NEW ZEALAND FOREST PRACTICE—
REVIEW AND PREVIEW *

By D. KENNEDY

The most recent Annual Report of the Director of Forestry reminds us that it is thirty years since forestry in New Zealand was granted a status similar to that accorded our other primary industries and placed under the administrative charge of a separate department of State. It has occurred to me that members of the Institute might be interested in hearing one member's view of our forest history to date, together with some observations on the present-day position and, offered in all trepidation, a few conjectures on probable future developments.

My excuse, if excuse be needed for offering a paper on such broad and probably unscientific lines, is that a knowledge of what has gone before is essential to an understanding of the present, or to an intelligent anticipation of the future. In any case I hope to provoke some discussion on what in my view are matters of high importance to future forestry in this country, and incidentally to benefit personally by learning the views of other members whose experience is wider than my own.

In reviewing the progress of forestry in New Zealand over the past thirty years it is convenient to handle the subject by decades, and I have therefore adopted this course.

1920—1930

The year 1920 saw the establishment of a separate department of State—the State Forest Service—charged with administering the forest law and ensuring that forests and the products thereof are available for the use of all generations. This step was obviously a reflection of public apprehension at the rapid wastage of our indigenous forests, and the lack of any regeneration or establishment programme likely to provide for the Dominion's future needs. The new Service fell heir to a forest estate totalling 6\(\frac{1}{2}\) million acres, the great bulk of it covered by some form of indigenous forest, but including some 37,000 acres of exotic plantations, mostly Corsican pine and European larch which had been established in the Rotorua district and in the treeless regions of Canterbury and Otago from 1896 onwards.

During the decade following the inauguration of the Forest Service some effort was expended in attempting to find answers to the problems of indigenous forest silviculture and management. The general belief was that our main indigenous timber species were unconscionably slow in growth, and early research on the matter

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tended to confirm this view. It also emphasised the general intractability of the main species and their failure to regenerate or respond to orthodox silvicultural treatments. The result was that the indigenous species were accepted as unmanageable. I realise that this summary handling of our indigenous forests may bring drastic reaction from some of my listeners, and I will make further passing reference to the problem later. Suffice it to say at the moment, however, that the policy which crystallised from the original appreciation of the position was in brief, to aggregate the largest possible area of indigenous forest under public ownership, and to eke out the supply of produce therefrom for the longest-possible period by encouraging economical harvesting and conversion methods and prudent end-use of the products.

The conviction that New Zealand's indigenous forests could not be economically perpetuated did in a sense simplify the whole problem. Some alternative source of timber had to be provided for the future; the only question was how was this to be done. I think it is correct that in the twenties we were frequently regaled with the doleful news that the world's natural resources—coal, oil, timber, yea, and the very soil fertility itself—were being depleted without thought or provision for future generations, and at a speed which would bring retribution even on the generation then living. You will recall being told at school, as I was, of the number of acres of Canadian spruce felled to produce one edition of an American daily paper and the unbelievable number of years it required to grow that spruce. Unfortunately I am unable to harrow you afresh with these disturbing details because I, too, have forgotten them. It is a fact, however, that you, I and the world in general were conditioned to believe that a timber famine was just around the corner, and that New Zealand would be no more exempt from this dire fate than any other country.

Fortunately for New Zealand, by the time it became obvious that we must repair an earlier generation's prodigality with our timber resources we had a good many pointers to show us the way. Even though we could show no progress in re-establishing our high-grade indigenous timbers, the planting of exotic timber species had been proceeding on a small scale as a State activity for twenty odd years. Many European and North American coniferous species had been introduced and some at least of these were proving thoroughly at home in our soils and climate. Insignis pine in particular had proved a remarkably fast grower and appreciable quantities of timber had already been produced from shelter-belts and wood-lots of this species established by the early settlers on the farms of Canterbury and Otago. Idle land, well suited to the cheap establishment of plantations, was available in quantity, and each winter and spring produced some unemployment among seasonal workers.

