

QUALITY v. QUANTITY IN NEW ZEALAND FORESTRY AND FOREST PRODUCTS *

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Reasons Underlying the Lack of a Technical Literature

The older we become the more reluctant most of us grow either to write about forestry or to talk about it publicly. Many of us incline to fall back on the old saying that our deeds should speak for themselves—good or bad. I am breaking a long silence only at the request of your worthy Secretary whose evangelism has not yet been mellowed by the years. In doing so I have been prompted to enquire why there should be such a marked reluctance on the part of the profession to write and talk upon the subject of its vocation. Possibly there are numerous contributing factors. Characteristically colonials are individualistic and in their impatience to get things done their own way they are understandably intolerant of the opinions of others. Subconsciously if not consciously they realise that if they are to be allowed to do things their own way so must others; and they therefore refrain from telling others how they should manage their affairs. Again, to some members of the profession, the immaturity of our forestry is a deterrent; while to others the deterrent is the apparent lack or paucity of real forestry.

All these undoubtedly do play a part, but I have asked myself if the silence does not stem from our British heritage. It should not be forgotten that two centuries of the industrial age left the United Kingdom with such a vestige of its indigenous forest—virtually all of it hardwoods—that what sense of forestry may have existed in the old days has long since been replaced by a spurious philosophy of arboriculture. Urban and rural dwellers alike worship the oak and the ash and the elm of the parks and the hedgerows and woods of the Home Country. It is against such a background that modern British forestry has had to evolve. It has been a slow process. Why? Why for instance do folk around New Forest oppose so bitterly the proposals of His Majesty's Commissioners to plant open land with conifers? It is not the loss of commonage. They protest that the countryside will be despoiled by the nauseating endless never changing pattern and appearance of ugly straight stems and dark topped trees.

Is this a reflection of the Britisher's love of freedom and his hatred of regimentation? I believe it is. But his tree worship does not stop at hatred of conifers. His thoughts are so centred upon the shade of the hedgerow and the sigh of the tree tops, upon the pleasing aspect of the park and the calm majesty of old trees and upon the deep quiet of the woods and the rustle underfoot of last year's leaves that his enjoyment of these becomes the alpha and omega of forestry. That the country needs timber—and that even he personally must

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use some—is only remotely connected in his mind with the fact that he owns the wherewithal for its production. In war it may be reluctantly admitted but at best the exploitation of such timber is regarded as only a slightly lesser crime than the war itself. The important point is that so often as a matter of sentiment the forest is denied proper management. To many British landowners there is no greater anathema than a felling budget for a mature stand. Is it any wonder that the forester becomes preoccupied with the arguable questions of espacement and thinning of young conifers? He has little else to vary or to talk about, so that comparatively little is written on British forestry.

Is the picture much different in New Zealand? Yes and no! We still possess a very sizeable indigenous forest estate, but is it not a fact that the ecological complexity of its primitive flora has engendered in foresters a feeling of defeatism and frustration, and given them an exotic softwood complex with similar preoccupation upon espacement problems, etc? Again their impatience is evident in their concentration upon quick growing species and their reluctance to spread establishment over a rotation. But it is difficult to argue that in these tendencies lies an explanation of our silence as a profession. It is just as valid to argue that quick results and well recognised mistakes provide excellent material for record and discussion.

Let us revert to the common absence of an established forestry art in both Great Britain and New Zealand, and to the preoccupation of their foresters on the mechanics of coniferous establishment and management. I have used "art" in juxtaposition to mechanics to emphasise that out of the lack of practise of an indigenous forestry, has developed the very negation of the art of forestry—rigidity or inflexibility (in our exotic forestry). In retrospect it appears almost fantastic that out of New Zealand's 800,000 acres of exotic forest something like 500,000 could have been planted at the one spacing of 8 ft. by 8 ft. with little significant variation according to site or species. In the absence of any reliable guide one would have thought that sufficient variation would have been introduced to allow future generations to arrive at sound conclusions on the subject. But has t his inflexibility of thought—and administration—contributed to our silence? I think the verdict should be in the affirmative even though it is only a minor contribution.

