	6 "
14 "	6 "
15 "	6 "
16 "	5 "

It is interesting to know how often the forest can be cut over so that the crop may be continuous. The lumbering to be carried on annually.

The area being 30,000 acres with a yield of 3,500 feet, board measure per acre, with a diameter limit of cut of 10 inches, the same yield may be obtained in 37 years, the area lumbered annually being 811 acres.

The diameter limit being 12 inches, the average yield, being 3,000 feet per acre, the same yield can be obtained in 25 years. The area lumbered over annually will be 1,200 acres.

"Pinchot" is of opinion that the limit of cut of 12 inches is the most profitable.

It must be borne in mind that the success of this method of forest preservation depends on the area cut each year and the care shown in the preservation of the young seedling spruce.

The continuous supply of spruce and pine will depend upon the strict enforcement of the limitation of diameter cut at 12 inches and the adoption of the sectional system which is a return to the Code Forrestiere of 1696 and the method of *Tire et Aire*.

Pine does not seed every year. It does not reproduce as rapidly as spruce as it is less tolerant of shade.

In a preserved pine forest with a limitation of 12 inches cut it may be lumbered over every 40 years. The seed of pine and spruce is easily obtainable. Pine east of the Gatineau River has diminished greatly in quantity and quality.

To seed large areas of the waste lands would, no doubt, be a very expensive operation, but selected spots of half an acre each on elevated places might be seeded down; they would form centres of distribution of seed. Re-forestation would necessitate the establishment of a forestry branch of the department with trained foresters in charge.

In the meantime, the forest can be preserved with our present regulation by perfecting our system of fire protection; by enforcing strictly the diameter limit of cut; by putting an end to the jobbing speculator who takes up lots to sell the merchantable timber and to defraud the Government of its timber dues.

Mr. W. C. Edwards, M.P., a gentleman of wide experience in forestry, writes me as follows:—

"I think the Province of Quebec has a great heritage if she has the common sense to take care of it. In fact, it is my belief that she is the richest province on the continent

of America in so far as timber supply is concerned, not because of its great present wealth alone, but in my judgment the great reproducing qualities of spruce timber and the fact that it occupies the most northerly portion of the country and can receive no attack from the north, if it is only protected from the south, there is no reason why Quebec's spruce supply should not go on for ever. Then again is the question of water power. The water powers of the Province of Quebec are simply enormous in value and the means of preservation of these water powers is the preservation of the forests."

The United States have established a department of forestry and are spending large sums annually to re-afforest treeless regions.

A fruitful source of destruction of valuable timber is the practice of some lumbermen of keeping their dams shut down to hold the water back, long after the necessity exists. The dam gates should be raised as soon as the drive of logs is over and the necessity of the surplus water required for the drive is past. Large areas of good timber are destroyed by the carelessness of lumbermen in this respect. Forest rangers should report all such offences, for which a heavy fine should be imposed.

The Province of Quebec can by timely precautions preserve her wealth by a strict enforcement of protective regulations and efficient fire protection.

The colon who has cleared up a forest farm remembers the hard work involved in preparing his ground for cultivation, and is apt to regard the tree as an enemy. This impression ought to be removed by education. The school teachers should be provided with a short simple lecture on the importance of the forests. The immense damage to the forests from fires, and the necessity of care in setting fires in the woods or near them; the planting of spruce and pine on the waste places of the farm should be advocated, so that while the child is growing up, a sure source of wealth would



be his reward in the future. Our birds ought also to be mentioned. The important work they perform in nature, in the preservation of grain, fruit and forest should be explained and their preservation and protection taught, pointing out the profit to be derived from forest culture, also every farm where there is land fit only for a wood lot should be devoted to the production of pulp wood and fire wood, and if young growth is to be promoted the wood lot should not be pastured, as cattle destroy the young growth.

#### CHAP. IV.

#### WATER SUPPLY.

The denudation of the forest will diminish the volume and regularity of flow of many streams, and destroy completely the value of others.

One instance may suffice to show what a future there is for the development of manufactures in Canada.

The Manicouagan river has at 12 miles from its mouth falls 110 feet high; at 22 miles 165 feet; at 65 miles, 115 feet; at 125 miles, 175 feet. At the waterfall nearest the mouth of the river there is a power of 331,456.

For the employment of these waterfalls the forest products are necessary. The pulp mill, the paper mill, the lumber mill are valueless without the supply of raw material.

Professor B. E. Fernow gives in the new *Science Review* October 1894, the following graphic description of the process and effect of denuding the forest:—

"Forest growth begins on barren sands or bare rocks, by the starting of shrubs and small plants, that dying, leave their remains to form a humus or soil in which better and larger plants may grow. Trees create soil through their own decay and death, and by catching and holding water and drifting material of all kind. A forest in active operation creates its own soil at the rate of one foot in five hundred years. A lumberman can strip an acre of forest of its trees in a few days and leave the soil that took five hundred years to deposit to be totally ruined and destroyed in a few months. The natural processes that instantly follow the cutting off or burning of a forest area, and the correct methods of controlling them and the proper means to be used in saving our forest wealth, form the science of forestry."

A rapid and graphic study of this science made the most interesting and valuable part of professor Fernow's paper.

Rain falling on forest-covered land meets with an elastic surface. The leaves break up its down-pour and the trees and the vegetable growth under them act precisely as a sponge, checking the on-rush of the water, holding it back and allowing it to soak slowly away, without injury to the soil. Forests act as moisture holders and keep the air damp by checking too rapid evaporation. Drying winds and the direct sunlight act more slowly in woods than on bare hillsides. Strip the land of its trees by axe or fire, and the rain strikes the soil with full force, accumulates in swift rivulets, plows up the soil and sweeps it away to lower levels. The process is simple, the results are enormously destructive. Streams that in forests ran evenly throughout the greater part of the year, become capricious and uncertain, now raging in destructive floods and torrents, now dwindling to mere rivulets of no value to the miller or boatman. With incredible rapidity the costly soil of mountain slopes is swept away and lost after the forests disappear. The soil gone the rains sweep down loose rock and cover the once fertile valleys with wastes of sand and gravel. The process begins everywhere the moment the trees are gone, and increases in destructiveness from year to year, leaving stony wastes on the mountains and a wilderness in the valleys. That we do not see more miles of ruined land and sterile mountain side; that our country is not so much impoverished and desolate as Spain and parts of France, is simply because we have not gone far enough. The process has begun already on a gigantic scale in several of our States, and it is only a question of time when the States, combined or singly, must interfere and control the farmer, the miner and lumberman, who are now so barbarously destroying the present and potential wealth of the country. Well may foreign writers, seeing our wasteful methods of tree cutting, and viewing our

'excusable forest fires, say that we are "a barbarous and uncivilized people."

Is it not better to keep our raw material to be manufactured into pulp and paper and create populous centres in our own country rather than to facilitate its export and with the exported raw material our surplus population?

One experiment in this direction has proved a success. The Grand Mere establishment keeps 3,000 Canadians at home, who, in the absence of this establishment, would most likely be working in the United States.

The value of pulp of wood imported into the United States in the year ending 30th June, 1901, was:—

Mechanically ground pulp—

70,222,073, value \$491,899.00, duty  $\frac{1}{2}$ c per lb.

Chemical unbleached—

90207,760, value \$1,436,052.00, duty 1c per lb.

Chemical bleached—

20,112,995, value \$478,156.00, duty  $\frac{1}{4}$ c per lb.

Pulp wood, 1900—

value \$1,344,144.00, free.

Assuming the cord of pulp wood at \$4 per cord and calculating a cord of wood for each ton of chemical pulp, Canada exported in 1901 the immense quantity of 426,307 cords of pulp wood.

The total value exported to the United States amounted to \$3,750,251. Four hundred and twenty-six thousand cords of spruce wood manufactured into paper at \$35 per ton of paper would leave in Canada over fourteen millions of dollars, \$14,910,000 instead of \$3,750,000.

Although we have given prominence to the pine and spruce there are other trees which are of great value and deserve protection. The Hon. J. L. Snowball has stated that any tree will make pulp. In France they pay as much for hemlock as for pine for pulp wood.

We have ascertained that much abuse is made of the pulp limit of 7 inches for black spruce, that the jobbers are cutting everything in sight; even the white spruce is cut down to four inches. The limit of cut for black spruce to 7 inches is because this tree is of smaller diameter growth than the white spruce. Under this limit small logs of 4 inches will be made, but limit of 12 inches for white spruce should be strictly adhered to. When the supply of pulp is exhausted the mill must close. If, therefore, we desire a continuance of this industry, strict supervision of lumbering operations must be adopted and enforced.

For statistics and information in relation to the pulp industry in relation to our forces, we refer to an exceedingly valuable paper, compiled by J. C. Langelier, Superintendent of Forest Rangers, Quebec, where the whole subject is treated in an exhaustive article.

## CHAP. V.

### FOREST FIRES.

There is scarcely a report of explorers in all sections of our province which does not mention large tracts of country burnt over by forest fires, some completely barren replaced by moss and lichen, others covered with young *Boulcau* and *Tremble*, wild cherry and weed trees and many covered with a growth of sapling spruce, which thirty or forty years hence will be of value if not again destroyed by fire. The proportion of our forests destroyed by fire is variously estimated, some as high as eighty-five per cent., none less than fifty per cent.

The Indian with his signal fire throughout the forest region beyond the height of land from Labrador to the Western Boundary has been the cause of destroying vast tracts of virgin forest of inestimable value. The spruce gum gatherer, the birch bark stripper for *caséaults*, for holding maple sap, careless hunters, the log drivers' boucane to keep off the flier while he watches to prevent a jam of logs, the green sportman with his torpedo match, and the festive camping party, the isolated speculative jobber or squatter, the locomotive and the settlers' *abbatis*; this last is the most fruitful source of forest fires. A report on forest fires issued by the Bureau of Forestry at Washington asserts the following facts: In an average year 60 human lives are lost in forest fires, twenty-five millions of dollars worth of real property over ten million acres of timber land is burnt over, and young forest growth of at least seventy-five millions of dollars in value is destroyed. We have an annual loss of one hundred millions of dollars resulting from forest fires not taking into account the loss caused by the impoverishing of

the soil by fire, the drying up of water courses and springs consequent upon the denudation of the forests.

The same process of destruction of forest wealth by fire has been going on in our Province. An instance is cited where on the River Eagle, a branch of the Gatineau, in the midst of a valuable pinery an isolated bogus settler had taken up a lot. In clearing a patch of land he set fire to the bush and destroyed over one million dollars of pine lumber. The total crop raised on the clearing did not exceed ten bushels of potatoes. The pine being destroyed the bogus settler abandoned his lot. It would lengthen our report materially if we were to cite the number of forest fires and the amount of forest wealth destroyed from this cause.

The fire regulations of the Government if strictly carried out will minimize the danger. The forest-ranger system has worked well where it has been established and faithfully enforced. In the pine region the fire ranger has done good work because he has been supervised by the limit holders. East of the Gatineau River the system has not been enforced.

The Government should compel every lumberman to employ fire rangers from the first day of April to the first day of October in each year. It is of vital importance that the operation of the law in this respect should be rigidly enforced every where in our Province. If the expense is an obstacle the lumberman should pay the whole cost of this service. Any person who has walked through a portion of forest which has been lumbered over will realize at once the necessity of keeping fire out of the woods.

It is of paramount importance that the fire service should be brought to the highest state of efficiency and applied throughout the Province.

The present fire regulations should be revised, Art. 1344 might be repealed as it is embodied in Art. 1345. Art. 1345 should be amended by changing the close season to the first of May and first of October. An early spring with much dry

weather makes the months of April and May dangerous months for the spread of fire. A provision should be inserted here that a space of fifty feet from the forest should be cleared of all inflammable matter and that no brush heap should be set on fire at any time without such a fire strip. It may be urged that this would cause trouble and expense to the settler. Such would be the case to a trifling extent, but the settler would save his standing timber by this precaution and the Provincial Treasury would profit.

A fire in the woods fairly started is soon beyond human control. It is better, therefore, to take the necessary care and expenses of prevention before the fire takes place. The dates for the prohibited term to set fires should be made uniformly from May 1 to October 1. For the offences in 1348, 1349 the forest rangers should be specially charged with their prosecution. A similar placard to that used for the game laws should be posted in the public places and at the houses of every settler who is likely to make an abbatis, and all offences against the fire clauses should be rigorously prosecuted. Article 1353 should be amended so that the close season for fires would be between 1st May and 1st October, and a fire strip of fifty feet should be insisted upon between the forest and any abbatis. The fire-ranger system should be extended to every section of the province which is exposed to damage from forest fires.

Mr. J. R. Booth, of Ottawa, made the following remarks at the Forestry Association meeting in 1902: "My object in coming here at this time was in hopes of hearing some plan whereby they could suggest the preservation of the forests and the carrying on of agricultural operations in the same district. If there is any scheme by which those two interests can be continued with safety I think that is about the solution of the whole subject. I have never been able yet to see how those two interests can be preserved in the same district. The Government are generous in paying a certain sum



for the protection of the forests from fire in the dry season, but I presume a great many in this room have a very good idea of how helpless a gang of men are to handle fire in a forest. It is an old saying that an ounce of prevention is worth a pound of cure, and I think that is the right way to preserve the forests. It rests with the Government to say how far they should allow settlers to go into a country that is not fit for agricultural purposes, where there is only a mere patch of good land here and there. To establish a settler in such a district is to endanger thousands upon thousands of acres of timber around him. That has been going on in this Ottawa district all the time I have been here, forty years, and it is still continued, and I do not see but we are having those fires now almost as generally as a number of years ago. Even last summer we had the most destructive fire that we have had for a long time in the Nipissing, the Temiscamingue and the Kippawa Districts. The woods was full of men, yet, they had no power over it. We all know how that fire originated—through settlers. There was more timber burnt in that fire than all the settlers that will be in that country for the next forty years will pay the country for. If the Government continue the practice of putting settlers into such a country, no matter if there are small patches or even large quantities of arable lands, they should, in my opinion, decide which is the most valuable to the country, to preserve the forests or to make a small settlement in a country valuable mainly for its forests."

There is no doubt that the clearing up of the debris of the forests and burning up would lessen the intensity of forest fires. It is quite practicable in ordinary years to burn heaps in the clear spaces of the forests after the first of October and in winter when the trees are cut. That this plan would minimize the damage and lessen the destruction of the standing timber is certain. The objection from the limit-holder is the expense. The Government could easily ascertain the cost by experi-

ment on a few acres of forest. With proper precaution the settlers' abbatifire could be rendered less dangerous. If the sarclage and debris were collected on the log piles instead of as at present scattered over the clearing and a calm day selected for the burning, if a cleared strip next the forest were left, comparatively few fires would result. These precautions have been tried by careful settlers with success.