In this favourable atmosphere the establishment of exotic forests was rapidly pushed ahead throughout the twenties, and for the decade ending in 1930 the Forest Service planted some 211,000 acres in
exotic species. This large-scale establishment of new forests by the State was accompanied by no little publicity, stressing New Zealand's need for future timber supplies, her unrivalled climatic and soil conditions for the growth of forest trees, and last but not least, the highly attractive financial rewards likely to be reaped by those with enough foresight to undertake the establishment of forests on their own account. All this had one somewhat unexpected result. Private interests were quick to realise the commercial possibilities in this new field, and by 1930 private companies financed by wide-spread bond-selling campaigns had planted some 170,000 acres in exotic timber trees. Looking back on the ten years up to 1930 in an attempt to assess the importance of this period, I think the points of greatest significance are, firstly, that New Zealand was irrevocably committed to future dependence on an exotic timber economy, and secondly, in a matter of little more than five years almost half of our total exotic forests were established.

1931—1940

The history and development of forestry during the ten years ending in 1940 can scarcely be set out in general terms because this was a period of great economic change and forest practice was perforce modified to meet changing conditions. Those of us in the forty plus age-class will recall without enthusiasm that the first half of the decade was a time of acute economic depression; unemployment was rife and every inducement was offered to employing authorities to engage and retain labour.

One immediate result of this depression was the cessation, on grounds of economy, of such forest research as had been instituted in more spacious days, and of professional forestry training. In other respects the slump did little to alter the pattern adopted in the twenties, beyond perhaps increasing the tempo of operations by virtue of the more plentiful manpower then offering. In the five years 1931-35 the Forest Service planted more than 150,000 acres in exotics, and private companies added another 100,000 acres. In short, the popular, official and technical conception of forestry at this stage was still "planting trees."

The second half of this decade saw some major changes in the New Zealand way of life, changes which had a marked effect on the practice of forestry. In common with the rest of the world the Dominion emerged from the economic depression of the early thirties, and the great bulk of the men who had been employed on relief works during that period were rapidly re-absorbed into normal industry.

It was about this time that foresters in general began to entertain doubts as to whether our practice of exotic forestry was in balance. True, New Zealand had created records in establishing new forests—tree-planting on an heroic scale, but was it forestry, and would it meet in the most efficient way possible our future timber needs? I imagine that at that time a glance at the map of New Zealand showing the location of the exotic forests, plus a cursory inspection of any
cross-section of these forests would not have been exactly reassuring. Although we could claim the establishment of an exotic forest estate approaching 800,000 acres, more than half of this was concentrated in one region—the central North Island—well away from the main centres of timber consumption. Conversely, no provision had been made for the future local needs of many regions which were even then beginning to feel the shortage of timber. The forests themselves could scarcely be described as a working plans officer’s dream; about three-quarters of the total area had been established within the short space of ten years and was thus of one broad age-class; some two-thirds of the total area had been planted in one species only, insignis pine; wide initial spacing and neglect of subsequent beating up had left large areas poorly established or scarcely stocked at all; and the oldest age-classes, though obviously overdue for thinning, had received virtually no treatment since planting.

These unpalatable truths became generally apparent in a time of rising prosperity with wage and all other costs tending to increase, and with other industries beginning to compete for labour. For the first time in many years forestry could not readily obtain ample labour, and with the outbreak of the Second World War in 1939 the shortage of manpower rapidly became a critical factor and the one which has largely dictated the tempo of operations even to the present day.

The doubts and uncertainties which arose in the five years 1936-40 found expression in a number of ways. Gone were the vast planting programmes in which we took such pride during the 1925-35 era, and in their stead we see the trend to the establishment of smaller strategically placed forests, created to serve the needs of their own particular locality. Large-scale private planting by this time had ceased. Likewise, within the novel limits imposed by a scarcity of labour, some earnest effort, certainly belated and probably misguided, was made towards improving the woeful silvicultural condition of our older stands. Except for a few small and favourably located forests which enjoyed a demand for thinnings, and in which exemplary work was done in pointing the way to sound and profitable management, this usually took the form of pruning. No one would be temerarious enough to say that this effort was wasted; but bearing in mind its negative effect on thrift and increment, plus the fact that it was carried out on a fairly high cost structure, it is obvious that the money could have been spent in the same forests to better advantage.

