

1880.
NEW ZEALAND.

SUGGESTIONS ON FORESTS IN NEW ZEALAND

(PAPERS RELATING TO).

Presented to both Houses of the General Assembly by Command of His Excellency.

No. 1.

Mr. A. LECOY to the Hon. the MINISTER of LANDS.

SIR,—

Wellington, 14th April, 1880.

In accordance with the arrangement which I made with you, I have now the honor to transmit "Suggestions on Forests in the Colony of New Zealand," which I shall be obliged by your submitting to Parliament during its next session.

I have, &c.,

The Hon. the Minister of Lands, Wellington.

A. LECOY.

Enclosure in No. 1.

SUGGESTIONS ON FORESTS IN THE COLONY OF NEW ZEALAND.

PREFATORY OBSERVATIONS.

THE establishment of State forests has for its object not only to provide for a regular and permanent supply of timber and wood, but also to maintain the protection given by Nature against the disturbance of the climatic equilibrium, the occurrence of droughts, the disastrous effects of flood-waters, &c., experience having shown the preventive or modifying influence, as the case may be, of extensive forest areas. Furthermore, that the conservation of these woodlands, intended for the general interest, should not be intrusted to the management of private persons as purchasers of them; because forests, considered from a financial point of view, being almost the least remunerative of all land cultivations (as private property), the apparent interest of the purchaser would be to realize the value of the timber, and to convert the forest land into agricultural or pastoral, thereby selfishly disregarding the beneficial effects which the existence of the forest afforded to the whole district.

In the hands of Governments, forests represent a national interest of the highest importance, not only because of the financial resources which the annual fellings afford, as the direct revenue derivable from the property, but, above all, on account of the salubrious and fertilizing effects which forests bestow on the surrounding country, thus favouring the progress of agriculture and the general development of national wealth.

It is only under such prosperous conditions, it may be remarked, that freehold lands can well afford to contribute towards the public expenditure, and thus will spring up (*i.e.*, by the conservation of forests) other sources of State revenue. Again, the great mass of the ever-growing forest, notwithstanding the annual thinning out of it, may be assimilated, in its effects, to a public insurance-fund sunk for the purpose of securing the safety of arable lands from contingent damages by floods, &c., thereby assuring the stability of public revenues.

The material importance of these indirect advantages as resulting from the proper management of forests, especially when situated in mountainous regions, may be demonstrated by the observation of events of recent occurrence in France. In that country, as the result of injudicious alienations of State forests and the further conversion of the forest land into pasturages, originated periodical inundations, and the ultimate ruin of agriculture in no less than four "départements," the rural population of which are now emigrating to America.*

* "Etudes sur l'Aménagement des Forêts," p. 489, par L. Tassy, Conservateur des Forêts. Rothschild, publisher, Paris.

The loss of private property has thus been enormous, and the deficiency in the land-tax revenue from the same cause—namely, the indiscriminate clearing of forests—may also be computed at millions of money.*

To the collateral advantages just alluded to may be ascribed the difference in character and productive powers of forests, as State or freehold property respectively.

For climatic purposes the total area of the Crown forest-lands in New Zealand, taken at 5,000,000 acres, would not be more than sufficient as compared with the area of the whole colony, for the probability is that the private forests, at present adding to the climatic advantages of the public woodlands, will gradually disappear, unless the owners could be persuaded to sacrifice their own pecuniary interest to the public welfare. In France and in Germany the primitive woodland areas, though much reduced, still represent in both countries a surface equal to about 24 per cent. of the total area of the country, but notwithstanding this the people there are complaining of climatic disturbances as the result of the clearing of the woodlands.

I. AREA OF THE TIMBER LANDS IN THE COLONY.

The total area of forest on Crown lands in this colony was estimated by the Commissioners of Crown Lands, 1879, at 10,158,870 acres; from which area, however, large reductions should be allowed for past dilapidations, inaccessible country, &c. It will be also a matter for further consideration to ascertain the extent and condition of the remaining valuable forests which have already, or soon will become, accessible by roads, &c.

The gross revenue afforded by the disposal of produce from all these forests does not exceed £3,000 a year.

The total area of freehold forests in the colony is about equal to the above. Heavy depression bears on the value of private forests as well as on the timber trade, arising, no doubt, from the fact that the supply available from both public and private forests is in excess of the present requirements of the population; but the principal cause of such depression may be ascribed to the practice of disposing of the public timber-lands and likewise of their produce at almost nominal prices: so that, looking at the case simply from a financial point of view, it may be questionable if the interests of the State would not be further promoted by altogether discontinuing the disposal of the public forests, rather than by maintaining a gratuitous system so manifestly in opposition to interests of such magnitude, and of such importance to the colony at large, as unquestionably are those which relate to private forests, for in such case the increasing value of the freehold timber-lands would render the property amenable to State taxation with some degree of effect. The expression of this idea, however, has no other meaning than to show how obsolete and incompatible with the real interests of the colony the present management of the public forests ought to be considered; when otherwise it might be expected that the existing disproportion between the supply and the demand, as well as the antagonistic circumstances just pointed out, would disappear, and that forest produce would become a source of legitimate profit to all interested parties in the colony, should the administration of the public forests be once established on the right principles, and should also the exportation of New Zealand timbers to Europe be initiated and carried out in the right direction.

