I have assumed that "protection forestry" covers what those concerned with protection forests in New Zealand are expected to do. From the Annual Report of the N.Z. Forest Service 1965 and the Report of the Forest Research Institute 1964, I find that protection foresters are expected to understand, to plan for, and to implement plans on an area covering between one-third and one-half of New Zealand. This area comprises most of our non-commercial forests (10 to 14 million acres?), and a vast area (10 to 14 million acres?) above these forests, consisting of sub-alpine scrub, alpine grasslands, and bare ridges and tops.

May I stress the significance of this latter area and quote J. T. Holloway in justification for including reference to it throughout this paper. "The well-being of the lowlands is dependent on the well-being of the mountain forests, and this in turn is dependent on the safe-keeping of the scrublands and grasslands that lie at higher altitudes still. In default of any other agency or authority accepting responsibility for the lands above the forests, foresters must work from the lowland forest limits right through to the snowline — this being particularly the case now that the national forest authority is, at one and the same time, the authority responsible for control of noxious wild animals wherever they may be found — in the forests in winter, above the forests in summer."

Perusal of the reports mentioned shows that protection forestry staff today are involved in:

1. **Watershed surveys** involving detailed studies of forests, sub-alpine scrub and alpine grasslands, with particular attention to the effects of noxious animals.

2. **Detailed studies of animals** particularly deer (several species), chamois, thar, opossum, goat and hare. This work even includes investigation into the infection of some of these species by *Brucella*, *Leptospira* and *Salmonella* organisms.

3. **Plant ecology**, especially as it affects revegetation of depleted and eroded areas.

4. **Climatology and hydrology**, involving detailed measurements of meteorological importance in areas and at altitudes where previous data are non-existent; snow surveys, and measurement of run-off both in streams and in plots.

5. **Geology and pedology** in fields where little previous work has been done. Here work ranges from trials with nitrogen fertilizers, to the growth of *Alnus* to replace gross nitrogen deficiencies, to the classification of screes and study of scree movement.
(6) Study of watershed or complete catchments, to enable suggestions to be made for the control of those (and this means most of them) which are out of balance.

(7) Reforestation trials at the higher altitudes and more difficult situations.

(8) Studies of the grazing intensity needed to contain the spread of exotic conifers into pastoral land.

(9) Public relations with people of widely different interests: runholders, stalkers, those interested in the forests and mountains as a source of recreation, and even other scientists.

It will be obvious that the protection forester in New Zealand must receive a training sufficiently wide to enable him to understand and obtain the assistance of many disciplines and to inspire the confidence necessary to obtain the full co-operation of other organizations, particularly catchment authorities involved in the work of soil and water conservation. While he may be considered a specialist in protection forestry and watershed management, he must, as Dils says, be in fact a “generalised specialist” or a “specialised generalist”. In spite of this, it must be remembered that from the time of his entrance to the university he is being trained as and will always remain a “forester”.

I doubt if there will be disagreement among members of the Institute that undergraduate training must be compressed into four years of university study and field experience and that, in the first three years, subjects must be common to all, no matter whether ultimate employment will be in production forestry, in forest products, in protection forestry or one of the many facets of forest research. I hope it will be agreed that the main aim of university study should be to produce a Bachelor of Forestry or Forestry Science who is “a man of culture, knowledge and wisdom, who can think for himself and make sound decisions”. Most of his technical training will come in the field after he has commenced his employment.

Thus, I cannot stress too strongly the hope that the planners of the School of Forestry will not in any way be bound by tradition, that they will realize that New Zealand conditions are different from those anywhere else in the world, and that we aim to produce foresters for work in New Zealand. While I concede that we must search the world for ideas and methods which have been proved and which may be common to all forestry education, we must carefully assess our own problems and requirements and plan and teach accordingly.

The general education aimed at will naturally encompass basic biological and physical sciences, mathematics, economics and, I hope, something of the humanities, even if this involves only the understanding of people. This will take two years, with, in both years, some limited introduction to the broad field of forestry to sustain interest. Obviously, with the exception of this last, we must rely, at these first two stages, on other faculties in the university. And here, a worry arises. I am not happy with the general quality of teaching in our universities. While people are trained specially for teaching in kindergartens and in primary and secondary schools, there is no system of training teachers for the uni-
versities. Ability in and enthusiasm for teaching in universities does not reap reward in promotion comparable with that received by staff who apply their enthusiasms to research and publication. Too many promising and keen students fail to make the grade or lose interest because of dull and uninspired teaching in the first years of university study. However, I may be unduly pessimistic, and by 1968 the University of Canterbury, in its new home, may be putting skill in teaching in its proper place.

My second worry is that the interests and research work of biologists on the staffs of New Zealand universities, including Canterbury, bear so little relation to the real problems and needs of protection forestry and watershed management.

A young student can be influenced considerably by the research interests and achievements of his teachers; perhaps the first dean of the new school may be able to ensure that, in future appointments to biology staff, interest of applicants in animal and plant ecology and their relation to protection forestry will be considered a favourable qualification.