Leadership and Training the Fundamental Pre-requisites

Where then lies the real explanation? I have exhausted all the psychological approaches and can fall back on only basic causes—lack of good leadership and good training. These are the two pre-requisites of every human activity and of none more so than forestry. Good leadership and good training would have introduced sound debate into our councils, given us flexibility for rigidity, mellowed our judgements and allowed us to avoid many of our mistakes. In

retrospect the most important was in not appointing say, ten senior foresters of the 40 to 50 year age group and another ten of the 30 to 40 year group, when the Forest Service was first set afloat. Only with a nucleus of this size could near perfect results have been secured. It is certain that in a nucleus of this size could have been found both the necessary quality of leadership and variation of opinion as would have given us 30 years of intensive research into the indigenous forest resource—thereby avoiding defeatism on its management—and at the same time a very much better exotic forest capital with a balanced distribution of age classes, stands properly thinned and pruned, and withal at a very much lower cost. It is equally certain that the profession would have been neither so silent nor so unproductive of a first class technical literature. These remarks in no wise deprecate the early work of the first Director of Forestry, our old friend Mac-Intosh Ellis who, whilst a professional forester, was a great publicist and should be given full credit both for selling forestry as a national activity to the public and inspiring such staff as were made available to him.

Just as the essence of successful administration is high quality leadership so too the essence of technical performance is high quality training. Both the ecological complexity of our primitive indigenous flora and the necessity for correcting the grievous mistakes of the past—as well as avoiding mistakes in future—in the establishment and management of the country's exotic forest estate make it imperative that the forester of the future be trained to higher standards than previously dreamt of. You are aware that for ten years the Forest Service has aimed at the teaching of professional forestry subjects only after completion of a B.Sc. degree—and at a forestry school integrated with a forestry research institution in a suitable forest environment. A recent study by Mr. T. C. Birch of higher forestry education in Northern Europe tends to confirm my more recent conviction that a forest environment is not sufficient. It is rather a *forestry* environment which is essential and it can be found only in those countries in which forestry is an old established art and everyday practice. It is only against such a background that student foresters will receive that optimum inspiration and faith which will equip them to deal with the problems we leave them as a legacy. Neither is it possible to ignore the fear that an adequate staff of inspired teachers is quite beyond the national finances—four highly paid professional foresters for a maximum average annual requirement of eight graduates.

Reconsideration of higher forestry education in New Zealand therefore appears necessary. The ideal solution would seem to lie in the granting of scholarships to the best forestry schools in Northern Europe where education is liberal, teaching inspired and dominant environment a forestry one. The linguistic difficulty, however, is very real and though the best British, Australian and American schools

fall short of the desired combination, it is impossible to deny that their standards of teaching will be very much higher than any obtainable in N.Z. for another generation.

Only out of quality leadership and quality training will come quality forests and quality forest products, and only to the degree that those are developed will forests play an important part in the national economy. New Zealand has had one forestry boom—the bond selling racket which was a second South Sea Bubble, in which enormous sums have already been lost. The State with its huge expediency plantings on unsuitable sites has been no less blameworthy. But if lack of high quality leadership was to blame in the case of both company and State policies, the quality of many company plantings was higher than that of many of the State plantings, though credit for this should go to the bondholders trustees. In subsequent silvicultural management the State did some commendable work, though quite insignificant by volume. The companies have done even less. Both have little to be proud of, but taking this as a starting point should it not be a challenge to both to make the best of what they own and what they can produce from them? To the extent that they fail to do so they will limit the volume of trade they can develop. Only by the production of forest products of the highest possible quality—within of course the limits imposed by lack of silvicultural treatment—and at the lowest possible price consistent with earning a reasonable profit on conversion, will the exotic forests make their maximum contribution to both the domestic and export trade of the Dominion.

