

# NEW ZEALAND'S FUTURE NEEDS IN HIGHER FORESTRY EDUCATION

A. L. POOLE \*

## INTRODUCTION

In addition to the subject of higher forestry education, it might be appropriate—in fact, I think it is essential—to say something about the relationship between general and professionally-trained forest officers. Although at present this is largely a Forest Service domestic matter, it must be considered carefully in relation to the teaching undertaken at the School of Forestry. It also becomes more than a domestic Forest Service matter, because industry attracts so many of the Service's General Division trained staff.

I have accepted the thesis that the university sets out to do two things in the education of a person: one, to produce a broadly-educated person who adopts a versatile approach to the solution of problems; two, to equip a person to pursue a particular profession. It is hoped, of course, that the proposed forestry education at the University of Canterbury will do both these things provided the right raw material is forthcoming.

In analysing what future needs might be, I will attempt to trace, very broadly indeed, how forestry has evolved so far in this country. In this way, we will perhaps get some glimpses of the future and so eliminate crystal-ball gazing. In this approach, personal experiences must loom large.

I have a dim recollection of being taught in the Auckland School that forestry was the art and science of growing trees. However this may be, at the time the seeds of forest policy began to germinate in this country, forestry in the more advanced countries of the world had passed the stage of being an art and was firmly based in the sciences. The names of skilled botanists such as Kirk and Cockayne, therefore, appeared prominently in the councils of forest policy in New Zealand. For a brief space, Kirk became the Chief Conservator of Forests to administer the second Forests Act. Cockayne was Secretary to the Royal Commission in Forestry that reported in 1914 and was indefatigable in describing native forests throughout the country. One might have expected that the art of forestry, in the form of attempts to regenerate kauri or beech or the coppicing of some hardwoods, might have appeared. However, any such developments were prevented by the political attitude towards native forest, and rapid disappearance of that forest. The art and the science of forestry were applied only to exotic afforestation, and when formal university education in forestry began in New Zealand it was based on science. For various reasons, I concentrated more on this basis than on the forestry subjects. I have always been thankful that I did, because science provided me with far and away the best basis of any teaching I received at a university. I believe that this would still apply, because the basic forestry subjects consist largely of applied science.

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\* Director-General of Forests, N.Z. Forest Service.

## LAND USE POLICIES

I do not think we were ever taught in Auckland the relationship between land laws, land administration, and land use, an understanding of which is essential to an understanding of much of forest policy. I have had to learn the intricacies of this inter-relationship as opportunity offered and necessity demanded. The effect of land laws and administration on land use became important from the signing of the Treaty of Waitangi in 1840. The Treaty laid down that land could be sold to the Crown only, and this restriction enabled the Crown to fit forest use into the rapidly evolving land use pattern. Though foresters might deplore many of the things that were done or were *not* done, the Crown was able to introduce from time to time far-reaching measures affecting forests. The forests that did not remain in Maori ownership mostly became Crown property, so that their disposal for settlement at least had some semblance of law and order, and took into account timber needs in districts. The Crown was able to retain most of the essential protection forest on the main mountain ranges. When clearance of some of this forest did proceed too far in places (and was followed by erosion and increased river problems) and when clearance of production forest did proceed too fast, Crown ownership enabled a statesman to intervene, as did Bell in introducing unique legislation distinguishing between Provisional and Permanent State forests. The law relating to the latter category placed the onus of making a very substantial case for clearance on the would-be forest clearer—in effect on the Lands Department, which was deeply involved politically in forest clearance.

Provincial, and later Crown ownership of land also facilitated the commencement of exotic afforestation. The first tree planting encouragement Acts used as an attraction the granting of "waste land" for afforestation. The availability of extensive areas of vacant Crown lands, mostly grasslands, also enabled the Lands Department to start its own afforestation schemes and to develop them on this type of country for over twenty years before the State Forest Service was set up.

We have come now to a phase of forestry and land use that contains many more problems than foresters have had to face hitherto. The way has been paved, through various assistance schemes, for afforestation to fit more intimately into land use. But to ensure that it will do this, incentive schemes need to be studied closely by foresters, especially forest economists. Many abstruse problems of land values, forest valuation, and discount values are appearing.

