

EIGHTEEN YEARS ON
A Progress Report, and Assessment of the Future,
For the School of Forestry

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Volume 11 (2) of the *New Zealand Journal of Forestry* which appeared in 1966 is dominated by a series of papers, records of discussion and a subcommittee report which are all related to the announcement in 1964 that the national School of Forestry was to be established at the University of Canterbury. Re-reading the number brings recollection of the critical scrutiny which the University's proposals were subjected to and the vigorous debate which developed at the 1966 Annual General Meeting and Conference of the New Zealand Institute of Foresters.

As would have been expected, the views expressed by members on university forestry education were sound and enlightened and much good advice on academic matters fills the pages. There were, *inter alia*, calls for the new School to address itself to New Zealand features and problems and not, "... be an anaemic, gutless copy of a certain antediluvian old-world institution". Probably the most striking common theme was an expression of concern, indeed suspicious concern, that the new School of Forestry might not come up to par, for the simple reason that the resources provided would not be adequate. The system then in vogue of sending New Zealand science graduates to a range of overseas forestry schools for professional tuition was seen to have conferred important advantages and so retained a measure of support; nobody wanted it replaced by a new system which would be inferior in any way. Reading these pages again and re-capturing some of the spirit of the issue brings the realisation that an attitude of critical suspicion was really the correct pose in a professional sense. Certainly it was not unhelpful to those who later had to bring the new School into being.

It is salutary now to look back on those early doubts, and on the many inceptive problems, so that 18 years on, and 295 B. For.Sc., 24 M.For.Sc. and 5 Ph.D. graduates later, the important lessons learned can be identified and documented. It is even more salutary to look ahead to the needs of the nineties and be-

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yond to see how the School which originated in the early part of the second planting boom, should develop to meet, *inter alia*, those needs which will be influenced largely by the harvesting, utilisation and marketing of the resultant timber.

EARLY DOUBTS AND PROBLEMS

The overwhelming concern of the profession in 1966 was that the resources of the new School would be inadequate mainly in one vital respect; there would not be enough teachers. Evidence was adduced from several authorities that the minimum lecturing cadre for a School of Forestry was 6 and if any school started off with fewer than 6 it could not be fully effective. Perhaps it was no coincidence, therefore, that there were 6 teachers standing to their lecterns when the first students came through the doors of the new building in February 1970. In fact, there were effectively more than 6 because a happy arrangement had been made with Lincoln Agricultural College, which still continues, that their Soil Science Department would teach the subject of Forest Soils to forestry students at Ilam, with financial resources provided initially by the University of Canterbury. Two years after, thanks to an endowment of a chair from N.Z. Forest Products Ltd, the teaching staff increased to 7, and two years later again a lectureship was added by the University to make a total of 8.

In the early planning years of the School, the uncertainty next most commonly voiced by the profession, as question or criticism, was where would all the graduates go? It was thought by some that a staff:student ratio acceptable to the University would result in the production of a number of forestry graduates in excess of the number of jobs available. The implications of this point were serious, and taken seriously. If too many graduates were produced, the profession of forestry would tend to be devalued with obviously undesirable consequences for professional rewards and standards. Furthermore, there would arise a form of vocational "back pressure", to include in the B.For.Sc. course as options a range of subjects some of which would be only peripheral to professional forestry. In this way the job prospects of the unemployed surplus would be enhanced. Of course, the result would be, as is apparent in some overseas schools, that some of the graduates produced would not be qualified as general forestry practitioners, another form of professional devaluation. Accordingly a great deal of attention was given to the assessment of future professional job opportunities.

Estimates of the numbers of foresters needed in the future were obtained from the Forest Service and the large companies. These and other estimates enabled the prediction to be made that up to 26 bachelor graduates would be required per year for work in New Zealand. To this number was added a quota of 4 overseas students who would return home after the completion of their courses. Planning for the course and the building proceeded on the basis of annual intakes of up to 30 into professional classes — *i.e.*, in the third year. Since 1971 when the first graduates completed their courses — they started the Intermediate years in 1968 — an average of 23 B.For.Sc. graduates has been produced annually and virtually all have obtained jobs in professional capacities.

From the outset the new School of Forestry was made more than welcome at Canterbury. Various departments realised that association with the new campus discipline would bring mutual benefits and of course this consideration must have bulked large in the decision to site the School at Canterbury. In fact, there was a suggestion that some of the undergraduate teaching be undertaken at Lincoln College. This was not favoured as it would have hindered the development of the School and impeded the establishment of Forestry as a discrete entity on the campus.

