

# IRISH FORESTRY

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## **The role of the Forester in a Changing World.**

By PROF. BLACK

**Y**OUR Society has paid me a great honour in inviting me to address you on the occasion of the 24th annual general meeting. The association of my predecessor, Professor Mark L. Anderson, with Ireland in general, and the early years of your society in particular, has meant that forestry in Ireland has always had a special place in the affections of the Department of Forestry of the University of Edinburgh. It is my earnest hope that these links will be strengthened in the years ahead by the broadening of my department's interests to cover the whole range of biological natural resources since, as I hope to show tonight, there are changes in the air which, sooner or later, Irish forestry must come to terms with.

You have asked me to speak on the role of the forester in a changing world. This title makes two assumptions, one of which I will allow to go without challenge, while the other will form the basis of my paper. The first of these assumptions is that the world today is changing; this is the one which I will take as read—after all, the world is always changing, always has been and, I hope, always will be. What we really mean when we speak of a changing world is that the world today is changing more quickly than we have been led to expect, and more quickly, perhaps, than we would like. We are concerned to know if we can change our institutions, and, at the personal level, our own attitudes or world-view, at a rate fast enough to adapt to changes which result from factors beyond the control either of ourselves or even the society to which we immediately belong. This leads me directly to the second assumption inherent in the title of my address, which is that the forester *has* a role in the world today. It has probably never occurred to you to inquire whether foresters have any role at all today; you have all probably taken it for granted that they have. It is this assumption which I propose to examine now.

An occasion such as this is, I believe, a very good time for a little self-examination. Every now and again we should all stand back from our chosen profession and day-to-day activities, to question the bases on which our work proceeds, in the hope that by analysing them objectively—that is, by ridding ourselves of the accumulated

dross of years of sloppy thinking and unconscious self-justification—we may see ourselves for what we are; parasites on society or saviours of mankind? Or are we, as are most people, somewhere between the two? And, in that case, towards which pole do we vere? You may perhaps feel that since I did not myself have the benefit of a formal education in forestry, having come to this subject only since my appointment to Edinburgh some 3 years ago, I should not presume to take you all to task. But I believe that it is simply because of this that I can be objective, and can discern strengths and weaknesses better, perhaps, than some of you who have been professionally involved in forestry for much longer periods.

What—if we may borrow a concept from ecology—is the niche of the forester in the world today? Is there more than one niche—say, one for a forester in an ecosystem of advanced technology, such as one in Western Europe or North America, and another for a forester in an ecosystem of lesser maturity (that, of lesser functional complexity), such as one in a developing country? Are foresters fulfilling the demands of society today and can they adapt to the needs of tomorrow?

Clearly the superficial answer to the first question is that the niche of the forester is the management of forests. Immediately we find ourselves faced with a series of formidable questions, the answers to which will enable us to assess the role of the forester in today's changing world. Here are some of them:—

- (1) On whose behalf does the forester look after his forests?
- (2) For what purpose or purposes?
- (3) Does the forester do his job or jobs as well as he should?
- (4) If the answer to question 3 is "no",—why not?

I may perhaps be accused of leaving out one of the most important questions of all—"what is a forest"? Assuming that we are probably all agreed on the answer; for the purpose of this talk, a forest is a sizeable piece of land with trees growing on it. If this was not always what the word forest meant, this is what it means today. Perhaps it was worthwhile after all to draw attention to the meaning of the word forest, if only to remind us that the forest consists of the land as well as the trees, and not just the trees alone. Since land is in short supply in many parts of the world, and is, indeed, frequently the resource limiting the growth of human populations, the proportion of land occupied by trees must be balanced against the proportion used for other purposes—food production, urban development, transport, recreation, etc. I shall return later to this question of allocation of land between competing uses, but I would like to draw attention at this point to an unfortunate, though perhaps understandable, rigidity of attitude towards changes in use. Proposals to vary land use, either between productive systems such as agriculture and forestry, or out of productive use into urban or

similar development (in so far as such use can be considered as non-productive) are almost invariably opposed and frequently lead to much ill-feeling. It is scarcely surprising that resource managers regard such changes from their own point of view, and that they should find it difficult to give proper weight to the claims of other users, or the place of the various land uses in the national economy. There seems to be a general belief, particularly strongly held in agriculture but by no means unknown in forestry, that land once given over to one form of use should remain in that form for all time. This view is, I believe, quite, quite wrong. Surely it is only to be expected that in a changing world there will be changes in the structure and function of society which will vary the priorities on which land is to be allocated between uses. We should rather see land use as a "rotation of crops", on an extended time scale, in which the products can be varied in accordance with the current needs of society.

