RESEARCH IN RELATION TO HIGHER FORESTRY EDUCATION

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INTRODUCTION

The invitation to discuss the subject of research was, to all intents and purposes, an invitation to put my head on the chopping block. There would, inevitably, be many people at this meeting who are or have been engaged in research; and it is well known that each and every scientist clings tenaciously and pugnaciously to two convictions: first, that his own research speciality is by far the most important of all specialities, and, secondly, that his way of doing his job was ordained by God. Anyone foolish enough to cast a shadow of doubt is a right and proper candidate for the axe.

Over and above this, however, I soon realized that I could not discuss the question of research out of context. I could not, in fact, begin to think of research, in relation to higher education in forestry, without foreknowledge of the kind of school of forestry to be established, of the kind of forestry to be taught, and of the kind of graduate to be produced. Without this foreknowledge, I could only set up my own conceptual school and discuss research in relation to this model, thus exposing myself to even more numerous and willing axemen.

In doing so, in trespassing in this way across the fields of all other speakers, I will be as brief as possible; but I may be blunt or even downright rude. This is no time to pull punches. The subject of this symposium is of too vital a significance to the future of forestry in New Zealand for the exercise of diplomatic niceties.

OBJECTIVES AND FUNCTIONS OF A NEW ZEALAND SCHOOL OF FORESTRY

From the moment it was announced that a school or department of forestry was to be re-established within the University of Canterbury, argument has been endless. Frankly, however, many of the schemes I have heard promulgated have been wilder and woollier than the wildest and woolliest merino wether that ever roamed the Canterbury hills. For example, I have heard one forester advocate, regrettably in all seriousness, the establishment of a school that would be no more nor less than an anaemic, gutless copy of a certain antediluvian old-world institution. And I have likewise heard proposals that would bring a blush to the cheeks of the most case-hardened American academic empire-builder. The only satisfactory feature of such ideas is that, like a merino wether, they are unlikely to be fertile.

Disregarding the lunatic fringe, however, most proposals appear to fall readily into one or other of three fairly distinct groups.

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The first of these I will call the technical high school group, its protagonists apparently reasoning as follows: "I am Bill Whosit, a grossly overworked forester. My desk sags beneath a load of files, all containing requests for urgent action on this and that. I cannot see daylight anywhere. But hold it! There is a young fellow coming in. Who the hell is he? Oh! A brand new graduate from the Canterbury School of Forestry, told to report to me for duty? Here you! Take half these damn files! Get out of my sight! And get cracking!"

It does not matter much what these files contain, perhaps demands for action on a new compartment layout, for advice concerning unexplained mortality in the local forest nursery, for solution of a tricky logging problem, for revision of piecework payments on a contract pruning operation, for analysis of sample plot data, for resolution of a cook-shop dispute, or for an Arbor Day talk to the local Girls' High School. We could all add to such a list ad infinitum. But whatever the contents of the list, any young graduate should be able to take the assignment in his stride. If he cannot, then the School of Forestry is a wash-out. All that is necessary in the design of a curriculum for the School is therefore the preparation of a complete list of all possible tasks and the provision of pressure cooker courses to cover each separate item.

Of course, when so expressed, this is patently absurd. A very small percentage of the very best students might survive such treatment without harm, but these few would finish up good foresters even if you taught them nothing but Greek — and simultaneously gave them free access to a good forestry library. The average to below-average student would emerge with a brain like the rumen of a cow, crammed with ill-sorted and undigested fragments, while the above-average student would be likely to assimilate, thoroughly, only those particular course offerings that, to each man individually, proved especially palatable.

In effect, such a school, with such a department-store curriculum, would turn out a steady stream of poorly-educated technicians, ready for instant employment on a variety of minor chores but very ill-equipped for any activity demanding the exercise of constructive thought, imagination, and initiative. If this is what is really wanted, well and good; but do not complain when, in twenty years' time, you wake up to discover that most policy-making managerial or administrative posts have been filled by other than foresters.

So much for the proposals of the first group: the second group I will call the research school group. Here the prevailing idea seems to be that every aspiring young forester should have a yearning for research, and that a good school should cultivate and give the fullest rein to this urge. Alternatively, in some academic circles, the notion is loosely held that forestry is just one more scientific discipline, to be added to a faculty of science, and to be taught in comparable fashion to the teaching of the old-established, necessarily research-oriented, basic disciplines.

Both these ideas, also, are absurd. Increasingly and inevitably, as knowledge accumulates, the forestry research field fragments, each fragment becoming the research province of some more narrowly-based specialist — chemists, physicists, anatomists, gene-
ticists, mycologists, entomologists, microbiologists, biometricians, economists, and the like. One has only to look at the Forest Research Institute, staffed not so many years ago mainly by foresters but, today, employing a very wide range of specialists in the basic sciences.