Another initial difficulty was that time was short. The appointee to the Foundation Chair took up his post early in 1967. Professional classes were planned to start in 1969, leaving only two years for the erection of a building, the formulation of a curriculum and the recruitment of staff. The situation was readily appreciated by the University Council and the commencement of professional classes was postponed to 1970. Meanwhile in 1968 the first students commenced their 2-year Intermediate course. By November 1969 the building was virtually completed, the curriculum had become entrenched in regulations and prescriptions in the University Calendar, and the staff had been appointed.

THE INITIAL DESIGN

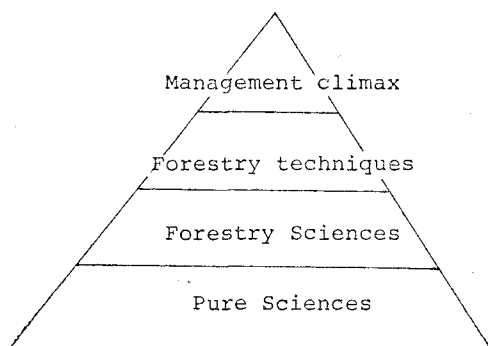
The first task of the Foundation Professor had been to travel extensively in New Zealand and consult principals in the forestry sector, both governmental and private, about the educational needs of their organisations. Then there was opportunity, on a 9 months overseas study tour, to study forestry curricula first-hand at universities in Australia, U.S.A., Canada, Great Britain,

Switzerland, Germany, Sweden and Japan, and other aspects of forestry too. An eclectic approach was adopted during the study tour, selecting from some of the overseas schools what was deemed to be good and applicable to New Zealand conditions. But always in mind was the increasingly distinctive nature of New Zealand forestry and the need to choose a curriculum to match it.

New Zealand forestry had progressed spectacularly since the early 1950s and New Zealand foresters were becoming recognised overseas for their refined management of the highly productive softwood plantations. Furthermore, in contrast to forest management in some countries, economic precepts and criteria were becoming incorporated routinely into the silviculture regimes. Also, the spectacularly short rotations of the exotic softwoods enabled qualities to be moulded by selected silvicultural regimes to meet recognised market requirements, a consideration which highlighted the importance of wood science. Finally, a better understanding was being achieved of the ecological features and problems of the indigenous protection forests, problems encountered to the same degree in few other countries. All these features had to be accommodated in a truly New Zealand curriculum.

The resultant new B.For.Sc. course comprised four main components. First and forming a foundation to the whole academic structure was the two years' preparation in *pure science*: Mathematics, Statistics, Chemistry, Biology, Botany, Soil Science and Economics. Then, as the first element in the professional classes, these disciplines were to be studied as they applied to forestry, so becoming the *forestry sciences*: Mathematics and Statistics were transformed into Forest Biometry; Economics into Forest Economics, Biology and Botany into Forest Ecology; and Chemistry and Botany into Wood Science. At the next level above, and often depending on the *forestry sciences* for fundamental rationales, were *forestry techniques*: Silviculture, Forest Engineering and aspects of wood processing. An opportunity for choice was provided in which students could elect to take a paper in Advanced Wood Science or Multiple-use Forestry, which represented a degree of specialisation. Finally, as a capstone, was the *management climax* which was made up of Principles of Management and a realistic regional Management Case-study. In the latter the students were required to integrate all the subjects they had studied and make justifiable management decisions. This management climax was akin to the professional synthesis required in many technologies for decision-making or design.

There was one other facet of the management climax, a subject called Forestry and Society which had the aim of providing an understanding of where forestry and foresters fitted into the community, a sort of professional conscience. The structure of the B.For.Sc. course can be portrayed diagrammatically, with each component forming a launching platform for the one above.



Postgraduate studies commenced in 1972, a little hesitantly. At first the M.For.Sc. degree was seen essentially as a management/professional qualification, comprising course work and a report. It was to have a dichotomous relationship with the Ph.D. degree which was seen as the sole research qualification and which comprised a thesis only. Changes were made as experience was gained. Initially a postgraduate student had to choose one or the other; he could not proceed to doctoral study by way of the masterate course. However, it was found that many students wanted to undertake research at lower than doctoral level; also it was realised that a thesis submitted for a Ph.D. may not possess the quality and depth required for a doctoral qualification but it may be worthy of a masterate qualification. Accordingly, it is now possible to study for a M. For.Sc. degree by thesis only, as is possible in masterate programmes elsewhere on the campus. The Ph.D. is still obtained formally by thesis only but the desirability of doctoral students advancing theoretically in course work became obvious as did the need for some to take "bridging" courses. Now some Ph.D. students are required to take such course work, although not for formal credit.