I have so far said nothing about standards. While I welcome a New Zealand School of Forestry for the major reason that we can have our teaching related directly to New Zealand's needs, I do so only if the School sets and maintains standards equivalent to those of the overseas schools to which our trainees have gone for so many years. Their standards are high; their deficiency has been that the teaching obviously could not be related to the needs of the few New Zealand students. And it is in the professional years that standards will be set. Whatever curriculum may be decided upon, it is the staff which will be the vital factor, and above all we must not skimp on staff. Dr Dils says that the American Society of Foresters does not fully recognize any school of forestry with fewer than six on its staff. I contend this must be the minimum here by 1969 and that each appointee, no matter what his basic qualifications, should have had some New Zealand field experience.

I omit any detailed suggestions as to curriculum in the third or first professional year. It should, in the main, be common to all and would consist of basic forestry subjects. However I would hope that, apart from these, time would be found for a preliminary treatment of protection forestry and watershed management. This may attract "waverers" into this discipline in the fourth year; at least it would ensure that all graduates at least knew what was involved in protection forestry and how it might concern them in their other fields of employment.

The fourth, or second professional year should provide opportunity for concentration in a major field of forestry. For those who wish to go into protection forestry, major fields of study should be:

1. Plant and Animal Ecology, with emphasis on revegetation and mammals, respectively. (I hope these will not be taught separately but if this cannot be avoided there must be unity of approach.)

2. Soils, with emphasis on erodibility and fertility.

3. Hydrology in a wide sense, including microclimatatology.

4. Land capability planning, which is vital to catchment (watershed) control and management.
(5) Soil conservation, with special reference to the use of vegetation and small structures for erosion control and watershed rehabilitation.

(6) Recreation. This is a new idea in university education. To quote McKelvey at the 1965 Conference: "The main recreational pursuits in the indigenous forests of New Zealand are hunting and shooting, swimming, camping, tramping, climbing, skiing and winter sports, picnicking, fishing, boating and canoeing, field nature study, enjoyment of scenery and experience of wilderness and isolation". Recreation is a form of land use which is likely to be concentrated in areas where conservation forestry is vitally important. It is equally important that protection foresters should study problems of public use so that in their planning they can make right decisions—decisions which will achieve the fullest use and improvement of the natural resource in terms of public benefit. Multiple use has many definitions. I believe it should not be "every possible use over a whole area" but should be implemented by dividing the area concerned into units suitable for various specific purposes. Recreation can be one of these purposes.

In these major fields of study, I would draw attention to the importance of working in the closest co-operation with Lincoln College as regards instruction. At this stage we must get close to the land and must beware of becoming entangled in the coils of the academic fraternity. Lincoln may have to be asked to strengthen its ecology section and to re-organize its course in soil conservation; its soils and hydrology would appear to be ideally suited to the needs of forestry training. There is nothing but good in having future soil conservators and future protection foresters trained together where the needs are identical, or at least very similar.

I would like at this stage to express my concern at the semi-illiteracy of many recent university graduates. While expert in the use of technical terms, they find difficulty in writing simple English and speaking good English. Their speech is often deplorable in its slovenliness. In their writing they show deficiencies in choice of words, in arrangement, in rhythm, in sentence structure and in punctuation. Could I appeal to the first dean to be also the first in this country to include mastery of his own language as a requirement of every graduate?

In any curriculum that provides for some degree of specialization in the fourth year, there is a danger of fragmentation; more so if some of the instruction is given in another faculty or in another institution. I hope that in the final year of the curriculum for Bachelor of Forestry there will be a course, taken by all students, which will attempt to provide unification, a course which might be entitled, "We are all Foresters". Obviously such a course would be the prerogative of the dean.

Graduate instruction is normally designed for those aiming at research work and this section of the symposium is dealt with by J. T. Holloway. If he advocates a five-year Honours Bachelor of Forestry and a Ph.D. course, I agree with him. On the other hand, I would like to see what I would call the general practitioner given the opportunity of proceeding to a Masters degree. I was thinking in terms of one year's advanced study in one or two sections of
the fourth-year subjects, together with a strictly limited thesis or dissertation, when Mr Holloway gave me his thoughts to which I now subscribe. He suggests that qualification for Masterate be the completion of an additional (fifth) year, taking a separate fourth-year option. This would give the breadth of training desirable for those aiming at administrative positions or for those who are not sure in which field they wish to work. This higher degree could be taken immediately after the Bachelor's degree or any reasonable number of years afterwards.

I am in favour, too, of the introduction of a Diploma in Forestry Science available only to graduates in another discipline provided they have passed in suitable subjects. (There is already a successful example in the Diploma of Agricultural Science at Lincoln College.) The course would consist of the subjects of one of the fourth-year options.

I am also in favour of the admission to the courses for the first and second professional years of graduates in other disciplines who have suitable pre-requisites, including satisfactory field experience. They would then proceed to the Bachelor of Forestry degree.

To sum up: I suggest we aim at excellence in the liberal education of graduates in forestry. This depends on three main factors: (1) The attraction of quality students; (2) The design of a curriculum with an exacting approach to knowledge; and (3) Creativity and dedication in teaching. Excellence in undergraduate teaching does not detract from the scholarly or research interests of staff—it can intensify them. Teacher-scholars are needed, men who pass on their scholarly excitement to students and set them thinking about important matters. And think what advantages such men, if appointed, will have—their classes will be small and they will work in a new school which can create its own exciting tradition. And they will enjoy meeting the challenge that the future of New Zealand forestry, in its wider sense, is largely in their hands.