National Forestry

Address

BY

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NATIONAL FORESTRY.

THIS Pamphlet contains the text of an Address delivered by MR. D. E HUTCHINS, I.F.S., before the Annual Meeting of the New Zealand Forestry League, Incorporated, held in the Dominion Farmers' Institute, Wellington, on July 17th, 1918, with editorial comment by the "New Zealand Times," in which paper the address appeared as a series of articles. ∴ ∴ ∴

SOME POPULAR ASPECTS OF NATIONAL FORESTRY

The official statement prepared under the direction of the Hon. D. H. Guthrie, and published in the "New Zealand Times" of August 28th, showed that a total area of 444,017 acres had been provided for soldier settlement, at a total cost, in buying land, and loans to the soldier settlers, of £1,656,043.

This represents a vast amount of good work accomplished, but is it certain that the work is up to date? Unfortunately, the details show that this land is to be settled not by modern methods, but in the rough-and-ready way of fifty years ago, when land had little value and timber less. Such methods are out of date. They mean loss. They mean loss of production at a time when everyone is agreed more must be got out of the land to pay for the war debts. If we hand over good forest, or soil of poor agricultural value, to the settler, we force him to destroy the forest on the chance of making something out of it—a penny, a shilling in the pound, perhaps—or perhaps less than nothing, if the land reverts to Gorse, Manuka, and scrub. It is a bankrupt business! If, however, we first demarcate out the land best suited for State forestry, the State is laying up wealth for the future: and the necessary expenditure in the process of forest development and improvement, gives the settler just that which he generally wants most, *ready money, without running into debt.*

Let anyone buy a large-scale war-map, and see the final land-settlement that has been arrived at, after centuries of trial, in the wealthy populous countries of, central Europe. Be it France, Germany, Switzerland, Austria, or Belgium: be the country republican, limited monarchy, or ruled by autocratic emperors, the result is the same, the poor land, (about a quarter the total area) is under productive forest, which pours its millions yearly into the coffers of the various States—Prussia, for instance, £4,500,000 net yearly.

It is useless to attempt to shut our eyes to what has been done in Europe, latterly in America, and since the war started in Australia and in England. The no-State-forestry policy of England cost the country £37,000,000 during the first two years of the war, over and above the usual heavy timber bill for imported timber. £15,000,000 is now to be spent (as a first instalment) on a scheme of national forestry.

New Zealand must keep pace with the rest of the advanced nations, and settle its bush and mountain lands on modern lines. How this is to be done was well shown in an address, of which we publish the first portion to-day, delivered by Mr D. E. Hut-

chins, I.F.S., at the last annual meeting of the Forestry League. The procedure there sketched was agreed to in principle by the two Ministers present at the meeting, Sir Francis Bell and Mr Guthrie. The earlier portion of the programme was, indeed, promised by the Prime Minister at the last full session of Parliament. ("New Zealand Times," September 24th, 1918.)

FOREST LEAGUE ANNUAL MEETING, 1918.

ADDRESS BY D. E. HUTCHINS, I.F.S.

1.

Forestry in New Zealand may be considered under various aspects. The scenic and the climatic you are familiar with. Most of those here this evening have read the pamphlet on floods in New Zealand rivers, by Professor Grossman, of Auckland.

Two years ago I had the pleasure, at the inauguration of the Forestry League of giving my first impressions of New Zealand forestry. Since then I have travelled again through New Zealand, from the northern Kauri forests to Invercargill. I have discussed the forest question with men of all shades of opinion, bushmen, sawmillers, timber-dealers, scientists, farmers, civil servants, journalists, and members of the Government. Many farmers unasked and of their own shrewd common-sense and practical knowledge of the bush have sketched to me exactly what scientific forestry could do in New Zealand. Under the able guidance of the Lands Department I have digested a weighty mass of Blue-books. Let me at once record my obligation to its kindly staff. I have done the demarcation of the Waipoa forest and camped for a month in a Kauri forest.

This experience has not altered my first impressions but it has added materially to them. The sufficiently rapid growth of native trees has been confirmed, and it has come out that Kauri is the record largest timber-tree of the world. It has been shown further, in my report now being printed, that in 80 or 100 years, all the possible costs of this war can be paid out of half a million acres of restorable Kauri forest. The calculation is a simple one. A normal mature Kauri forest will in the future return quite £10 net per acre per year. This capitalises at 4 per cent. to £250; and £250 x 500,000 = £125,000,000. The war will, at the worst, cost within this sum. There is good evidence that a careful policy of forest demarcation and forest redemption could secure this half-million acres of restorable Kauri land.

It looks as if the other forests of the Dominion, if carefully handled, would be able eventually to pay a large part of the whole public debt.

Think of the Kingdom of Wurtemberg with an average return of £1 10s per acre per year net—the average return from all its State forests, good, bad and indifferent!

FOREST SETTLEMENT.

Half a million acres of normal Kauri forest would largely augment the number of bread-winners settled permanently on the soil. Thus, when war broke out, the number of agricultural and pastoral bread-winners in New Zealand was 110,025. Less than half a million acres of normal forest, in full working, would provide permanent employment for 10,000 men settled on small holdings in the forest, and employed on forest work, logging and sawing. If, as in Europe, they had farm allotments as well, the number would be larger.

It is the result of an official inquiry that average employment on the purely pastoral sheep-runs of New Zealand is at the rate of one man per 3003 acres. There is hardly any forestry, however poor the forest, that would not give more employment than this, while a fully stocked Kauri forest would give employment at the rate of one man per 75 acres. This is better even than dairying on the poor Kauri lands. Indeed, the result of an inquiry as to the exact profit being made on the poor land near the Waipoa forest showed that after much disappointment and loss, the dairy farmers remaining were just making

a living! All they got was a poor living wage: the State nothing.

If New Zealand possessed cultivated forests in the same proportion as the most advanced States of central Europe, viz., 25 per cent. of its area, the forests would eventually support a population nearly the same as the whole present population. Since 16 million acres, at an average of 5 persons per family, and 200 acres of forest per family, would mean with the resulting sawmill employment a population of some 500,000 souls. Working half on small farms and half in the forest, as in Europe, the population supported would be some 1,000,000. I here take a general average of 200 acres of forest to support a family. But if we take European figures the employment in valuable forest, such as Kauri forest, would be at the rate of one family maintained per 75 acres. Probably about 200 acres per family may be taken as a general average for all New Zealand forests once put into good order. In a word, get good forest on to the poor lands of New Zealand, in the same proportion as central Europe, and you eventually settle on the land 1 million souls. The small English, war-insurance, foresty scheme of 1,770,000 acres only (now adopted) is calculated to permanently settle on the land 25,000 families, say 125,000 souls.