The year 1940 saw the beginnings of a new phase in exotic timber production. Insignis pine had long been established on the New Zealand market but supplies had come hitherto almost wholly from the conversion of farm shelter-belts. By 1940 the early plantings of the private forestry companies and of the Forest Service were nearing maturity and it was during that year that large-scale timber production from forest stands was first undertaken.
1941-50

The events of the decade just passed are too recent in everyone’s memory to need detailed review. They were of course overshadowed by the Second World War and the all-pervading post-war shortages. Most exotic forests were reduced to a regime of dire austerity, manpower and equipment being so short that even essential maintenance could not be done in most cases. The war-inspired demand for timber gave some of the older forests the chance to demonstrate their productivity, and from this test they emerged with flying colours, establishing insignis pine on the market as a general purpose building timber and giving some indication of the special uses to which species such as Corsican pine, larch and Douglas fir may be put when supplies are more freely available in a wider range of sizes and grades. The respect won by our exotic timbers when used under stress of wartime shortages has undoubtedly been enhanced by the wider and more exacting demands of the post-war period, and when one recalls that, except for insignis pine, the market has so far received only thinnings, then the outlook for our exotic timber looks promising indeed.

The abnormal conditions which have prevailed throughout the post-war years have virtually hamstrung the practice of forestry at the present time. The trend towards the creation of smallish forests, located to meet a nearby demand, and planted at a rate which will allow subsequent tending to be carried out by a static labour complement, is being prosecuted so far as economic conditions will permit, and arrears in this direction will doubtless be overtaken in time. It is true also that appreciable areas of mature insignis pine are being clear-felled yearly, and comparable areas of Corsican pine, larch and Douglas fir are receiving some form of improvement by thinning. Thinning, however, is confined to those stands which yield saleable produce in the form of sawlogs, poles, fencing material or mineprops. The area treated is limited by shortages of manpower and equipment rather than by demand for the produce, and as matters stand today, far from making any inroads on the arrears of thinning accumulated by years of neglect, we are actually falling further behind every year.

1951-?

New Zealand’s foresters can fairly be described as fortunate beings. We have participated in the latter-day liquidation of an indigenous forest estate unique in its ecology and probably unparalleled in the high quality and general utility of its constituents. We have tacitly agreed, after some tentative investigation, that we cannot perpetuate our own particular type of forest, and we have accepted this thesis for a matter of twenty years. Do I hear someone mention kauri and beech? Those of the profession who have faith in these species and are trying to evolve a practicable system for their management have the goodwill and best wishes of every New Zealander, forester and layman alike. Who knows, after the problems
of kauri and beech are solved, that sustained investigation may not bring a ray of hope for rimu, totara and at least the species whose site requirements do not coincide with those of the dairy cow.

Rightly or wrongly we have committed future generations of New Zealanders to complete dependence on exotic timber, and in the course of doing so we have witnessed some remarkable changes. The approaching timber famine was quite a live issue as recently as 1925, and undoubtedly the bogey had some basis in fact. Today, less than a generation later, the forest authority is offering to the world some 28 million cubic feet of timber per annum in perpetuity from one forest. This represents approximately one-third of our present total annual cut, and the great bulk of it is surplus to New Zealand's requirements and available for export. One can well imagine that a bald account of this "rags to riches" metamorphosis achieved in less than thirty years, would strain the credulity of Northern Hemisphere foresters.

Our firm belief, cherished for at least fifteen years, that tree-planting and forestry were synonymous terms has led us into a strange situation, which will take longer to untangle than it took to create. The planting of vast areas over the course of a very few years in the twenties and early thirties was a feat of organisation in which the foresters of that day may well take pride. Certainly various expedients were adopted to ensure that the maximum acreage was covered; espacement was widened to eight feet or more; small nursery stock was used; notch-planting was the general rule, and blanking was omitted altogether. Despite these departures from the well-established customs of an earlier generation a fairly high degree of successful establishment was obtained, and if the present condition of these forests is not all we could wish, the blame can scarcely be laid at the door of those responsible for the original planting. The very magnitude of their work amazed the forestry world at large, but little did anyone realise at the time that planting, big as the job was, required only a fraction of the labour that adequate tending would subsequently demand.