Integration of Manufacture the Key to Optimum Forest Development

At the specific request of your worthy Secretary I am committed to review the basic conversion processes required to give effect to the objective of maximum development of the exotic forest resource. The logical starting point is the subject of integration, which is a system of economically combining the various types of conversion—sawmilling, plywood manufacture, structural fibreboard production, pulp and paper manufacture, etc., etc. Each section of the integrated set-up takes the particular kinds of raw forest material most suited to its production and thereby secures these at a minimum price. Some operate on the waste of others, and all unusable material is employed as fuel. Yet by the sharing of common facilities, which may include wood yard and barking equipment as well as steam and power house and other engineering services, both capital and operating costs per unit of product are so reduced that the forest owner can realise a higher total value for his raw material. Another advantage of integration is one of greater financial or operating stability. Quite often prices of the various end products do not move together, and experience has shown that by shifting emphasis in production and in

use of the raw materials a significant improvement in financial returns and stability is possible.

The principle of integration has already been accepted both by the larger companies and by the State. At Penrose there is a sawmill and box factory integrated with a structural fibre board plant, the sawmill cutting out the central square of logs for conversion into box shooks and leaving the slabs for chipping and defiberising into mechanical pulp which is later reformed into sheets of softboard and hardboard. At Whakatane a sawmill has been combined with a paperboard plant. The Murupara scheme provides for common wood yard, steam and power plant and all engineering services for a combined sawmill, groundwood pulp mill, sulphate pulp mill and newsprint and printings paper mill. In the wood yard, tree length logs will be cut to best advantage to feed all sections—straight top logs free of heartwood for the groundwood mill, large straight butt logs—many with heartwood—for the sawmill, and the remaining logs—crooked, and with heartwood—for the chemical pulp mill. These three classes of raw material will be barked, and the bark, together with offcuts in trimming etc., sent to the steam plant as fuel. Only by this means can forest owners be assured of a maximum return for their investment in growing exotic forests.

Of equal importance with integration is the concentration of production in as large plants as practicable. It is possible to be categorical on this matter. Only through the adoption of what appear to be enormous production units will it ever be possible to compete even in Australia at world parity prices. It is for this reason that the Murupara scheme envisages a sawmill producing over 70 million board feet annually with a reduction in production costs of the order of 40 per cent on current figures; but it is pertinent to remark that this can be achieved only through integration. In its final stage of development Murupara will consume annually some 28 million cubic feet of wood, equivalent to one-third of the entire wood usage of New Zealand's sawmilling industry of 1949.

It is fully appreciated that the adoption of these large units is one of the fundamental difficulties of forest administration. New Zealanders as opposed to Australians and Americans and others, are essentially individualistic in their outlook, and not industrial. The Dominion is a country of owner-farmers, of co-operatives, of owner businesses, and in the sawmilling industry itself of owner-managers. It is a national trait which must be modified if forestry is to play a due part in the national economy.

The Pulping Processes—their Nature and Significance

It is appropriate at this stage to review the basic means of conversion in the pulp and paper field. First let us debunk this "Chemical Age of Wood." Various people with nothing but an academic knowledge of forest products talk glowingly and plausibly of

wood rescuing even the present civilisation from the likely exhaustion of oil, coal and other fuels, and of iron and other metals. Quantity not quality is their watchword. Cattle are to be fed on reduced wood waste and molasses; compreg is to replace metals and wood alcohol is to power the world. Such writers are invariably in search of notoriety and entirely unrealistic for forestry thrives not upon fear but upon economic pressure. The substitutions they envisage are evolutionary not revolutionary—to be measured by centuries rather than by generations. The cardinal error of its proponents is their failure to realise that the more chemical utilisation is developed the more important do the saw and veneer logs become as the basic product of the forest, and the greater the money which can be spent on silviculture and management to ensure their production, since chemical developments allow the use of both silvicultural and conversion waste at a profit to the forest owner as well as to the converter. All direct mechanical methods of conversion such as milling, slicing or veneering have the basic inherent advantage of being much more economical of plant investment, power supplies and labour than chemical means of conversion.