## THE RADIATA PINE ERA

The growing of radiata pine wood, which has formed the basis of a great deal of the present activity in forestry and forest products industries, calls for some comment. The main planting was taking place when foresters of my generation were students. It is true that there was little scientific planning or guidance to this large-scale planting. One might almost say that forest practice in those years reverted to an art, and a fairly primitive art at that. As with all arts, a basis of trial and error was introduced—this time on a huge scale, and in the place of scientific beginnings

that had been well laid during the previous 20 years or more. What scientific guidance was available strove valiantly to keep up with a development that expanded so rapidly that such guidance soon had restricted effect. However, where it was effective, the results are plain to see today. One of the lessons to be learned from the practices of those days, possibly the main one, is, therefore, that the application of scientific forestry principles could have achieved incomparably better results than those that came from the "hit and miss" methods used.

It is the introduction of extensive and, particularly, integrated utilization into exotic forests that has sharpened up the focus of all those watching the developing New Zealand forestry scene. As one of the generation of foresters who had an uncomprehending hand—in the physical sense of planting radiata pine trees at the rate of 2,000 or so per day, and throwing the odd bundles into the scrub because of exhaustion at the end of the day—in creating the remarkable exotic resource, I have subsequently had to try to comprehend the significance of developments taking place round this resource.

There are many important lessons to be learned from recent developments. Because such lessons should have a bearing on any curriculum designed for the Forestry School, I will point out those which to my mind are the most important.

(1) *Exploitation of Exotic Woods*: The first problems to be solved as speedily as possible were those concerning a knowledge of exotic woods, their utilization, and their marketing. These problems were tackled vigorously, but not by foresters. It is essential, however, that foresters become familiar, if nothing better, with the broader aspects of utilization and marketing of exotic woods. The silvicultural treatment of exotic tree stands, particularly radiata pine, can be varied very widely to yield a range of produce for different utilization needs. Not many New Zealand foresters have learned this lesson yet, or maybe they are still engrossed with the very difficult problems of rectifying early silvicultural mistakes. It is a chastening experience to go into the field with European foresters who from a momentary glance at a standing tree can nominate the different categories of log grades and the utilization to which these logs will be put.

(2) *Development of Silviculture*: Silviculture, of course, is the bread and butter of a forester's living, and hence is basic in his training. Not much need be said about it, therefore, except, possibly, to express the hope that the teaching of it in New Zealand might make future foresters more venturesome in the practice of it. Present-day foresters regret that there are not now available the results of many more trials and variations of silvicultural practices. But are these same foresters varying their practices sufficiently for the benefit of future foresters? I think not. In fact, in certain respects, particularly with regard to the selection of species, our practices have become far too restricted. Radiata pine dominates our thinking and practices to an undue extent. Even with this species we are not very venturesome, except possibly in planting it where obviously it should not be planted.

Foresters have been faced with a tremendous problem in trying to rectify the uneven age-class distribution of radiata pine. This

tree responds in a remarkable, almost incredible way after thinning. Extensive Borggreveian thinnings were surely the way to extend the life of stands which will be needed while the regenerated stands are putting on maturity. A small amount of research on this could have shown a great deal, though I am not sure that Borggreveian thinning would not be the best way to treat all radiata stands. I have found, however, that almost invariably foresters have closed minds to this system, largely it seems because of what they have been taught—not because of what they have found out. The teaching of free thinking is as important as the teaching of technical matters. There is a tremendous field of investigation and research on the economic aspects of radiata pine silviculture.

(3) *Assessment Methods*: New Zealand has moved so rapidly into the exploitation of exotic forests that we have been caught "flat footed" in our inability to assess quantities of wood in them accurately and speedily. True, research in this field was far ahead of practice, but the attitude towards its application was coloured by the spectre of unsalable surpluses. Young foresters can hardly be expected to appreciate the widespread concern—almost a phobia—a generation ago about the creation of unsalable surpluses of primary products, including timber. In recent times, perhaps only Britain's bid to join the E.E.C. has produced comparable uneasiness about our ability to find markets for our surplus produce. The time has arrived, however, when we should know with considerable accuracy what quantities of wood can be sold. In ten years' time, or possibly less, it will be necessary to predict this with even greater accuracy. By that time there will be strong pressures to cut in excess of sustained yields. In the future, growths and yields and the measurement of them will loom large in a forester's work and in foresters' meetings.