It is easy to be critical in this enlightened age, but we should not forget that if the boom years of forestry bequeathed us many of our present-day headaches, they also produced the plenitude of raw material which is one of New Zealand's greatest potential assets today, and which in some respects at least is the envy of the world. Our problem is the embarrassment of riches, and it says little for this and later generations of foresters if we do not capitalise on our opportunities.

If we must introduce a carping note towards the actions of our forbears it should perhaps be directed to their neglect of the 30-40,000 acres of potentially valuable stands—mainly Corsican pine and larch—planted under the auspices of the Department of Lands and Survey between 1898 and 1920. These areas were planted on classical European lines: rigorous culling of nursery stock, summer pre-pitting
of the site, careful planting on spacings of six feet and less, and conscientious blanking of failures for several years or until one hundred per cent survival was assured. Many of these stands can be seen today in the older forests, a monument to the technical competence of the foresters responsible for their establishment, but unfortunately—and we of this generation must accept some responsibility here—not an enduring monument.

By the late twenties these older stands were in urgent need of thinning, and no less a body than the Empire Forestry Conference of 1928 emphasised this aspect in its findings, pointing out that the untended stands were making negligible increment and inviting epidemic insect or fungal attack. No change in forest practice followed this authoritative warning, firstly because no market existed for thinnings, and also because there was a strong body of opinion inclining to the view that our exotic stands did not necessarily conform to proven and timeless silvicultural laws, and that natural suppression would obviate the need for thinning. It must be admitted in all fairness that the behaviour of some species during early life, notably insignis pine and Douglas fir, lent colour to this view.

It is idle at this late stage to speculate on the possible results of a bold decision to undertake large-scale thinning to waste in 1930. Remember the unemployment of that day and the nominal cost at which any employer could obtain virtually unlimited numbers of men. True enough, forestry played no inconsiderable part in alleviating unemployment, but think of our position today had even one half the labour available been used for thinning instead of planting during what were, from the forester’s viewpoint, the lush years of the early thirties. We would certainly have had a smaller forest estate—no great disadvantage because it would have been cheaper to manage, but more important still, its physical condition and monetary value would be better by an extent at which we can only guess.

While one cannot help regretting the years the locusts have eaten, we can be grateful that all is not lost by any means. The enigma of our indigenous forests is largely unsolved and the future must rest on exotic species. New Zealand is entering on an era of more intensive land use, and where we could afford in the past to accept less than maximum production from our land, it is unlikely that we will be able to continue this happy-go-lucky policy in a hungry world. Our exotic forests must be made to play their full part, and unless we see to it that they do so, we cannot complain if the areas they occupy are taken away from us and diverted to some other form of land-use.

Today’s foresters have the inestimable benefit of fifty years experience to guide them in the handling of our exotic forests. Certainly one cannot purchase this accumulated wisdom in text-book form, as one might for example in studying New Zealand pasture management, but the facts are there, nonetheless, in the living evidence of the forests themselves. Do these forests offer any outstanding lesson to help us in our future practice? I think they do.
I have heard the profession mildly castigated for its past neglect of essentials and its devotion to trivia, our preoccupation with the thinning of young stands being cited as a case in point. I find this charge difficult to understand. My reading of the past is that our greatest failure has been our neglect of thinning; and if one may be permitted to stray into the realms of prophecy, that the whole future of our exotic forests may be summed up in two words “timely thinning.” This is a time for bold decisions; high time to recognise that we must write off as beyond human intervention much of our older forest which has struggled along untended for forty years and longer. Our younger stands, still thrifty and capable of response to thinning, must be treated before they meet the sorry fate of their older counterparts. Decisions on these matters should not be difficult to make. The forests themselves contain all the answers and we are merely called on to interpret the abundant evidence available to our five senses.