Pulp products are the major avenue of chemical conversion. Pulping processes fall into two broad categories—mechanical and chemical. The names indicate the means by which individual fibres or wood cells or bundles thereof are separated from one another. There are two forms of mechanical pulping. The first and most important by far is known as grinding—from the fact that straight bolts of non-resinous long-fibred woods such as the spruces, firs and hemlocks are pressed against the face of a wide grindstone so that the fibres or bundles of fibres are ground off the wood sideways, the objective being to preserve as much of the ultimate length of the fibre as possible. The yield of pulp is of the order of 90 per cent in the case of softwoods. Hardwoods are seldom ground because of the characteristically shorter length of their fibres. Due to this fact and the much larger proportion of square or oblong storage cells from both wood rays and other distributed soft tissue (medullary structure) there is a much greater loss of pulp owing to production of a high proportion of wood flour instead of fibre, and the yield is more like 80 per cent. Of all the eucalypts only one is favoured for grinding for newsprint, and to use this it has been necessary to manufacture much of the grinder equipment in stainless steel in order to prevent corrosion by the tannins and to avoid staining of the pulp. Pulp so produced by grinding is known either as “groundwood” or “mechanical pulp.” It is most commonly used for the production of newsprint and other similar printings, all of which are relatively cheap papers both because of the high yield of pulp and the fact that only power is needed for its production.

The second means of mechanical pulping consists of putting small bark-free chips through various types of what are known as “defibrators.” One common type consists of two opposed discs one

rotating relative to the other, their faces at the centre being separated by a distance greater than the size of the chips introduced at this point, but narrowing almost to fibre thickness at their peripheries, so that as the chips are thrown outwards by centrifugal action they are reduced to fibres or fibre bundles before being discharged at the rim. This type of pulping does not give as fine separation of either individual fibres or of bundles and the product is much coarser. Its widest use is for the production of structural fibreboard—both softboard and hardboard. Both softwoods and hardwoods are widely reduced as there is not the same loss in hardwoods due to the coarser type of product secured. Hardwoods also appear to give certain desirable qualities to hardboard. Power is again the chief element of cost—both for chipping and defibrating. The product is variously referred to as “defibrated pulp,” “defiberised pulp” or “disintegrated wood,” though usually classified as mechanical pulp for statistical purposes, there seldom being a differentiation between “groundwood” and “defibrated pulp,” etc.

In chemical pulping small bark-free chips not much more than an inch in dimension are subjected to the solvent action of various chemicals which remove not only the lignin binding the fibres to one another but various extractives in the wood together with portions of the lignin-cellulose complex. The result is that virtually all fibres are left full length but, as the lignin and other materials removed are of the order of 50 per cent, the yield is only about half that of the grinding process—that is about 45 per cent. The cost of chemicals is not inconsiderable even though much of them is recovered in some processes. Due to the low yields chemical pulps are much more costly than mechanical pulps.

Although there is a wide variety of chemicals in use for pulping, only three processes are of real importance—sulphite, sulphate and soda. The first uses calcium bisulphite as the cooking agent; the two others, sodium sulphide and caustic soda. The chips are introduced into large pressure vessels and subjected to several hours cooking under high pressures and temperatures, the heating being done either directly or indirectly by steam. In the sulphite process the liquor being an acid the digesters must be lined with acid-resisting refractories, but this is unnecessary in the case of both the other processes which are alkaline. Generally speaking the spruces, firs and hemlocks are reduced by the sulphite process, the pines by the sulphate and the hardwoods by the soda; though the sulphate can be used for most woods.