II. FOREST LEGISLATION IN NEW ZEALAND.

The conservation of the Crown timber-lands in this colony was first enacted by "The New Zealand Forests Act, 1874." The Act is intitled "An Act to provide for the Establishment of State Forests, and for the Application of the Revenue derivable therefrom." The preamble recites that "it is expedient to make provision for preserving the soil and climate by tree-planting, for providing timber for future industrial purposes, for subjecting some portions of the native forests to skilled management and proper control, and for these purposes to constitute State forests." In section 6 of the Act, it is defined that "The State forests shall consist of such lands as the General Assembly shall hereafter from time to time determine."

Since the passing of the Act, its provisions under section 2, relative to a special fund to be paid by the Colonial Treasurer to the credit of an account to be called "the State Forests Account," have been rescinded by Act of the Legislature. Also, the power of determining the lands which shall constitute State forests, pertaining to the General Assembly under section 6 of the Act, has been absolutely vested in the Governor under Part V., section 91, of "The Land Act, 1877," which enacts that "It shall be lawful for the Governor, from time to time, as he shall think fit, or on the recommendation of the Board of any land district, to

* The land-tax revenue in France amounts to about £24,000,000.

declare any forests belonging to the Crown within such district to be forests subject to the provisions of this Part of this Act, and also from time to time to alter, amend, or revoke any such Proclamation."

All other provisions under this Part of the Act, which specially relates to forests, being the literal reproduction of provisions previously enacted under "The New Zealand Forests Act, 1874," Part V. of "The Land Act, 1877," consequently does not extend any further in its bearing than as an amendment to section 6 of the former Act. Therefore, apart from the withdrawal of the special fund and of the said amendment, both being enactments of a purely administrative character, the principles and provisions of "The New Zealand Forests Act, 1874," not having been repealed by an Act of the Legislature, still stand as the forest law of the colony.

It is enacted, under the Acts pre-cited, that the Governor shall have power to make, alter, or repeal regulations and by-laws for the administration and management of Crown forest-lands, and that "any regulations and by-laws may be made applicable to forests generally, or to one or more of such forests in particular." The last-cited provision indicates clearly that, although the extent of lands to be proclaimed State forests is not specified in the Act, this is a matter left for investigation on the part of the Administration, and to be determined by the Governor.

Under sections 88 and 167 of "The Land Act, 1877," the power to reserve and to withdraw from sale, leasing, or licensing any Crown land is vested in the Governor absolutely.

Hitherto, no regulations under the Act have been framed, and it is obvious that no definite regulations can be made prior to the proclamation of the Crown timber lands which shall be reserved for State purposes, the issue of the Proclamation itself depending upon a solution of the question of extent.

In conclusion, our forest law is plain and definitive: it prescribes the conservation of the Crown timber lands in such proportion, or to such extent, as the Governor shall deem necessary; but it may be remarked that the powers of the Governor, under the Act, apply only to measures of execution which do not touch nor suspend, and still less do they abrogate, the main objects of the law—viz., the twice-proclaimed enactment of the conservation of the public forests: and, in the matter of public forests, conservation means inalienability. Again, and apart from all question of legality, it may be observed that, at the time of the passing of "The New Zealand Forests Act, 1874," the extent of the Crown forest lands in this colony might have been more than sufficient for State purposes. Has, since then, the area of these lands been so far reduced, through successive alienations, that the remaining portion might be found, under a proper system of conservation, only equal to, if not even below, the requirements of the present consumption, as supplied out of the public estate? This is the first question to be answered.

III. QUESTION OF EXTENT OF FOREST LANDS TO BE RESERVED FOR STATE PURPOSES.

The extent of bush land to be declared subject to the provisions of the Act may, generally, be determined by comparing the amount of the annual demand for produce out of the public forests with the quantity of the same which these forests can afford to supply annually and permanently. The ascertained relation existing between the supply and the demand will lead to a solution of the present question.

Although the available information on the subject is very limited, the few data at hand will allow estimates sufficiently approximate for the purpose of a demonstration.

As regards the extent of the general demand, the official information at hand does not give any further particulars than the quantity of sawn timber supplied out of the public forests in 1875. The increasing quantity since then has been taken approximately, and added to the known one. (See remarks under Table I.) As to the demand for produce other than sawn timber, the lack of information does not allow any other approximate estimate than by judging from comparison with the other class of produce. Altogether, the general demand is taken as annually absorbing the produce of 40,000 acres of the public forests, presumed to yield an average of 15,000 superficial feet of sawn timber to the acre. Approximate estimates of the money-value of the timber will be found under Table II.

Referring now to the quantity of produce which high timber forests can supply annually and permanently, such being the aims of State forestry, we shall be guided by rules and principles adopted in countries where forest-conservation is best carried out.

The perennity of forests may, notwithstanding the periodical cuttings in them, be maintained by the observance of rules applying to forest-cultivation which constitute the rudiments

of practical forestry;* but, besides the conservation of a forest as a whole, it is also necessary to determine the annual quantity of product which this forest is capable of supplying in perpetuity. This is scientific forestry.

The method of disposing of the produce of high timber forests by superficial measure of the land has, long ago, been replaced in Europe by the cubic measurement of trees. The standing timber is valued according to the contents of its volume, as estimated in cubic feet. Estimates by cubic measure apply as well to the valuation of forests, as a whole, as to that of trees individually.

