

EDITORIAL COMMENT

The Institute and the Private Consultant — A Reappraisal of the Relationship

Ten years ago, at the 39th Annual General Meeting of our Institute, the Constitution was amended to allow listing "of those members who wish, and in the opinion of Council are fitted, to be recognised as Consultants in the practice of forestry or in any branch or branches of forestry . . .".

Perusal of the minutes of Council meetings for two years preceding that date makes it clear that such listing was conceived as necessary both to protect the public from unqualified persons who set up as Consultants, and also to protect the image of the profession. These points have been incorporated in Clause 38(5) of the Constitution: "For the purpose of judging the fitness of a member to be classed as a Consultant . . . the Council at all times shall have regard to the protection of the public and the maintenance and improvement of the standards of practice and the professional status of foresters in New Zealand."

In the ten years since that time, 12 applications from consultants have been recognised by the Institute, and a number declined. The fees earned by New Zealand consultants have (on one estimate) grown from a figure of \$30 000 per annum in 1965 to \$750 000 per annum in 1975. Within the country work has been offered them by the Forest Service, insurance companies, local bodies, farmers, forest owners and logging contractors; and, outside of New Zealand, by private companies, the Ministry of Foreign Affairs, World Bank and so on. The continued growth of the industry, too, seems assured: with private forest planting currently expanding at the rate of 8 to 10 000 ha per year there must be considerable scope for further employment, both in the forest consulting and the forest contracting business.

In the light of this it seems pertinent to re-examine the Institute's involvement in the private consulting scene; to consider what the consultant gains for his registration fee, and the Institute for the time and effort it expends on administering the scheme. First, the recognised consultant gains respectability: the Institute in effect guarantees to his clients (or to the Courts if he is engaged in litigation) his training, experience and competence — a factor designed to distinguish him clearly in the public mind from a contractor who is not so recognised. This was the major reason for the initial request by con-

sultants for Institute recognition. And there has been a hope by some that the quality of this recognition could extend — that the Institute might in time obtain a Government charter similar to that of professions such as law, medicine and engineering. Clearly the professional status of consultants would benefit from such a step if it were to eventuate; but the prospects for this cannot be regarded as good. Chartered professions have traditionally achieved recognition in the Courts and in the public mind *either* by granting membership through a recognised degree supported by practical experience; *or* by formal examination, after a recognised period of field experience. The Institute of Foresters, since New Plymouth, grants Full Membership on less than these conditions, and thus its prospects of ever becoming chartered must be considered dim. Indeed any consideration of a charter would appear to be inconsistent with the philosophies defined at New Plymouth.

So too is it unlikely that the Institute can carry out some of the functions which professional bodies provide for consultants in other spheres, such as co-ordinating the setting of scale fees, provision of joint public indemnity, etc. With only 10 recognised consultants out of a total membership of over 700 it is difficult for the Institute to justify spending too much time on consultants' affairs. The numerical issue, however, affects the consultant as well as the Institute: to obtain recognition from the Institute, no matter how inadequate this may prove to be in practice, the prospective consultant must apply to, and be examined in terms of his competence by, an organisation of his peers whose members (in the view of at least one consultant) "are antagonistic to private enterprise", and who (to another) "doubtfully understand the consultant role". And also of course the consultant must conform to the rules of professional conduct and accept the disciplinary powers of an organisation in which he does not (of right) have representation on the governing body.

And the Institute? While the concept of recognition of consultants was partly regarded as a professional obligation to protect society, the issue as to whether the Institute has such an obligation is open to question. H. H. Chapman, for example, in examining this issue with the Society of American Foresters in 1947, regarded protection of the public against unqualified or inadequately-qualified persons as something which was a governmental responsibility. The professional responsibility he saw as being restricted to the entirely separate field of ensuring ethical practices — a necessity for all members, not just consultants.

The second issue, of whether professional incompetence by inadequately-trained people reflects adversely on the whole profession, has parallels in many other spheres. But with the

forest consultants representing such a small percentage of practising foresters in New Zealand, it is difficult to see that their impact on the forestry profession can be too great. Certainly the fire the profession is presently under does not emanate from issues involving forestry consultants or contractors. Indeed, such people have generally been successful in their profession before branching into private practice, and thus can be expected to be highly competent in their business operations. An essential part of such competence is the restriction of one's activities to areas in which one is qualified to act.