SOME LESSONS LEARNED AND EXPERIENCE GAINED

Many lessons have been learned, and of course this will continue. It would be inappropriate to attempt to describe all of them

here but some considered to be of greater general significance are listed below.

The Importance of Flexibility for Entry

Uniformity may be a desirable feature in growing pines, but it is not in producing foresters. A mix of students with different backgrounds including some from different countries can bring a stimulating variety of attitudes and philosophies. If all students were produced from the same mould, the dead hand of uniformity would certainly be apparent. Accordingly there has been a move towards a policy of flexibility for entry into professional classes. In addition to the majority of entrants who took the Intermediate course, there have been graduates in science, agriculture, arts, even medicine, and students holding a New Zealand Certificate in Forestry (NZCF). The really important criterion for acceptance, assuming a threshold preparation in relevant courses, is the quality of the student; good intellect and good motivation can compensate for many preparatory deficiencies.

The Integration Barrier

Positive teaching steps are needed to help students relate what they learn in one course to what they learn in another. Students seem to want to avoid such synthesis or integration, and it is necessary to insist on this with deliberate curricular moves. The Management Case-study in the final year is especially designed to achieve integration and has been reasonably successful, although the exercise is obviously painful for some students. Integration seems to require a measure of intellectual maturity before it can be mastered. It must be added that teaching staff, too, need an integrative spur. In fact, a comprehensive management case-study exercise in the final undergraduate year has had a profound influence on staff, broadening individual horizons and resulting in a good level of integration in teaching. With only 8 teachers covering the whole gamut of forestry, the pressure for each to remain within his unavoidably wide area of specialisation might otherwise have been overwhelming.

The Honours System

At the start the Honours system then in vogue at the Canberra School was adopted. The idea there was that very good students would need extra work to keep them fully extended and these were invited into the Honours stream, given a special topic of study and required to submit a substantial dissertation as an additional requirement. This system was found to be unsatis-

factory at Canterbury on two counts: first, the best students did not always want to be partly separated from their fellows in an Honours stream; second, the great majority of the students not invited to take Honours tended to resent the lack of opportunity to undertake a project largely of their own choice and largely on their own. For these reasons the system was changed in 1972 when all students were required to undertake study of special topics and submit dissertations, Honours being awarded on the aggregate of grades obtained in all papers of the Professional Courses, including the dissertation. In fact, the dissertation has been found to be a most important educational device in that it promotes individual effort and intellectual independence.

Practical Experience

At first the scheduled practical courses were a mixture of gaining experience in practical work skills and seeing in the field the application of what the students had learned in class. Also the courses were each about two weeks long and as they took place outside the teaching terms there was a significant reduction in time available for students to earn money on holiday jobs. Further, when some students came into professional classes they had never worked in a forest or wood-processing mill and had neither practical work experience nor even a knowledge of basic forestry jargon. For these reasons a change was made to requiring students to undertake a minimum period of practical work before they could enter professional classes and also before they could graduate. The practical courses became shorter and concentrated on the field applications of their studies.

The Importance of Communication

It is fashionable to criticise students in all disciplines for their frequent ineptness in written expression; unfortunately, it is justified. Any university teacher in a discipline which requires narrative-type exposition will readily describe the absence of precision, the lack of form, the faults in syntax and the misspelling which he encounters. It is no different in forestry. For an individual student these faults are serious personal deficiencies; for a profession which seeks to or is forced to communicate with the public they are little short of a collective tragedy. How can foresters secure the resources they need or obtain approval for a course of action from superiors unless they can write precisely, concisely and compellingly? How can they obtain public sanction for a management plan or an aspect of forestry policy unless they can put their case effectively? Teaching students to

write more expertly has taken a lot of the staff's time and will continue to do so: we cannot turn out literary incompetents. Efforts have been made to include time in the curriculum for students to prepare, discuss and summarise material to help them develop communication skills.