If the fire ranger-system were applied to all parts of the Province where settlement is proceeding, the colon could be warned to use all possible care with his fires. At present there is no effective supervision outside of districts 1 and 2, and carelessness goes unpunished. A conversation between two settlers in the Temiscamingue district was overheard lately. The best method of clearing land was discussed. One settler declared that the best way was to set fire to the woods around; evidently, there was room for education here.

In most places outside of the pine limits the regulations are a dead letter. The fire rangers are, as a rule, political appointments, and their utility is tested only at the general elections. In some cases they live at an inconvenient distance from the woods. When they receive the news of a fire it has spent its force or been extinguished without the aid of the fire ranger.

The fire ranger should be paid a stated sum and be on duty from 1st. May to 1st. October.

The cause of fire if it originated in an abbatifire, can easily be traced. The owner of the lot, who has caused thousands of dollars' damage by his carelessness, is found. His whole fortune amounts to two or three acres of cleared land, a log house, and the balance of 120 acres of forest land. This would hardly amount to the attorney's retainer in an action of damages.

A fine of ten dollars would have more effect on the colon than a judgment for a million dollars. If the penalty of the law were enforced in the way of a small fine for

infringement of the regulations or neglect of precautions, good might result, but prosecutions for this kind of offence are very rare. We would recommend therefore the perfecting the fire-ranger system and the strict and effective enforcement of the law and regulations. By far the most prolific cause of forest fires is the isolated squatter who settles down in the midst of valuable limits, and the bogus settler whose name is used by a neighbouring mill owner for the purpose of plundering the limit holder, and defrauding the Government of its dues. Frauds of this kind have increased the past few years to an alarming extent judging from the number of cases submitted to the Commission.

A remedy for this evil should be applied without delay. If prompt action is not taken the security of the limit holder will be very much impaired, and the value of a timber limit will be very much diminished if not destroyed. The uncertainty of tenure will take away all incentive from the limit holder to preserve and perpetuate his limits. Self preservation will induce him to cut close and let the future take care of itself.

Large investments of capital have been made in plant and machinery, which depend entirely upon the supply of spruce from the forest. Take away the revenue which the province now realizes from its stumpage dues and direct taxation would have to be resorted to. The crown license is regarded as a lease renewable every year, but it has become a custom to regard the title as permanent so much so that large sums are borrowed from financial institutions; on this security, it must therefore be undoubted. Limits are sold and transferred frequently at large advances upon the original cost from the Crown. The transfer fee is paid and accepted, and so long as the rent is paid the Crown will not disturb the limit holder. It follows then that the Crown is bound to make the necessary regulations to protect its tenants. Every administration since Confederation has

given the matter great consideration. Many difficulties have been overcome. The great sources of trouble, the isolated speculator and bogus settler, and occasionally the county member, still remains to the detriment of the Crown revenue and a menace to the safety of the forests. The remedy for this state of affairs is to change completely the present defective system by completely separating the agricultural and lumbering industries.

At present the Crown Lands Agent receives from the Department a list of lots which he is obliged to sell to the first applicant who is a *bona fide* settler. There is no distinction made of lots under license. All such lots should be withdrawn from the list. When it is desired to sell them for settlement the crown should give ample time to remove the merchantable timber. Every lot which the local agent has to sell should be fit for settlement purposes and "propre a l'agriculture." No wood lot should be sold exceeding 50 acres, and no wood lot should be sold which is under license; the latter regulation existed in 1874. Formerly, 30 months was given to the limit holder to clear the lots. The present regulation should be changed so that in all cases the limit holder should have absolute one year from date of notice to remove the merchantable timber. The limit holder may have been paying ground rent for years previous to being deprived of a lot. Under existing regulations the license expires on the first day of May. If a lot is sold which is situated within a limit after November, the limit holder has no time to take the merchantable timber off. In a large number of cases the lots are taken in the last days of April and the limit holder's license expires on the first day of May following. In such cases the Government loses its dues on the lot and the limit holder his timber. Every expedient is resorted to by speculators to obtain lots under the names of fictitious settlers who never settle. In one case examined by the Commissioners

142 lots had been taken out of one limit by this method. Some of the lots were taken by *bona fide* settlers, but the great majority were reported unfit for culture and had evidently been taken by speculators under false pretences. The limit holder maintained that he had never received the notice required by law. The officers of the department of lands are kept busy investigating complaints from this source.

The loss of stumpage dues on these lots is of serious consequence to the revenue, as in such cases the lots are completely stripped of the valuable timber and abandoned. If the lots are fit for culture the *bona fide* settler, who would otherwise take up the lots, is prevented from so doing, because the merchantable timber, which would have supported him in his early clearing, is gone. A provision in the location ticket, should be inserted, giving to the limit holder one clear year from date of his reception of notice of sale of the lot in question to remove the merchantable timber.

In the patents issued in Ontario under the Free Grants Act the Crown reserves all the pine trees which remain the property of the Crown or Licensee. The patentee is allowed building and fencing stuff. The Crown exacts stumpage on all pine trees cut and disposed of in the clearing. Under this Act, Chapter 25 R. S. O., lands considered fit for settlement are set aside as free grant lands, but mineral and pine lands are excepted.

Large tracts of forest lands are owned by lumbermen under patents principally on the south shore of the St. Lawrence. From these lands the Government derives no revenue. These lands have been obtained by performing settlers duties or as wood lands, the purchasers no doubt preferring the security of private ownership to the risk of being plundered and blackmailed by bogus settlers and speculators.

The present regulations respecting shanty, books and the keeping a check on the amount of logs out in each lumbering camp are admirable, but they are more honoured in the breach than in the observance. The shanty foreman may be illiterate, and he is in all cases the employee of the lumberman. We would suggest the employment of permanent skilled and educated men, who should represent the department in each limits, whose duty it should be to keep an account of all lumber cut on the limits during the season, and who would see that the Government regulations as to accounts, diameter of cut and fire precautions on the drive are faithfully carried out. If capable men are selected they could also act as explorers if required.

The procedure for cancelling sales should be simplified. Where lots have been held for more than one year without development and when fraud is proven the cancellation should take effect *ipso facto* and be completed on the order of the Commissioner.

CHAP. VI.  
SETTLER.

For purposes of colonization the province requires settlers. There is little or no complaint as between the lumberman and the *bona fide* settlers, on the contrary the evidence goes to show that the *bona fide* settler is welcomed by the limit holder, and assisted by securing a market for his merchantable timber and high prices for hay, oats and all other farm produce which he has to sell. The settler near a limits finds ready employment for his teams in the lumbering operations in winter at a time when he has little else to do, and the money earned in this way enables him to successfully tide over the most critical period of his existence. The *bona fide* settler has been treated with the utmost generosity and consideration by every government and he deserves it. Canadians have reason to be proud of the brave hearted, plucky colon who carves out a fortune for self and family by the strength of his right arm. Honest, sober and industrious the habitant will compare favourably with any class of citizen; elsewhere, neither must we forget the highest praise to the wife, who throughout all struggles, is at his side, sharing the hardest labour, saving by her thrift and encouraging by her strong confidence in the future.

The product of farm and field constitutes the solid basis of prosperity for our Province, and the colon of good faith deserves and receives the highest consideration of the legislator without distinction of party. His welfare is of universal interest. Our system of selling insolated lots over the Province without reference to their value has proved defective, and the province is dotted over with farms which have been partially cleared and abandoned, or lots, which, although occupied, barely furnish subsistence to the farmer. The system

should be changed. "The land for settlement should be selected by skilled persons familiar with the quality and productiveness of the soil. Rich alluvial soils. Fertile valleys of sufficient extent along the river bottoms should be selected for agriculture. Hills, mountains, rocky country or land unfit for agriculture should be withdrawn from sale and reserved for forest land. Continuous settlement should be the guiding principle of our Colonization department. The Ontario Government inspects the land thoroughly before settlement. Land under license not fit for settlement is not sold to settlers. The proper system to pursue is to select places fit for the establishment of a township where there is good land. Make a first-class colonization road under Government supervision and sell the lots continuously along each side of the road. So soon as all the lots are taken open up a parallel range and adhere to the system of continuous and concentrated settlement.

Concentrate the intending settlers upon these lands, and when a township is settled survey a new one. This system if adopted would enable the Government to spend the colonization money to advantage in making good roads and bridges so indispensable to the prosperity and success of the settler. The settlers being nearer together would have the advantage of the assistance of neighbours. The Parish Church and village school so indispensable would be established and supported with less difficulty, and a strong and prosperous settlement would result. The number of lots granted to one person should be limited to one.

We embody here a letter of the Rev. Father Lacasse, O. M. S., on the subject, addressed to the Hon. G. A. Nantel the 9th of October, 1896 :—

"Il y a une quinzaine d'années, un grand nombre de ceux qui voulaient enrayer le courant d'émigration sont venus avec les meilleures intentions du monde conseiller aux pères de famille d'aller acheter d'immenses lots de terre dans la forêt



pour faire des seigneurs de leurs enfants. Le temps—ce grand maître—est venu démontrer que l'acquisition d'un grand nombre de lots—même pour un père ayant une nombreuse famille—n'est pas préconisable. Dans huit cas sur dix le conseil municipal fait vendre ces lots pour le remboursement des taxes.

Si l'on fait attention que six lots de largeur, équivalent à un mille de longueur, il sera facile d'expliquer pourquoi l'on ne voit souvent dans les nouvelles colonies que trois ou quatre maisons dans l'espace d'une lieue. Les conséquences de cet état de choses sont déplorables, surtout quand les spéculateurs se mettent de la partie. D'abord :

10. Les chemins sont impraticables.
20. L'établissement des écoles est impossible. Toute une population est vouée à l'ignorance.
30. L'érection d'une paroisse et la présence d'un curé retardée de vingt ans.

Vous avez bien compris toutes ces choses-là, monsieur le le Ministre, puisque vous avez favorisé l'amendement de la loi qui limite à deux le nombre de lots que peut acheter un colon. Soyez assuré que tous les amis de la colonisation ont applaudi des deux mains à cette mesure. Maintenant, permettez-moi de vous demander avec tout le respect que mérite et votre haute position et l'intérêt que vous portez aux colons, de compléter l'œuvre si bien commencée en déclarant :

I. Que six mois après l'achat d'un lot, s'il n'y a pas un chemin de fait, sur dix-huit pieds au moins de largeur sur toute la largeur du lot, muni d'un fossé, si besoin il y a, le tout à la satisfaction de l'agent des terres de la Couronne (on suppose qu'il n'y a pas de rivière ou accidents de terrain qui demandent de travaux communs), et de plus un arpent de terre défrichée, le dit lot deviendra la propriété de la Couronne, l'ancien acquéreur perdant tous ses droits.

II. Si vingt-quatre mois après l'achat d'un lot, celui-ci

n'est pas habité par l'acheteur ou par tout autre personne y résidant d'une manière permanente, l'acquéreur perdra tout ses droits et l'agent des terres de la Couronne pourra vendre le dit lot au premier qui en fera la demande, au bénéfice du gouvernement.

Vous voyez, monsieur le Ministre, que je ne suis pas avocat et que je n'ai pas l'habitude de rédiger des Bills, mais vous comprenez ma pensée.

Deux clauses de cette nature auront un très grand effet pour la grande cause de la colonisation. Le tout humblement soumis.

Je demeure, Monsieur le Ministre, avec considération,

Votre humble serviteur,

E. LECASSE, Ptre. O.M.I.

Ayant bien souvent entendu les plaintes des prêtres desservant les nouvelles Missions et les récriminations d'un grand nombre de colons contre ceux qui achètent des lots dans des vues de spéculation, je concours pleinement dans tout ce qui est dit plus haut.

Québec 10 Oct., 1836.

(Sig.) JOS. MARQUIS, Ptre.,

Agt. de Colonisation.

The present system of scattering the appropriations for colonization all over the Province, granting lots in isolated places, often long distances from a road, is unsatisfactory and is a waste of money. The settler wants a road. Pressure is brought to bear on the Government through the County Member. A road costing more than the lot is worth is built. If the settler has secured a lot unfit for culture he abandons the lot, and the government roads and lot both return to the forest primeval. Innumerable cases of this kind can be pointed out. The colonization road from Jacques Cartier River to Lake St. John represents an expenditure of thousands of dollars buried in the forest without any good result as far as colonization is concerned.

Many settlements in the Gatineau district have been abandoned, after millions of dollars of pine have been destroyed by fire. The pine gone and not one settler left.

The annual migration of Russian Polish laborers to Prussia is a case in point. It is calculated that 2,137,000 peasants insufficiently provided with arable land leave their homes in the central and northern provinces every year to seek work. Four hundred thousand persons are reported to be destitute and starving as a result of the crop failures in Finland this year, 1902. These facts emphasize the importance of settling our people on good land. The land not fit for agriculture should be devoted to forestry alone. It may not be practicable everywhere to absolutely separate the good from the bad lands. It frequently happens that the survey lines are drawn so that a considerable portion of the lot is covered with hills or mountains not fit for cultivation. In such cases a re-survey laying out the flat lands into farm lots of sufficient area might be made, and the rocky and hilly portion reserved for the growth of timber. The principle that good land only should be settled should not be departed from. No settlement should be allowed on land held under license as timber limits. When it is ascertained that land under license is favourable for settlement purposes, it should be taken out of the license in blocks sufficient for a township. The license holder should be duly notified to remove the merchantable timber and given ample time to perform the work, care being taken that the regulation as to size of cut is strictly observed. The lots should then be disposed of to settlers on a specified plan and the lots posed of continuously.

Under this system enough wood will remain to the settler for building purposes, and the hard wood and merchantable timber under the diameter limit of cut will remain as profit to the settler.

It is in the first and second year that the settler ex-

periences the greatest hardship. The sale of wood from his clearing and his labour with the lumberman in the winter chantier tides him over the difficulty. The license holder having cleared off the merchantable timber from the lot, there remains for the settler the timber under regulation diameter to be sold as pulp wood or retained to sell later on to the custom mill or custom lumberman. The forest portion of the lot is the settler's bank, and he should control it as soon as he obtains his patent. The question whether there should be a forest reserve on each lot must be decided by the Government. The wood lot on each farm is increasing in importance and value, especially in the older settlements.

If the existing regulations of the department are faithfully carried out there can be no trouble. Section 28 of the Agents' Manual is quite clear on the question. The department has a number of efficient agents and some whose services ought to be dispensed with on account of age or incompetence. The Crown Land Agent has very important duties to perform, and the very best men ought to be selected for the purpose. The agent should be physically capable of visiting the lots within his jurisdiction, and should be able to point out to the intending settler the lots which are propitious for agriculture. Many complaints are made of the lack of information regarding lots offered for sale. The agent should be familiar with the woods and be able to distinguish good land from bad. Many settlers are ignorant of the quality of land and require assistance in choosing advantageous lots.