It is a trend that must continue. It must be accepted that, in future, the only foresters who will be engaged in research, sensu stricto, will be a few aberrant individuals and a few who, as well as being foresters, have also had advanced training, and research experience, in one or more of the contributary disciplines. In sum, the aberrant individuals must be left to look after themselves; a school of forestry cannot be built around them; the foresters-cum-scientists must largely seek their research experience elsewhere; and the general forester requires only a broad understanding of research and research methods. The new School should not, therefore, be a research-oriented school.

I would add, only, lest someone rise up and slay me as a heretic, that there is a role, a vital role, that can and must be played by foresters in the research field. As research becomes more and more specialized, so there will be an ever-increasing need for co-ordination, integration and direction of effort toward specific forestry ends and specific forestry problems. This is a task for foresters, for a highly-select group of the most competent, experienced, versatile and diplomatic foresters, men with their feet firmly planted on the ground, broadly tolerant of scientists and their peculiar flights of fancy, but capable, as necessary and without undue hurt to their morale, of hauling them down from the airy-fairy realms of sweet cloud-cuckoo-land. The ultimate direction of the research effort must never be taken out of the hands of the very best foresters (men unlikely to be discovered in sufficient numbers among the graduates of a research school).

In brief, I am persuaded that the new School should be neither a technician factory nor a research-oriented school. I believe that the proposals of the third group come very close to the truth in suggesting that what the profession does need is a constant intake of well-educated, resourceful, enthusiastic and critical young men who, although not knowing all the tricks of the trade, have yet a sound basic comprehension of forestry coupled with the ability and a strong desire to learn; in other words, young men who have had a sound university education in the full and proper sense of this much-abused term. Give them this sound educational foundation and they will learn the necessary tricks, on the job, in short order.

How can such an education be given them? Admittedly, it will never be as easy as running a narrowly-technical or research-oriented school, but I am convinced it can be done. In fact, the University of Canterbury has itself taken one essential step in proposing the postponement of professional teaching to the third university year, though I would myself hope that, at the very least, strong encouragement will be given to students to complete a full Bachelor of Science degree before attempting the first professional year; and, likewise, that the door will be left open, at the discretion of the academic board, to admittance of candidates holding other degrees. The broader the educational base of the field of entrants as a whole, the greater will be the ultimate benefit.
to the School and to the profession, even though it may create some difficulties in teaching.

This postponement of professional education offers immeasurable advantages. Thus, to put matters crudely, it permits the elimination of incompetents before they become an encumbrance—a drastic culling of one- to two-year stock if you care to express it this way. And again, it gives the student time to decide what he really wants to do. I cannot concede that the average university entrant, straight from school, can wisely make an irrevocable career decision. There will always be a better standard of recruit if early exits and late entrances are made easy. Finally, and by no means least, such a postponement provides an opportunity for the acquisition of two to three seasons’ practical field experience prior to the commencement of forestry education proper.

The only proviso I would make with regard to the whole of the above is that, from the date of their enrolment at the university and even though they will not be studying forestry proper for two to three years, staff of the forestry school must maintain close contact with all prospective forestry students, advising and counselling them in their choice of courses and in their pursuit of field experience. They should be encouraged to participate, to the fullest extent possible, in all open meetings, field days, symposia or seminars arranged by the School, by associated sections of the Forest Research Institute, or by this Institute. I would not worry too much about what precise subjects are studied during these preparatory years, the main objective, as stated, being the acquisition of a broad basic education; but normally a judicious blending of physical and biological sciences, with compulsory mathematics, should be recommended.

Forestry education proper, therefore, would commence in the third or optionally fourth year with students of above-average age, maturity and educational attainment, who have had some practical field experience and some contact with forestry and foresters. And if, to such students, the basic essentials of forestry and an enthusiasm for forestry cannot be taught in a further two years, allowing for some specialization in the second of these professional years, then I would say there was something wrong with the teaching or that an attempt was still being made to cram in too much technician-type detail.

SCOPE AND METHOD IN THE TEACHING OF FORESTRY

We must now consider what should be taught in the professional years, and how it should be taught. Frankly, in this connection also, I have been appalled at the narrowness of thinking displayed by many with whom I have discussed the matter. Though I have not heard anyone say, explicitly, that they want a graduate to know all about growing and harvesting Pinus radiata on North Island pumice soils, and not much else, many suggestions have strayed so far in this direction that the charge contains a strong element of truth.

It is not that I consider the growing of pine trees on pumice, or of softwood crops anywhere, to be unimportant. It is a matter of great and growing national importance just as dairy farming, wool growing and wheat growing are; but, taken on its own, it is
not forestry. On its own, it is tree farming and should be called such. Forestry is more, much more, than this.