The Contribution of Guest Lecturers

Last year the teaching contributions of specialists outside the university — the guest lecturers — represented 6% of the formal tuition time in the B.For.Sc. course. Guest lecturers bring a range of benefits; they bring the students closer to field practice in their own field of specialisation; often they provide an authoritative "state of the art" picture of an aspect of forestry science; and they give the students a respite from the unavoidably over-familiar styles and idiosyncrasies of their usual teachers. There is much useful interaction too afterwards in the tea-room between the guest lecturers and many of the teaching staff. When the School commenced it was found quite impossible to cover all aspects of the B.For.Sc. curriculum with 6 teachers. The deficiencies were made up cheerfully by Forest Service engineers and foresters, company foresters and FRI scientists and their assistance was greatly appreciated. They continue to contribute and now have been joined by scientists from other universities, and principals in the industry who have much practical experience in utilisation and marketing. Our experience is that all these guest lecturers enhance our forestry studies substantially.

The Myth of Insularity

The eclectic approach to training foresters before the School opened, in which New Zealand science graduates were sent for their professional studies to Canberra, Aberdeen, Edinburgh, Bangor and Oxford, and even further afield in a few cases, brought a range of forestry experience and philosophy back to New Zealand. This was long regarded as a bulwark against insularity and some feared that the change to one national School would tend to introduce professional narrow-mindedness and introversion. In fact, this does not appear to have happened; at least the School does not appear to have been responsible for any such trend.

There have been several reasons. First, and perhaps of less importance, there has always been a small but significant cadre of overseas students who have brought variety in backgrounds, attitudes and philosophies. Of the 295 bachelor graduates, 21 have come from overseas; of the 24 masterate graduates, 16; and

of the 5 doctoral graduates, 1. Most of the overseas students were Malaysians but others came from Switzerland, Fiji, Philippines, Australia, Netherlands, Vietnam, United Kingdom, Chile, Korea, Canada, U.S.A., Bangladesh and Iraq.

Second, of the 12 members of the teaching staff who have taught or who are teaching at the School, only 4 are New Zealanders. Of the others, 4 are from the United Kingdom, 2 from Canada, 1 from U.S.A. and 1 from Australia. Discussion at any of the regular staff meetings readily reveals differences in forestry experience, and also differences in teaching philosophies and curricula preferences. Moreover, the generous study leave privileges at the University which enable teaching staff to travel overseas for up to 200 days for every 5 years of service help staff to keep up with ideas and developments outside New Zealand.

Finally, the generous endowments of visiting fellowships, first by N.Z. Forest Products Ltd from 1977 and latterly by Tasman Pulp and Paper Company Ltd since 1982, have resulted in 14 eminent foresters and forestry scientists from many parts of the world making substantial contributions to teaching and research in the School. They have come from Australia, United Kingdom, U.S.A., Canada, Sweden and Germany as well as two from New Zealand and this year there are visiting fellows from Australia and U.S.A. Insularity has been kept at bay.

The Essentiality of Postgraduate and Staff Research

Unleavened teaching of undergraduates can be a wearisome business. The stimulus of personal research, or interaction with postgraduate students where teaching is often on a one-to-one basis is necessary for academic staff to maintain a certain level of élan. Also teaching at the undergraduate level needs to be constantly improved and updated if it is to be fully effective; personal research and interaction with postgraduate students readily provide the material for such improvement. Since postgraduate studies commenced in 1972, there has been an annual average of about 5 masterate students and 4 doctoral students in the School, with 3 of these masterate students and 1 of these doctoral students being from overseas. The number of postgraduate students have not been as great as we might have hoped, especially in the early years. New Zealand foresters continue to travel overseas for their postgraduate training — only 4 of our own graduates have pursued postgraduate studies in the School — and the high cost of travel and the limited funding within New Zealand deter many excellent candidates from overseas.

Our Role in the Forestry Community

When the decision to establish the School became known, some claimed that here was an opportunity for an independent voice in New Zealand forestry, one detached from the aspirations of the government and the Forest Service on the one hand and private forestry companies on the other. It was conceded by these people that for various reasons the Institute had not been particularly effective in this regard and so the new School of Forestry could assume the role of speaking out impartially and fearlessly in the best interests of New Zealand forestry. But there was a major conceptual flaw in this thesis. Whatever is done to a university, it must not be politicised. There can be no party lines on politically-charged issues at any level; individual academics may speak out as they think fit, and do, but the idea of a university department having defined policies about this or that issue is untenable. Indeed, experience in the School has shown that it would be unattainable in a democratic context; it is difficult enough to agree on such pressing matters as next year's curriculum.