## CHAP. VII.

### COLONIZATION ROADS.

#### COLONIZATION SOCIETIES.

The present system, or rather absence of system, in making colonization roads is wasteful, and productive of very unsatisfactory results.

In the year 1901 the sum of \$119,000.00 was spent distributed over 42 counties in sums varying from \$194 to \$14,000.

In many cases appropriations are obtained and expended in settled municipalities which are abundantly able to pay for the work carried on, which really ought to be paid for out of municipal funds. In other cases roads are laid out and made to accomodate isolated settlers in places difficult of access, the roads costing more than the value of the farms which they are built to make accessible.

It frequently happens that impracticable routes are selected and money expended on them. Some are abandoned and better routes chosen, others are abandoned entirely because of the injudicious selection of the route.

The roads are mostly located by non-professional men, and are generally laid out without regard to steep hills or deep valleys. No effort is made to select the least costly routes. Wet and swampy places are macadamized with spruce or sapin branches, drainage of the road is not attempted. Side drains are forgotten. A heavy shower or two of rain washes a road of this description away and destroys it. No more expensive and unsatisfactory system of road making could be devised. The funds expended are, as a rule, entrusted to the county member, who invariably selects workmen who have been devoted to him at the last

election contest. This process of road work is described by a witness as follows:—

“C'est une administration impossible. Les hommes viennent sur le chemin pour travailler et ils sont maîtres des foremen. Le foreman dit: envoyez un peu. On lui répond que le diable t'emporte, c'est notre argent, c'est notre gouvernement; le foreman ne peut pas les mener, il est incompetent pour conduire les travaux.”

Under this system it takes one hundred dollars to do forty dollars worth of work. This vicious policy has flourished under many administrations. The remedy is to adopt the plan of concentrated and continuous settlement on lands fit for colonization only. The route of such roads should be properly surveyed and advantageously chosen.

The road should be economical in construction and well rounded up to the centre so as to shed the water into the side ditches and constructed according to regular plans and specifications prepared by a competent engineer, and no public money should be paid for roads which do not conform to the standard specification of the department. The roads of the Province of Quebec are proverbially the worst in any civilized country. Good roads are of vital importance to the prosperity of the country. We recommend that a short length of good road be built of macadam in each county as an object lesson. A proportion of the cost as an additional inducement a money prize might be offered to each forest county, which is exempt from fire during the year. The proceeds of such money prize to be devoted to making a piece of good road.

A great deal of inconvenience arises because of the doubt which exists as to the liability of limit holders to contribute to the cost of municipal roads. It frequently happens that a road must be constructed through a portion of a limit, and although Art. 780 of the Municipal Code seems quite clear as to the occupants of crown lands being respon-

sible for their share of such work, there is a difference of opinion on the question, the decision of which can only be obtained by a legal decision. We recommend therefore that an amendment to the law be made making it clear that the occupant of crown lands shall be liable to contribution to the cost of municipal roads, and that owners of timber limits shall be liable as well as private individuals. This will be an act of justice to the municipalities as bitter complaints are made of the inconvenience and loss caused by limit holders objecting and refusing to perform their portion of road work.

Since the year 1870 over 900,000 acres of land have been placed at the disposal of various societies. The results have been so unsatisfactory that it is wise to discontinue making grants of this kind. The managers of the Quebec and Lake St. John Railway Company by their liberal policy have built up important sections of new country and deserve the greatest praise for their liberality in this respect. A statement fyled by the department of sales says :—"The result from the point of view of colonization has been nil or nearly so." The lands reserved for these societies, which have not been cancelled, have been returned to the Crown. The creation of these societies has caused a loss to the province of \$75,000. In the case of the Dominion Land Company the Government paid damages of \$6,614. The amount paid by the province under 38 Victoria, chap. 3 amounts to \$60,320 and the reimbursement of French shareholders of the Temiscamingue Society, \$8,289, besides the Government in the latter case was unjustly blamed for the mistakes and incapacity of the projecters of the scheme. The causes of failure arose from the incapacity of the promoters. In many cases societies were merely organized for purposes of speculation. We recommend that the department of colonization should hereafter retain sole control and management of the public lands for settlement, and all matters concerning the selection of fit and proper sites for colonization and colonization roads.

## CHAP. VIII.

### LAND SALES AND BONUSSES ON TRANSFERS.

We are of opinion that no further sales of limits should be made except at advanced prices, and to parties who are desirous of working them within a specified time.

The following sales of pine limits in Ontario reported in the "Lumberman" of December, 1902, are evidence of increased value of timber limits.

Hunter Township, Berth 3.

17 square miles, \$12,700 per mile, Berth 4 11 $\frac{3}{4}$  miles, \$7,000 per mile. The above prices were selected from the sales of 1892. The lowest price obtained during the year was \$600 per mile.

In 1897 the highest price obtained was \$6,600 and the lowest \$300 per mile.

In 1899 the highest price obtained was \$8,500 and the lowest \$200.

In 1901 the highest was \$3,400 and the lowest \$300 per mile.

During the past year, 1902, a transfer of limits was made in Ontario which had been partially lumbered over for 40 years. The limits were 129 miles in extent and the price of sale is reported at \$655,000 or more than \$5,000 per mile.

These handsome prices are a testimonial to the purchaser's confidence in the fixity of tenure and the increased confidence in protection from fire.

If the purchaser of limits in the Province of Quebec can be assured of protection from the inroads of speculating jobbers and the perfection of our fire protection system, the same result will follow here and advanced and the same prices may be expected in our province. The price of spruce lumber is advancing, and its value as pulp wood is greater than



that of pine for the same purpose. The highest price obtained at the land sales at Quebec in June, 1901, was \$198.35 and the lowest \$36.02 for spruce limits. A halt should be called in our sales of limits at these prices. The average price charged for stumpage in the United States is for white pine from \$3 to \$4 and on spruce \$4.

Says Prof. B. E. Fernow in "Economics of Forestry," page 485: "That even these recorded values remain below the actual truth at least in certain instances, may be judged from the statement that the stumpage for white pine ranges in the States in which it is of importance between \$3.50 to \$4 per M, when in actual sales double the higher figure has been paid, and this year, 1902, millions of feet stumpage have been sold at more than \$8 per M feet stumpage. Spruce stumpage is given as ranging from \$2 to \$3, when actual sales were made at more than the latter price.

If the province wants more revenue we would recommend that the tariff of timber dues be increased. With pine sidings selling at \$42 to \$48 and spruce deals at \$44 to \$46 there is no good reason why the stumpage dues should not be increased. The prices of lumber have increased materially since 1884, and the tendency is to still higher prices.

We would also recommend that the Province should share equally in the profits of all transfers, after deduction of interest and charges on the original purchase price of the limits. The present transfer charge is too low when compared with speculative resales of timber limits. The forest is our most valuable source of revenue. The Provincial Treasury should have a fair share of this wealth.

In the case above cited of a sale of pine limits at \$5,000 per mile, the original purchaser 40 years previously paid 50 cents a mile for the exclusive right to cut. After working the limits for 40 years he sold them at \$5,000 per mile. Surely the public treasury is entitled to benefit at least in equal shares with the limit holder.

Private owners of spruce obtain readily \$2 per thousand stumpage, and there is no reason why the Government should not charge the same price.

The sale of timber limits should be held in the fall season, as the lumberman's capital is absorbed by the winter's operations and is not free for investment until the winter's product is sold and paid for. At least six months' notice of such sales should be given. The department should know the contents and characteristics of each lot to be offered, its previous value having been ascertained by an exploration of a practical forester accustomed to the work. This information should be open to the public as soon as the land is put up for sale.

"More than one-quarter of the entire wooded area of Sweden, or 14,300,000 acres, belongs to the Crown. This is valued at \$13,588,000, nearly \$1 an acre, and in 1888 yielded a net income of \$335,000. These royal timber preserves are managed with scrupulous care. All Sweden is divided into forest districts, and these, in turn, into *revir*. Each district is under the supervision of a chief forest inspector, and each *revir* is guarded by a forest ranger and a number of under-keepers. Only trees marked by them are permitted to be felled. The Crown forests are managed, in fact, on the principle that the increase alone may be cut, and that the forest itself—the capital stock, so to speak—shall stand forever on all Crown lands unsuitable for cultivation. Furthermore, the Government has entered upon an extensive and practical system of planting forests upon desolate and uncultivated areas. These excellent official measures have also had a marked effect upon the owners of the private forests, especially upon the larger proprietors, many of whom are now managing their timber lands as permanent sources of income. It is my judgment, therefore, that the vast forests of Sweden will be preserved and maintained, substantially, as they stand to-day, and that Sweden's lumber export—her greatest source

of income—will be kept up and kept good throughout an indefinite future."—*U. S. Consul's Report, No. 125, 1891, pages 227-8.*

M. Melard, Inspector of Forests in the service of the French Republic, in his recent work on "The Insufficiency of the World's Supply of Timber," says:

"There are but seven countries at present able to supply large quantities of timber. Five are in Europe, namely, Austria-Hungary, Sweden, Norway, Finland and Russia; two are in North America, namely, Canada and the United States."

"It has been shown that the available surplus of Austria-Hungary, of Russia and of the United States is seriously threatened by increase of population and by industrial development, and that of Norway by the abuse of the axe. There remain only three sources of supply in which confidence can be placed for yet a little time. These are Sweden, Finland and Canada.

"They are absolutely and hopelessly insufficient.

"If Sweden, Finland and Canada were to attempt to supply all the countries which reach out their hands for timber, their normal productions, and their forests, too, would be disposed of completely in a very short time, revenue and capital alike.

"A timber famine is thus within sight."

## CHAP. IX.

### WATER POWERS.

The Province of Quebec is bound to become the manufacturing centre of our Great Dominion. From the coast of Labrador, to its western boundary, the country abounds with magnificent water powers. Without its magnificent forests, these water powers would be comparatively worthless, because of the absence of raw material to supply the mills and because of the uncertain supply of water, consequent upon the denudation of the forest.

It is of the utmost importance therefore that the raw material, which our country produces so abundantly, should be retained to be manufactured within the Province. Our present system of selling water powers is not satisfactory as the value is not fixed by any certain standard. Water powers should be leased for 99 years at rental of so much per horse power utilized. Under this system the Province would derive an annual revenue largely in excess of the interest on sales of water powers outright.

The annual consumption of wood in the United States is estimated at 40 billion feet. If all the mills in Canada built and running and those under construction were running at their full capacity they could not supply the demand of Great Britain alone for pulp wood. The pulp mills actually in operation in Canada have a capacity of 382,000 tons a year. Their output in 1900 was 264,000 tons. The products of the forest in value and importance are second only to the agricultural products. The wood value of the pulp industry in the United States is over thirty millions of dollars. Spruce constitutes at least seventy-six per cent. of all the wood used. To secure the round two million cords of spruce

alone almost entirely cut in the North Eastern States, at least two hundred thousand acres of virgin mixed woods must be annually culled and over two million pure spruce stands would have to be maintained in good forestry management to secure this product continuously. The area of forest land in the United States is estimated at 500 million acres. That of Canada 800 millions, of which there is probably only 350 millions available. (Fernow.) Notwithstanding this great quantity of forest area it is estimated that the United States has at present only a visible supply for 50 years.

One of the duties imposed upon the Commission was to enquire whether in the interests of the colonization of the province it is expedient to contribute towards the building of certain bridges, and to grant subsidies in lands to certain railway companies.

The total area of lands subdivided and unsold on the 30th June, 1901, amounted to 6,777,287 acres. Of these there were surveyed 4,527,430. Taking the average sales of lands for the past 33 years, there is surveyed land sufficient to supply the demand for 65 years to come. It is worthy of note that the number of sales in 1868 amounted to 202,000 acres and in 1882, 214,000. For the five years ending 1901 the highest number of sales in one year have amounted to 188,000 acres. If the Government lands are to be settled the settler must have good roads and bridges. The policy of all the Governments of the Province has been to pay the cost of the main colonization roads. This policy is a wise one and must be continued.

No contribution should be made to the construction of bridges in old settled municipalities. Our municipal system provides methods for raising money for municipal works, and municipalities which are fairly established should assume the responsibility which self government entails. All local improvements should be performed at the expense of the local authorities. The provincial revenue is insufficient

for more than the legitimate demands of colonization expenditure. There is a tendency to regard the provincial treasury as an inexhaustible mine of wealth and a fair object of spoliation for the relief of municipal tax payers generally. Improvements would be promptly made at the expense of the municipality without a murmur, if the County Member had not offered to obtain the funds from the public chest. Anti-election promises are the prolific cause of these raids on the Treasury. If this practice is to continue the Government should impose a per capita tax of one dollar a head on all men over 18 years of age who do not pay any taxes as is the practice in the neighbouring Republic.

Money appropriated for colonization should be strictly applied in the interests and for the well being of the settler on the unimproved lands of the province.

The revenue from a tax of this nature would be considerable, and the proceeds could be divided between colonization roads and bridges in poor municipalities.

CHAP. X.  
LAND GRANTS AS SUBSIDIES TO RAILWAY  
COMPANIES.

Land grabbing according to the reports of Government agents of the United States are declared as a "great open door for perjury, fraud and theft of every possible description which in any way, direct or indirect, can lead to the obtaining of Government land by private or corporate interests."

The following companies have applied to the Provincial Government for aid by subsidy of land or money :

Atlantic, Quebec and Western.  
Atlantic and Lake Superior.  
Chateauguay and Northern.  
Metabrouan Pulp Co.  
Montfort and Gatineau.  
Northern Colonization Co.  
Gaspé and Occidental.  
Great Northern.  
Interprovincial and Barnes Bay.  
Pontiac and Pacific Question.  
Labrador.  
Matane.  
Montreal and James Bay.  
Ottawa and Gatineau.  
Montreal Bridge.  
Interprovincial Bridge.  
Quebec and Lake Abbetibi.  
Quebec and James Bay.  
Quebec and Lake Huron.  
Quebec and Lake St. John.  
South Shore.  
St. Gabriel de Brandon.  
Trans Canada.

The United States Government made a very extensive experiment in granting the public lands to aid the construction of railways. These grants were made to States and by them conveyed to the respective railroads. They encountered great opposition but were finally carried in 1870. The grants to the Pacific Railroad companies consisting of the Union and Central Pacific Railways consisted of 125,000 and 25,800 acres per mile in alternate sections. The Federal Government retained a lien on the Railway for the repayment of the subsidies granted and were subsequently repaid in full by the corporations.