The first of my questions was, "on whose behalf does the forester look after his forests"? The superficial answer is, of course, the people who pay his salary—the Forest Service, the Estate Owner, the County Council, etc., but we must delve a little deeper than this if we are to see the role of the forester in proper perspective. The western world today is an urbanized society with a highly sophisticated technology, and the vast majority of its members have little interest in, and no understanding of, the management of the resources upon which they depend for their survival. That management has been delegated to a number of specialists, of whom the forester is one. This dependence on a remote and unseen specialist does two things: firstly it leads the forester to think that, being an expert, his advice and opinion are not to be questioned (a common failing of many professions), thus further isolating him from the community of which he is a part; secondly, when public confidence in the specialist is lost—as, for instance, at times of forest fires, disastrous floods or slag heap failures, the specialist finds himself in the dock, a ready sacrifice to an outraged public who feel themselves betrayed. All professions concerned with resource management are in the same position, in as much as they act as agents for a society which, in the evolution of advanced technologies, have lost touch with the environment of which they are a part. I do not wish to suggest that the forester is particularly guilty in this respect; indeed I believe that social responsibility is stronger in foresters than in almost any other group in the community, for reasons which will become apparent later.

The root of the trouble is that modern man has become conceptually isolated from his environment. In a society which sees as its main purpose the domination of nature, rather than the achievement of a harmonious integration with nature, the attitude of the community towards the manager of biological natural resources is inevitably akin to that towards the engineer. "The environment is something to be manipulated; we tell you what to do; we pay you

to do it and mind you don't make any mistakes". Unfortunately biological resource management differs from engineering in one important respect—we do not have anything like the same degree of control over the variables involved.

Therefore, in answer to the question, for whom do we as foresters look after our forests, we can say that in the final analysis, we do so for society, which, like an absentee landlord, has no understanding of what we do, and no interest, save in the delivered product. An excusable result of this has been the creation among foresters of a professional "*esprit-de-corps*" which has tended to substitute a passionate devotion to the forest itself for an explicit feeling of social responsibility. Again, I do not wish to suggest that foresters are not alive to their responsibilities to the community, but rather that the forest then comes to be valued for itself alone, whereas its value should be assessed only in terms of all the competing uses for land and other economic resources, and their relevance to the total economic organization of the community.

This should serve to remind us that forestry, like any other system of resource management, requires a combination of inputs—land, capital, labour, expertise etc.—some or all of which may be in short supply. Forestry has no right to a share of the available resources just because it is a "good thing", to be encouraged for its own sake alone, but it must compete for them within the total economic framework. Accordingly forestry must expect to be judged by its results. As everyone here knows full well, the difficulty comes in expressing in economic terms the benefit accruing from the employment of scarce resources in the forestry sector. The obvious "front-line" products are easy enough to measure in economic units, though arguments based on these values often seem to involve a degree of special pleading over such matters as "national interest", "war-time security" and the like. These arguments may be valid enough, but my point is that it is not sufficient to bolster up a case which may seem weak on economic bases with supra-economic reasoning of an unquantifiable nature. Moreover, a forest supplies so many products not yet readily measured and valued—watershed management, recreational and wild-life potential, amenity rural employment and the conservation of ecological variety amongst them. Foresters themselves know that these benefits exist and that they should take them into consideration in the economic analysis, but it is certainly not enough to add a few percent in the calculation of interest on capital invested in an arbitrary and, indeed, an arrogant manner. One of the most pressing problems facing foresters today is to find ways and means of quantifying these secondary forest products so that their importance may be measured in meaningful terms.

It is clear from this discussion that the place of forests in the economy of industrial societies has changed in recent years, and that it is still changing. The spread of leisure and incomes through the

community on one hand, and an investment policy which discriminates against primary production industries in an industrialized economy on the other, to say nothing of refinements in the techniques of economic analysis, all tend towards an increasing emphasis on the so-called secondary forest products—recreation and amenity in particular. While it still remains possible for a country to widen its geographic resource base by trade, these trends may be expected to continue, but as standards of living increase in the primary producing countries, exportable surpluses will be reduced. As this occurs, there may well be a change of investment priorities, but this will not come for some long time yet.