Let me put it this way: the man who looks at his forest and comprehends all that is to be comprehended concerning timber quality, increment and silvicultural needs, and utilization, marketing and re-establishment requirements, and does not simultaneously comprehend the part his forest plays, or should play, in the conservation of soil resources, in the regulation of stream flow, and as a recreational or scenic asset, is not a good forester. Currently, and for a brief time to come, we may get away with the sharp cleavage now evident in our ranks between production foresters (the many) and protection foresters (the few), but an end is in sight. Probably before the immediate target of two million acres of exotic softwood forest is attained, and certainly long before the more distant target of three million acres is achieved, we must discover ourselves involved in the establishment and management of dual purpose forests, providing both timber and watershed protection. Mangatu Forest is but a first example.

By that time, too, public demand for the better-informed and more intensive management of outright protection forests, and for the more complete realization of the recreational and aesthetic potentials of all forests, will have grown to the extent that they can no longer be disregarded or paid token attention.

This is the situation we must be prepared for. This is the situation we must have in mind, in training the foresters of the future. Though there must still be a measure of specialization, in the production forestry, forest products, and protection forestry fields, respectively, a much better balance must be struck and a greater degree of co-ordination and mutual understanding must be achieved.

With this in mind, I visualize a first professional year in which forestry is taught, to all students together, as an integrated whole. The subject must not be broken down, as is customary in most schools and in most schemes, into a series of discrete and apparently unrelated units, but rather, by adopting an historical or developmental approach, the origins and functions of all fields of specialization should be traced and their essential interdependence stressed. Single-theme special-subject lectures and short courses can be interpolated, but the overall theme of continuity of the whole, and of the essential interdependence of all of its parts, must not be broken.

By the end of the first year, all students should have a thorough grasp of what forestry is and of what foresters, all kinds of foresters, do. They should have a sound understanding of the past and a broad conception of the future. They should know something of the problems that lie ahead of them and something of the techniques that they will be required to master. In particular, in many cases at least, they should know in which field of forestry their primary interest lies. In parentheses, I would hope that, in both professional years, maximum use could be made of seminar, discussion group and written project methods of teaching, thus developing the essential arts of free and fluent verbal and written expression. And I would hope that the first professional year will be so organized that the course offered can be taken by graduates in science, arts, commerce, accountancy, en-
gineering, law or agriculture who, though not proposing to become foresters, may nevertheless in their future careers require a broad understanding of forestry. This is the only kind of diploma course I would recommend, a Diploma in Forestry Science equivalent to the existing Diploma of Agricultural Science. The active participation of a sprinkling of such graduates in all class work during the first professional year must, unquestionably, be advantageous to all concerned.

The second professional year, to my way of thinking, should then be a year of solid intensive study in one or other of the three main fields — production forestry, forest products, or protection forestry — preceded by one additional summer's field work in the chosen field. All teaching in the production forestry field, i.e., of a probable majority of second-year students, would remain the primary responsibility of staff of the school; but, in the forest products and protection forestry fields, very close links must be established with other departments and schools. Thus advanced training in forest products should be organized in conjunction with the Schools of Engineering and Chemical Engineering, and with the hoped-for future School of Architecture; while advanced training in production forestry or watershed management, call it what you wish, should be undertaken, possibly at Lincoln College, conjointly by staff of the College and of the School of Forestry. Such interchanges of responsibility are essential, not only to ensure the best possible use of all available educational resources, but also to ensure the development of a full measure of understanding and mutual co-operation between engineers, chemical engineers, architects and forest products specialists, on the one hand, and between protection foresters and soil conservators on the other. There is no better way of ensuring that anyone takes a more active and informed interest in forestry or forest products than by compelling them to assume some portion of the teaching load.

Finally, with respect to my own special field of interest, and before I return to the question of research: I very much hope that it will be possible to devise a common final year course for Bachelor of Agricultural Science candidates majoring in soil conservation and Bachelor of Forestry Science students majoring in protection forestry. Watershed management, in the final analysis, is one subject, all aspects of which must be understood if real progress is to be made. The present lack of progress appears to me to stem largely from misunderstandings, themselves the outcome of much one-sided training. Ultimately, I would hope that wildlife management would also be added to this educational complex. The start made in education for wildlife management at the University of Otago must prove abortive. Such a subject can only be taught properly in conjunction with the teaching of the major land use subjects, agriculture and forestry, i.e., in New Zealand, within the University of Canterbury.

RESEARCH IN FORESTRY IN RELATION TO THE SCHOOL OF FORESTRY

I regret I have taken so long to come to my specified task, the discussion of research in relation to higher education in forestry;
but then, in taking so long, I have covered my main points already. Thus, I have stressed my conviction that the School should not be research-oriented; that, increasingly, the actual conduct though not the ultimate direction of research in forestry must devolve upon specialists in more restricted disciplinary fields, and that the average graduate in forestry needs only a general understanding of research and research methods. Questions that remain unanswered are: Should any provision at all be made for postgraduate research within the new School? Should the staff of the School be active in research? How best to ensure that all students have some contact with research during their years at the University? I will take these questions in reverse order.