In 1884 the House of Representatives passed the following resolution: "That in the judgment of this house all the public lands heretofore granted to States and Corporations to aid in the construction of railroads, so far as the same are now subject to be forfeited by reason of the nonfulfilment of the conditions on which the grants were made ought to be declared forfeited to the United States and restored to the public domain.

That it is of the highest public interest that the laws touching the public lands should be so framed and administered as to ultimately secure freehold therein to the greatest number of citizens, and to that end all laws facilitating speculation in the public lands, or facilitating the entry of purchase thereof in large bodies, ought to be repealed, and all of the public lands adapted to agriculture subject to bounty grants and those in aid of education ought to be reserved for the benefit of actual and *bona fide* settlers, and disposed of under the provisions of the homestead laws only.

The arguments in favour of the resolution were substantially as follows:

That large bodies of land were being secured by individual capitalists.

That enormous frauds were being perpetrated by securing large tracts of the public domain to the detriment of the country and the injury of actual settlers.



That the policy of the country should be to secure the largest ownership of public lands by the men whose labour would make them fruitful.

That the safety of republican institutions rests on the ownership of the lands by the people. That free institutions cannot survive the monopoly of lands. The resolution was carried by a vote of 251 to 17.

In the year 1870 the Legislature of Quebec set aside 3,208,500 acres for railway purposes in Blocks A, B, C and D, situated in the Counties of Pontiac, Quebec, Portneuf, Montcalm, Champlain and Chicoutimi. Two millions were granted to the North Shore Railway, and ten thousand acres per mile to the Montreal Northern Colonization Railway. Lands under license and within the blocks were excepted therefrom. Under 49, 50 Victoria, cap. 76, the land subsidies were made convertible into a money subsidy of 35c. an acre, payable when the subsidies were due and thirty-five cents when the lands were sold and paid for. On payment of these amounts the land reverted to the Crown.

Another land grant was made under 49 and 50 Vic., cap. 79, to various railway companies varying from 4,000 to 1,500 acres per mile.

Under 51 and 52 Vic., cap. 91, similar grants were made varying from 1,000 to 10,000 acres per mile. the whole grant amounting to over three millions of acres. These land grants were converted into cash payments at 35 cts per acre. The lands have reverted to the crown and are available for settlement or revenue as forest lands. It is fortunate for the province that they were redeemed. They consisted for the most part of forest lands unfit for agricultural purposes, and will add to the reserve stock of forest lands. The state of New York, where a large portion of the forest lands have been alienated has of late years spent several millions of dollars in repurchasing land for forest reservation. It will require

several millions more to complete the quantity required to protect the water supply of the state.

Quebec has performed her part in granting subsidies to railways. Public money has been freely given in many cases with poor returns, and there are instances where the subsidies ought never to have been given.

The mileage of track laid and square miles of area to each mile of railway in 1867,—1901 were :

	1867.	1901.
In Quebec.....	523	3,544
In Ontario.....	1,275	6,605

Square miles of area to each mile of track, in 1901.

Quebec.....	100
Ontario.....	32

Taken according to population.

Ontario 40 per cent. has railway miles	3.60 p. c.
Quebec 30 " " " "	19.37 p. c.

Amount contributed in subsidies :

Quebec.....	17,700,936
Ontario.....	8,709,578
Ontario Municipalities.....	12,198,164

*The following extracts from a summary made by F. D. Whelpley, from the U. S. Senate Committee report will show the results of the land grant policy in the United States at this date, 1902.*

"If our present system of land acts is continued five years longer, the entire public domain suitable for settlement will be exhausted, and there will be no land left for our people who desire to make homes upon it.

" During the first ninety days of the present fiscal year 6,109,000 acres of Government land were filed upon. Should this increasing ratio be maintained, between twenty-five and thirty million acres will be taken from the public domain the present fiscal year. "

The above statements are taken from a report made this week by the Senate Committee on public lands, 500,000-000 acres now left.

Many years ago Uncle Sam started in the real estate business with a landed property amounting to nearly two billion acres. There are now left in the hands of the Government about 500,000,000 acres of this vast empire. Never before in the history of the Land Office has the absorption of this land by private interests been so rapid, so eager or so stupendous in the acreage involved.

The laws as they stand to-day were drawn during an era of free land when apparently no thought had to be given for the future. That future has come, however, quicker than was dreamed of by the founders of the Homestead Act of 1862, and the laws which have in the past served a most beneficent purpose, are now shown by the Government records and by the reports of Government agents and experts to be a great open door for perjury, fraud and theft of every possible description, which in any way, direct or indirect, can lead to the obtaining of Government land by private or corporate interests.

" Instead of following the injunctions of Jackson, Lincoln, Grant, Cleveland, Harrison and Roosevelt, we are making " says the Senate Committee, "all possible haste under our present most unfortunate land acts to turn over to wealthy men and corporations this rich heritage of the people. The population of the United States, to-day eighty millions, will doubtless reach one hundred and thirty millions in the next twenty-five or thirty years.

"Where will this rapidly increasing population find

homes upon the land if we permit the public domain to pass into the possession of men seeking to own and control immense landed estates?

"There should be but one act upon our statute books under which public land can be acquired, and that one act should be a genuine homestead act, which imposes a residence of five years, and continuous cultivation of the soil, an act having no commutation provision attached to it."

## CHAP. XI.

### RADICAL LEGISLATION AND IMPERFECT LAWS IN RELATION TO LAND GRANTS.

In the preceding chapter are the reasons set forth by a majority of the Senate Land Committee for recommending the passage of what is known in the Senate as the Quarle's Bill and in the house as the Power's Bill. The two proposed measures are identical; they are the most radical land legislation which has been proposed in forty years.

The effect of the enactment of such a measure would be to sweep out of existence the present methods of obtaining Government land.

These are now being used to build up great grazing ranches and land monopolies throughout the Western States, constructed by their owners in the fear and realization that the free range is becoming exhausted and the time is near at hand when the people of the United States will demand that every acre of public land play its part in the building of a home rather than as incidental pasturage for a baron's long horned steer.

In the six years ending July 1, 1903, there will have been taken from the Government, under various alleged legal forms, about one hundred million acres. In 1898 a little more than eight million acres were taken. In 1899 a little more than nine million. In 1900 began the agitation for restriction of the land privilege.

The dictators of the live stock ranges realized the probable results of this agitation and counted it as an inevitable event of the near future that they should be either ousted from the free range they now hold as private property or compelled to pay toll to the people and give some reckoning of their use of this valuable public property.

Under the lax administration of imperfect laws it is easy enough for those who so desire to extend their holdings of Government land almost without limit, and in the year 1900, operations began upon the gigantic scale, which has since aroused the fear and indignation of those charged with the honest administration of the law and those who have looked upon the economic value of the remaining public land as one of the great national resources in times of stress either industrial or social.

Nearly fourteen million acres of land were taken in 1900 from the public domain, a jump of fifty per cent. over the figures of the year before. In 1901 nearly sixteen million acres so disappeared from the Government maps. In 1902 nearly twenty million acres was the grand total shown in the Land Commissioner's report, and 1903 promises to make a new record, with an absorption between thirty and thirty-five million acres of land.

In the eighties, when the Land Office made its great record in caring for home seekers, the population of a State or Territory increased in direct ratio to the number of land claims filed.

A curious feature of the present land operations of the United States Government is that not only has there been no increase of population noticeable in the States absorbing largest amount of Government land, but it is a fact that in many localities where the acreage disposed of has reached a stupendous total there has been an actual decrease of the agricultural population. Men have been driven from their homes to make room for a few range cattle or sheep.

#### WHOLE TOWNSHIPS SEIZED.

In many instances whole townships have been entered under this law in the interest of one person or firm, to whom the lands have been conveyed as soon as the receipts for the purchase price were issued. The reports from one public

land State alone for a single quarter shows that the timber entries increased over the preceding quarter to the number of 852, embracing an area of nearly 130,000 acres.

Many lands which the Government disposed of a few years ago for \$2.50 an acre, are now worth \$100 an acre or even more. Under this law the Government has disposed of more than five hundred million acres of valuable timber land, receiving therefore about \$13,000,000.

Individuals without funds of their own have been employed to make entries for others with large capital, who have paid the expenses, and some wealthy speculators have made enormous fortunes.

Considering the forests simply as property whose only use is to be converted into lumber and other materials of commercial value, the Government has disposed of them at an actual loss of considerably more than \$100,000,000.

In other words, through the operations of this law public property worth more than \$130,000,000 has been disposed of for about \$13,000,000.

#### THE MOST SERIOUS INJURY.

The fact that so large a part of the nation's resources has gone into the control of a few individuals or companies is not the most serious effect of the law. The principal injury consists in the loss of control of millions of acres of timber land to which future generations of American citizens must look not only for their supply of timber and timber products, but for protection to the supply of water, upon which will depend the fertile and most of the agricultural lands of the west.

The Desert Land Act was placed upon the statute books in the first instance to enable a few wealthy men to acquire vast bodies of land in California. The facilities it gave to rich men to obtain land on an extensive scale resulted in

making the Act applicable to all of our arid and semi-arid States.

In a great majority of cases its provisions have been flagrantly violated. Men and women have in numerous instances been employed to take up land in continuous bodies from 5,000 acres even to 300,000 acres, and to turn them over to land proprietors, to be used chiefly for grazing purposes.

For more than twenty years this act has been looked upon with disfavour by succeeding Presidents, and by all of the men who have been placed at the head of the Interior Department and the Land Office, and they have persistently urged its repeal.

The repeal of the homestead commutation provision is demanded because of the speculative character it gives to that Act. Instead of requiring the settler to live five years upon his land before receiving title, it allows him to prove up at the end of fourteen months by paying a minimum price for the land.

The pre-emption law, which allowed this form of land purchase, was repealed because of notorious abuse, and the commutation clause of the Homestead Act is merely a pre-emption law in another form. Twenty-five years ago Senator Teller, then Secretary of the Interior, said:— "It is my opinion that the time has fully arrived when the wastefulness in the disposal of public lands should cease and that the portion still remaining should be economized for the use of settlers only."

#### REPORTS OF FLAGRANT VIOLATIONS.

Special agents of the Interior Department have filed scores of reports, and all of these reports are a record of such flagrant violations of the law that in any other branch of the Government they would have resulted in immediate agitation and subsequent remedial legislation. A report just made by



the Secretary of the Interior, in response to a request for information on the part of the Senate Committee, condemns these three laws which the Quarle's Power's Bill proposes to repeal, and thoroughly demonstrates by statistics the remarkable fact that no adequate measures are now being employed by the Government to discover frauds in acquiring public lands.

This is illustrated by the fact that of 33,268 homesteads commuted in the ten years prior to 1902; only 210 were investigated. Of the 24,895 desert land proofs made during the same term of ten years, only 148 were investigated. The percentage of fraud found in the course of these limited investigations was such as to lead to the conclusion that a thorough examination of all land transactions between the Government and alleged settlers would lead to startling disclosures. In Wyoming alone eighty-five per cent. of the desert land claims investigated were found to be fraudulent.

#### SMALL NUMBER OF INVESTIGATIONS.

An official statement made by Secretary Lamar stands out in sharp contrast, for it appears that fraudulent land entries covering four hundred thousand acres were canceled in the two years prior to 1887. It is not necessary to state that fraudulent land entries are being made as frequently now as at any previous time, for there never has been in the life of this nation a time when public lands have been taken as rapidly as now with such a small corresponding increase in the population.

Intimately connected with this public land question is the fight for a leasing bill, which has been carried on intermittently in Washington for several years. The cattlemen find it expensive to hire persons to take up homesteads for them even at the apparently low price for which these services can be obtained, as shewn by the investigations

made by Colonel Mosby in Nebraska during the last few months.

If the cattlemen could secure the passage of a law allowing the Secretary of the Interior to make long term leases of large tracts of grazing land at minimum prices per acre, they are willing to take their chances of controlling the remaining public land to the practical exclusion of all prospective settlers.

Officers of the Government, and others who are in favour of preserving these public lands for settlers, have had the powerful combined cattle and sheep interests to fight on this leasing proposition as well as in the matter of the land laws, and this same question of a grazing law will enter into the impending public land controversy when the Fifty-eighth Congress is assembled.

#### PRESIDENT ROOSEVELT'S BELIEF.

President Roosevelt and Secretary Hitchcock both believe that this question of the control of remaining public lands is one of vital and immediate interest, and one which will absorb a great deal of time in its discussion before it is disposed of.

They believe it is one of the greatest questions with which the American people are now concerned, and that within a year the general public will awake to the efforts now being made by selfish interests to forestall any legislation looking to a conservation of these lands for future increase in population.

More bills affecting the public lands have been introduced in the last two months of the present session of Congress than for several years past, this being one of the results of current agitation of the subject.

Most of these bills represent the same liberal ideas which are now resulting in the absorption of land by other *bona fide* settlers. One member in Congress was so anxious to

ingratiate himself with the Spanish War veterans, proposed that each man who served ninety days or more in the Spanish American War should be allowed a homestead of 160 acres.

He thus proposed to dispose of at least 40,000,000 acres of the remaining public domain at one fell sweep with a provision that these claims could all be assigned to one corporation if so desired.

It is quite clear from the above extract that the Government should proceed cautiously in the direction of land grants. The Province controls the public lands at present, and should retain the ownership until the land is in the hands of the *bona fide* settler for the actual purpose of settlement for agricultural purposes. The forest lands should also remain the property of the State. The granting of money subsidies to railways or large corporations has been in the past a fruitful source of corruption and fraud on the public treasury, and should be abandoned completely. Complaint is made that the United States Senate is under the influence of trusts and corporations, and that its efficiency is much impaired in consequence. Members of the Quebec Legislature now living can testify to the great harm done to the best interests of the Province during the era of subsidy granting by the Legislature. The depleted Treasury of the Province is evidence conclusive on the financial side, and the lowered moral tone of the House during that period should warn their successors against a renewal of the policy.

It may be necessary for the State to aid certain railway projects, but this aid should be extended exclusively to short lines of railway, the extension of existing lines into an agricultural country to provide for our surplus population. Projects for traversing the continent from north to south and from east to west should be avoided.

Continental routes involving the expenditure of a hundred millions of dollars should be left entirely for the profit,

and built at the expense of the railway capitalist, speculator and promoter.

The State might, under proper conditions of settlement, grant lands in the immediate vicinity of a projected and approved line to the extent of five thousand acres per mile of railway completed and in operation, but only to facilitate the settlement and occupation of the land by our people. Railways projected for the benefit of land grabbers and timber speculators should be left to private enterprise.

No Government land grant should be made to any railway except to secure access to arable land fit for settlers' occupation. The terms to settlers should be continuous occupation for five years, with residence and duties performed of at least twenty-five acres of cleared and cultivated land before a title could be earned.