The sulphite process yields the lightest coloured pulps, so much so that they can be used without bleaching in combination with groundwood for the production of newsprint, and this is the basic reason for the comparative cheapness of Canadian and Scandinavian newsprint consisting of less than 20 per cent of sulphite and over 80 per cent of groundwood. When bleached, sulphite pulps constitute one of the purest forms known of cellulose and completely dominate

the market for dissolving pulps for rayon and plastic manufacture. Until comparatively recently sulphate pulps were almost exclusively used for brown wrappings, cartons, etc., but due to the diversion of sulphite pulps to dissolving purposes, large quantities of sulphate are now being bleached to supplement the declining supplies of paper grades in bleached sulphite. Hardwood soda pulps find their principal use for book papers for which their bulk and opacity makes them almost ideal. They are of course bleached.

Now for the applicability of the various processes to our exotic resource. Pines are not economically reducible by the sulphite process, and of the two alkaline processes the sulphate is the more suitable; but at the best it gives a light brown coloured pulp, which must be semi-bleached to be used as a substitute for unbleached sulphite and fully bleached for white papers. Likewise the heartwood of the exotic pines is so resinous that it is unsuitable for grinding, and only the heart-free or younger sappy wood can be ground and combined with semi-bleached sulphate for newsprint production which is the principal objective at Murupara. The colour of our pine newsprint is not quite as good as the best East Canadian sheet produced from spruce, but equals that manufactured from hemlock on the Pacific Coast. On the other hand it is much stronger than either, and in other qualities is equal in performance.

On the economic side, power and chemicals will cost more in New Zealand but offsetting this is the fact that at Murupara there is a greater concentration of annual wood growth with a shorter haul to mill than in any known place in Canada or Sweden. Before devaluation the project was a marginal profit earner at about 6 per cent but it is now capable of earning a very high profit and fulfilling the belief that it can be made as important to New Zealand as B.H.P. is to Australia.

Some debunking is also necessary in respect to the local production of both dissolving pulp and rayon. Only one pulp mill in the world has used the sulphate process for regularly producing a dissolving pulp from a softwood and this has involved an acid pretreatment. According to one of the most important users of dissolving pulps this sulphate pulp has not been as good as its normal supplies of bleached sulphite. Of even greater significance is the enormous size of pulp plants concentrating upon this one class of pulp and the close affiliation with the few rayon plants in which production is now centred (only eleven even in the U.S.A.). The present trend in the U.S.A. is for rayon producers to erect their own pulp mills in order to obtain complete control over the technical quality of their raw material which is so important that few pulp mills can undertake high quality dissolving pulp manufacture as only a part of their activities. The possibilities of producing either dissolving pulp or rayon in New Zealand are therefore extremely remote.

As for the remaining chemical means of utilisation, any mention of them can be dismissed as being insignificant. Even in the centre

of the Pacific North West with its huge supplies of cheap wood waste, alcohol production has never even looked like being an economic success.

Successful Marketing Dependent on Quality Merchandising

New Zealand is entering upon a critical phase in forest development. Just when we are forgetting the repercussions of the bond-selling boom with its stories of £500 for £25 in 20 years and the repayment of the National Debt with a few 100,000 acres of exotic forest, there is a growing feeling that forestry can play a leading part in the national economy. Already there are woeful exaggerations. I have heard the forests referred to as "The Fifth Estate," presumably to follow in export value the huge trade in butter, cheese, wool and meat. I have even overheard a declaration that in the immediate future they will rank second only to the dairy industry. These statements are matters for grave concern by the profession. They could have a basis in fact—if—and when—!!!

The "if" refers to the effective marketing of high quality products. This is axiomatic, but nevertheless it is far from being realised, more especially in the field of sawn timber production. Until comparatively recent years the prevailing philosophy in the indigenous timber industry was to give the consumer the minimum service possible. With the development of national grading rules and the installation of dry kilns during the intra-wars period there was a distinct improvement, but the sellers market which has existed since 1940 has not improved matters. On the consumers side there was a philosophy of wood use based upon limitless abuse. That such philosophies should prevail for a century is only a reflection of the enormous virgin forest wealth of the Dominion and of the extraordinarily good qualities of the indigenous timbers which could be equally maltreated by sawmiller and user alike and yet give highly satisfactory results—as exemplified by the number of houses in good condition after 80 years of use.