The foresters of twenty and thirty years ago were loath to thin their stands because they had no market to absorb the thinnings and help defray the cost of the work. Time has proved that they were wrong in their assessment of the importance of a low-cost or cost free operation, as against the wider importance of maintaining thrifty stands. True, we have not as yet suffered any catastrophic retribution for their omission, but our singular freedom from epidemics has been more fortuitous than deliberate, and cannot be expected to last in a world rapidly growing smaller. Indeed, signs are not wanting at the moment that our immunity may be at an end sooner than we think. A very few years ago we were happy to believe that we could plant insinis pine, absent ourselves for 25-30 years, and then return to reap a moderately successful crop of saw-logs. Would anyone be rash enough to claim that the same procedure will bring results today? Similarly we have seen fifty year old Corsican pine stands in an advanced stage of physical deterioration through lack of any thinning since planting. The picture presented by such a stand is a wall of small stalks interspersed with a few sizeable logs, but not nearly enough to repay the cost of sorting them from the associated mass of rubbish and delivering them to a miller. Does anyone think that we are raising a crop of Corsican pine timber by the simple expedient of planting it on a good site?

The same reluctance which characterised our predecessors is still in evidence today when it comes to thinning stands in obvious need of that operation. We are more fortunate than they were, however, inasmuch as we have a buoyant market for quite a proportion of our thinnings at rates which leave some margin over working costs. Our problem, then, although in essence the same as the earlier one, differs in detail and is primarily due to the abnormal economic conditions obtaining today. Labour, transport, materials and equipment impose a strict limit on the volume of thinnings that can be handled, and thus on the area that can be thinned. Unfortunately, the area being
treated annually under these conditions bears no realistic relationship
to the total in need of immediate thinning; nor does the near future
hold any prospect of the figures being brought to equilibrium. In
this queer situation we have enormous quantities of material for which
the market is clamouring, and which the forester ardently wishes to
see removed from his stands. If he directs all his energies towards
supplying the market he must allow the greater portion of his stands
to remain unthinned. What is he to do for the best in these circum-
stances?

I think most foresters will agree that the answer to this question
will be found by glancing backwards a matter of twenty years.
Because of what they regarded as a temporary difficulty the foresters
of that day delayed their thinnings with unfortunate results. Surely
that experience should be sufficient to convince us that we must avoid
the same pitfall at all costs. I am firmly convinced that our future
success or failure in exotic forest management depends almost wholly
on whether we thin intelligently or neglect that operation. It is
obvious that we cannot hope to thin and salvage all merchantable
produce at a rate which will overtake arrears and keep abreast of
current demands. Eight men with the requisite horses or light tractor
could be expected to thin and salvage the merchantable produce from
about fifty acres of forty-year-old Corsican pine in a year, and they
would be busy enough at that. The same eight men, suitably equipped
with power saws could quite conceivably deal with one thousand acres
in a year, provided they had only to fell the surplus growing stock to
waste. Isn't the solution of our whole thinning problem largely a
matter of recognising these simple truths and translating them into
appropriate action?

Once we are agreed that thinning to waste today is justified if
it will avert greater wastage in the future, our problem becomes much
simpler. All we have to do is to attack the stands in need of thinning
and ensure that they are treated before reaching a degree of stagnation
that makes response to thinning unlikely. This in itself is no small
order, and we should be glad that the mechanical age has brought us
many new developments to lighten the task. The mobile circular
saw and the power chain saw have proved their worth as labour-savers
and output-boosters, and these are the tools on which the forester
must depend to overcome the shortage of labour which will probably
remain with us in our time. As foresters we rather pride ourselves
on being somewhat conservative in outlook. This conservatism is
rarely so pronounced as that of the average forest workman, or more
particularly the Maori forest workman—good man that he is. Any
new development which makes the job easier or increases man-hour
output is always viewed with some antagonism by its operators, and
power saws in general have been regarded with deep suspicion in the
early stages of their introduction. In these circumstances the
forester is often forced to adopt the role of outright radical, or he will
find his new machines condemned out of hand by men whose opinions,
though honestly given, were obviously formed before the machine was tried out. It is a gratifying experience to see indifference giving way to whole-hearted enthusiasm as a newly introduced machine proves its worth, and to note the operator's impatience if a breakdown temporarily forces him back to hand methods. Our hypothetical thinning gang of eight men and, say, five power saws, if multiplied tenfold, would only amount to a medium sized sawmill staff plus a trifling capital investment, but what a transformation they could bring about on even the largest forest in a very few years.