Large blocks of land should not be placed at the disposal of private individuals or large corporations unless to promote *bona fide* settlement and a *proviso* that the maximum price to actual settlers shall not exceed three dollars per acre.

The Province is losing large sums of money annually because of the single track winter roads. It is estimated that one dollar and a half per thousand feet is lost in the transportation of logs in one-horse loads. By amending the law so that single sleighs should be constructed with side shafts or *travails croches*, double teams could be used on our winter roads, and a large annual saving to our people effected.

Complaint is made of the increasing destructiveness of insects in timber. This is due in part to the scarcity of birds in our woods. This might be prevented by a rigorous enforcement of the law against destroying insectivorous birds and the confiscation of the plumage of birds wherever found.

## APPENDIX I.

Mr. Alexander MacLaurin, of Montreal, made a study of conditions prevailing in Sweden in connection with the Lumber trade. The following is printed with his kind permission.

I visited Sweden during the month of February 1903; my idea in going over there was to see how they manufactured the lumber, how the mills were built, what kind of machinery was used and how they manage their forests.

The timber lands extend from the North of Sweden to within a few miles of Stockholm, the capital of the country.

There are only two kinds of timber there, viz., white wood, which resembles our white spruce in this province, and red wood, it is something like our red pine, but a little closer in the grain. There is an abundant supply of these two woods, but of small size; the average runs from 6 to 9 inches at the top end, 20 to 28 feet long for winter sawing. The large logs will average 8 to 11 inches diameter. These are sawed in summer; there is comparatively no 12 or 13 inches diameter timber.

Every farmer grows timber and markets a few trees every winter, just the same as a farmer here would market his oats and hay. Wood is a regular commodity of trade amongst the farmers; every farmer preserves a portion of his farm which is adapted only to the raising of timber for this purpose, and a Swedish farmer will never attempt to clear land or cultivate that which is stony, reserving it for forest culture. They cultivate the land close up to the forest and so soon as they reach the stony portion they reserve it for forest culture. The hills are all covered with timber, I only saw one hill which had been denuded of

forest, and that was caused by a fire. Fires are of rare occurrence. I saw no land of any consequence which had been run over and destroyed by fire. I was informed that there had only been one fire during the past year in the whole of Sweden, it was an insignificant fire, and was put out very quickly, inasmuch as under the system fire protection in Sweden, fire rangers may enforce the attendance of the military, and all able bodied citizens may be compelled by the fire ranger to assist in the extinction of forest fires, the consequence is that a fire has no chance of extending very far under this system. There is a heavy fine upon any person refusing to assist at a forest fire. There was one thing which struck me very forcibly going up the country, that the railway ran through miles of forest and I did not see a particle of land destroyed by fire along the tracks for a distance of 400 miles, which I travelled on that railway, which runs up into the north of Sweden. I asked one of the largest lumbermen how they managed to keep the forest so close to the railway track from catching fire. The railway company is obliged to keep watchmen along the track during the dry season, in fact, they were living along the track this winter when I was there. Their houses were situated about a mile apart along the railway track. These men are railway employees, and their duty is to take all precautions against fire. The railways in Sweden are owned by the Government, and in consequence these men are also Government employees.

I travelled through the woods across country in a sleigh through wood roads nearly all the way for about 30 miles for the purpose of seeing the condition in which the forests were. I took particular notice of the forest floor in various parts and where, on the private lots owned by the farmers, they cut their own firewood. The forest floor was cleaned up completely and no debris left. I saw a few tree tops in the bush, where they were manufacturing small square timber, chiefly

4 inches square, for the German market; I asked them what they were doing with such stuff as that? They told me it was for the German market. Everywhere I went the forest floor was clean, there was no underbrush such as we have in our country. The timber, as I said before, was white and red wood with a sprinkling of small white birch. I saw no large birch such as we have in our country, the white birch is cut by the farmers mostly for fuel. I saw none over 4 inches, and the habit of the tree is different from what it is in Quebec, it is generally branched close to the ground, leaving very little clear stuff.

I did not see any birch fit for spool wood.

As far as I could find out there was no regulation with regard to the clearing up of the debris of the forest, this perhaps arises from the fact that there is very little debris left, everything being utilized as far as possible.

It is about the closest cutting that I have ever seen, no where in Canada have I seen any such close cutting. The tops of some of the trees, which were too rough, were cut off and piled in with the slabs and edgings for charcoal. Every available piece of wood which is not otherwise merchantable is worked up into charcoal, so that the whole tree is utilized into merchantable stuff.

I did not see any manufacturers of wood alcohol. There is such a demand for charcoal for the iron smelting industries that every pound of charcoal which can be manufactured finds a ready market.

The Government forest lands are for the most part situated at the head waters of the rivers.

The forests are divided into sections; the sections are simply blazed out. When the Government decides to sell any of the timber or trees of a certain size, that is to say, merchantable trees, they are marked by the Government ranger. The sale of the sections is made by auction, the

lumbermen purchase the trees only that are marked. The Government in offering the trees at auction give an approximate estimate of the quantity of timber on each section, they give you the exact number of trees and an approximate average of the size, and what they will produce when cut down,—this for the information of the purchaser. The Government, however, is not bound by this estimate only so far as the number of trees is concerned, the approximate estimate is given as a guide to the purchasers. The purchasers, of course, examine the sections which are to be sold, the Government giving ample notice of the sales of these sections, and the purchasers examine for themselves the limits; in many cases where the purchaser has confidence in the skill of the explorer, they place implicit reliance upon the Government report. They seem to rely on the honesty of each other; I never saw a people who placed such confidence in one another as do the Swedish people; this convinces me that their dealings are distinguished by great honesty.

There is no effort to cheat the Government, and there is nothing done on the part of the Government to lessen the confidence of the purchasers in the honesty and fidelity of the system. The fact is, the Government, the farmers and the lumbermen work hand in hand inasmuch as the timber revenue forms a very important item in the budget of the Country. The Government seems to realize that it is their duty to facilitate in every way the production of the article and its sale in such a way that the lumbermen can make a profit out of the business, and all parties are satisfied.

In fact, there is perfect accord between the Government, the lumbermen and their employees. I heard nothing while I was in Sweden of any attempt to defraud the Government, and the speculating jobber is a factor entirely unknown. The fact is, that the farmers look upon the production of their forest lots as an important source of wealth, and they deal with the lumbermen as with friends.



I visited one of the largest lumbering concerns in Sweden. They were engaged in the manufacture of lumber since the year 1643; they have conducted the lumbering business through their ancestors in this same place, on the same river, since the year 1643. I saw the original deed granting a limit of 500 miles to the firm who established the business in 1643; of course, the establishment has changed hands a number of times since the original grant, but the limits are operated still, and are valuable at the present day. The reason for this state of things is easily explained by the fact that the proper system of forest preservation has existed from the first, on these limits, and that this system is still in force at the present day.

The cut of the establishment is about eighty millions a year. I saw many thousands of logs within 10 miles of the mill, put out on the ice of the river this winter. The average was from 4 to 9 inches.

Labour in Sweden is very much cheaper than ours; they pay their men from 70 cts. to \$1.50 per day, without board, the average wage is about 85 cents.

The lumbering is carried on there with farmers who take jobs and jobbers, no crews being put in the woods as we do in Canada. The fact is they have been in the business so long that every farmer is as much interested in the preservation of the forest as the Government and the lumbermen. The people have been educated up to this point; they are an intelligent reading people, who for the most part can read and write. In fact, it is very rare to find any person who cannot read and write, and the whole tendency of their education has been in the direction of acquiring a knowledge of the value of forest to the community. The whole Northern section of Sweden is dependent upon forest production and its industries. In this respect it closely resembles Quebec.

I investigated the question of the expense of getting

timber out of the woods, and found that the cost of this department of lumbering differed very slightly from our own. The cost of manufacturing at the mills is much lower than ours, this is due largely, first to cheaper labour, and secondly, the rate of insurance on mill properties and lumber yards. These two items reduced the cost of manufacture about one-half what it costs us.

I saw a number of pulp factories, and so far as the machinery and manufacture is concerned, they are similar to ours. I noticed that they take better care of the pulp, after it is manufactured, than we do. It is put up in parcels of 100 to 200 lbs. and covered with jute sacking, so that the material is kept cleaner and preserved from destruction in carriage to its place of destination, than pulp forwarded in open parcels. I noticed in England the deliveries of pulp which came from Canada were in many instances tarnished with coal dust, and ragged dirty ends, which caused expense to the manufacturers in cleaning it for use, while the Swedish pulp came out of its packages white as snow. This must inevitably work in favour of a higher price for Swedish pulp over the carelessly forwarded Canadian pulp. As far as I remember the extra cost of juting the pulp was insignificant, while the advantage to the vendor of the pulp was quite important.

It is in the interests of our pulp manufacturers, who export pulp, to enclose it in jute covered parcels; the manufacturers of paper will understand how much damage can be done from particles of coal dust or other impurities mixed up in the pulp, which it is impossible to separate, or to ascertain, until the process has gone too far. All this can be avoided by packing our pulp properly and protecting with jute coverings. The extra expense of covering it would not probably amount to 20 or 30 cents per ton.

In conversation with pulp manufacturers, whom I met,

there seems to be a feeling of dread at the competition from Quebec, our country being the only one they feared.

I was struck by a circumstance which occurred on my visit to the large lumbering establishments, of which I have spoken before. In passing through the various buildings in connection with it, I did not see a lock on any door, and on asking if this was customary in their establishments, their reply was, "that locks were not necessary, inasmuch as they placed implicit confidence in their employees, of whom they had 2,000 in the establishment.

I investigated also, the question of supplies to the employees, and found that the supply store was conducted on co-operative principles, the employees engaging a manager and clerks to conduct the business, and every purchaser at the store being a shareholder in the profits *pro rata* to the amount of his purchase.

From what I have seen in regard to Sweden, that the system there will result in a permanent supply of timber, and I am also of opinion that the same result can be produced in the Province of Quebec if the Government would take hold of the question seriously and intelligently. To do this the farmers and colons must be taken into the confidence of the Government and educated, and no better method can be devised than to enlist the good offices of the country curates in the instruction of their parishioners in the principle which governs the perpetual production of forest products. Unfortunately in some instances the curate who has great influence in a parish, becomes unconsciously an instrument in the hands of speculating jobbers. The Government revenue suffers accordingly.

The large establishment of which I have spoken is situated on the River Angermann, in Sweden; this River is similar to the Gatineau, and about as long. There are 25 lumbering establishments on this River, whereas on the Gatineau to-day there remains only two establishments.

As a matter of fact the Gatineau River and Valley is far superior as a timber producer to the Swedish river both in size and possible quantities and variety of timber. Where the Swedish country only produces two varieties the Gatineau country furnishes white and red spine, pruce, cedar, birch, not to speak of the hard woods, which are of considerable value. If the Gatineau Valley had been treated in the same way as the country tributary to the Angermann it would supply fully as great a number of milling establishments as the Swedish River.

At the head waters of the Angermann the timber becomes very small, which is not the case with the Gatineau River. I am familiar with the country tributary to the Gatineau River and have seen thousands of pines in the burnt district destroyed. In fact, in the Ottawa country there is more Brulé than standing forest. In Sweden they do not re-plant, they trust to natural reproduction, that is to say, the seeding from the standing trees. There are always trees left sufficient to produce fresh seed and to re-seed the forest naturally.

The system of cutting in sections serves the purpose of reproduction by lapse of time. It is a well-known fact that for every tree of 12 inches diameter cut in the forest there has got to be a sapling growing to fill its place; it becomes a question then of preserving the sections sufficiently long so that that sapling will become a 12 inch tree before the forest section is again lumbered over.

There is a record kept by the Government of every section cut, and the date of cut. Time is given for the reproduction of the forest. It is under this system alone that the perpetual supply of forest products can be obtained and perpetuated; There is no middle course. No system of preservation will be perfect unless some such regulation is adopted and effectively enforced.

Timber does not grow as fast in Sweden as it does with

us. It is estimated in Sweden that between 15 to 20 years are required to get a re-cut of 11 or 12 inches on the stump. From observation and experience I am of the opinion that from the sapling to the 12 inch spruce tree it will be about 30 years. The average growth of pine from the sapling in propitious ground would be about 2 feet high for each year. A 12 inch pine would be at least 40 feet high.

I noticed in the Northern part of Sweden, farm after farm, consisting of only 4 acres or there about of good land under cultivation, the balance of the farm was entirely in forest trees. These farmers supplement their agricultural products by the profits which they make out of forest culture, in fact, one might say that the greater part of a Swedish farm in this section of the country is a wood or timber farm, and the natives pay as much attention to the culture of the forest as our people do to their farms. If this practice had been followed by the colons in the Province of Quebec, where similar circumstances exist, they would have a large forest on the farm, instead of a desolate, burnt-up and valueless piece of ground with hills completely denuded of soil.

This forest farm would be a constant source of revenue to the farmer and we would retain our population. The abandoned farm as we know it now would be a thing of the past and a source of wealth to the Province. Now it is an eyesore and a reflection on the system which produces it.

As a consequence of this forest culture, in all my travels in Sweden I never saw a house which was uninhabited, however isolated it may have been in the forest. I found the houses inhabited by a seemingly comfortable family.

## APPENDIX II.

Extract from Report of General C. C. Andrews, U. S. Minister at Stockholm, 1877.

The forests' greatest enemies in the animal kingdom are its smallest ones, so far as the coniferous trees are concerned. The forest insects which, because of their insignificant size, are often overlooked by uninformed persons, do sometimes, when conditions have been especially favourable for their multiplication to enormous numbers, cause great ravages, and can then destroy not only extensive tree plantations but also whole forests. Among the insects which appear to have been most destructive in the Swedish forests, belong different species of beetles, such as bark-beetles, pine weevils, pine-beetles and caterpillars. The bark-beetles are called bark-beetles because they burrow into the bark of trees and deposit their eggs there, after which the larvæ themselves make burrows in different directions in the bark, in consequence of which the tree dies. The eight-toothed bark-beetle (*Tomicus typographus*) deserves special attention, as it attacks the spruce forests, and during years of ravages causes spruce drought on a large scale; also the twelve-toothed bark-beetle (*T. stenographus*), which usually prefers pine trees.

A very small bark-beetle, the six-toothed (*T. chalcographus*), is often found together with the common eight-toothed beetle, and makes pretty star-shaped tunnels in the bark. The common pine weevil (*Hyllobius abietis*) makes great havoc on coniferous plantations, but can, with some labour, be exterminated. The common pine-beetle (*Hylesinus pini-perda*), which at first sight much resembles the common bark-beetle, is among the most widely spread of all the forest's injurious insects. Like the bark-beetle, they live as larvæ in the bark of trees, and cause not a little harm when they become fully developed and devour the marrow of the youngest pine shoots, which thereafter dwindle away. They do not immediately kill the trees, but to a great extent retard their growth, and the top of the pines acquire a peculiar appearance, as if the side shoots had been cut off, and this is the reason

the Germans have given this insect the name of gardener. The larvae of the caterpillar destroy in the middle and southern parts of Sweden the roots of tree plants, and especially is this true of those in nurseries.