Old records show that many years ago, into the mountain forests bordering the Rhine Valley, "colonists" were regularly introduced and settled as forest workers on small farms (See my "Journal of a Forest Tour," Maskew Miller, Capetown). What the mountain forests bordering the Rhine Valley have now worked out to, is well shown on the large scale war-map on the wall. This demonstrates that, taking the highly-industrialised Rhine Valley, with its teeming population, together with the Vosges and Black Forest mountain areas on each side, quite one-third the total area is permanent cultivated forest. New Zealand colonised almost entirely by men from the British Isles, with the Britisher's contempt for "Continental ways," has never tried forest settlement. The settlement, that would not suit farms, or mines, or towns, has been left undone. A good deal of farm-settlement has been attempted with heavy national loss on land better suited for forestry, the general position now being that about 1-3rd of the land area of New Zealand still remains unoccupied.

This 1-3rd of New Zealand unoccupied, and 1-3rd of the Rhine country area under productive forest is significant.

During my recent lecturing tour in the South Island, I found a lack of exact knowledge of what was meant by the scientific forestry of other countries. Little was understood of the millions that were being poured yearly into the coffers of European States, or of the existence of a large body of men trained in scientific forestry at the universities. My audience often had scarcely heard of the New Zealand Forest League or its aims.

THE GOVERNMENT TIMBER PLANTATIONS.

From 1896 to 1909 the State plantations were managed by an amateur forester—De mortuis nil nisi bonum. From 1909 till quite recently they managed themselves! In 1913 the Forestry Commission pointed out where the State plantations were inferior to the private plantations on the Canterbury Plains and elsewhere. Insignis pine-planting was then introduced, and the further planting of the (more than risky) Larch stopped. That other conifer of proved value in New Zealand, the Macrocarpa cypress, has not yet been planted to any appreciable extent. It demands some sylvicultural prevision and special seed-providing, which are not yet available. Eucalypts are strikingly better in the private plantations in New Zealand and in the Government plantations in South Africa.

The good feature of the Government timber plantations is the adoption of high-class dense planting, though at first, misled by European books, it was too high-class and too costly. None of the Australian Government planting is near the New Zealand in density, and very little of the private planting, in New Zealand, excepting some of Sir George Grey's planting on Kawau, and Mr James Deans's in Canterbury, together with some smaller plantations. The bad features of the Government timber plantations are:—Insufficient fire-protection, absence of "working-plans,"

and of "pot-and-pan" nurseries; a bad selection of the trees planted. The last two faults led to the failure straight-away of all the dry-country work, where trees were most sought after. North European tree-planting methods may not be always the best in a country that runs into latitudes considerably nearer the Equator than Algiers! Perhaps, also, the greater summer sun-power in the Southern Hemisphere may have some practical effect on tree-planting such as it seems to possess in some other aspects of plant life. In South Africa pot-and-pan nurseries have long been used for all tree-planting (except leaf-shedding trees) in every description of climate, from the dry hot-and-cold climate of the plateau country, to the wet climate of the coast and coast mountains, with rainfalls averaging nearly 100 inches. For its size, South Africa has more tree-planting than any country in the world, except Japan. Pot-and-pan planting is used in all the 163 Government nurseries (distributing some five or six million trees yearly), and the system has been in unbroken use for 35 years. I showed, by exhaustive trials, that it had many advantages over the Spanish-reed (bamboo)-section system of South Australia.

The problem now before the Government plantations in New Zealand is thinning. That requires the practical trained forester. As Sir William Schlich, the Oxford professor, pointed out in his recent review of New Zealand forestry, thinning is the crux of the matter. Good or bad thinning will make or mar the Government timber plantations. Supposing that the plantations are properly thinned, the recovery of the £2,000,000 sunk in the timber plantations will depend largely on whether the Larch gets disease before or after it is large enough to furnish railway sleepers. At present the Rotorua Larch looks its best. That in the Southern Island, which averages older, has suffered from the leaf-fall disease.

Happily for the Government timber plantations they have now been placed under Sir Francis Bell, but his hands would be strengthened if the facts regarding them were better known. All that is known generally about them is that the Government are doing good work in planting trees with prison labour. It is not known that they represent less than the 1-500th part of the forestry of the Dominion. Where plantations are really required is on poor soil in accessible localities; and, generally, in the forests, as may be provided by the "Working-plans." This year, 1917-18, South Africa is spending £194,000 on plantations and forest development.

FOREST ALIENATION WITHOUT DEMARCATION.

This is by far the most urgent matter in the New Zealand forestry of to-day, though as yet it is outside the functions of the Minister in charge of New Zealand Forestry. It is quite likely that in one year there may be alienated 3 times as much good demarcatable forest as it has taken the Dominion 22 years to plant at a cost of £2,000,000 (reckoning interest to felling time).

During the year ended March 31st, 1917, the total area of land alienated in New Zealand was 1,106,037 acres (Statistics of New Zealand, vol. 3, page 1). If, as is thought by those best in a position to know, some 100,000 acres of demarcatable forest are alienated for destruction yearly, one has the very simple calculation of 100,000 acres x £65 (planting costs with interest) = £6,500,000. Everyone is agreed that the country now wants every scrap of demarcatable forest left to it, otherwise why should it be spending £39,000 a year on timber plantations, or the Dominion altogether some £45,000 a year on forestry?

In the above calculation I have taken £65 per acre as representing the actual cost of timber plantations (plus interest at 4 per cent. for 40 years, the average maturity period for the timber); but the forest alienated without demarcation may represent a much higher value than that. It may represent £200 or £300 per acre value of timber on it now, plus another £200 or £300 per acre, the value, capitalised at 4 per cent., of all succeeding crops of timber. This supposes the case of a forest well stocked now and with young timber that by judicious thinning will have another stock of timber fit to cut in 20 or 30 years, and so on in perpetuity, the forest being cut over in a regular succession of compartments, so that it is always being cropped and always growing again; the

forester's business being to see that with assisted natural regeneration and such planting as may be necessary, the forest is ever improving.