On the other hand, some foresaw that locating the School at Canterbury might isolate it from the most dynamic elements of the sector and perhaps relegate it to a backwater. Whether or not this danger has been avoided will depend on one's perception of the forestry scene and one's expectations for the School. Certainly the School has played little part in many of the day-to-day controversies which vex forest managers. However, individual teachers in the School have sought to play a part in the broader field where the general principles of issues are debated. Perhaps this tyranny of distance from the Central North Island has conferred the benefit that the School cannot be identified as the pawn of any faction.

On balance though, it would be desirable for individuals in the School to be playing a greater role than at present in many issues and developments. The problem is one of resources: time, money and manpower. It is just not possible for staff to travel as freely as their counterparts in government and company employ. The tyranny of distance is reinforced by the tyranny of the timetable; only in the field of wood science where there are 2 teachers is it practicable to relieve a teacher to enable him to attend a meeting during term time.

Finally, it may be germane to consider what contribution other than teaching and research can reasonably be expected from such a small cadre. There are only 8 teachers in the School to some

150 scientists at the Forest Research Institute which places any impact School staff may have had in perspective.

THE SCENE CHANGES

The 1981 Exotic Forestry Conference was a milestone in the development of forestry policy in New Zealand. The Conference was held primarily because it was timely to consider the implications of the pending dramatic increase in exotic wood production: a doubling of current output by 1998 and a trebling by 2005 (Anon., 1980). The implications are substantial and wideranging and include training. The School has always considered it important to keep in touch with the forestry industry to ensure that the teaching and research programmes are what the sector requires in the long term. Several of the staff attended the plenary session and served on working parties. The Conference identified the salient trends, relevant to higher forestry education, which will develop over the next decade or so:

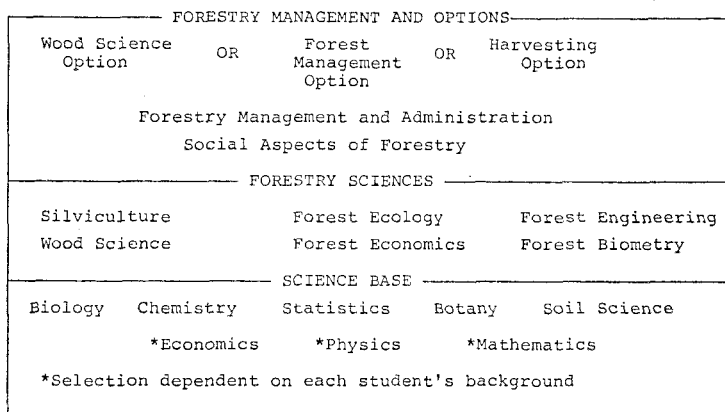
- (1) The changing emphasis in forestry from silviculture and management to forest harvesting, processing and marketing.
- (2) An increasing need to base all management decisions on quantitative analyses, and to develop appropriate techniques to monitor and control forest operations and industrial processing.
- (3) An increasing need for an integrated land use policy which emphasises effective multiple-use management of forest land and which recognises the increasing importance of farm forestry.
- (4) An increasing need to fit forestry — economically, socially, environmentally. industrially — more comfortably into the rest of the community.

The trends set out above indicate the increasing role of university-trained technologists. Further, there were specific recommendations referred to the School from the Conference for greater emphasis on harvesting, wood science and technology, and marketing in the B.For.Sc. course.

THE NEW DESIGN

The pending expansion in exotic production forestry and wood processing is obvious, but this should not be at the expense of other facets of New Zealand forestry. Soil and water conservation, recreation, scientific reservation, conservation of indigenous forest biota, and the whole indigenous forest estate have to retain their importance. Accordingly, the requests for more tuition in harvesting, wood science and marketing had to be viewed as additional needs and, if the 4-year undergraduate

degree course was not to be lengthened, they could be provided only in options. This was the rationale behind the new 1+3 B.For.Sc. course structure which was approved by the University Council in 1982 and which is portrayed diagrammatically below.



Other recommendations from the 1981 Conference made further demands on the School and implied an expanded teaching effort. They involved teaching forestry in agricultural curricula, collaborative studies with chemists and engineers in relevant aspects of wood processing and forest engineering, and a greater input into professional continuing education.