From the Institute's point of view it would seem that a major cause for involvement with consultants has been simply that they are members, and that there has been no other organisation in existence which can provide them with a form of recognition based on their professional qualifications. Until recently this would have been adequate reason for Institute involvement. Since the 1974 Annual General Meeting, however, the Institute has widened its view of what constitutes professional standing in terms of its membership. This it has done by accepting a blurring of the distinction between professionalism in the academic sense and in the sense of proven, practical performance. Such acceptance must raise questions as to whether a similar blurring may exist between purely professional consulting services, and sub-professional (or even non-professional) consulting and management contract activities. If the latter distinction is not a sharp one (as is claimed by a number of users of consultants) then the Institute, by its recognition of only one form of consultant, may be accused of promoting the interests of one section of its membership at the expense of another. If it accepts that accusation, then it must be prepared to re-examine the basis for consultant recognition.

One answer for the Institute could be to propose that consultants form their own professional association. This has been done in the U.S.A., where the Association of Consulting Foresters was organised in 1948; and in New Zealand by consulting engineers who formed the Association of Consulting Engineers, New Zealand. The organisation of these two bodies is different, the former being independent of the general professional body, the Society of American Foresters, while the latter is in fact a Division of the New Zealand Institution of Engineers.

The major problem of course, in doing this with forestry in New Zealand, would be the paucity of principal or partner forest consultants. There are, for example, 250-odd consulting engineers in New Zealand, compared with 10 listed forest consultants (and a handful more who have chosen not to seek

recognition, but who perhaps would if a separate association was formed). The consulting industry is on all counts a growth one, but it is arguable as to whether this will solve the problem. So long as a considerable amount of professional consulting work in New Zealand is being carried out by salaried staff (employed by consultants or government departments) it may be that the major extension in numbers will not be in the type of consultant currently recognised by the Institute. Certainly, too, expansion can be predicted in the fields of sub-professional consulting and management contracts.

Any decision as to the formation of a Consultants' Association would, of course, be one for consultants to make. But in view of the present dissatisfaction by a number of consultants with the net benefits of recognition, and in view of foresters' changed understanding of what constitutes professionalism, there is an onus on the Institute to examine critically its present attitudes to consultants. It must also spell out clearly to consultants what it sees itself able to do (and not to do) for them in the long term. If that proves to be as little as some of them fear, a separate Consultants' Association could well result, and perhaps to the benefit of all parties.

Chemical Production Plants: An Aid to Sustained Yield Management of New Zealand's Indigenous Resources?

At the Forestry Development Conference in May 1975 the (then) Minister of Forests made the following statement: "Out of all the discussion over the utilisation and management of the West Coast forests there is at least a large measure of agreement that wood which is currently going to waste, both in the forests and at sawmills, should be put to good use." The wood referred to is still going to waste, and a number of comments expressing frustration at that situation came from different speakers in discussion at the Institute's 1976 AGM. For example: "The major block to successful beech forest management is utilisation of the timber." "We are wasting large quantities of beech in present operations." "It is quite possible that *no* viable means of beech utilisation can be found at present."

The people presently charged with finding whether or not timber going to waste on the West Coast *can* be used economically are the Finnish consultants, Jaako Poyry, due to report to the Government later this year. What quantities of wood are they concerned with, and how large or small are these volumes by present utilisation standards?

In the West Coast Beech Project area there is a probable annual wastage associated with logging of 300 000 m³ of beech

and miscellaneous hardwoods and softwoods; and perhaps another 80 000 m³ of sawmill waste. In total this is equivalent to some 500 tonnes of oven-dry wood per day. To utilise widely-scattered quantities of wood in these volumes in an area distant from markets is not easy. The only "Beech Scheme" proposals received were for kraft mills which, to be economic, require at least 1 400 tonnes oven-dry weight of chip wood per day. Such proposals were not acceptable, largely because of the strain that they would place on the wood resource available. Thus utilisation of the West Coast beech resources has so far foundered, essentially because there has been no economic means of processing *less than* 1 400 tonnes of chip wood per day. One of Jaako Poyry's terms of reference is to try to find such means.

Chemical utilisation of wood has not so far occurred on a large scale outside the USSR, primarily because wood has been competing as a raw resource with petrochemicals. In the decade prior to 1973 the cost of petrochemicals declined relative to the cost of wood, but since then of course the trend has reversed, and it may be possible in future to synthesise many chemical substances as economically from wood as from petrochemicals. Such a situation has a marked potential to influence forest management practices. Chemical utilisation has two very great advantages to the forester. First, it is extremely versatile in terms of end-product, with production possible of substances as diverse as energy fuels, stock-foods, plastics and synthetic rubbers. Secondly, chemical utilisation is totally non-demanding in terms of wood quality: species, density, fibre-length, etc., are unimportant, as is the presence of bark and foliage. Thus, relative to pulping, the forest manager must view chemical utilisation with a great deal of enthusiasm.