What is the average value of the forest being alienated without demarcation, no one now knows. If it averages £30 per acre, an alienation of 100,000 acres would mean a yearly loss of £3 millions!

Now advocates of the present system will tell you that good millable timber is not given away; that it is measured and paid for. This leaves out of account the bulk of the demarcatable forest; forest that is of poor or fair quality, but which is improvable at a fraction of the cost of planting an entirely new forest. But of course the paying for the timber in the good forest does not stop the destruction of the forest; in fact, it usually hastens it.

Even the payment for the timber is a very partial business. It is only in Auckland and a part of the Wellington district that timber in the log is measured and paid for. Everywhere else the timber is paid for "off the saw," which is a direct premium on wasteful working. In any case, as mentioned above, even when the timber in the log is paid for, it is only the present crop that is thought of, so that in the case of demarcatable forest the value of the future crops is not counted: and this may be the chief value, sometimes the only value, *as indeed is the case just now with all the Government timber plantations.*

Of course a large part of the millable forest has to be destroyed, its value for farming being greater than its value for forestry. Who knows how much? The only answer is forest demarcation; or classification when there are existing surveys and the necessary data available. Otherwise there is no knowing how far the estimate of 100,000 acres of demarcatable forest being given away yearly is correct. There always remains the haunting spectre —100,000 acres multiplied by £65 equals £6,500,000 — supposing the forest being now recklessly alienated had to be replanted at the actual cost of planting in the past. Truly a gaunt spectre to be brooding over a land that is pouring out its wealth in a terrible war!

Forest demarcation and a Forest Department would be a mere bagatelle compared to these figures. It might mean £15,000 or £20,000 a year, while at this moment some £45,000 a year is being spent on quasi-forestry without skilled direction. All those who have looked into the figures say that a Forest Department must pay for itself at once. The Australian Forest Departments have done so, one and all.

The position is most serious in North Auckland. Kauri timber has become so valuable that everyone there seeks to hold their own Kauri and acquire more Government Kauri land. It is sold to them for the value of the present crop of timber plus a fraction of the forest value of the land which is generally very poor farming land. But under scientific forestry the present crop of Kauri timber is usually far from being the best crop. A moment's reflection will show what that means.

Kauri forest, worth £300 or even £400 per acre, as national forest, is being scrapped like a good ship for the value of the copper nails in it! Half a million acres *of any sort of restorable Kauri forest*, obtained now, (by demarcation or redemption) would gradually increase in value and finally pay all charges on the war debt with a considerable margin towards the reduction of general taxation.

It will hardly be credited that a first-rate Kauri forest is now being worked and actually destroyed by the Railway Department. It is true that this is not quite a simple case. To begin with, in the absence of a Forest Department, this exceptionally fine Kauri forest was given away for a song, then bought back at a high price as no such Kauri could be got elsewhere for railway purposes. It was a shocking bungle and yet no one blundered! It was part of the system that left a very valuable national asset in charge of nobody in particular! The Forest Department of the New Zealand Administration was a blank.

From one of my Waipoa camps I was in daily view of a long, low range covered with dense forest. That forest was the Tutamoe forest, where once grew the world's record big timber tree, the historical giant Kauri called "Kairaru" by the Maoris. The forest

is still full of Kauri in the sapling, seedling, and dormant seed, stages. For dairying it had the low value of the Waipoa forest. Only dairying could compete with its present forest value; no farming could touch its future forest value. That forest had been surveyed and cut up into lots awaiting sale in a few months. This is typical of large areas of Kauri forest.

All around the Waipoa forest lay huge areas of worked-out Kauri forest, still capable of being redeemed for the country. The situation demands immediate action—the absolute stoppage of any further alienation of Kauri forest.

FORESTRY AND THE LANDS DEPARTMENT.

The present position of forestry in New Zealand makes it interesting to glance at the history of forestry and the Lands Departments in the various Australian States. When I was in West Australia in 1914, in response to a general feeling that the interests of forestry and of land settlement should be confided to different hands, forestry was removed from the Lands Department and placed under the Department of Mines. In New South Wales it had been removed from the Lands Department, but the friction between the Forest Department and the Lands Department was far from being to the public weal. In South Australia forests and lands were working together harmoniously, but that is an old-settled State with the main forest boundaries determined long ago. In Queensland in 1914 forestry and lands were under one Minister, but the Forest Department had a competent professional forester at the head of it. In Victoria forestry had been taken away from Lands and given to the Minister for Mines.

Since I left New South Wales the great change has occurred that has revolutionised forestry there. Forestry and lands are now working harmoniously together under one Minister, he an able and active Minister of Forests.

The placing of the forestry of New Zealand under two Ministers can only be regarded as a temporary expedient. Sir Francis Bell has now charge of the smaller half and Mr Guthrie of much the larger and far more important part. *Mr. Guthrie can give away three times as much good forest in a year as Sir Francis Bell can plant in twenty years!* I do not think many foresters would hazard a definite opinion as to which description of forest, acre for acre, would average the best value to the country 40 years hence — the artificial forest or good native forest scientifically worked.

At present prices the destruction of one Kauri forest, Puhi-puhi, has meant the loss of well over £3,000,000 in the value of the standing and prospective timber crops. In area the forest was no more than the upper part of Wellington Harbor, as cut off square by a line passing through the southern end of Somes' Island, viz., 5,800 acres.

ABSENCE OF A FOREST DEPARTMENT IN NEW ZEALAND.

About £45,000 a year is being spent on New Zealand forestry by six Government departments—(1) Land Commissioners (2) Timber plantations branch, (3) Railways, (4) Tourist Department, (5) Mining Department and Wardens' Courts, (6) Agricultural Department.

As far as I know there is nothing to be said against any one of these departments, but when they get on to technical work, which is outside their own sphere, the mistakes are often deplorable.

Till quite lately the timber plantations have been going each on their own devices, their offices inspected, but not their work. The Railway Department has charge of two fine forests, and is working and destroying them, instead of working and improving them. The Tourist Department has charge of trees and plantations at Rotorua and Hanmer, and is spending some £2000 or £3000 a year on the Milford Sound track, while such work would be done without extra cost if there were a Forest Department at work developing the forest. The Wardens' Courts and mining laws are a scandal in forest management fully exposed in both the Timber Commission Report of 1909 and the Forest Commission Report of 1913. The Agricultural Department has just that little knowledge of forestry that is pro-

verbially dangerous. It distributes forest tree-seed but not the best obtainable, as for instance Landes Maritime-pine seed instead of Leiria seed. Not long ago it wrote to Kew, England, asking the botanical name of one of the very commonest extra-tropical trees, the Carob tree of the Mediterranean. The reply from Kew filled half a page of the Agricultural Journal, and amateur forestry fills a good many more pages of the same publication! The directions given for propogating the Carob tree were fundamentally wrong. (See my report on "Cypress Forestry" and "Australian Forestry," p. 249.)