The cubic quantity of timber and wood which can be taken out of a forest yearly, without causing any injury to the permanency of the supply, is ascertained as follows:—

1. The duration of the revolution of the forest has to be determined. (A forest has accomplished its revolution when the whole arboreal vegetation on it at the time it was taken in hand has been exhausted by successive annual fellings; so that, at the expiration of the revolution, the total area will consist of a regenerated forest, stocked with trees of various ages. The duration of the revolution is based on the age at which trees of the same species and in the same conditions of vegetation are considered to be ripe for the axe. Therefore, if the age at which trees are to be felled be one hundred years, the revolution would include a like number of years during which the forest must be worked yearly in such proportion as to afford about an equal quantity of the same produce for one hundred consecutive years; so pursuing the same system with new arboreal generations in perpetuity.)

2. The cubic volume of the ligneous material standing on the whole area has to be estimated, to which the computed future volume, or increment resulting from the growth of the trees up to the time they will come in turn to be felled, has to be added.

3. The total of the present and future volumes being then divided by the number of years comprised in the revolution, the quotient will show the quantity of produce that the forest is capable of supplying yearly for ever. Let R be revolution; V , present volume; a , the increment, or future volume; A , the annual supply: then it will be—

$$\frac{V + a}{R} = A; \text{ or } A = \frac{V + a}{R}.$$

This is the theory of the method generally adopted for the purpose of ascertaining the capability of forests as regards the annual supply derivable from them. The working of State forests is divided into several periods of the revolution, which come in rotation after exhaustion of all mature trees on the sections comprehended in the period. In practice, when the periods are of short duration—under twenty years, for instance—the experiments relative to the annual increase are generally neglected, and the estimates are only made upon the present volume. The latter mode of estimation is evidently the best adaptable to our native forests, where so many superannuated trees form the largest portion of the present volume of the forest.

In the following table, the annual acreage, and the estimates in superficial feet, are taken in lieu of the cubic volume they are intended to represent. The estimates apply to a period of time—say, two years after formation of a special forest administration—when the New Zealand timber exports to Europe are supposed to be fairly started.

TABLE I.

EXTENT of FOREST LAND, as required to supply annually and permanently the Demand for a Given Quantity.

1. Total Area of Valuable Forests in the hands of the Government, taken as	2. Amount of the Demand (for Sawn Timber only), including Colonial Consumption and Exports, per annum, taken as	3. Average Yield of New Zealand Forests per Acre (for Sawn Timber only), taken as generally stated by Saw-millers.	4. Annual Acreage of the Fellings required to supply the Demand per Column 2.	5. Annual Acreage required to supply the Demand for Logs, Piles, Fencing Stuff, Shingles, and Fire- wood, taken as	6. Total Annual Acreage required to supply the General Demand per Columns 4 and 5.	7. Total Area systematically required to allow the Acreage per Column 6. The Revolution taken as 125 Years.
Acres.	Superficial feet.	Superficial feet.	Acres.	Acres.	Acres.	Acres.
5,000,000	300,000,000	15,000	20,000	20,000	40,000	5,000,000

* The fundamental conditions of a proper management of State forests consist—(1) in determining the quantity of the annual cuttings, so that about the same quantity may be obtained yearly and permanently; and (2) in operating, as regards the cuttings, in such manner or proportion that the natural regeneration of the forest should not thereby be impeded. Natural regeneration on the worked areas is secured by a judicious reservation of trees intended for seeding, and protection of the seedlings against prevailing winds. Plantations and transplantations on these extensive woodlands are only resorted to as an exception to the general rule.

Remarks.—Column 1: From information supplied by the Survey Department, the total area of bush land in the colony which may be available for the purpose of immediate systematic treatment consists of—

				Acres.	
In the North Island	...	...	...	3,328,797,	out of 9 blocks.
In the South Island	...	...	...	2,418,284,	out of 8 blocks.
Total	...	...	...	5,747,081,	out of 17 blocks.

There is also in the South Island a total area of bush land of 6,314,012 acres situated in country said to be inaccessible.

The total area as taken in this column has been reduced by 747,081 acres, on account of presumed open spaces in the interior of forests, dilapidations, &c.

Column 2: For 1875–76 the supply taken out of the public forests for sawn timber only, as given by the Commissioners of Lands, amounted to about 150,000,000 superficial feet.

The increase from 1875 to, say, 1882, is, approximately	80,000,000	„
The exportation to Australia already exceeds	10,000,000	„
The expected exportation to Europe, at beginning, is		
taken as	60,000,000	„
Total, as above	300,000,000	„

Column 5: The demand for that class of forest produce is enormous, but the lack of information does not allow any basis for estimation. Should the right extent of the required acreage be above the one taken—should it be, for instance, 30,000 acres—then the area per column 7 should be short by 1,250,000 acres.

Column 6: The annual acreage is here taken as the total surface of separate lots of ground occupied by the trees to be felled. The forest is supposed to be worked by thinnings, and the produce given by the said totalized acreage is in reality supplied out of a field of operation extending farther than the stated totalized acreage, the extension itself depending upon the local condition of the forest.

Column 7: The activity of the arboreal vegetation in New Zealand, as bearing on the intrinsic value of the timber, renders it advisable that trees of the most valuable descriptions should not be felled under the age of 125 years; besides which, it may be remarked that annual crops of trees at that age will be found more profitable than crops under it.

The above observations relating to the subject of extent of State forests in the colony will be resorted to as a basis for rules and regulations further suggested.