Among moths there are many which are injurious, such as the pine moth (*Gastropascha pini*), the black arches, nun or spruce moth (*Liparis monacha*), pale beauty (*Trachea pini-perda*), the geometrical moth, bordered white moth or span worm (*Fidonia piniaria*), the larch mining moth (*Tinea laricina*), the pine-shoot tortrix or twig twist (*Tortrix buoliana*), the green oak tortrix or oak-leaf roller (*T. viridana*), etc. Among these the nun or spruce moth has advanced, devastating in southern Sweden, principally in Södermanland and Östergötland, where elaborate means have been employed for their extermination. The work has been chiefly confined to whitewashing the trunks of trees, this procedure preventing the larvae from infesting healthy trees. Besides, in districts small trees have been felled and the branches trimmed off, both to prevent the larvae from spreading and to deprive them of food.

Too numerous game can also be harmful to the forest economy. Sweden's most noble wild animal, the elk, causes in certain parts of the country noticeable damage to young pines whose cones and shoots furnish a part of his food. The roe deer causes injury to the plants of the spruce, and especially to those of the silver spruce. From the forester's point of view it would be well to reduce the number of these animals more than the hunter in the interests of hunting will admit. Even grazing cattle, and foremost among them the goat, become in places where propagation is in progress really injurious, especially if the pastures are not confined within certain limits.

To the forest's foes belong also a large number of parasitic fungi, which appear chiefly on the trees, blossoms, leaves, cones, bark, or else in the wood.

To the first group belong *Lophodermium Pinastri*, which in nurseries cause much damage to two-year or older pine plants, fungi, *Chrysomyxa abietis* on the spruce, etc.

To the latter group of fungi, which produce decay, may be named the *Polyporus pini*, *P. annosus*, *P. pinicola*, *P. borealis*, all common on our coniferous trees. Against the parasitic

fungi one is as yet almost defenseless. In many cases the diseased plants and trees must be removed to prevent the infection from spreading.

#### PREPARING PLANS FOR THE CARE OF THE FOREST. (FOREST DIVISION.)

In rational forest economy the work which is to be done during a period of ten to twenty years is usually considered beforehand and special work defined for each year of this period. This calculation belongs to a part of forest economy called forest division or forest valuation. A careful plan of economy is mapped out for the management of the forest on the basis of a previous surveying, description, and estimate or valuation of the timber. But this plan of economy must often undergo more or less alternation, in consequence of unforeseen circumstances, such as storm devastations, insect-deprecatations, and forest fires, or when it is necessary to make use of favourable conditions which may arise when there is an increased demand for certain varieties of timber. The changes in the original plans which thus arise are righted at the forest revisions recurring at regular intervals.

Complete plans for the care of the forest are usually made only in regard to the State forests, and not even in regard to all of these, as for the greater number of crown parks in northern Sweden only a summary is made of the valuation of the timber resources. A similar summary is also made of the timber to be cut during the so-called division period.

The cutting of the stated amount is then done without any previously defined plan, wherefore the succeeding revisions are intended not so much for pursuing a systematic forest culture as for making new calculations like the former ones. Such original calculation that is not intended for a certain period of time, but is only temporarily in force, is also practiced in regard to private forests located among the mountainous regions. These forests are under the supervision of the forest corps, and all timber cut for sale must be marked. For other private forests, which are subject to forest laws, no estimate is made of the timber to be cut, as the owner of the forest can conduct his lumbering to suit himself if he only remains within the wide limits



of the law. The forestry corps has only to see that the laws are obeyed, and if they are not to begin proceedings in the manner already described under heading, Forestry Administration. For the remaining private forests it is not customary to make working plans, although many of them—how many can not be stated—receive private attention from the forestry corps.

Directions concerning the division of the public forests for tract cutting and tract thinning were issued by the royal domain office May 10, 1866. According to these directions maps must be made of the forest, a general description of its nature and condition, and a special description of the different districts and tracts. A plan of economy with table, appendix and memorial, containing propositions for the management and supervision of the forest and the disposal of the forest products, must also be made. In other words, a working plan is made.

The forest map is made on a scale of 1:8,000 by measuring in a great many lines, which, with the assistance of some already staked headlines, are measured off, with help of the compass, at 100 meters' distance from each other and traversing the whole forest. A change of that method is now under consideration in order to mark out, both on the map and in the forest, the permanent boundaries between the different tracts. The description is intended to form the foundation for the succeeding plan of economy, and shall include the result of the timber estimation, which is done either by districts or tracts, in cubic meters.

The plan of economy first defines the system of management and the rotation or the proper age of the forest trees. The age usually allowed to the two most common trees, pine and spruce, is about 100 years in the southern and not more than 150 years in the northern part. The time of rotation for the common birch found in pasture lands is from 60 to 80 years. The beech requires 120 to 140 years and the oak from 150 up to 300 years. Cutting or consumption is estimated according to the so-called compartment system introduced from Germany. To the plan of economy also belong directions for forest cultivation and drainage, building of roads, etc.

This forest division, carried into effect at the revisions and with a carefully pursued cultivation, creates a restocked

forest of the greatest possible production for the future, but suffers the fault of giving, during the nearest periods, a very uneven present production.

In Sweden there are now (1900) no suitable regulations for divisions for thinning, but there is a passing from an old and obsolete method to a better one under which the foresters make their own various proposals. Lately the domain department has brought forth a project for regulating the division of the public forests for systematic thinning. This proposition differs from the regulations for tract cutting now in force inasmuch that the map of the forest is made on a scale of 1:20,000, that only trees which are disposable as timber are estimated in regard to number and cubic contents, and that the quantity of the yearly consumption is based on the amount of timber and the time of rotation, according to the future relation between the production and the amount of timber which is expected to exist in the forest after it has been thoroughly renewed and the production raised to its highest point.

When taking out the yearly timber production, the forester, as a rule, first removes the trees that have blown down and those which are dry or otherwise injured. Next of importance is to remove standing seed trees or other older trees which prevent the growth of the younger trees. The cutting must thereafter be extended to old woods, which have become thin and sparse, and in their place new tracts with a better growth must be established. The thinning may now begin in such young and middle-aged forests that are too dense, and last of all, the better and older forests are attacked in order to complete the yearly production. In mountainous regions and other districts where the forests are liable to suffer from storms, it is customary to let that part of the forest remain the longest which forms a kind of defense against the fury of the tempests. In other words, the cutting proceeds against the direction from which the storms come with the greatest violence.

When not all trees in an older forest shall be felled at the same time, the forest supervisor has each separate tree marked, the mark being placed both on the trunk and near the root or on a larger root branch, so that he can tell, after the cutting is over, whether other trees than those that were marked have been felled.

## FORESTRY INSTRUCTION.

The principal institution in Sweden for instruction in forestry is the Royal Forest Institute, at Stockholm. It is pleasantly situated on a rise of ground in a grove close to the bridge as one turns from the city to enter the Deer Park. The course of study occupies two years. Tuition is free. Candidates for admission must have sound health, be neither under 18 nor over 28 years of age, and must have passed an examination such as admits to the university, which includes a knowledge of the German language and either the English or French. Among the studies pursued are the classification and division of forest, forest culture, and the quality of timber, forest technology, climate and soil, forest botany, forest insects, art of hunting, mathematics, forest and game laws, map drawing, etc. Four pupils receive from the State a stipend, as assistance, of 250 rix-dollars each, per year. Graduates are regarded as members of the forest "stat" or corps, and are in the line of promotion therein; their first appointment being that of assistant chief of range, which is generally received immediately after graduation and opens the way to their earning about 600 rix-dollars a year in surveying and other work connected with forest. In ten years they can be promoted to "Jagmastare," or chief of range. Above this last office is the position of forest inspector, which has been created for three or four years. Fifteen thousand three hundred rix-dollars are annually appropriated for the support of the institute. There are four active instructors, namely, the director and three "lektors" or teachers.

Besides the institute there are, in Sweden, six forest schools, which are principally supported by the Government and located at the following places: Tierps, Upsala County; Ombergs, Ostergotland County; Boda, Calma County; Daniels Lands, Christianstad County; Hunneberg, Elfsborg County, and Silbre, Wester Norrland County. Tuition at the forest schools is free, and, besides, ten pupils at each school receive board and lodging free. The course of study lasts eight months. Some knowledge of the common branches taught in the folk-schools is all that is required for admittance. A graduate of a forest school can be employed as a forest watchman at about 300 rix-dollars per year and use of a dwelling and patch of ground.

THE FOREST INSTITUTE—ITS OBJECT AND ORGANIZATION.

(Regulations Issued May 25, 1860.)

1. A suitable locality in the royal park, near Stockholm, shall continue to be placed at the disposal of the Forest Institute, embracing lecture-rooms, library, rooms for collections, the director, one teacher, and one porter, also necessary ground for nursery, tree planting and target ground; a suitable forest in the vicinity of the city shall also be placed under the regular care and management of the institute, in order to impart to the pupils practical knowledge herein.
2. In order to teach the pupils surveying, appraisement and the technical terms of the forest, they shall, during a certain time every year, be employed in forests suitable for the purpose, under the direction of the teachers; separate funds will be assigned for this purpose.
3. To assist the pupils during their stay at the institute, a certain number of stipends, the amount of which will be separately fixed, will be assigned to such indigent pupils who have made themselves deserving of the same through industry, skill and good conduct.
4. The institute is to be managed by a director, appointed by His Royal Majesty, and the director, together with four teachers, also appointed by His Royal Majesty, will furnish the instruction, viz: One the care and management of forests, one hunting and forest laws, one natural history, and one mathematics. These teachers will be entitled to their years of service, as merits equal to the forest and chase officers of the kingdom, the two latter only in case they have graduated at the Forest Institute. For the appointing of director, as well as teachers, the forest administration will nominate candidates. At the institute is also a porter, appointed by the director, and may by him be removed.
5. The course of instruction shall embrace mathematics and natural history to the extent required for the superintendence of forests and the chase; knowledge of the regulations for the forest and the chase, bookkeeping, and of the forms for forest accounts; hunting; theoretical and practical knowledge of forest appraisement; cultivation of woods and forest technology; as well as expertness in surveying, map drawing, leveling and shooting.

6. The course of instruction will be continued during two years, counted from the commencement of the month of June every year, and be so arranged that fully-educated pupils may yearly graduate and new ones be admitted in their place.

7. Pupils who wish to obtain certificates of having graduated shall, having previously undergone a probation at a public examination, manifest sufficient knowledge and skill in all the branches which they have been taught at the institute. In order to obtain a certificate for forest management, the pupil shall prove himself to have satisfactorily constructed a map, with regular plan of forest surveying and cultivation.

8. The instruction shall continue during the whole year, with the exception of three weeks' vacation during Christmas and one week after the yearly examination, and shall be thus regulated, that the pupils acquire, from the commencement of October until the end of May, theoretical and such practical knowledge as local circumstances at the institute admit of, and that during the summer months the pupils are occupied in the forests of the Government and under the direction of the teachers with surveying and estimating of forests, and with the most usual modes of the cultivation, care and felling of trees.

9. Every year, at the commencement of the month of June, the pupils shall be publicly examined in all the subjects in which they have received instruction. The pupil who, having previously undergone a probation, proves himself at the examination to possess the knowledge and skill mentioned in § 7, may, without regard to the longer or shorter time he has at the college, receive due certificate.

THE DIRECTOR OF THE FOREST INSTITUTE.

10. The director ought to have made himself known as possessing knowledge and experience of forest-managing, and shall live within the locality of the institute, in order to properly exercise his functions. His duties shall embrace not only the administration of the institute and the responsibility of its operations, and of the completeness of the instruction, but also to promote the development of and spread throughout the country the science of forest-management.

It shall consequently be the duty of the director—

- (1) To quarterly collect from the treasury of His Royal Majesty and the realm, at the request of the forest administration, the funds assigned to salaries and maintenance of the institute; to dispose of these funds according to regulations, and for each calendar year account for their disposal, which accounts shall be delivered before the end of the next following February to the forest administration for auditing;
- (2) To watch over the care and maintenance of the ground, buildings, nurseries, archives, library, collections, tools, implements, and other movables of the institute, and to see to it that complete lists of the same are made out and always at hand. He shall, however, according to what is stated below, have right to suitably distribute between the teachers the administration and care of collections, tools, and the movables;
- (3) Having examined the certificates produced and the amount of knowledge possessed by the candidates for admission to admit them as pupils, and, according to statements of the teachers, separately for each branch, issue certificates to pupils who have finished their course, and to propose to the forest administration the distribution of the assigned stipends among such pupils who shall be considered most deserving of the same;
- (4) To issue regulations as well for the maintenance of good order and morality within the institute as for the suitable course of teaching and the manner of imparting the same, for which purpose the director shall make out a regular table of instruction, so that the business be properly distributed between the teachers, and the time advantageously employed to the benefit of the pupils;
- (5) To himself instruct in one of the head branches of forest economy as well as, business permitting, be present at the preliminary examination of the pupils in the other branches;
- (6) To endeavour in every possible manner to promote the knowledge and spread of an improved forest economy and management of the chase within the kingdom, for the purpose of which he must keep himself informed of the progress of the science and technical terms of the forest, even in

foreign countries, and to write and publish pamphlets on the subject whenever circumstances require;

(7) To report to the forest administration partly such business which requires the decision of His Royal Majesty, and partly such steps in regard to an improved forest economy and management of the chase within the kingdom which may be found necessary;

(8) To make such reports or give such information concerning the forest economy and the management of the chase which the forest administration may demand, as well as to render to the same yearly accounts of the operations of the institute; and

(9) To give the porter instructions in regard to his attendance and other duties at the institute.

#### THE TEACHERS AT THE FOREST INSTITUTE.

11. The teacher of forest economy ought to have graduated at the institute with honours, and, thereafter, on his own responsibility, managed a forest district, and, as his services are constantly required, he ought to live within the institute. This teacher shall—

(1) Instruct and examine in all the branches of forest economy in which the director himself does not teach; and, besides, practically instruct the pupils in surveying and estimating of the area of forests, and the cubic contents of trees, construction of maps, valuation of soil, growing and felled timber, to collect and preserve seeds, the laying out and care of nurseries forest growing and planting, the position of seed-trees, clearing, to quench quicksand, felling of trees, assorting and marking of timber, as well as to conduct a party of the pupils in the forests for practical measuring, estimating, and dividing of forest land;

(2) To have under his care, and to account for, the archives, library, and movables of the institute, with the exception of those for which the teacher of the chase and regulations is responsible;

(3) To manage the economy of and account for the forests assigned to the care of the institute;

(4) To assist the director in watching over that given instructions are followed, and in maintaining industry and order among the pupils; and

(5) To take command of the place in the absence of the director.