It is of no use deploring lost opportunities, but I think it only right to mention here, that after some trouble I persuaded a forester with exceptional qualifications, a first-class man, and a colonial man, born and bred, to apply for the position of head of the Forest Department in New Zealand. His application was refused, and shortly afterwards the New South Wales Government secured him on a yearly salary of £1000! The success which has attended the introduction of scientific forestry to America began with one good appointment to the post of Chief Forester in the United States of America —an American, who went to France and got his forest training at the Nancy Forest School—Gifford Pinchot.

A few weeks ago a speaker (Colonel Balfour) said:—He believed Great Britain and Turkey were the only civilised countries that lacked an organised forest service. Evidently that Scotch gentleman had not been to New Zealand or Tasmania!

SHOULD WE RESTRICT TIMBER EXPORTS TEMPORARILY?

Till New Zealand has a Forest Department and the ordinary forestry of other countries, it may be a question whether there should not be some retriction on the export of New Zealand timber to Australia. Under ordinary circumstances this is the last thing one would suggest. Forests have no value without population and markets; but native Kauri timber is very nearly done, and accessible White-pine has only a few years to run, so that until New Zealand gets the forestry of other countries it seems only prudent to place temporary restriction on the export of Kauri and White-pine. This is the more important because there is unusual activity just now, in forest-working and forest-destroying. I heard a few days ago of the acquirement by an outside syndicate of a timber concession for 20 million superficial feet.

WHITE PINE.

The forest topic of the hour is White-pine. New Zealand wants all its remaining supplies for butter-boxes. Australia wants it, too; not only for butter-boxes, but for packing-cases and house-building, because Australia had an enormous import of soft-woods before the war, and supplies are now difficult. The New Zealand farmer says stop the export of White-pine. The New Zealand miller says we have a right to live as well as the farmer, it would be unfair to handicap our industry. The Australians say if you tax White-pine, we can tax coal and corn. What does the forester say?

To begin with, of course, his sympathies are with the miller, his right hand, in all forest work; but there is more than that. If the miller has destroyed the forest, he has had no choice in the matter. But the farmers, knowing well what was going on in the country, with a commanding voice in every New Zealand Parliament, have carelessly sacrificed population, progress, and permanent good for the temporary gain following the destruction of demarcatable forest. If the farmers now are hard put to for supplies of White-pine, they have only themselves to thank for the reckless squandering of the noble forests they inherited. (This, however, by the way; the White-pine question in New Zealand is not one of sympathies.)

The position to-day is that a large part of the best and most accessible White-pine is not on demarcatable forest land, and that war conditions afford the best chance of getting this forest worked off at a profit. Let us get this classified or demarcated as quickly as possible. It is for Parliament to decide then whether to hold a portion or all of this timber for butter-boxes, or to let it go to Australia without check.

Certainly, however, the larger half of the existing White-pine is that

scattered throughout the "mixed" forest, and which will help to form the future national forests of the country. Here the position is as clear as daylight. Get these forests demarcated, opened up, and developed as rapidly as possible. Work through these forest systematically, section by section, taking out the mature trees and leaving the younger trees to develop. Where the younger trees are not now abundant, all the indications are that ordinary silvicultural methods will soon bring young trees up. White-pine seeds profusely. In certain years the whole tree is coloured with the mass of seeds, and one can sweep up seeds below by the bucketful. It seems mainly the dense undergrowth that ordinarily keeps the seed from coming up like grass. That was the conclusion I came to on my tour through the West Coast forests. In Stewart Island, where the undergrowth is very dense, White-pine is very scarce. In the burnt outskirts of the Waipoa Kauri forest it was the most abundant tree coming up again. How best to aid the natural regeneration of White-pine is one of the studies before the foresters of the future. Artificial regeneration, where wanted in the forest, promises to be quite easy.

The following practical measures are called for to meet the present White-pine shortage:—

(1) Demarcate and classify the forests to see more exactly what the actual supplies of mature timber are.

(2) Prepare "working plans" for the demarcated forests, so as to ensure full supplies in the future and for all time.

(3) Start plantations (mainly of Insignis pine) to eke out supplies in the early future. Insignis pine is not a first-class butter-box timber, but with parafining it does well.

Some of these temporary pine plantations might be on better-class land that for want of care or through errors in stocking, has run to Gorse and scrub, such land being restored to pasture after it had been cleaned by one rotation of pine-planting.

GROWTH OF NATIVE TIMBER TREES.

This subject has aroused much interest. There is clear evidence that the New Zealand trees, in their native forests, grow some 50 or 75 per cent. faster than the European trees in their native forests; and the European trees with this growth give the results which we see in European scientific forestry. Thus the Kingdom of Prussia, mostly on poor land, which is unoccupied, or yielding nothing in New Zealand, gets £4,500,000 net State Forest revenue yearly. But the New Zealander sees an Insignis-pine and a native tree growing side by side and remains unconvinced!

Take a collection of native trees and a collection of fast-growing introduced trees planted near one another in the open, and you will generally (but not always) see the introduced trees growing two or three times as fast as the native trees. If I wanted to plant a tree, or several trees, I would plant the introduced trees. But if I got the native trees for nothing, and had to put down £65 per acre (planting costs, plus interest) for the introduced trees, I should hesitate. When it comes to millions of acres, as in national forests, at £65 each, there is only one reply, we must be contented with the forests we have got. That is the decision in all countries. They plant where they are forced to plant; otherwise not. They first see what foresters can do, their craft being to work and improve the native forest by judicious thinning instead of haphazard and destructive timber-cutting; added to this is the assisting of natural regeneration by various means; and in the end planting just as little as they have to plant on account of the expense. In this interplanting, in New Zealand forests, the quick-growing introduced trees, especially where they have good self-spreading properties, will play a large part.

That is the matter, stated broadly. There are a number of details which tend to make foresters, especially in New Zealand, favour the native trees.