Assuming that I have convinced you all that thinning is both necessary and urgent, that thinning to waste is the only practical solution, and that the mechanics of the job are not insurmountable, we might perhaps touch on silvicultural aspects. What are the guiding principles which we should follow? Firstly, it goes without saying that we will not thin to waste in any stand which could be thinned and salvaged normally before physical deterioration sets in. Again, we must avoid the needless expense and disappointment which would follow the thinning of stands which have lost the ability to respond to increased growing space; this would merely be throwing good money after bad. The stage at which any particular stand loses its power of response may be open to argument, but we have a range of examples covering more than half a century to guide us in making decisions on this point. Our efforts must obviously be directed to those stands which are in need of and capable of improvement by thinning, and there are literally tens of thousands of acres which fall unquestionably into this category. The cost factor will have to be kept prominently in view at all times, but on the other hand the thinning must be sufficiently heavy to allow the stands to maintain a thrifty condition for a considerable time to come. This particular point is one which places the forester in something of a quandary, as it is difficult to tell at this stage to what extent we will be able to carry out second and subsequent thinnings. We can be quite sure now that the sale of produce from second or later thinning would make the operation quite attractive financially, but we cannot foresee whether labour and equipment will be available in sufficient strength to make the job physically possible. It may well be that most of our stands will have to make do with only one thinning, and in carrying out the first thinning I think we would be wise to keep this possibility in mind. It will necessitate some compromise with silvicultural principles, but, let it be remembered, we are forced to deal in the main with aberrant stands which have long passed the stage when ideal treatment will bring about ideal results.

Most of our stands of slower-growing species—Douglas fir, and Corsican, ponderosa and lodgepole pines—of the twenty to thirty-five year age-class are overcrowded and carry from 500 to 1,000 living trees per acre, depending on initial espacement. In many cases growth has been so uniform in the past that the great bulk of the living trees could, if given sufficient growing-space, develop into
well-formed specimens, capable of yielding saw-logs. By reducing the stocking of such stands by anything from fifty to seventy-five per cent we cannot help but improve the physical condition of the remainder; indeed I have seen stands with so many well-formed stems surplus to normal stocking that they could literally have been thinned and improved by men working blindfolded. I do not advocate this system, and mention it only to emphasize the favourable basis from which we can begin realistic thinning operations.

I believe that reduced to essentials our thinning problem is comparatively simple and straightforward. Its very magnitude is somewhat frightening, but even though the forester, paradoxically enough, is experiencing the worst of hard times, I am confident that the ingenuity of the profession will be equal to the task. The job is urgent; it will never be handled with timidity and indecision, and it is for us to ensure by our energy and initiative that the full potential of our exotic forests will be available for tomorrow and after.

THE TREND OF FOREST LAW *

By W. BOARDMAN

In the following brief review of forest laws it will be recognised that certain broad principles have been law for many years and, had they been implemented and enforced, would have been beneficial to the Dominion and would have avoided much wasteful destruction of forest and unnecessary loss of valuable timber.

The necessity for the active administration of a progressive forest policy was not apparently realised or taken seriously until November 1918, when the ministerial offices of Commissioner of State Forests and Minister of Lands were separated and the late Rt. Hon. Sir Francis Bell was appointed to the former office. A separate sub-department was formed, which was re-organised in 1920 as a Department of State which became the State Forest Service, now the N.Z. Forest Service.

The powers of the Commissioner of State Forests and the functions of the new Forest Service were fully set out in the Forests Act 1921-22. Although this is the first comprehensive forestry statute to become law in New Zealand, it was at the time only the culmination of a long list of previous legislative enactments affecting forestry and forest policy.

The first of these was inspired by the operations in kauri forests, in the early years of New Zealand’s settlement, of the large and lucrative export trade in kauri spars. In 1841 His Excellency Governor

*Read before the Annual Meeting of the New Zealand Institute of Foresters at Nelson, 17th June, 1950.