The grave threat to exotic forestry is that these two philosophies have been carried over from indigenous to exotic sawmilling and usage. It has been accentuated of course in that we have had to mill immature instead of mature exotics. The product of such trees is so susceptible to decay that to log, saw, season and use it in the same careless manner as the indigenous timbers is only to result in tragic building losses with serious prejudice to the future marketing of exotics. I was naive enough for many years to believe that all these threats could be effectively dealt with by educational work with sawmillers and users, but the experience of more recent years has convinced me that so far as the milling of immature exotics is concerned it is a case of the wish being father to the thought. The basic weakness lies in the carry-over of the owner-manager type of operator from the indigenous to the exotic forests. In the milling of large old shelter belt timber with a very high proportion of heart grades it was an understandable and successful transition; but the same cannot be

said in the milling of immature exotics. Much crude milling equipment has been employed: much sawn timber has been needlessly damaged by mould, stain and decay; much has been poorly graded; and far too much has gone into building instead of being rejected for grade, decay, etc.

It is true that sap stain dipping may enable small operators to get their product to merchants for kiln drying, etc., but it is questionable if any immature timber should continue to be used unless suitably dried and preserved against wetting, decay and insect attack so that consumers can be guaranteed a high value product which will give them buildings even superior in service to those previously constructed of indigenous timbers. Admittedly most of the undesirable features of the trade are accentuated by the prevailing sellers market but even with the development of a buyers market there could be only a temporary improvement, and the consumer would still be without adequate protection against a recurrence of the present trouble.

So much for the domestic markets, which are sheltered by tariffs and therefore not as competitive as would otherwise be the case. Only on the export markets does the full force of world competition impinge on New Zealand forestry—and true competition in terms of use value. Because dollars and—until recently—Scandinavian currencies have been scarce Australia has bought New Zealand exotics fairly freely since the war; but with the easing of the latter currencies quality competition by Sweden has already been felt by New Zealand producers and will progressively force prices downwards. The only New Zealand timber which has been able effectively to resist this quality competition has been the Waipa timber which like the Swedish product is log frame sawn and therefore is more uniform and accurate in dimension than any other timber. But in addition it has been properly kiln dried, well graded, attractively branded and bundled in such a manner that it has commanded lower freight rates and a premium from the buyer—the first because it facilitates the loading and unloading of boats and the second because the user is able to take delivery from boats' side direct into his factory for machining. All these developments are extra services; and while they involve additional costs to the producer they return him greater profits because the consumer in paying more is able to save a still greater amount through elimination of costly losses.

These are no theories but the proven practice of the whole export trade of Europe, the keynotes of which is quality competition. In turn this brings us back to the question of unit size. To meet world competition very much larger units are required for the export trade than for the domestic. Sweden is a case in point. While there are only some five hundred odd log frame mills there are over six thousand circular mills, but the former produce about 85 per cent of the country's output and almost 100 per cent of its export. It is for this reason that Murupara has been designed for an output of over 70 million board feet, in the expectation that 60 million will be exported,

even better sawn, better kiln dried, better graded and better bundled than the present production of Waipa. Of even greater importance will be the fact that by the diversion of the smaller and poorer grade logs to the pulp mills the average grade and average dimension of the sawn product will be much higher.

I do not propose to deal with the subject of quality in pulp and paper products in which the standards are so well established technically that either they must be attained or no products will be exported at a payable price. I can assure you that so far as newsprint is concerned there is every reason to believe that as a result of exhaustive tests and commercial trials it is entirely practicable to meet world competition in New Zealand and Australia on both quality and price.