IV. ADMINISTRATION OF THE STATE FORESTS IN THE COLONY.—TRANSITORY ORGANIZATION.

When the establishment of State forests shall have been definitely proclaimed, and also a special department organized for the management of this most important portion of the public estate, the Administration of Forests will then take rank among other colonial institutions whose function it is to supervise and improve the production of the public revenues. All collateral and scientific considerations touching forestry being set aside, the duty of the forester on executive service will consist in obtaining from the forest intrusted to his care all the revenue it can afford consistently with the permanence of the supply derivable from it. At the head-quarters of the department, forest interests will be observed and taken in hand from a more general point of view; production, as arising from either public or private forests, will be encouraged and fostered by showing the practical advantage of working forests on right principles, and also by reliable information being issued to the public in respect to the exportation of New Zealand timbers; so that the timber trade may soon be relieved from a state of stagnant depression, the effects of which bear so severely on all other commercial transactions, for forest industries and trade are paramount in this colony, and the prosperity of the community at large is greatly dependent upon their welfare.

No serious argument against the advisability of forming a forest department could ever have been upheld; and only difficulties of execution—however, more apparent than real—have, it seems, hitherto caused delays in the carrying out of the enactments of the forest law. These difficulties may apply to wholesale necessary changes in the present system of management of the Crown timber lands, which changes would involve, it is presumed, extra expenditure as well as the difficult task of organizing the requisite body of foresters, &c.

There cannot be any doubt as to the absolute necessity of introducing sweeping reforms

in the present management of these forests: no proper and remunerative treatment of the forest is practicable under the system of bush licenses and leases granted by superficial measure of the land; but ample power, under the Act, is given to the Executive for the purpose of issuing new regulations on the subject. (The reforms suggested on this particular point will appear in the sketch of regulations hereinafter submitted.)

Again, the object of the administration of forests, being to supervise and promote colonial interests of the highest importance, would be frustrated by the interference in such business of the Land Boards acting under the powers relating to Crown timber-lands generally, as given to them by "The Land Act, 1877," and especially in reference to such powers under sections 86 and 90, Part IV. of the same Act; but, here again, it may be observed that these powers would be virtually rescinded solely by the fact of the Governor exercising the superior powers vested in him, specially under sections 88 and 167 of "The Land Act, 1877," and generally under Part V. of the same Act.

In reference to the question of expenditure, and to that of the organization of the forest service, no substantial objection could be raised should the subject be viewed in its proper light. It is obvious that no fully efficient and scientific staff of foresters, such as may issue at a future time from our forest schools, can be formed at present; and, moreover, it must be understood that an institution of the kind is not immediately needed here, for the most urgent wants of the colony in respect to its forest affairs are simply these: (1) To stop at once the rapidly-progressive destruction of these magnificent forests, as now proceeding through the general practice of working indiscriminately extensive areas of the same, without any care for the natural regeneration of the forest; and (2) to obtain a most legitimate colonial revenue out of the immense quantity of produce which these forests yearly supply towards the general demand. Therefore, until we can attain to full efficiency in the service (such as the splendid arboreal vegetation in New Zealand will lead us to anticipate when our forest industries and timber trade shall have been developed and extended in the proportion they are entitled to), the administration of the timber-lands must be submitted to a transitory organization, and confined within the boundaries of practical forestry, as comprehended in the terms "conservation" and "revenue." Thus, for the present practical purposes of our forest administration, it may be contended that, not only for reasons of economy, but principally for the good of the service itself, no noticeable, if any, extra expenditure should accrue to the budget of the Land Ministry, as the staff of foresters at first necessary ought to be drawn from the general Land and Survey Departments. These officials, already trained in the business of administrative routine, would readily understand the bearing of, and the process of bringing into force, the new forest regulations; also, acting under instructions issued by the central forest administration, these officials would, if not already trained, soon become competent in the execution of their official and technical duties.

The number of the forest officers on executive service must, of course, be proportionate to the amount of work they will have to perform. Judging from the approximate estimates previously given (and still judging *a priori*, as the lack of information compels us to do), it may be, however, asserted that no less than 30 rangers, assisted by an adequate number of forest-guards, say, 90 or 100, all being under the authority of 10 inspectors, should constitute the staff of foresters on executive service^{at} the beginning—that is to say, for the purpose of allowing the means of operating successfully through a period of experimentation. Of course there will be no objection to the extension of the staff as soon as practical and profitable results may be obtained. The inspectors and rangers to be, in the first instance, taken out of the present forest service, and the number of them as above given to be supplemented, if necessary, by the transfer of officials from the Survey Department into the Forest Department. Forest-guards to be obtained by the transfer of men of the Armed Constabulary into the forest service. It must be observed that the duties of rangers and forest-guards will consist of actual and considerable work to be done by them, which will not any longer be confined to a simple police function, as is the case at present.

The general direction of the Forest Department would be given to the Minister of Lands, whose clerical staff would do the office work of the department. Superior control over the executive service should be exercised by the Commissioners of Crown Lands, acting as general inspectors, under the direct authority of the Minister of Lands.

The result of such an organization would be a considerable economy of expenditure, combining as well the exigences of good service which are so imperatively required for the success of a new institution destined to promote colonial interests of the highest importance,

V. REVENUE DERIVABLE FROM STATE FORESTS.

Semi-official statements relating to the forest revenue in Germany, circulated in the colony, had the effect of representing the amount of the said revenue as not being above a few shillings per acre, from which a large amount of expenditure had to be deducted. Upon the admitted value of that source of information, it was resolved, in the House of Representatives, a few years ago, that, "judging from the results attained in Germany, the conservation or regeneration of the indigenous forests in this colony would not pay."