The principles of chemical utilisation are very simple. In crude terms, wood is a mixture of three natural polymers — cellulose, hemi-cellulose and lignin in an approximate ratio of 2:1:1. In the most commonly visualised utilisation pathway, cellulose and hemi-cellulose are hydrolysed to sugars (in about 75% yield). These in turn are fermented to ethanol (40% conversion) at which stage processing may stop. A final yield of 25 litres of alcohol per 100 kg oven-dry wood could be expected. However, if the process is continued beyond this point, the ethanol may be converted to ethylene (95% yield) which in turn can be converted to butadiene (70% yield). Both these compounds are directly usable for the production of plastics and synthetic fibres and rubber; and if cresols (obtainable from lignin in 40% yields) are added to the list the necessary starting points exist to produce almost

all currently-used synthetic polymers presently made from petrochemicals.

To make *all* our synthetic polymers from wood by the methods suggested in the previous paragraph would require a large and expensive integrated plant, some refinements to existing technology, and probably some further change in the current price differential between wood and petrochemicals. It is not necessary, however (at least initially), to visualise going that far, and if one simply considers ethanol production, very much simpler plants are involved. In the Madison process, wood (as chips, sawdust or small pieces) is digested with a continuous flow of hot dilute sulphuric acid. The 5% sugar solution resulting is neutralised with lime and then fermented with yeast to ethanol. Lignin is left in the digestors from which it is removable. Apart from the lignin, methanol and furfural are also produced as by-products, both readily saleable. In a recent economic analysis¹ the Forest Research Institute has made a preliminary examination of the profitability of an ethanol plant in New Zealand, based on wood.

Profitability examination was compared for mills with daily wood intakes of 50, 100 and 500 oven-dry tonnes per day. As in most manufacturing processes profitability initially increased with increasing plant size. Assuming a cost price for wood of \$5 per cubic metre at the mill, the 50 tonne per day mill was not profitable, the 100 tonne/day mill gave a marginal return on capital invested and the 500 tonne/day mill gave a return of up to 25%. These figures must be of considerable interest to foresters concerned with complete utilisation of wood on small- to medium-sized forest areas, particularly as the report indicates that quite large increases in the price paid for raw wood have relatively little effect on the cost of ethanol. If one considered for the West Coast a plant with one-tenth of the wood requirement of a minimum sized kraft pulp mill, the total capital cost would be some \$8 million and the return on investment an estimated 8%. With a plant having one-third of the minimum daily wood requirement of a kraft mill (an amount very close to that available in the West Coast Beech Project area), profitability moves to better than 20% on a capital outlay of \$20 million, a return generally accepted as being of interest to industry. There might be some prospect of acceptable profitability levels with plants intermediate in size between the two, provided that a series of such small

¹ *New Zealand Forest Service, Forest Research Institute, Forest Products Division Wood Chemistry Report No. 11, 1976, by D. A. Whitworth (unpub.).*

plants were built as feeder plants to supply a large-scale plastics production plant. The economics of a plastics production plant based on Maui gas are currently being examined by the Petrochemicals Project Group; and the New Zealand Energy Research and Development Committee is currently examining the prospects of combining chemical products derived from both Maui gas and primary resources (such as grass and forest waste) to jointly supply different types of major plant.

To the forester these prospects offer new hope for more complete utilisation and site clearance. Not only might they offer prospects for beech management on a scale which does not necessitate conversion of the forest to other species, but they could also change the economics of conversion of large areas of cut-over podocarp forest to exotics. It is possible to envisage initially feeding an ethanol plant with the residual wood from such sites during the land clearing phase of a large conversion operation, and then keeping the plant going, first on thinnings and then on sawdust and mill residues from the subsequent exotic crop. (150 tonnes per day oven-dry weight of wood is probably available from most major mills manufacturing sawn timber, pulp and paper.)

The plea from the forester for small-scale wood utilisation plants comparable in profitability to large-scale ones is becoming louder, and is being echoed too by regional development planners. If present and likely future world oil prices tilt the profitability away from petrochemicals and towards wood, this constitutes a happy situation for the forester. If it leads to a technology where small wood-using plants can be built and run profitably, then our forest management procedures will develop a flexibility never before available. This might provide the necessary link for the further evolution of sound indigenous forest management in New Zealand.