(1) What has to be looked to in forestry is not the growth of single trees, but the volume of good, closely-grown timber produceable per acre. The New Zealand native trees belong to the class called "shade-bearing" or "tolerant" trees, viz., they can be closely packed-in together in the forest; they make better value per acre than per tree! When the Austra-

lian Gums and the European Larch, for instance, are stagg-headed, or dying for want of light, the New Zealand trees are making their best growth.

(2) Some forest trees do well planted in the open; others pine or die taken away from the shade and shelter of their native forests. All, or practically all, the native trees of New Zealand, are almost like fish out of water planted in the open. It is exactly the same with the South African trees in the same class of forest. It is the same with some European trees: thus the Silver-fir of Europe is the tallest of all the native trees of Europe in the forest and the finest timber volume-producer per acre. But it is difficult to rear it at all planted in the open.

(3) The native forests of New Zealand are not poor forests. There is no need to replace their timber. They are practically all coniferous soft-wood, the class of forest that supplies 9-10ths of all the timber used in the world. Even leaving out the peerless Kauri, their timbers average a higher value than European timbers. Foreign critics, American writers, for instance, say that the New Zealand forest is the finest coniferous forest in the Southern Hemisphere, and ought to feed one of the finest timber markets in the world, the soft-wood timber market of the Southern Hemisphere, a market worth some £8,000,000 yearly, in the early future.

(4) Ages must elapse, before the introduced trees become as firmly established and as resistent to disease as the native trees. The great Strobus-pine, or White-pine, of North America, is a case in point. It grew splendidly for over 200 years in Europe, and then got the disease which now compels foresters to taboo it. This fell disease has crossed the Atlantic to America. If it gets into New Zealand the Insignis and the Ponderosa pine will be threatened by it, but not the Maritime or Corsican pines. The Stone-pine in South Africa did well for some 200 years, and then succumbed to a disease allied to potato disease. In every country foresters put a heavy discount on introduced trees. Get them into the native forests, let them have the chance of spreading there (like Gorse in the open), if they will, but do not sink millions in doubtful plantation of almost untried exotic trees.

Thus, when the man in the street tells you that forestry consists in cutting down one tree and planting another, and that the native trees grow too slowly to be replanted, you can give him the reply I got, after many questions, in the forest of Compiègne: "Demandez de messieurs les forestiers, c'est leur metier"—"Ask the forest people; it is their business."

With all these discounts, it is difficult to say which class of trees have the greatest future before them in the forests of New Zealand; but with the pick of the world's temperate and extra-tropical climates to choose from, it will be strange if certain of the introduced trees do not take a large place in the forests of the future. Trees such as Douglas-fir, Californian Redwood, Tulip tree, the upright form of the Macrocarpa Cypress, many pines, spruces and firs, together with some eucalypts are hard to beat. The same remark applies to Australian Redwood, to Silky-oak, and to more eucalyptus in the North. These are for gradual introduction to the forests as provided by the "Working Plans." To think of destroying the natural forests wholesale and replacing them by little scraps (comparatively) of costly and uncertain plantations, is nothing better in a national sense than "midsummer night's madness! !"

FOREST WORKING PLANS.

Whenever I mention forest "Working plans" in New Zealand I am misunderstood or asked what I mean. Two years ago the first Australian "Working plan" was drawn up by Mr H. H. Corbin, of the Adelaide University. It has just reached me in the printed report of the recent Forest Conference of Perth, West Australia (maps and diagram here shown). Two points are specially worthy of your notice in this Kaipo Working-plan.

(1) It relates to an area where there is a good deal of native forest, situated on the Mount Lofty Range, in a climate resembling parts of New Zealand. That forest is not to be destroyed and replanted; but to be worked and improved by sylvicultural methods. As was aptly remarked

at the Perth Forest Conference by Mr Lane Poole (a trained forester from the French national forest school of Nancy), "as they all knew, the first thing the forester learns when he takes a course at a forestry school is that forestry begins with the axe, not with the seed-bed."

(2) The second point to notice on this South Australian "Working-plan" is this:—When I have said that every acre planted in the Government timber plantations has cost with interest at 4 per cent. as much as £65, that statement has been questioned. Now, if you look at the plantation graph of costs showing the figures arrived at by Mr Corbin in South Australia, you will see that his figures are extraordinarily near mine! His mean figure is £64, and this refers to sparser, less costly, planting than that of New Zealand.

HIGH COST OF LIVING.

This is a subject of universal interest, and yet two potent and patent causes of dear living, have never been touched on, in all the long inquiry on the subject! Much has to be imported; much can only be produced in New Zealand at the cost of a heavy protection that tends to make living dearer.

There are, however, two necessaries of life, housing and fuel, which are at present very costly, simply because the country has followed a makeshift forest policy and artificially made them costly. The effect of a mistaken forest policy has been to banish timber and firewood to a distance from all the large centres of population. Firewood will not stand a long railway-carriage, and so firewood prices are now almost prohibitive in the larger towns of New Zealand. In the forest, on an average, quite half of every tree felled is burnt or left to rot in top, slabs, waste-wood, and butt. Economical forestry asks for the use of all the tree. This is one great difference between the economic forests of Europe (at the back door of the people, so to speak) and the popular British idea of forest on distant mountain ranges. As an instance, take the hill country round Wellington.

The forest at Wellington instead of being improved by foresters, has been destroyed. Sheep, cows and scrub have taken the place of the forest. The cows are wanted (no one would advocate the whole country under forest), the sheep might quite as well be 100 miles away; the Gorse, Blackberry and scrub no one wants anywhere!

If an enemy were to land near Wellington, the want of timber at hand might be more serious still. In my report on New Zealand forestry I have framed proposals for (1) a suburban forest at Wellington on the European model, extending from the Tinakori road to Johnsonville; (2) for developing and working the extensive mountain forests further afield. The latter proposal will bring *fuel to the householder at once*, together with some timber for house-building. It will open up country (now only the haunt of the wild pig) with some population, also timber, and fuel for present needs. It will give more population, more timber, and abundant firewood hereafter. The scarceness of these two necessaries of civilised life will be appreciated, when it is considered that to-day the use of timber and firewood in New Zealand, per head of population, is less than 1-6th, perhaps 1-10th, the use of timber and firewood in the United States of America: and this extraordinary position becomes even more striking when it is considered that in America only about half the houses are wood-built.