In the said statements, the forest revenue, arising from the annual acreage of fellings, has been ascribed to the whole forest area, through an erroneous analogy between the productive powers of high timber State forests and those of freehold property: but dissimilarity in the conditions pertaining to each kind of property does not admit of comparison; besides which, the annual acreage being calculated on only a portion of the whole arboreal stock, it cannot be taken as the produce of the whole forest. However, the essential point to be observed is the amount of revenue derivable from State forests, when managed under such principles as are generally adopted in Europe. The item of expenditure involved in the management of those forests also requires consideration.

All State forests in Europe have been, and many are still, encumbered with forest rights and servitudes of feudal origin, the commutation of which necessitates expenses generally included in the expenditure of the Forest Department; which, with other causes of expense, such as the preservation of game, the collection of the forest revenue, &c., are in Germany also included in the departmental expenditure. In France, the Forest Department has nothing to do with the preservation of game, nor with financial matters; besides which, all forest rights and servitudes have been redeemed, and the departmental expenditure is thus confined to the salaries of the staff and forest-guards, and does not exceed 5 per cent. of the revenue; whilst in Germany, owing to causes just stated, the average forest expenditure in the German States hereafter named is above 30 per cent. On the other hand, as may be observed in the following tables, the gross returns from the annual sales of the standing timber have hitherto been less in France than in Germany, the cause for such a difference being mainly that a systematic treatment of State forests had been adopted in Germany long before it was introduced into France, and that, the revolution or age of maturity of forest trees having been fixed so high as a hundred to two hundred years, according to species, climate, soil, &c., forests in Germany yield at the present time a larger number of trees, arrived at maturity and full dimensions, than those of France, thereby affording larger money returns.

TABLE II.

FOREST REVENUE in EUROPE: Column 1 showing the Total Area of State Forests in each State; Column 2, the Annual Acreage devoted to the Fellings, as the computed Total Surface of the Separate Lots of Ground where Trees have been felled;* Column 3, State Income per Sales of the Standing Timber, as the Exhaustive Product per Column 2; Column 4, Income per acre, per Column 2; Column 5, Amount of the Departmental Expenditure under circumstances special to each State; Column 6, Percentage of Expenditure on Revenue.

NAME OF STATE.	1.	2.	3.	4.	5.	6.
	Area.	Annual Acreage.	State Income, per Column 2.	Income per Acre, per Column 2.	Amount of Expenditure.	Percentage of Expenditure.
	Acres.	Acres.	£	£ s. d.	£	Per cent.
Bavaria	3,000,000	24,000	1,261,279	52 11 0	494,287	39
Hanover	591,000	4,728	408,200	86 6 0	128,000	31
Saxony	394,000	3,152	350,000	114 6 0	101,000	29
Prussia	6,216,500	49,732	2,100,000	42 4 0	1,100,000	51
France	2,500,000	20,000	1,400,000	70 0 0	70,000	5

FOREST REVENUE in the COLONY (as might be expected two years from date of formation of a special administration, acting under the same principles as adopted in Europe).

New Zealand	5,000,000	40,000	1,000,000	25 0 0	See ante.	
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* The working of high timber forests by thinnings, being intended to secure the natural regeneration of the forest, prevents at the same time the existence of large open spaces or blanks in the interior of the forest, which would prove fatal to the surrounding standing timber.

Remarks on Revenue in Europe.—Columns 1, 3, 5, are taken from Captain Campbell-Walker's reports on the forests of the German States ; and for France the information is taken from official returns, including ten consecutive years, up to 1870.

For all of the above State forests, the average duration of the revolution is taken as 125 years.

As a rule, the upset prices at the auction sales are calculated to allow one-third of the market value of the forest product as the share of the State.

Remarks on Revenue in New Zealand.—These estimates come in as the sequel of those given in Table I., in which the general yearly demand for produce out of the public forests is taken as absorbing yearly the exhaustive yield of 40,000 acres of forest. Out of that total annual acreage, the consumption for sawn timber only is taken as 300,000,000 superficial feet, having to be supplied by the exhaustive yield of 20,000 acres, at the rate of 15,000 feet per acre. The estimated market value of the sawn timber is taken as follows : For the year 1879, sawn timber ranges from 7s. to 15s per 100 superficial feet, giving an average price of 11s. per 100. These estimates applying to a period of time when forest interests should have been improved, mostly owing to the exportation of New Zealand timbers to Europe being then fairly started, an advance of 2s. on the above average price for 1879 has been added to it. Thus,—

300,000,000 superficial feet of sawn timber, at 13s. per 100,	£
would be	1,950,000
The surplus quantity of the total annual acreage, 20,000 acres, applying to round timber also participating in the said advance in prices, is taken as representing a market value of	1,050,000
Total market value for the full contents of 40,000 acres of forest	£3,000,000

—one-third of the total market value being taken, as in Europe, for the share of the State.