1 The teacher of the chase and regulations shall have graduated at the institute with honours, and thereafter served at the forest and chase corps of the Kingdom. This teacher shall—

(1) Instruct and examine in the knowledge of firearms, shooting, the theory and technical terms of the chase, forest and chase regulations, and bookkeeping;

(2) Assist at the practices in forest economy, and conduct, during the summer season, a party of the pupils on practical measuring, estimating, and dividing of forest land;

(3) To exercise the pupils in target practice, and also, when there is an opportunity of hunting and driving game instruct the pupils in the care of wolf-pits, traps, nets and cages; the making and care of hunting implements, the keeping of forests, as well as to prefer charges against poachers and other offenders against game and forest laws; and

(4) To take care of and account for the tools and collections of models of the institute, as well as of the forest and hunting implements, and of what belongs to the target-ground.

13. The teacher of natural history ought to have made himself known as thoroughly well acquainted with this science. His duties shall be—

(1) To instruct and examine in those parts of physics, chemistry and mineralogy which are required for the knowledge of forest climate and soil, in general and forest botany, and in zoology, as far as this branch of knowledge is connected with the forests;

(2) To instruct in the manner of preparing herbaria, and of stuffing and preserving animals and insects;

(3) To conduct the pupils on mineralogical and botanical excursions, and to practice with them the examining of soil and plants;

(4) To instruct the pupils during visits to the museum of the Academy of Sciences; and

(5) To take care of and account for the zoological and botanical collections of the institute, and to make out complete lists of the same.

14. The teacher of mathematics ought to have made



himself known as thoroughly acquainted with this science. This teacher shall instruct and examine in arithmetic, algebra, planimetry, stereometry, trigonometry, conical sections, geometrical constructions, descriptive geometry, general and forest architecture, elements of mechanics, and theory of the construction and use of mathematical instruments. He shall besides practice with the pupils the drawing and copying of maps, calculating of areas, sketching maps, surveying, construction of buildings and roads for forest purposes, with estimates of materials and labour, measuring of cubic contents, and adjustment of instruments. [There are at present six teachers in the institute.]

#### PUPILS AT THE FOREST INSTITUTE.

15. In order to be admitted at the forest institute application shall be made to the director within the middle of the month of May [now before the 1st of July] and the following certificates annexed to the same:

That the applicant is at least 18 and not above 28 years old; that his constitution is good and faultless, and not affected with any kind of incurable disease; that he has always conducted himself well; that he either has passed such examination and obtained certificates of approval in mathematics, natural history, and Swedish grammar, which entitles him to enter the universities of the Kingdom, or that he has been examined by the appointed teachers at any of the elementary schools within the Kingdom in each of these branches, and found to possess sufficient knowledge therein to enable him to graduate from the school; also, that he has, during at least one year, with some forester practiced and acquired sufficient skill in the economy and surveying of the forest.

16. Applicants whose applications are complete, and who consequently may expect to fill the vacancies at the institute, must publicly and in the presence of the director be examined by the teachers in arithmetic and algebra, planimetry and stereometry, general botany and zoology; also, to write a Swedish theme.

17. Those exhibiting the greatest knowledge shall have the preference of being admitted to the institute.

18. At the commencement of every year the director shall propose to the forest administration for receiving of stipends those of the pupils who are in need of assistance and have shown themselves most deserving of same through industry, skill, and orderly conduct.

19. The pupils shall obey the orders of the director and the teachers, orderly and decently conduct themselves, follow the regulations at the institute, and attentively and industriously profit by the instructions.

20. Should the pupil disobey the orders of the director or the teachers, create any disturbance at the institute, conduct himself in a disorderly manner, or neglect his studies, he shall receive warning from the director. Should he not then change his conduct, but continue his offenses, the director shall, after having consulted the teachers, send him away from the institute. [There are now a higher and lower course at the institute. For admission to the higher course applicant must have graduated at the forest school, Omsberg.]

#### THE FOREST SCHOOLS—THEIR OBJECT AND ORGANIZATION.

21. Suitable localities, large enough to permit both teachers and pupils to live there, shall be placed at the disposal of the forest schools at such places as will be especially determined upon.

22. To a certain number of pupils, unable to maintain themselves at the school, sufficient assistance shall be given, according to what is therefore specially prescribed.

23. The forest schools shall be managed under the superintendence of the nearest chief of range, by a teacher appointed by His Royal Majesty the King, after having been proposed to the situation by the governor of the province and with the approval of the forest administration; this teacher shall be assisted by a ranger, nominated by the forest administration.

24. The instruction at the forest school shall embrace the four first rules of arithmetic and the rules of proportion in whole and decimal numbers; knowledge of scales for plan-drawings, as far as required for making of maps and measuring distances; knowledge of square and cubic measures with practical application at the measuring of the extent and con-

tents of surfaces and solid bodies; knowledge of the nourishing organs of the forest trees and of their food and the natural conditions for their thriving; knowledge of the most dangerous insects of the Swedish forest and of the manner of destroying them; the chief principles of rational forest economy, and knowledge of the rules existing for the peace and keeping of forests, marking and carrying of timber, hunting, and also of the legal form for entering charges. The pupils will also be practiced in marking out a  $\sigma$  measuring of forest lines; tilling places and sowing fields; calculating of the cubic contents of trees and timber; the position of seed trees; sowing by hand and planting, as well as the preparing of the soil for forest growing; collecting and assorting of forest seeds; clearing and cutting, assorting and piling of timber; marking cattle and making out of grazing lists; laying up and keeping patrol lists; making out lists of unlawfully felled timber on which embargo has been laid; monthly reports and service accounts; the trapping of beasts and the grand chase.

25. The course of instruction shall begin on the 1st of October every year and continue until the middle of the following June, during which time all the respective subjects and exercises shall have been taught to the pupils, hereafter they are publicly examined in the presence of the chief of range in order to ascertain the knowledge and skill they have acquired.

26. The pupil who has satisfactorily passed the examination is entitled to receive certificate of approved skill, issued by the chief of range and the principal of the school.

#### PRIVATE FOREST INSTRUCTION.

27. For the establishing of forest schools in the respective provinces of the kingdom, and the education of competent assistants for managing private forests, the Government will yearly contribute, as far as the funds will permit, provided the communities which apply for such assistance shall fulfill the following conditions:

(1) That the community shall place requisite locality to the disposal of the school, furnish the teacher as well as the pupils with apartments, and pay for the maintenance of the school;

(2) That the organization of the school and the proposed rules for its operation has been sanctioned by His Royal Majesty; and

(3) That the operations of the school, of which a yearly report shall be made to the forest administration, shall be exercised under the superintendence of the nearest chief of range and the forest administration.

REGULATIONS FOR THE DIVISION OF THE PUBLIC FORESTS  
FOR THE PURPOSE OF SYSTEMATIC ECONOMY.

Issued June 29, 1877. Drawn up by Mr. Cuthjockman.

1. The dividing of a forest consists in its delimitation on a map with description and economical plan based on careful estimates having a view to the future of the forest and the highest reasonable income that can be derived from it.

2. The allotting is effected so that there may be introduced, as circumstances require, high-forest culture with tract cutting or systematic thinning, or, nevertheless, for applying low-forest culture.

3. Forest is divided, according to its extent and nature, into more or less blocks. Smaller forests, however, may each comprise only a single block. The block is divided into divisions or parcels, whose limits are generally determined by natural formation or permanent marks, and these again into subdivisions, including differences which have been observed in surveying, delineating and estimating the forest.

4. In the surveying is noted only such differences of the forest stand and ground, as, according to the above-mentioned method of forest work, exercise some influence thereon; and with the objects and differences noted in the surveying shall be added on the map the boundaries exactly to correspond with the facts. When a correct map happens to have been previously drawn up, a copy of it, with requisite additions, shall be used in the allotment of the forest.

5. The map of the forest shall be drawn up on such scale as allows requisite clearness in specifying what should be noted thereon for the economy of the forest.

6. The forest is estimated in cubic feet or in cords of 100 cubic feet (Swedish solid measure, except when the allot-

ment or dividing takes place for thinning (applicable to heavy timber), when the estimate is made by number or piece. The estimate ought, as near as possible, to correspond with the reality, but had better be too low than too high.

7. The description shall include all important matters which, at the execution of the allotment, can be of weight for the economy of the forest.

8. The plan of management is drawn up for a period of twenty years and ought to include the requisite prescriptions as to the manner of working the forest, rotation time, consumption, culture and the other means of administration which have not already been prescribed by the public statutes.

9. Tract cutting will have the preference, as a manner of working the forest, except where from local circumstances it is unsuitable.

10. The rotation period should be extended as far as is necessary for raising the different sorts of trees and forest production which are counted on from the forest, but without occasioning such delay in consumption that any part of the forest shall thereby receive injury or deteriorate in value.

11. The estimate of what shall be consumed during the period of division or allotment shall be based on the forest's growth, the extent of ground, and on the known quantity of wood and timber, ascertained by careful calculation, whereof no more may be taken out than corresponds with the growth of the forest during the said time.

12. During the last year of the division period a revision is made for searching out the changes the forest has undergone and for drawing up the economy plan for the following division period.

Moreover, the Government having authorized the administration of forests to issue regulations which may be required in conformity with the above principles, the administration of forests has found it reasonable to ordain as follows:

1. The method of working a forest, mentioned in paragraph 2 above, can, where necessary, be introduced on the same block, though on separate parts thereof; for example, forest-grown rocky hills, moss tracts, or other land on which systematic thinning seems an object, also such tracts as seem suitable for low-forest culture, may enter into the same plan of economy with tract cutting, where the grounds have not sufficient extent for more than one block.

2. In dividing the forests into blocks, regard is had that as far as possible the older, middle-aged, and young forest stands are in suitable relations to each other, also that the block obtains a proper form. The ground allotted in the block for tract cutting may not exceed "0,000 quadrat ref" (1,300 acres). With the introducing of systematic heavy-timber thinning, block allotment is fixed according to the means for floating, and accordingly a connected forest of even 12,000 acres may be reckoned to a block, providing the product therefrom can be floated on the same water course, Lands whereon low-forest culture is introduced, and which are not entered in the economy plan that has been fixed for tract cutting are divided into blocks of at most 120 acres. When blocks are not situated apart, they ought to have natural boundaries, as water courses, marsh, and rocky-hill extents, etc., or nevertheless be bounded by highways or fences; but if such do not exist, they are separated by means of a line cleared through the forest to the width of 20 feet.

3. In dividing the block into parcels or divisions, the principal object of which is to facilitate "orienting" or astronomical directions, and clearness in description, likewise attaining an approximating homogeneous stand, the same is to be observed concerning their boundaries that has just been mentioned in respect to blocks. Nevertheless the separating lines may be cleared only the width of 10 feet. The forest land of a division should not exceed 200 acres, except in forests which are allotted for merchantable or heavy timber, within which, as comprising the division or parcel, may be reckoned only those parts divided by natural boundaries. Connected forest blocks of 200 acres' extent or less constitute only a division or parcel.

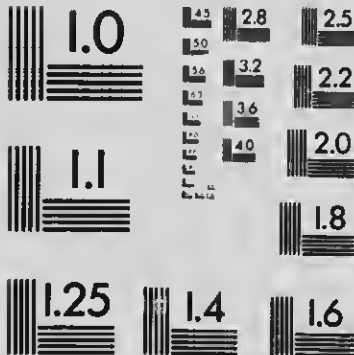
4. The surveying of a forest, where it is so required, may be based, as heretofore, on parallel lines running in right angles, or over valleys and summit extents in oblique direction. Nevertheless hereafter these lines ought not to be cut or cleared more than is necessary for making them visible, but shall instead be blazed to a breadth of 10 feet. In the allotment of the forest for the purpose of systematic heavy-timber thinning, smaller impediments, unless sketched on the map, shall only be noted in the description.

5. Forest maps shall be drawn up on a scale of 1-8000



# 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



of natural size, with these exceptions: Lands allotted for heavy-timber thinning shall be mapped on a scale of 1:20,000 of natural size; lands for low-forest culture, according to separate plan of economy, shall be mapped on a scale of 1:4,000 of natural size. A separate map is drawn up for each block. On the just-mentioned maps of 1:20,000 scale two or three blocks may, nevertheless, be contained, according to circumstances. When the forest is composed of several blocks, with map for each, a comprehensive map of the whole forest may be prepared, showing the relative situation of the blocks, on a scale of 1:20,000 of natural size; and with heavy-timber thinning 1:50,000 of natural size. The map of the floating courses, below mentioned, are drawn on a scale of 1:50,000 of natural size. When a comprehensive map on the scale aforementioned has been prepared, the floating courses should be shown thereon, and in such case no separate map of these is needed. The maps shall be well and plainly drawn, coloured, provided with names of bordering estates, forests, or the like, written around, title, scale, and north direction whereon the variation is observed. The cleared or blazed lines and the separating lines pertaining to the project for period allotment or division shall be drawn on the map; also the yearly clearing or cutting bounds in the first period; the latter, nevertheless, only on maps of forests which are not under the immediate administration of the forest corps.

6. The valuation or estimate of the forest is undertaken in conformity with the recognized principles of forest science separately for each subdivision, with regard to differences of ground and forest stand.

7. The description consists of general and stand description.

8. The general description is based in certain parts on stand description, and shall under separate titles account for—

History of the changes which the forest has undergone financially, state and administration of possessory right, where-with, if practicable, the official proceedings may be introduced on which the changes or improvements have been based, and the influence of these, of forest fires, of injuries by storms and the like on the forest's present condition.

The uses or service with which the forest, from one cause or another, is charged; how far these are based on

culture or resolutions, and in the latter case what, also, the influence on the forest which the uses produce.

Boundaries on adjoining stranger owners; also, when the forest belongs to homestead or farm, on the thereto belonging arable and pasture land; wherewith for that case any land which did not before belong to the forest, but which is included in the allotment, with the reason therefor, ought separately to be given, regard being had to what is prescribed in royal forest regulations of the 29th June, 1806, section 38.

Nature of the forest land, nature of the forest stand in general, according to stand description.

Block allotment or dividing, and motives for the same.

Prevailing winds, and their effect.

Depredations and wastes; to what extent the forest is exposed to such, and their nature.

Watching or care; how this is ordered and how far sufficient.