SOME POPULAR ASPECTS OF THE SUBJECT.

THE FUEL QUESTION.

IV.

The supply of coal in New Zealand is limited. Public policy demands its economical use, as in Europe (apart from England), while over large areas in New Zealand it is *more economical to grow wood-fuel than to bring coal from a distance.* That has long been the position at Capetown; where, on poor sandy soil one can grow wattle-fuel from seed and get a beginning supply in three years. That was my personal experience as a suburban householder near Capetown. I got all my firewood free after three years! As a generalisation one may say that in most extra-tropical and warm temperate climates with good rainfalls one acre under wood-fuel production will supply one household, thus 70,000 acres for the present population of Wellington. The tree must, of course, be selected for the rapid production of heavy, good-burning wood, and should reproduce itself freely as do most wattles, nearly all gums, and some pines. New Zealand has neither the abundant coal of England nor the suburban forests of the Continent of Europe ("Austr. Forestry," by the writer, pages 104-340-378).

The forest, of course, yields many other products besides timber and fuel that go towards lowering the cost of living — posts for fencing and culverts, pulpwood for paper, wood alcohol for motors (as soon as petrol gets a little dearer than it is now), tanning material, Kauri gum and resin generally, edible fungus (a large industry in Japan, a small one in New Zealand), together with chemicals for explosives, charcoal for fine French cookery and other products. "Tout revient à la forêt," says the enthusiastic Frenchman. The essence of cheap-living is production on the spot instead of importing from the other side of the world. Both the Federal and State Governments in Australia are establishing forest products laboratories and research stations. Queensland is so satisfied with the work of one institute at Gympie that it proposes to establish another in the tropics.

RETURNED SOLDIERS.

Many will remember one of the best of Sir Rudyard Kipling's early tales, entitled "Soldiers Three." In the forestry of the hour there are three points which specially concern our returned soldiers. These are: (1) Forest demarcation, (2) forest redemption, and (3) forest development. If these could only be put in hand without further delay, it would mean land and congenial work in the country for many returned soldiers.

When I came back from my southern tour, I found Australian papers with accounts of what is being done to repatriate the soldiers and develop the country and forests in three Australian States—Victoria, New South Wales, and South Australia. The Federal Government is advancing the money, and these three States, with their Forest Departments, and demarcated forests already formed, are arranging to spend the money in forest development and road-making. The same work has been urged on the New Zealand Government by the Forestry League for over a year. Yet what has been done? The end of the war is in sight, we may reasonably hope, and what preparation has been made for it by demarcating and developing the forests as in Europe? This forest development and road-making would afford much employment and gradually more and more land settlement. No Australian State has so large an area of isolated yet plowable or pastoral mountain land; or such valuable soft-wood forest to put in order; and for a forest loan New Zealand credit is as good as that of the Commonwealth of Australia.

BETTER THAN ORDINARY EMIGRANTS.

There are strong reasons for making the forest development scheme open to all soldiers of the British Empire. They have risked their lives, and fought side by side with New Zealanders, to help save this fair land from the grasp of the Hun. The New Zealand returned

soldier is at home, and tends to go back to the old avenues of employment. The British soldier has been "doing his bit" for one-third or one-quarter the happier pay of the New Zealand soldier and his dependents; he has little in his pockets; he looks with longing eyes towards this fair land. But what is his chance of making his way, almost penniless, and in a strange land? Offer him, however, certain Government employment to fall back upon in the State forests with a home in a village hamlet, and the chance of a small allotment on the European plan as the forest development proceeds, and the prospect is an inviting one for a hard-working married man.

From the New Zealand point of view there are these three things to remember:—(1) the British soldier-emigrant so employed would be in a new avenue of employment, displacing no one. (2) The whole scheme is financed by its forestry. Think of that Prussian £4,500,000 net revenue yearly, with the conditions less favourable than in New Zealand, or little Switzerland getting somewhere about £3,000,000 altogether out of its mountain forests, or Germany £24,000,000 gross from all classes of forest, or Japan £12,000,000. (3) Practically 1-3rd the area of New Zealand is still unoccupied, returning nothing; and of this "unoccupied third" a large part is mountain or sterile land that is only good for forestry; land that never will be developed in the ordinary way; land that requires the resources of the State and a well-thought-out scheme of scientific forestry for its development.

Let us remember, too, that the returned soldier is better stock than the average emigrant. He represents the medically fit, the smaller and better half of the population—only about 40 per cent. of the present New Zealand population though. The returned soldier is the pick of the manhood of the country!

On the other hand, the emigrant too often is not even a fair representative of the average population. He may have weak health, alcoholic, or other weaknesses, that throw him back in the battle of life, and make him think of a new start in a new country. When I was in England before the war, and inquiring into these matters, as a returned colonist naturally does, it seemed to me that the stronger men usually went to Canada. The climate is severe, but the prizes greater. Let New Zealand now get a share of the best and bravest men of England!

ENGLAND, NEW ZEALAND, AND AUSTRALIA IN FORESTRY.

England—Said Lord Rosebery, in his famous Chatham speech during the darkest days of the Boer War:—"We are a people of enormous waste; we are not scientific." Englnd was then spending towards £40,000,000 yearly on imported forest products, most of which could have been produced in the British Isles at the cost of poor grazing on a few million acres; but "wait-and-see" was the national forest policy of those days. At last, only a few months before the outbreak of this war, Mr Lloyd George got his way, and in his Swindon land-nationalisation speech announced a national forest policy.

Let us not forget that during this war, in addition to the usual leakage of some 40 millions a year for imported forest products, England has probably paid something like £80 millions as extra freight charges for timber and mine props."—See Report of Forestry Sub-Committee, Reconstruction Committee, 1917.

New Zealand.—If anyone doubts the waste that has been going on over forestry in New Zealand, let him read "Forests and Profligacy" in Scholefield's book, "New Zealand in Evolution." All else in that book (by a New Zealander) is laudatory, as it well may be. But in forestry there is still the fatal "wait-and-see" policy of England before the war. To pay the war-debt, says everyone, New Zealand must have more population, more production; yet nothing is being done to open up and develop with forestry and small farms the "unoccupied third" of the Dominion. The division of large estates is good—would that there were more of it—but clearly what is wanted now is the development by new methods of land that old methods have left unoccupied. All details are to hand in the history of the development of similar mountain forest lands in central Europe.