In the above total quantity of 300,000,000 superficial feet of sawn timber is included an approximate estimate of 60,000,000 superficial feet towards the expected exportation of New Zealand timbers to Europe : 60,000,000 superficial feet (equal to about 120,000 tons), at an average value of 13s. per 100 feet, would be £390,000. The timber exports from Canada to England are £5,000,000 per annum (Report of Colonial Office, England, 1878). New Zealand timbers are generally superior in intrinsic value and beauty to Canadian timbers. Again, the exportation of New Zealand timbers should not be confined to England alone, and ready markets for our forest produce, at remunerative prices, may be found elsewhere. From the above-stated approximate figures it may be expected that capital to an amount of about £1,000,000 would come yearly from abroad, as money derived from the timber exports.

The comparison of the revenue per acre, as above stated, for New Zealand and Europe, will already indicate a difference in the commercial value of timbers, here and there, worthy of attention in this colony, while at the same time it may be remarked that the intrinsic value of New Zealand timbers compares very favourably with those indigenous to or imported into Europe, as proved by the experiments of two eminent colonial engineers, the late Mr. Balfour, C.E., and Mr. Blair, C.E.

VI. SKETCH OF REGULATIONS BY PROCLAMATION OF THE GOVERNOR.

Whereas by section 91, Part V., of "The Land Act, 1877," it is enacted that the Governor shall have power to declare any forests belonging to the Crown to be subject to the provisions under this Part of the Act ; and, by section 93 of this Part of the Act, it is enacted that the Governor shall have power to make, alter, or repeal regulations and by-laws for the management and administration of the affairs of the said forests ; that any such regulations and by-laws may be made applicable to forests under this Part of the Act generally, or to one or more of such forests in particular ; and that the Governor may by any such regulations or by-laws impose reasonable penalties not exceeding fifty pounds for any one offence :

And whereas, by sections 88 and 167 of "The Land Act, 1877," the power to reserve and to withdraw from sale, leasing, or licensing any Crown land is vested in the Governor absolutely :

And whereas it is expedient that the total area of the timber-lands in the Colony of New Zealand, such as at the present time is remaining in the possession of the Crown, should be withdrawn from sale, and so reserved for State purposes, except in cases hereunder specified,

and that the conservation of these forests, and the regularity of the supply derivable therefrom, should be provided for by subjecting the said forests to skilled management and proper control :

Now, therefore, I, . . . the Governor of the Colony of New Zealand, in pursuance and exercise of the powers vested in me by the said Act, do hereby order and proclaim that the total area of the Crown timber-lands in this colony shall, from the date of the promulgation of this present order, be withdrawn from sale, leasing, or licensing, and shall be reserved for State purposes, saving and excepting from such general reservation such portion or portions of the forest lands as it may be deemed expedient, from time to time, to open up for purposes of actual settlement or public works ; and that the timber standing on the said lands shall be disposed of and yearly offered for sale by auction upon the scale and in the manner hereunder specified ; and, in pursuance and exercise of the said powers vested in me under the Act, I do hereby make the rules, regulations, and orders hereunder set forth for the management and administration of the said forests :—

1. There shall be a special administration for the management of the State forests, to be intitled "The Forest Department." The Forest Department shall be administered under the immediate authority of the Minister of Lands. Administration.

The general direction of the Forest Department shall be provisionally added to the ordinary duties of the officers of the Crown Lands Department.

The Commissioners of Crown Lands shall, under the direct instructions of the Land Minister, exercise the duties of general inspectors in respect to the executive service of the Forest Department.

Inspectors and Rangers of Forests shall be appointed by the Governor, on the recommendation of the Land Minister ; Forest-Guards shall be appointed by the Director-General of the Forest Department. Forest-Guards shall be made responsible for any damages and wrongs perpetrated on the sections of forest specially assigned to their supervision, unless the said damages and wrongs have been duly authenticated by the Guard and reported by him to the Ranger.

Rangers and Forest-Guards shall be required to take the oath prescribed for constables.

2. All actions, suits, and proceedings at law, respecting State forests generally, shall be prosecuted by the Commissioners of Crown Lands, acting in exercise of their powers and duties as defined by sections 11 (subsections *c, d, e, f, g, h*), 12, 13, 14, 15, and 16, of "The Land Act, 1877." Law proceedings.

All purchase-moneys in respect of sales of the standing timber-trees, and moneys payable by way of deposit, or in respect of moneys due for damages and wrongs, or due from any cause whatsoever in respect to State forests generally, shall be paid to the Receiver of Land Revenue. Finances.

3. All State forests in this colony shall be subject to systematic conservation, and the quantity of timber and wood annually derivable therefrom shall be ascertained and determined as soon as practicable, to the effect that the annual fellings in each forest should be restricted to such a quantity of forest-produce as may be available regularly and permanently. Systematic conservation.

4. Timber-trees in State forests shall be annually offered for sale by public auction at such upset prices, and in such quantities expressed in cubic feet, as shall be determined by the Minister of Lands, on the report of the Director of the Forest Department. Timber sales.

The standing timber-trees, or any timber or wood, being found cut down in State forests, accruing from damages and wrongs therein perpetrated, shall be sold as approximately estimated in cubic feet. No such timber shall be offered for sale unless the same shall have been previously marked with the special stamp-hammer.

The Commissioner of Crown Lands shall be the Chairman, and will be assisted by the local forest officer and the Receiver of Land Revenue at the timber auction sales.

On the receipt of special instructions from the Minister of Lands respecting the timber auction sales, the Commissioner of Crown Lands shall give notice of the time and place at which the auction sale is intended to be held, and the notice shall be published in the *Gazette*, or in a local newspaper, not less than six weeks before such auction shall take place, and the special clauses and conditions and general terms of the sales shall be inserted at the same time in the *Gazette* or newspaper.