(4) *Selling of Timber*: While we were caught unprepared in matters concerning the assessment of standing timber, we have been caught even less prepared in matters concerning the efficient selling of it. The planning of a sale that must take into consideration the perpetual thrift of the forest, the encouragement of sound and profitable industry—but return a profit to the owner of the forest, and which will serve the public interest and, where necessary, conform with national forest policies, can be an intricate and most testing exercise: it calls upon all the teaching and experience of a forester. Not nearly enough study, thought, and discussion has gone into questions connected with the sale of standing exotic timber. I have found my own forestry education hopelessly inadequate to deal with these matters, and only the gleanings of later experience have helped me. I sometimes feel that an education in commerce and experience in this field would have been more appropriate. (One might then have adopted, with equanimity, the questionable ethics of certain industry bargaining tactics.) However, one might then not place the right emphasis on such essential matters as the need to grow good and healthy forests and to keep within sustained yields. The solution seems to lie in a broader forestry education.

(5) *Planning for the Future*: We are now engaged in some long thinking. The exotic forest and the forest industry developments

have been so promising that there is widespread support for continued development. The past has been guided by broad policies, but we have now reached the age of statistics, computers, and planning, whether we like it or not. Our population increases at such and such a percentage. In a certain year, therefore, so many children will go to school; so many houses and school buildings will be required, etc. Forestry lends itself to planning, so we calculate *per capita* forest products consumptions, examine world trends and markets, and plan accordingly. The realization is just dawning that the economy of whole regions can be stimulated and improved by the creation of large forest resources.

The planning of exotic forests is, therefore, something we must develop and study more and more closely.

## PROTECTION FORESTRY

Nationally, attention is being focused on matters related to water. Since 1942 we have had a Soil Conservation and Rivers Control Council, part of whose task is to control unruly waters. We have a Water Pollution Council and many Acts governing urban water supplies and irrigation. The broad administration of all these matters is about to be amalgamated in a single Act and under a single organization. As an integral part of these matters, the management of all vegetation, particularly forests, on steep country becomes increasingly important. This management was almost neglected by foresters until the responsibility for control of deer passed to the Forest Service in 1956. Such management must now include, to an increasing extent, the rehabilitation of degraded steep country. Fortunately, research in this field is well advanced, but there is a long way to go before results can be applied on a large scale. Problems in this field are abstruse and I believe that people best equipped to contribute to the management of high country are those possessing the best education in basic science. I see little point in including in a forestry curriculum more than a section of lectures outlining the problems.

The increasing use of high country for recreation has forced the owners of this land to take more notice of recreational requirements. In future a great deal of this recreation must be superimposed on management of the land for other purposes. What I have said about management of high country therefore applies. Forestry curricula should not be cluttered up with courses on recreation in forest areas.

## DISCUSSION

These then, to my mind, are the main lessons to be learned from a study of our forest history and of the rapid developments now taking place around us. The need to practise forestry as a science; to develop silviculture in a versatile and imaginative manner; to understand utilization, marketing, and the development of marketing of forest products; to develop mensuration, particularly assessment methods, to a much greater extent than in the past; to develop sound methods of selling wood; to study the broader implications of forest policy, especially the place of forests in land use, in economic development, in trade, and in employment;

and to realize the importance of protection forests and to understand their functions. These are all matters that future foresters must be equipped to study, understand, and administer.

I suppose all this adds up to advocating the need for foresters trained along orthodox lines. There is a temptation today to cram courses with a lot of specializations, but these can be learned once the science and main subjects and principles of forestry have been mastered. One specialization (speaking from a narrow forestry point of view) has come to be widely accepted, and has resulted in many forestry courses offering two main options at the undergraduate level. This specialization is utilization. I think, however, that all foresters intending to practise what might be termed basic forestry need to be taught more utilization than they normally get; and that those specializing in utilization need to know more about forestry than they usually appear to do.