Student contact with research should be a very simple matter to arrange. I have already suggested that, as far as possible, seminar and discussion group methods should be employed in teaching, and I now suggest that research staff of the Forest Research Institute, to be housed together with the new School on the University campus, must participate, where appropriate, in these seminars and discussion groups. If any research officer argues that this would be a waste of his valuable time, let me say that he will find exposure of his work and most cherished notions to the uninhibited criticism and comment of a group of keen undergraduates a most chastening experience. I would call it a most necessary experience. The only thing that must be guaranteed is that the Forest Products and Production Forestry branches of the Forest Research Institute are as adequately represented on the campus as the Protection Forestry branch.

The question of the active participation of staff in research is a more difficult one to answer. The theory is widely held that, to be a good university teacher, a man must personally engage in research, and that his success as a teacher can be measured by the number of words in his research publications. This may be true for single-discipline, necessarily research-oriented departments, though I am inclined to doubt even this, especially at the undergraduate level. When I look back on my own six to seven years at university, all the teachers I remember best were men who were too pre-occupied with teaching well, to do much research. In a multi-disciplinary school such as forestry, unless the level of staffing is lavish, I fail completely to see that staff will have time for research, as well as time to teach well, keep abreast of progress in all pertinent fields, and maintain adequate student contacts. Furthermore, I believe that there is one other task the staff of the School must accept before they engage in research.

Thus one of the most serious deficiencies in New Zealand forestry today is, I believe, the virtual complete lack of a substantial body of well-informed public opinion on forestry matters. Leadership in the development of this body of opinion cannot come readily from those who are members of the Forest Service, nor can it come from those who are members of large industrial organizations. For various reasons, some valid, some invalid, leadership from both these directions would be regarded with distrust by the general public. But where else can this leadership come from? From this Institute? We have tried and failed. Our membership
is too widely dispersed and too amorphous in its views. Leadership must come, can only come, from the School of Forestry.

I must make it quite clear, however, that when I suggest that members of the staff will have little time to engage personally in research, I am far from suggesting that they should have no concern with it. Research, in a wider sense, should be a major concern of theirs and they should, one and all, have had some research experience. Within the University of Canterbury, including Lincoln College, there is an immense potential for forestry-oriented research. The surface of this has hardly been scratched under the Forest Research Institute's present system of research grants. This potential requires the most thorough exploration and development. I have not the slightest doubt but that the necessarily limited spare time of the necessarily small staff of a small school of forestry will be much more profitably expended in this direction than in attempts to pursue independent research. At the same time, this is the course of action that must be adopted if reasonable numbers of top-quality recruits from other departments and disciplines are to be encouraged to enter upon careers in forestry research. This can be achieved only if their interest in such a career receives adequate stimulation while they are still undergraduates or, at the latest, while they are postgraduate research students.

Finally, should provision be made for postgraduate research training within the School itself? I believe it must be made. Though full use should be made of the research facilities and teaching experience available in other schools or departments, there will undoubtedly be many cases where the most adequate training and supervision can be provided from within the School itself, or by the Forest Research Institute in cooperation with the School. This will especially be the case in silvicultural research. Provision must be made for advanced study up to and including the Ph.D. level. In this connection, I would suggest that the double degree, B.Sc., B.For.Sc., should be accepted as equivalent to the B.Sc.(Hons.) degree as a pre-requisite qualification for Ph.D. studies. A masters degree, I consider, should not be a research degree but should be awarded to candidates who have completed courses, at the level of the second professional year, in two of the available options; for example in production forestry and forest products, or in production and protection forestry.

POSTSCRIPT

I realize that there will be many foresters who will say that I have gone too far, much too far, in proposing the delegation, to other schools and departments, of responsibilities for teaching and research training. But I believe that, if one stops to think, it will be realized that there is only one other option open—postponement of the establishment of a school indefinitely, postponement until such time that a school big enough to support senior specialist staff in all pertinent disciplines and major fields of forestry was warranted. One must be prepared to go the whole way; it is ridiculous to be prepared to co-operate in some fields but not in others.
I admit that achievement of the necessary degree of co-operation is the greatest challenge facing the staff of the new School but, in this, they should have the full support of all staff of the Forest Research Institute stationed on the campus. Anyone with so little enthusiasm for forestry that he does not believe that he can communicate some part of it to others, should not be allowed near the place.

Lastly, just in case there is anyone who does not believe in co-operation at all, let me refer to the excellent advice given in Ecclesiastes, Chapter XI, Verse 1. This is the advice I have taken in preparation of these notes.