If any purchaser of the timber at the auction sale declares that he has a saw-mill, or any other establishment in connection with the timber trade, situated in the interior of or near a State forest from which he used to draw his ordinary supply, and that he shall require for the maintenance and working of his establishment a quantity of timber equal or about equal to

that just bought by him, it may be decided at once by the Commissioner of Crown Lands, as he shall think fit, that the required amount of annual supply shall be granted to the said purchaser for two consecutive years, under the same terms and conditions as made for the present sale; the delivery of timber-trees applying to the second year to be made after the entire fulfilment of the terms and conditions of the sale, and then the second-year operations to be subject to the same terms and conditions as for the first.

All enactments, rules, and regulations in force relating to sales by auction of Crown lands shall be made applicable to the sales of timber on State forests.

**Purchaser's obligations.
Prohibitions and penalties.**

5. After completion of the auction sale, no changes or addition whatever in respect to the number and species of the trees included in the sale shall be allowed, and the occurrence of such change or addition will render the purchaser liable to a fine equal to twice the value of the trees not included in the sales (but the fine not to exceed fifty pounds sterling), notwithstanding the surrender of the timber unduly cut, or of its value. Any forest officer who shall permit or tolerate such changes or additions shall be fined to the same amount, besides being responsible for damages.

The purchaser shall not begin working in the forest before written permission has been remitted to him by the local forest officer, or otherwise he may be prosecuted at law as a delinquent in respect to any wood cut by him.

The purchaser shall be responsible for any damages and wrongs perpetrated within the acreage of his fellings or around the same within a radius of two hundred and fifty yards.

The purchaser shall be bound to respect all trees marked to be reserved, and no compensation shall be admitted by the fact of the purchaser having left trees standing in lieu of reserved trees cut by him. The fine incurred in the occurrence of reserved trees having been cut shall be equal to four times the value of the timber, but not to exceed fifty pounds sterling, notwithstanding the surrender of the same, or payment of its value.

The purchaser shall not cut or remove any timber or wood in or out of his acreage during night-time, under penalty of five pounds sterling.

It is prohibited to peel or take the bark off standing trees, or to remove the bark thereof, unless it is authorized by special clause of the sale, under penalty of not less than two or more than twenty pounds sterling, notwithstanding payment of the damage so perpetrated.

Any infraction of the clauses and conditions of the sale, relating to the mode of felling trees and to the cleaning of the acreage of the purchaser, will be punished by a penalty of not less than two or more than twenty pounds sterling, notwithstanding any other sum of money to be due for any damages resulting from such infractions.

The local Ranger shall indicate, in writing, to the purchaser such places where he can build a lodge or a working-shop, which temporary buildings shall not be transported to any other place, under a penalty of two pounds sterling.

The transportation of the timber and wood shall be made through the roads or in such direction as shall have been indicated by the special clauses and conditions of the sale, under penalty of two pounds sterling in case of infraction.

The cuttings, the removal of timber and wood, and the clearing of the acreage shall be completed within the period specified by the special clauses and conditions of the sale, unless a special delay be granted by the Forest Department, under a penalty, in respect to non-execution, of not less than two pounds sterling and not to exceed twenty pounds sterling, notwithstanding payment due for any accruing damages.

It is prohibited that any purchaser or men in his employment shall light fires anywhere else in the forest than in their lodge or working-shop, under penalty of not less than one pound sterling and not to exceed five pounds sterling, notwithstanding compensation for any damage resulting from the infraction.

The purchaser shall not bring into his acreage any timber or wood foreign to it, under penalty from five pounds sterling up to twenty pounds sterling.

From date of his written permission, and until he has obtained his clearance, the purchaser shall be responsible for any damages and wrongs perpetrated within the acreage assigned to his fellings, or within a radius of two hundred and fifty yards around it, unless such damages and wrongs have been reported by him or his agent to the Ranger.

The verification or inventory of the acreage worked upon by the purchaser shall take place within two months from date of the expiration of the period granted for the cleaning of the acreage. Notice of the verification shall be given to the purchaser ten days before it shall take place.

No clearance or discharge of his obligations in respect to the working of the said acre-

age shall be given to the purchaser until the completion of the said verification ; but, should the forest officer in charge fail to perform the verification within the said period, the purchaser, at the expiration of the two months' delay, will be exonerated from all responsibility in the case.

VII. EXPORTATION OF NEW ZEALAND TIMBERS TO EUROPE.

There is a recent work, modestly called a "Hand-Book of New Zealand," by Dr. Hector, M.D., C.M.G., F.R.S., which commands the attention of all persons of intellectual and philanthropical disposition, besides touching the more immediate interest and pride of the colonists. Therein, next to statistics evidencing the great progress already accomplished by the young colony in all directions, may be observed a magnificent tableau of the natural riches of the colony, not painted in gleaming or dazzling colours, but as simply shown by stern, official, and indisputable figures. In this admirable work will be found some most valuable information respecting the forests of New Zealand. The total area of public and private forests is stated to be about 20,000,000 acres. Also is given a descriptive list of the principal forest trees in New Zealand, and tables showing the intrinsic value of the timber, the quantities exported, &c.

The immense demand in Europe for timber of the economic value which it is shown, by the tables just referred to, that New Zealand timbers possess, makes it a matter of surprise that the question of exportation to Europe has been so long neglected. From these tables, it appears that timber, up to the present time, has only been exported in any appreciable quantity to the neighbouring colonies, whilst little or none has found its way beyond. Has not the time, therefore, arrived when this question of exportation should receive serious consideration?