A discussion meeting was held in Britain last year on "Education in British Forestry" and the proceedings were reported in a supplement to *Forestry*. No doubt this meeting was stimulated by the presence of four forestry schools in Britain and the lack of forestry employment for many of their graduates. The schools are therefore seeking to teach many courses outside the subjects falling within what have hitherto been regarded as orthodox forestry. What interested me was not so much the proceedings as a subsequent letter written in response to an invitation by Prof. Laurie for "frank comment". Part of this letter, which is aptly headed "The Wood from the Trees", says:

"My own considered opinion goes further than that; I say that university-trained foresters do not know nearly enough about timber to make them competent forest managers. I go further still and say that university teachers of forestry in general do not themselves know nearly enough about timber to teach students how to grow good timber trees.

"A student should learn from the start what is the main object of his training and what constitutes a good timber tree. He needs, therefore, from the beginning to observe and study the conversion of round timber at a sawmill. Having thus a clear idea of what training in forestry is really about, he will obtain full benefit from subsequent teaching and practice. Furthermore, at some stage in his education, he should satisfy his examiners by practical demonstration in the wood and sawmill that he can measure timber and value a standing tree and log it correctly when felled; that he can grade the logs obtained; that he understands simple methods of conversion and can finally measure and grade the outturn."

At all costs, New Zealand should avoid the type of curriculum that has been developed in many American forestry schools. These provide for what is virtually technical or applied training at the university level. Though this training is essential at a lower level, it does not equip graduates with the versatility needed to cope with the broader administrative problems.

*General and Professional Foresters:* This leads me to what is termed ranger training in New Zealand. It is imperative that we consider this in relation to higher forestry education whether it is a domestic Forest Service problem or not. In all forestry opera-



tions — government or private — a strong, generally-trained cadre of foresters is essential. Indeed, such officers have been largely responsible for laying the foundations of forestry in this country, with, however, exceptionally strong professional leadership at the top.

Because of the very rapid development of forestry and forest industries, it is essential that the present type of General Division forester continues to be trained in at least the present numbers. These foresters are the most versatile forest staff and will continue to be so for a long time to come.

At one time it was thought that both general and professional training could be given in the one institution. However, further consideration and inquiries about experience elsewhere have made it fairly clear that the two types of training should be done separately. One aims directly at the management of men and field operations; the other at forestry and administrative details and principles. This is not to say that individuals from one field will not become skilled in the other; they are certain to do so. If we are to make the best use of our total array of trained manpower, it is essential that such individuals be recognized and employed according to their skills and development.

*Summary — A Quotation:* I cannot resist making a long quotation from another source. Professor Laurie in reviewing *Forestry Education in America Today and Tomorrow* (Dana and Johnson, 1963) summarized views on current American forestry teaching. These views, to my mind, set out succinctly good guide lines for any higher forestry education. He said:

"The main points that emerge are:

"Firstly, general agreement that the four-year undergraduate curricula do not provide adequate instruction in the basic biological sciences, physical sciences, and mathematics. That in forestry subjects they pay too little attention to theories and principles and too much attention to practices and techniques.

"Secondly, that there is often an undesirable proliferation of courses and curricula.

"Thirdly, nearly all commentators bewail the inability of the average forester to use the English language effectively either in speaking or writing.

"Fourthly, with the increasing need for administrative as well as technical ability, foresters need a better grounding in the social sciences and their application in the fields of forest economics, forest administration, forest law, and forest politics. They also need the broadening and civilizing influence of the humanities.

"No one would, I think, dissent from these views. In this country we have probably been more conscious of the aim of training good forest administrators rather than good forest technicians, but how far we have succeeded in this is an open question.

"Fifthly, there is an increasing need for 'forest land managers'. The forester should be concerned with all the products and services of the forest and not merely with timber production. Multiple use should be practised and not just talked about. Consequently, an understanding of the whole ecosystem and its control is a prime requisite for a forest manager, and this may require a broadening of the undergraduate programme.

"This concept has, I think, been well appreciated in this country and forestry teaching has had a fairly definite ecological bias. Again, it is an open question whether this bias has been sufficiently strong.

"Sixthly, the perennial problem of whether the training should aim at producing 'generalists' or 'specialists', and at what stage specialisation should be permitted is discussed. Opinions differed on this. It is clear that both categories will be required, and the most general view was that specialisation should mainly be at the post-graduate level."

#### R E F E R E N C E

Dana, S. T.; Johnson, E. W., 1963. *Forestry Education in America Today and Tomorrow*. Soc. Amer. For., Washington, D.C. 402 pp.