THE NEED FOR MORE RESOURCES

The table below shows the student numbers in the professional undergraduate and postgraduate classes since 1970 (McKelvey, 1983):

Year	B.For.Sc.	M.For.Sc.	Ph.D.	Total
1970	20	—	—	20
1971	36	—	—	36
1972	43	1	2	46
1973	49	7	2	58
1974	50	5	1	56
1975	56	2	1	59
1976	49	5	1	55
1977	51	6	4	61
1978	62	7	5	74
1979	51	6	6	63
1980	40	10	5	55
1981	45	4	7	56
1982	32	3	6	61
1983	55	5	5	65
1984	75	5	6	86

Set out below are the number of students in undergraduate and postgraduate studies expected up to the end of 1989 (McKelvey, 1983). In fact, the figures for total undergraduate students are appreciably higher but allowance has to be made, in the new First Professional course, for teaching by departments in the Faculty of Science. The figures in the tables represent students taught by the Faculty of Forestry in terms of full-time student equivalents.

<i>Year</i>	<i>Undergraduate</i>	<i>Postgraduate</i>	<i>Total</i>
1985	86	12	98
1986	91	12	103
1987	96	13	109
1988	103	14	117
1989	109	15	124

These numbers take no account of any involvement in wood studies with other departments, or of requests to teach farm forestry or expand extension work. The expanded professional teaching in the B.For.Sc. degree with optional courses in the fourth year, the predicted increase in undergraduate student numbers (Baumgart, 1982; McKelvey, 1983) and the further development of postgraduate studies — excluding any consideration of involvement in professional continuing education and other fields — require additional resources: staff, accommodation and equipment, with staff being the most urgent and important need. By 1989 it is estimated that there will be need of 6 more teaching staff and 4 more technical staff (McKelvey, 1983). The need for more teaching staff can be readily demonstrated on quantitative grounds because of increasing student numbers, due to the three professional years now in place of two, more job opportunities, and the introduction of options in the final year.

There are also qualitative considerations. Indeed, there will have to be a philosophical change in teaching at the School. During the last 15 years the School of Forestry has sought to give each student a good understanding of the biological, social and economic factors of forestry and how these need to be synthesised to solve forest management problems. Today, industry is asking for specialised skills in harvesting, forest products and marketing to be grafted on to the existing generalist training. This change is understandable as now, while new land is still being planted up, skills in silviculture and management are in particular demand, whereas by the 1990s forest harvesting, wood processing and marketing will be of increasing importance. Also,

the increasing technological complexity of New Zealand forestry will cause greater emphasis to be placed on postgraduate qualifications and there will be need of more substantial and more systematic continuing professional education.

A total teaching staff of 14 in the School of Forestry is entirely warranted, ultimately on grounds of national interest. It is germane to point out that there are some 250 academics specifically involved in agriculture at Lincoln and Massey (leaving aside a further 130 in supporting departments — *e.g.*, computing, economics), whereas at present only 8 are closely involved in the forestry sector. Both sectors are primary producers currently contributing (1982) 71% and 9%, respectively, to overseas earnings (Reserve Bank, 1983). Forestry suffers by comparison, even before the 1990s.

PERSPECTIVE

The effectiveness of the School over its 15 years of life is not a subject on which staff in the School can properly make pronouncements. They can but observe their graduates, numerate and reasonably literate, facing up to a range of management and research problems in forestry in various parts of the world. It is up to others to say how well or not they are performing. It is more fitting for the staff to address the future and comment on factors affecting the effectiveness of the School then.

They see the future presenting difficulties owing to three principal factors. First, the School had not developed as fully as it should have as the national school, before the increasingly bleak economic climate since 1975 forced it prematurely into a steady state. Second, the growth of the whole New Zealand forestry industry and the increasing complexity and refinement of the technology of forestry in recent years are placing additional demands, both quantitative and qualitative, on the academic programme. Third, there are not the resources to respond to these demands and so there is the frustration of realising that the School may not be able in the eighties to produce the greater number of more specialised graduates required in the nineties and beyond. Yet it would seem to be desirable to have enough well-trained New Zealanders in readiness for the coming increase in wood production, rather than trying to recruit piecemeal from overseas as shortages in skills develop. There is need of a substantial increase in teaching resources which would be in the national interest because of the increasing importance of the forestry sector to the economy of New Zealand.

The posture of suspicious concern adopted by this Institute 18 years ago because of uncertainty about the adequacy of the resources to be made available to the new School of Forestry assisted significantly with its establishment. A posture now of explicit support for more teaching resources would be similarly helpful.

ACKNOWLEDGEMENTS

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