Pasture and autumn-mowing, and what effect such use has on the forest.

Selling of the produce of the forest, where this can come in question, wherewith, when this is dependent on opportunity of floating, a map of the floating course in the forest and in its neighbourhood is annexed, providing such map can be had without separate survey.

With several other relations which, in and for the forest administration, can be of weight, which like the above-mentioned ought to be stated under separate titles.

9. *The description of the stand.* Table No. 1, which is prepared in tabular form, and which, with the exception of area reports, composed in proportion to the progress of the survey and valuation, contains the following columns:—

1. *Division*, or parcel (in the Swedi "skiften"), where-in is introduced the name of the division and what block it has been divided, also the letters whereby these are denoted on the map.

2. *Subdivision*, in which column is placed the letter whereby the differences of the forest land and forest stand have been denoted on the map.

3. *Extent*, wherein the area is given in new measuring (quadrat ref and quadrat poles), and which column is subdivided in two, namely:

*a. Forest land, where regard is had to the area of forest-bearing ground, the subdivisions are given as—*

*(a) Forest-grown, or—*

*(b) Bare, under which latter designation may be introduced as well such land as produces only bushes and scattered trees as that which shall be cleared, during the division period for effecting satisfactory regrowth; also—*

*b. Impediments and land not regarded sufficiently fertile for forests, under which is noted such rocky hills, marshes, mosses, etc., which can not be counted on to bear forest; also such sand holes, ways, and tilled places, etc., whereon forest will not be grown.*

*4. Land where under the subdivision is described with regard to the quality of the land and soil.*

*5. Situation, where the situation is described as well with regard to moisture as in relation to prevailing winds.*

*6. The forest, which column is subdivided into four:*

*a. Sort of trees, wherein is introduced the kind of trees the forest stands consist of, with special remarks as to the prevailing—*

*b. Growth, closeness, windfalls, previous treatment, etc., where a fuller description of the forest stand is given, as well as how the same seems to have been treated previously.*

*c. Amount of production, wherein is noted the number of cords, at 100 cubic feet (Swedish) solid measure, which the growing forest contains*

*(a) By quadrat ref (say 10,000 square feet) in whole and tenths of cords, and—*

*(b) By subdivision in whole cords; or nevertheless with heavy or merchantable timber-thinning number of sticks per 10,000 square feet and in the whole subdivision; also—*

*d. Age class, wherein is introduced the prevailing ages of the forest stand, designed to show twenty-years-age classes, from 1-20, 20-40, 40-60 years, etc., whereafter, under the title of treatment of the stand during the division period (Tables Nos. 1, 2), follows:*

*7. Manner of working the forest, in which column is noted how far the stand shall proceed under allotment of tract cutting, or if thinning or low-forest culture should be there introduced: and—*

*8. Special means, including accounts of what ought to*

be adopted for the stand and land during the time for which the division is regarded to be effective, whereto shall be stated for the occurrence of help pruning or preparatory cleaning (or cutting) that amount of wood and timber which thereby, according to valuation, it is considered can be obtained per 10,000 square feet. The area, as well as quantity of wood and timber on the subdivisions, may be summed up for every division or parcel, and a compendium introduced at the end of the table, wherein the whole of the area of the division or parcel and quantity of wood and timber noted shows the extent and bulk of the wood and timber, as well as a like compendium for the separate blocks to show the whole area of the forest and stock of wood in cords, or with heavy or merchantable timber thinning in timber.

To the description of the stand belong equally with tract cutting a compendium of the area which the different age classes occupy and the timber and wood mass each one contains. The description ought to be accompanied by the length valuations introduced in the forest.

10. *The plan of management*, of which a sketch ought to be made at the place of employment, so that the state of the forest in case of need may serve for further direction, contains the following titles:

*Manner of working the forest*, under which is noted for every block how great part of forest land and quantity of wood and timber suits the one or the other of the mentioned methods of working the forest and where so required the motives for the distribution of the forest ground between them.

*Rotation*, under which title separately for each block and method of working the forest with necessary motives may be introduced the age which, in general, it is thought the forest should have before the same can be consumed; whereto with heavy timber thinning under the title in question ought to be given the time.

*Thinning time*, during which thinning shall be done.

*Consumption*, which title for every block contains a calculation of what, during the whole of the twenty-year period, and during every year of the same, should be consumed; also report where and how consumption ought to be effected separately for forest adapted to tract cutting, thinning, or low

forest culture; and there ought therewith to be added in tabular form, equally for the two foregoing titles, a compendium (Table No. 2), to which is added a report for the whole block and area, and amount of wood and timber summed together.

*Forest cultivating* (with special regard to sowing and planting), under which is noted in table form (Table III), by block division and subdivision, the area of the ground which during the period shall undergo complete forest cultivating (that is, clearing and raising forest again on the same place by planting or sowing), help culture, drainage, or other means for advancing regrowth, whereto may be noted the nature of the measures and steps which, in every case, shall be adopted.

*Project for the future division of the forest in respect to rotation and thinning periods*, under which title, and with reference to the map of the forest, is indicated how it is considered, on the basis of the present state, the subdivisions ought to be united for hastening, and with least sacrifice of growth, to form suitable parts of the forest, corresponding with the twenty-year periods, separate report being made for the division of the ground in every block for tract cutting, thinning, or low forest growing.

*Pasture and autumn mowing*, under which is noted that which, with regard to the subject, should be observed during the division period.

*Means of facilitating the transportation and sale of wood and timber*, under which title is given, as may happen, the needful scheme for ways, improvement of floating courses, disposing of the sorts of timber necessary for the region, etc.

*Administration and care*, wherewith representation is made of what, in said respect, ought to be adopted to secure suitability of plan of economy, therewith always complying with what is prescribed by the control book for consumption and forest cultivation.

11. *Rotation with tract cutting* is determined so that, after knowledge is acquired of the kinds of trees the forest will yield, and the growing time required for them, the area of the forest-grown land is divided into the number of twenty-year periods which said growing time contains; thus, with one hundred and forty years' growing time by 7, with one

hundred and twenty years by 6, etc., whereby is ascertained the extent on an average can be consumed during every twenty years. Thereafter is examined through comparing the extent of this latter with the area which every age class takes up, how long time consumption in each and every class, beginning with the oldest, should require, wherewith also knowledge is gained of the age of the forest at the time of consumption. If then it is found that any essential part of the forest should be consumed first after that which has taken injury from too high age, so ought said examination to be renewed in a twenty years' shorter time, and in proportion to the therewith greater area of consumption, till its result shows that the forest can be consumed without losing in value when the last-mentioned time is adopted for rotation time.

With the introduction of regulated timber thinning it is seen, too, that the thinning time becomes so sufficient that a requisite number of trees may be able to grow to heavy timber by the time its thinning returns to the same tract which it before went over.

As well rotation as thinning time should contain a certain number of twenty-year periods.

Thinning time ought to be an equal part of rotation time.

12. The computation of what is taken out by tract cutting during the period is made thus:

Of that part of the forest-grown land allotted to tract cutting is assigned for *consumption* during forty years, two-sevenths of the area with one hundred and forty year, two-sixths or one-third with one hundred and twenty year, two-fifths with one hundred year rotation periods, etc. Out of the oldest age classes is taken off thereafter as great area as corresponds to said part. The forest which is found on the area thus taken off consists of that which can be consumed during forty years. Hereof is allotted for consumption during the first twenty years, out of the oldest or least growing stand, so great a part that the growing forest thereon, *without* including the grown, may attain to wood and timber mass equally with the growing forest on the other part, *with* reckoning or including that grown during twenty years. With the reckoning of growth, nevertheless, so-called growth tables may not be used unless the yearly growth of the stand running in the two-thirds is accepted as the average amount of what these during its filled age yearly grow.

*In thinning of heavy timber* is consumed, during the time adopted for thinning, all the timber found at the dividing or allotment besides half the quantity of heavy timber stuff which within the period of thinning can grow. Of this amount of wood and timber can thus be consumed during the twenty-year division period, with forty-year thinning time half, with sixty-year one-third, and with eighty-year one-fourth. In this way is taken off that part of the forest which shall correspond with the first twenty-year period, wherewith is observed, nevertheless, that only such land as bears heavy timber, or within the thinning period grows heavy or merchantable timber stuff, enters into the calculation, also that the part taken off does not more than twenty-five per cent. exceed that which the land just mentioned, reckoned exclusively according to the area, shall have produced in the period. If it is found, notwithstanding such augmentation in area, the part taken or sold off does not contain the number of pieces of timber which, according to the above-mentioned calculation ought to be had, the consumption is reduced to what the thus sold-off district for a period of twenty years can according to calculation give.

With other thinning the consumption's mass is calculated the same as is mentioned in regard to tract cutting.

In the dividing or allotment for low-forest growing, with separate blocks, the area is divided by that number of periods which the rotation time contains, after which the amount of consumption is fixed according to the bulk of production on that part which corresponds to the first period, wherewith, if so required, the growth is reckoned in the manner above written.

In the consumption calculated in harmony with the above principles is not included what, according to estimate, is obtained through preparatory thinning and help pruning or clearing up of found windfalls and dry forest, so-called cleaning-cutting, likewise neither the utilizing of stumps, roots, branches, and twigs.

13. When the division or allotment takes place in such forests as are mentioned in Chapters III and V of the Government's Forest Regulations of 20th June, 1866, with the dividing proceedings and maps shall special memorial be prepared, representing how far it is thought the forest, according to §§

16 and 23 of said regulations, ought to be placed under the immediate care and administration of the forest corps, also if such is not the condition, the need of the products of the forest at the homestead or farm to which it belongs; also how far the forest is insufficient to supply said need, or nevertheless besides answering the requirement or leaving something over the same, and in the latter case the amount of surplus, also project for the forest rent, which, according to § 17 ought to be reckoned, or that portion of clear gain which, on the principle of § 24 of regulations, can accrue to the resident occupier.

14. At the *revision* of the allotment which here above is ordained is drawn up accurate calculation of the older age classes, wherewith the map is intended for introducing noticed changes, of economy hitherto drawn up for the public forests, where these have been operative twenty years or more. Should the maps and allotment proceedings be found continuing suitable the drawing up of new ones may be dispensed with.

#### EXPLANATION OF CERTAIN TERMS IN SWEDISH FOREST SCIENCE.

*Forest culture* (skogs skotsel) includes the raising of forest, its treatment during growth, and its consumption.

By *consumption* of forest is understood the felling of trees in such a manner as to facilitate the effort of nature to produce new forest in place of the former.

*Forest cultivating* (skogs odling) is the raising of forest by means of sowing seed by hand or planting.

*High forest* is that which is not intended to be consumed till the trees have attained their maturity.

*Low forest* is that which comes from shoots from the roots or stumps of former trees and which may be consumed in a shorter time to give place to another similar crop—as, for instance, timber for hoops, hop poles, and the like.

*Rotation period.* The time required, commencing with the sowing, for a forest to grow and mature.

*Tract cutting* is the felling of such a portion of the forest as, according to a previously prepared plan, has been allotted



for a year's supply, or such a portion as can be cut with due regard to the rotation period.

*Regulated thinning* is a manner of consumption or of cutting which is generally practiced in forests where the trees in the same place are of different age.

ST. PAUL, MISS., *June 19, 1900.*

C. C. ANDREWS.

## SUMMARY.

As a result of the study given to subject of forestry colonization, the following suggestion may be of value:

1. A forest reserve to consist of the lands proper only for forest culture.
2. A system of scientific forestry and systematic re-forestation of the burnt districts, vacant lands and waste places.
3. The establishment of a Forestry Professorship and the establishment of a system for the preservation and perpetuation of the forest supply and a trained staff of foresters.
4. The perfection of our system of fire rangers and its application to the whole Province.
5. A penalty on lumbermen keeping large districts flooded by the back water of closed dams, which should be opened after the drive has gone out.
6. Efficient fire protection.
7. The prevention of complete denudation of hills and protection of the water supply.
8. A close season for setting fires near the forests from the 1st May to the 1st October in each year. When a dry spring occurs, accompanied by a dry April, the close season should commence on the 1st day of April. A dry April is sure to bring a crop of bush fires.
9. A fire strip of 50 feet between the abatis and the forest.
10. The withdrawal from settlement of lands not fit for farming purposes.
11. The abolition of the practice of selling isolated lots in the midst of timber limits.
12. The abolition of the practice of selling lots to speculative jobbers who take up land simply to defraud the Government of its just dues and who never intend to cultivate the land so taken up.

13. Adopt a system by which the districts which are suitable only for forestry shall not be settled upon by squatters.
14. The license holder should have one year clear from date of notice to remove merchantable timber from lots which are withdrawn from license.
15. Separate the lumbering from the agricultural interests as far as possible.
16. The dismissal of incapable Crown Lands Agents and a rigid enforcement of the regulations in regard to shanty books and the periodical examination of the lumbermen's books.
17. Capable educated woodsmen, Government employees, to inspect the lumber camps to see that the Government regulations are being carried out, and that a faithful account is being rendered of timber cut and the diameter cut regulations enforced.
18. Summary process of lot cancellation.
19. Every encouragement and facility to *bona fide* settlers.
20. Concentration of settlers on good lands.
21. Compact contiguous groups so that each settler will be near a neighbour. This can be accomplished by continuous settlement.
22. Selection of proper land for settlement purposes, and intelligent and active Crown Lands Agents having a knowledge of the quality of the lots in their districts capable of directing intending settlers to suitable lots.
23. Colonization roads of the best kind.
24. A substantial bonus to counties where no forest fire has occurred within the year, such bonus to be devoted to the construction of macadinized roads.
25. The expenditure of the funds for colonization roads to be made upon, regularly surveyed routes laid out by a competent engineer or surveyor, on continuous routes are advantageously laid out for continuous settlement.

26. The expenditure of colonization money to be strictly confined to colonization districts. Old settled districts should raise money by local taxation for roads and bridges within their limits.

27. Location of routes should be approved of by the Colonization Department only.

28. Holders and occupants of Crown Land should be liable for municipal taxes for roads.

29. Grants to Colonization Societies should cease.

30. The Province should share equally in the net profit on transfers of licenses.

31. Double the Crown charges for timber dues. The effect would be to give a handsome surplus to the province and relieve us from the necessity of disposing of our remaining limits below their value.

32. Sales of limits should be made in the fall with full information of the contents of limits approximately on the report of skilled woodsmen explorers. Not less than one year's notice of such sales should be given so that intending purchasers can have time to explore the limits offered for sale.

33. Water powers should be sold on 99 years' lease at so much per horse power developed. A time limit of number of horse power developed to be an absolute condition under penalty of nullity.

All of which is respectfully submitted,

GEO. W. STEPHENS,

*Ex-Commissioner Colonization.*