Australia.

I wish there were time now to tell you more fully what forestry reforms Australia has accomplished since the war started, New South Wales certainly three times as much as during the whole 100 years preceding the war!

New South Wales — New South Wales forestry may be said to have taken a serious turn when, in 1900, the timber industry, at a conference held in Sydney, passed the following resolution:—"The forest lands represent a national asset, present and prospective, of £150,000,000, and the necessary attention cannot be given to them except by an expert administration." At the same time they demanded the reservation of a huge area of forest.

New South Wales forestry progress may be summarised thus:—(1) A well-organised Forest Department; (2) Inalienable State forests, consisting of about 5 million acres of absolutely the best land for forestry purposes, quite irrespective of settlement value, and a million acres of the next best land, to be held as "Timber Reserves." (Ashford); (3) These 6 million acres are to be managed under the regular "Working plans" of scientific forestry (2 years' hard work surveying and classifying has already been done); (4) A good Forest Act; (5) Control of State forests and all forestry matters by a Board of Commissioners, who are untrammelled by political interference excepting in distinct measures of policy (I quote Mr Ashford's words again); (6) State sawmills to provide Government timber and incidentally to prevent a ring in timber prices.

Western Australia. — In Western Australia a forestry revolution second only to New South Wales has been accomplished. A trained forester and one experienced in administrative work, has been appointed. The forest bill now before Parliament proposes to free forestry from politics not by means of a Forest Commission but by making the Conservator of Forests' office a fixed appointment for a term of years and his policy responsible to a vote of both branches of the Legislature. I gather that his position is to be somewhat similar to that of the Civil Service Commissioner in New Zealand, or to the "Controller and Auditor-General" in South Africa. Westralia has agreed to receive 25,000 British soldiers after the war.

Victoria.—When I visited Victoria in 1914, it had been the leading Australian State in forestry for many years previously. When New South Wales jumped ahead shortly afterwards, Victoria did not remain long in the background. The Press and the public loudly demanded forest reform, and with the first change of Government it came. A powerful deputation representing the Forest League and half a dozen other patriotic societies waited on the Premier and the Minister of Forests two months ago. A recent Australian mail brought particulars of the Government's policy. Victoria is to have a Forest Commission and forestry development on much the same lines as New South Wales, road-making, firepaths and "Working-plans." The Government timber-seasoning kilns are to be extended. "It is proposed to establish at the chief centres small forest villages, where allotments for cottages and gardens will be granted to forest workers at low ground rents. The employees will be financially assisted in the erection of their homes."

Eleven years ago Victoria passed a good Forest Act, established a well-organised Forest Department, and had 4 million acres of permanent State forest demarcated. In addition there is a considerable area of "timber reserves" together with forest on Crown Land which is withheld from alienation pending its demarcation or examination by the Forest Department.

Other Australian States. — With the exception of Tasmania, forestry is progressing along similar lines in the other Australian States. They have more or less completely organised Forest Departments, with a technically-trained forester to direct or advise. All are doing forest demarcation. South Australia and Victoria practise forest redemption as opportunity offers. Queensland so long the forestry laggard among the States of Continental Australia (p. 291, "Australian Forestry") is now ahead of New Zealand. Queensland secured a trained forester of exceptional attainments 5 years ago, who began forest demarcations as soon as he took his seat in the Conservator's chair. Queensland has a For-

est Department (just reorganised and increased) that is past the enmity stage of the Lands Department; the lamb and the wolf dwell at peace in the same kraal in that warm country! is a considerable area of timber reserves together with forest on Crown Queensland has the perfect Minister of Lands, one who, if his speeches mean anything, is an enthusiastic forester as well—Mr J. H. Coyne.

FORESTRY FREED FROM POLITICS IN NEW ZEALAND.

Forestry must be freed from party politics in New Zealand. Though I was at first doubtful about the necessity for this here, all my doubts have now vanished. Ministerial responsibility is the essence of the Parliamentary system, but Ministerial responsibility, like the "law of supply and demand," does not work in forestry. One has to wait too long for results. It may easily be 60, 80, or 100 years before a mistake in forestry becomes fully apparent to the public eye. No Ministry lasts that time!

I am convinced that to get forestry outside party politics, with its ephemeral Governments, is over and above everything. It is included in the new British scheme of national forestry. It was insisted on by the Governor-General of Australia (a forester of acknowledged eminence) at the recent Forest Conference in Perth, West Australia. Let us never forget that leaving national forestry to party politics in England has cost England, some £80,000,000 during the war over and above the ordinary charge for imported timber, which for some years has been upwards of £40,000,000 yearly.

THE AUSTRALIAN FOREST LESSON

There is this striking contrast between New Zealand and all the more advanced Australian States; that, whereas they have applied the war lesson at once and started on a sound forest policy, New Zealand is allowing the shocking public waste over its forests to continue. This Australian forestry that has come forward since the war, is no fitful advance in one State; it is solid progress throughout Australia. There has been nothing like it before in Australian history. And yet there are still earnest, independent men in New Zealand who say let forestry stand over till after the war! Is it consistent to conscript wealth for war purposes and yet allow perhaps £4,000,000 a year of the children's inheritance to slip through vacillating fingers? It is the children who will have to shoulder the great burden of the war debt.

At the last full session of Parliament, the Prime Minister is reported to have promised forestry reforms that would go far to place New Zealand on a level with New South Wales, Victoria, West Australia, and South Australia—nay, even the United States. Give him popular support and it is certain that those reforms will not be long in coming. And popular support will be forthcoming, yea, one hundredfold, once the Forestry League can get it realised what scientific forestry is doing for other countries! Give the New Zealand Government a mandate for a forest-development loan; and the immigration of a forest population, and Nature will do the rest. Nature will do more for the forest in New Zealand than in Europe, and the market for timber and firewood is better in New Zealand.

A MINISTER FOR FORESTS.

The appointment of Sir Francis Bell as Minister for Forests was hailed with satisfaction throughout New Zealand: the more so as it was thought at first that it meant more than it actually did. Newspapers, commenting favourably reached me from quite unexpected quarters. For the first time in New Zealand history, its fine forest has a permanent official voice in the Cabinet, and, as befits the tardy entity of the forest into the councils of the nation, no weak or uncertain voice. Nevertheless a voice is not sufficient. The situation demands a hand equipped with the necessary powers to strike at once. Actually Sir Francis Bell has had forestal authority before, more than a year ago, when he had temporary charge of the Lands Department during Mr Massey's absence.