The exportation of New Zealand timbers to Europe should be directed with the view of specially supplying the place of the hardwood timbers thereto indigenous or imported ; scarcity of, and consequent high prices for, that particular class of timber being very much felt in England and France at present, while the demand for the same is increasing out of all proportion to any quantity available from the old sources of production.

New Zealand timbers should be placed in the European markets for such commercial value as may be indicated by a comparison of their intrinsic value with that of oak, taken as the standard timber.

An important distinction should be made in reference to the intrinsic and commercial values of oak. There are two varieties of the species which are most in demand—namely, the hardwood oak (the English and Continental "pedunculata"), and the soft, or rather softer wood oak (Continental and American "cerris"). The former gives a strong, durable, compact, and fine-grained timber, which, although it is difficult to work, reaches the highest price in the English timber markets ; but the production of this species has been so much reduced, and its timber is now so scarce, that it has little commercial importance when compared with the immense demand in favour of the latter species, whose timber is also included in the class of hardwoods in Europe, and which is admitted to be a more suitable timber for coopers' and joiners' work than the "pedunculata."

Experiments made in England on the strength and weight of the English oak "pedunculata" show its strength to be 176 lb. as the breaking weight on a sample one foot long and one inch square, and the weight per cubic foot to be from 46 lb. to 51 lb.

Tables of experiments made here will show that very many species of New Zealand trees are superior in strength to the English oak, which is now sold in England at from £6 to £7 10s. per 100 superficial feet, in its green state.

As regards the Continental and American oaks, the experiments at hand apply to the strength of the American oak only. Mr. W. N. Blair, C.E., the experimenter, attributes to that timber a degree of strength not exceeding the breaking weight of 155 lb., under the same process of experimentation as above mentioned.

Now, the intrinsic value of this class of timber may be, to a certain extent, deduced from its market value: 1. The French oak "cerris" and also oak imported into France from Austria, Hungary, Galicia, and the Adriatic, is quoted outside of the toll-gates of Paris at the rate of £2 per 100 superficial feet (*Revue des Eaux et Forêts*, October, 1878). 2. The Quebec oak is quoted at £6 per ton in the London market (*European Mail*, February, 1880). 3. The Dantzic and Memel oak is quoted in the same market (the same source of information) at £5 per ton.

It may be inferred from the above facts that the requisite strength for our indigenous

timbers to compete successfully with the Continental oak would be from 160 lb. to 165 lb. as the breaking weight. Then, we have the birches, rimu, kauri, and other descriptions, which have equal or adequate strength for all the uses the Continental oak is applied to. Rimu, for joiners' work, is as good a timber as the Continental oak: its strength, tested by Mr. Blair, on twenty-five samples, attains 175·40 lb. as the breaking weight, besides which the fineness of its grain and beauty of tints give it a value unquestionably above that of the said oak for joiners' plain and ornamental work. However, it must be borne in mind that oak possesses internal properties—the purity of the sap in it and the absence of any noxious juices—which render it most valuable for the manufacture of wine-cask staves, an article of immense demand in England and France. Ready-made staves of oak are imported into England and France from America, the Baltic, and Eastern Europe. The planks intended for staves are always split and cleared from sapwood. Under this form of conversion, oak reaches higher prices than those above quoted.

The wood of the New Zealand birches possesses all the requisite qualities to make staves, and there are reasons to believe that its juices would be found, by analysis, perfectly free from any noxious matter. This would be a matter of great importance, for each birch-tree giving an average of about 3,000 superficial feet of planks, clear of sapwood, would represent in the English and French markets a value of about £60. Thus our birches would be found a most valuable timber, and a perfect substitute for the Continental oak in all its uses.

Some descriptions of the pine tribes, converted into deals of 12 feet in length, 3 x 9 inches, reach very high prices in the London market. Quebec pine, manufactured in these dimensions, fetches £24 per ton=£5 per 100 superficial feet nearly. Christiania pine deals, in the same dimensions, are quoted at £4 per 100 superficial feet (*European Mail*, February, 1880).

Besides the value which New Zealand timbers would be entitled to in the European markets, there are also to be found in our native forests other sorts of produce which could be most profitably utilized. The bark of some species of our indigenous trees, as intended for tanning purposes, and experimented on at the Wellington Museum, gave the percentage of tannin as follows: Rata, percentage of tannin, 18·56; hinau, 21·78; kiritoatoa, 23·2.

A sample of the best French bark, young oak, sent to the writer, was analysed at the same institution (No. 2568), when the percentage of tannin was found to be 12·8. Prices for the bark of oak are about the same in England and France, and have increased in both countries about 100 per cent. during the last twenty years, and will further increase, not only because of an increasing consumption of leather, but mainly owing to the fact that the sources of production are becoming exhausted everywhere.

The above particulars are only a short abstract out of many important points, bearing on the subject of exportation, which require the serious consideration of the colony.

The whole forest question in New Zealand, as comprised in these terms—Conservation, Revenue, and Exportation—cannot be properly dealt with and treated otherwise than by the formation of a special administration, having for its objects to investigate and promote the great interests it concerns.

Wellington, April, 1880.

A. LECOEY.

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By authority: GEORGE DIDSBURY, Government Printer, Wellington.—1880.

Price 9d.]