Potential Value of the Exotic Forest Resource

Presuming now that all essentials are duly fulfilled we are left with the problem of assessing the magnitude or value of the forest industry based upon the existing exotic resource which is commonly quoted at 850,000 acres but of which probably not much more than 600,000 are commercially significant within the immediate future, the remainder being slow growing species and poor stands. Assuming that in the absence of any damaging epidemics we could rely on an average annual increment of 200 cubic feet (and this appears too high for policy calculations without allowance for losses) we would have a total forest yield of 120 million cubic feet. At present New Zealand used 150 million board feet of sawn exotics but supposing forest policy forces this up to 360 million at the expense of a reduction in the indigenous cut it would require only 60 million cubic feet of raw forest material, in addition to which probably another 10 million would be needed for local pulp and paper production, etc. This leaves about 50 million cubic feet for export usage, for which the most optimistic estimates of an export trade in the immediate future include 25 million of sawlogs giving a production of about 150 million board feet, 5 million for the production of 24,000 tons of chemical pulp and another 8 million for the production of 60,000 tons of newsprint leaving a surplus of 12 million cubic feet.

An estimate of the value at present day prices of the total trade on an ex-mill basis is as follows :

<i>Sawn Timber :</i>	Local Trade	360,000,000 bd. ft.	£6,100,000	
	Export Trade	150,000,000 bd. ft.	£2,550,000	
				£8,650,000
<i>Newsprint :</i>	Local Trade	40,000 tons	£1,800,000	
	Export Trade	60,000 tons	£2,400,000	
				£4,200,000
<i>Printings and Writings :</i>	Local Trade	9,000 tons		£540,000
<i>Chemical Pulp :</i>	Export Trade	24,000 tons		£645,000
<i>Wrappings :</i>	Local Trade	15,000 tons		£1,050,000
<i>Pulp Board Products :</i>	Local Trade	30,000 tons		£1,700,000
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			Total :	£16,785,000

By comparison the trade in butter, cheese, meat and wool based on recent production statistics and adjusted as far as possible to a similar ex-factory basis is approximately as follows :

<i>Butter :</i>	Local Trade	29,000 tons	£6,000,000	
	Export Trade	133,000 tons	£28,000,000	
				£34,000,000
<i>Cheese :</i>	Local Trade	7,000 tons	£1,000,000	
	Export Trade	92,000 tons	£10,000,000	
				£11,000,000
<i>Meat :</i>	Local Trade	120,000 tons	£9,000,000	
	Export Trade	360,000 tons	£29,000,000	
				£38,000,000
<i>Wool :</i>	Local Trade	4,000 tons	£1,000,000	
	Export Trade	160,000 tons	£38,000,000	
				£39,000,000
				<hr/>
				Total : £122,000,000

The comparison speaks for itself. It is highly probable of course that by the time our trade in forest products has increased to the extent now visualised, unit values will be much lower but the same comment will apply to those of all our other products and the comparison therefore remains a valid one.

But if I should appear apprehensive of the immediate future it does not mean that there are not in the far distant future real potentialities for forest development in New Zealand. Undoubtedly there is still an enormous acreage of land in total which could be put to effective use in the growing of forests, but it is a usage which cannot be recommended for either State or private owners until a very much stronger profession—numerically and technically—has been built up to ensure that such an expanded forest estate can be well established and silviculturally managed. Even with our present exotic estate and an actual surplus of total material we will have serious shortages of clean veneer logs for the plywood industry and an even more serious shortage of high quality sawlogs for the production of clear grades of sawn timber for sash and door manufacture and interior finishings, etc. Only proper forest management can remedy such defects. The blame is our own. Not one Government has denied the Forest Service any funds for essential activities. What should have been done was to have devoted more moneys to silviculture and less to establishment, especially in the depression period. Then we would have had less maldistribution of age classes and—ininitely more important—many stands well thinned and pruned to yield significant quantities of high class veneer and saw logs. Let us hope that we have learned our lesson.