The anomalous position of the Minister for Forests now is only too apparent. His first duty is to work the State forests and preserve them. But he cannot work the State forests and preserve them without a Forest Department. He is in the position of an able and willing workman with all his

tools taken away. He may perhaps be able to answer the prayer of the Forestry League and set his face like steel against further forest destruction. But that will mean forest development held up till there is an organised Forest Department. And forest development is particularly urgent now on account of the war, which has brought, not only a very good demand for New Zealand timber, but returned soldiers ready to work in the Forest Department and to occupy the small farms opened up with forest development.

The Forest League has been largely instrumental in obtaining the appointment of a real Minister for Forests in place of the dummy Commissioner of Forests that has so long figured on the Statute Book. But a Forest Minister without a Forest Department can only be looked on as a very temporary makeshift.

Among the "Aims and objects of the Forest League," it is stated (p. 4—d): "To secure for distribution at cost-price seeds of trees suitable for planting in various districts, and to ensure that these shall be true to name and of high germinating power."

The president of the Forestry League, Sir James Wilson, has frequently expressed the wish that the New Zealand Government would establish a seed-store on the model of that which has been in successful use in South Africa for many years past. You will be glad to learn that I have just received an official intimation that such a seed-store will be established as soon as accommodation can be found for it.

It will serve the double purpose of getting reliable seed first-hand for the Government timber plantations and of distributing timber-seeds to farmers at cost price. The seed-store will thus cost the country nothing, neither will it enter into competition with the nurserymen's seed businesses, as would the free distribution of forest seed such as is practised in many countries.

DEMARCATION OF THE BEST KAURI FOREST.

Waipoa is the best Government Kauri forest now left. Nearly two years ago, Sir Francis Bell authorised my doing the demarcation of this forest. I wished, when I left New Zealand, to leave something more than writing and talking behind me! The Waipoa work is described in the Government bulletin "Waipoa Kauri Forest" and a brief sketch of it is given in the "New Zealand Journal of Agriculture for April, 1918. The announcement has not been made officially but it is understood that my demarcation has been accepted. and my recommendations for the future management of the forest approved.

Curiously enough, the demarcated area of the Waipoa Kauri forest is almost exactly the same as that of all the Government timber plantations. Not many people will have doubts as to which is most valuable, Kauri timber, or doubtful Larch, or quick-growing Insignis pine. The country has sunk £2,000,000 over the timber plantations; the Waipoa forest has cost the country, what?—the appointment of Sir Francis Bell to the charge of its forestry. What has the Dominion gained by preserving the Waipoa forest? It has gained a yearly net revenue of rather over £10 per acre per year, as soon as the forest is fully stocked and with its age-classes established. With this, too, will come permanent land-settlement at the rate of about one family per 75 acres, on logging and forest work, *besides the large employment afforded by the timber mills.* This calculation takes actual European figures allowing for both the greater value of Kauri timber as compared to European timbers, and for the greater cost of New Zealand labour. Thus the 30,000 acres of demarcated forest would settle eventually, say in 90 years, about 400 families permanently on the land. Even for the present both profit and employment will be greater if the forest be worked rationally than if destroyed.

What has the Dominion lost by preserving the Waipoa forest? With the forest destroyed, the climate is so wet and the land so poor, that, say the farmers, it would have cut up practically into about 20 or 30 cattle runs of rough, course grazing, supporting some 20 or 30 families.

THE WORK OF THE FORESTRY LEAGUE.

Thus the first 2 years' existence of the Forestry League are marked by 3 important points achieved:—

(1) The appointment of a Minister for Forests, giving New Zealand for-

ests, for the first time, a voice in the Cabinet.

(2) A Government seed-store.

(3) The demarcation and saving of the Waipoa forest.

Though New Zealand, in general forestry, has fallen behind the other States of Australasia (excepting Tasmania) since the war started, there is this to be said:—Not one of them has got a Waipoa Kauri forest or a Government seed-store. For these two solid achievements New Zealand has to thank Sir Francis Bell and Sir James Wilson.

The Forest League has prospered. It is now in the position of thinking about a paid secretary. The league has begun the issue of forestry bulletins. It is but a step to a regular Forest League organ, such as have been started during the past year in New South Wales, in Victoria, and in Westralia.

GOVERNMENT HELP FOR THE FOREST LEAGUE.

The question of a Government subsidy, or other help, to the Forest League ought certainly to be brought forward. In most civilised countries there is an active forestry propaganda promoted and encouraged by Government, both through the Forest Department and by means of subsidies to forest societies. In Canada and the United States and Spain the forestry propaganda is particularly active. In Japan the forestry societies are numerous and influential. They are subsidised and used officially by the Government. In New Zealand an active Government forestry propaganda is specially needed, because so little is known about the forestry of other countries and what is to be gained by forestry in New Zealand as regards population and national wealth.

The "Touring Club" of France receives full recognition and active support from the French Government. Its special function is to popularise the State forests, and thus promote touring in France.

At present the New Zealand Forest League particularly requires a paid secretary and travelling lecturer. There must be many civil servants retiring, or near the age of retirement, who could fulfil such duties with satisfaction and benefit to the country. Such an arrangement would naturally help the Forestry League in its national mission to spread a knowledge of the scientific forestry of other countries.

A FOREST PROGRAMME.

I suggest that the Forestry League put forward the following programme against the next meeting of Parliament:—

(1) The organisation of a Forest Department, with a technically-trained chief forester (Conservator of Forests) at the head of it.

(2) The Minister for Forests to be in charge of all forest work and all forest lands.

(3) A forest loan and active forest development, especially roads, with an attractive scheme of forest work and forest holdings for returned soldiers. This scheme to be open to the soldiers of the Empire.

(4) The first step to take is forest demarcation, because the organisation for that already exists in the Lands Department.

(5) Such legislation, at the next session of Parliament, as may be necessary to give effect to the above; bearing in mind that a complete Forest Act must await the drafting of the technically trained forest officer to be appointed.

(6) A loan of £1,000,000 sterling for forest development and soldier settlement on the lines of former European, and now (since the war began) Australian practice.

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Please enrol me as.....of the New
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Zealand Forestry League Incorporated, for the year ending March 31st, 19....., for which I enclose

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.....

Date....., 19.....

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