This discussion has led us straight into the middle of an answer to the second question—for what purpose or purposes do we manage our forests? If we accept that we act as agents for a society which is prepared to delegate this responsibility to us, we must also accept, I believe, that the objects of management should also be those explicitly or implicitly laid down by that society. When the requirements of society change, so must the objectives. This is a very different thing from saying that the specialist should accept blindly all the demands made upon him, to the exclusion of his judgement on matters within his own province; but it does mean that he should preserve a flexible attitude to the changing world and not meet new demands with a reactionary determination to carry on as before. We hear a great deal today about multiple purpose management, and the need to pay due regard to secondary forest products, and this is a case in point, where new demands—such as greater public access—are not always welcome to the forester. There is, of course, nothing new about multiple use of forests, and multiple use is not peculiar to forestry. Traditional forest use was always multiple purpose—shelter and grazing for stock, acorns for pigs, firewood for villagers, hunting and fishing for the favoured few as well as timber for constructional purposes and for charcoal are easily cited uses, while water gathering and conservation of ecological variability always existed, though probably totally disregarded. If there is one important difference between multiple use ancient and modern, it is that today management for simultaneous uses, and the proportion of effort devoted to each, have become acts of deliberate policy. The importance of multiple use in other forms of land use is easily seen in hill-farming and other extensive systems of agriculture, though admittedly to a lesser extent: wool, meat, hunting, recreation and water gathering all apply.

As my colleague Dr. W. E. S. Mutch recently pointed out, the significance of multiple use management lies in its relation to intensity of effort—the input of resources (capital, labour, etc.) per unit of land area. The greater this input of resources, the more specialized and single minded must be the objectives, if a proper return is to be achieved. The whole trend of intensive resource use is towards

ecological simplification—a concept which is diametrically opposed to multiple use. I am now suggesting that for any piece of land, the form of land use which is appropriate is that which gives the equimarginal return at the highest investment; under the most favourable conditions, where the most capital and labour can be deployed, a specialized and intensive single use system can outbid other single uses and combinations of uses; where conditions are least favourable a low level of input yields a return by multiple purpose management that exceeds all single purpose uses. The idea that multiple purpose use in forestry is associated with low inputs and *less* intensive management may sound strange to foresters, and, as far as I am aware, has never been subjected to stringent economic analysis. Nevertheless, I am convinced that it is correct.

I suspect that one of the difficulties in approaching the problem of multiple use is that foresters have too easily fallen into the bad habit of comparing efficiencies of management in terms of the production of timber per unit land surface, instead of the return on the input of *all* resources invested in the venture—capital, labour, etc. *as well as land*. For the purpose of social accounting, indices of production based on one resource only are obviously inadequate and frequently misleading. Thus, in my opinion, the decision on multiple versus single use rests properly on economic criteria; where potential production is high, and the return to invested resources is good, single purpose use should prevail. Where these conditions do not hold, multiple use with extensive management comes into its own. In a nutshell, I am saying that good forests should be intensively managed for timber and that forests on poor sites should be managed for the widest possible variety of purposes. It follows, of course, that conditions which are most suitable for intensive forestry are also those suitable for agricultural use, not, it is true, for the most intensive food production, but for multiple-purpose extensive agriculture. Similarly, agriculture must give way to a more intensive system—market gardening and horticulture—as conditions become even more favourable.

The impact of this argument on the professional forester is important, since the traditional forestry training has been developed for forest management in non-industrialized economies where different investment policies are relevant and where multiple use practises are of less significance. My experience suggests to me that many foresters are unwilling to accept the validity of multiple use management, preferring single purpose use—not because the latter is simpler, I think, but because all their training was directed to this end. This suggestion—iconoclastic as it may seem—is obviously less applicable to recent graduates, but these men have yet to reach the positions of responsibility where powers of decision lie. I would appeal to all foresters to retain a flexible attitude to the changing demands of society and to be prepared to adapt their thinking accordingly.

My third question was—do we do our job as well as we should? The answer to this question involves two separate issues: firstly, are our concepts and guiding principles the most appropriate for the fulfilment of our objectives and, secondly, are the ways in which we translate our concepts into practice the best we can choose? Put in another way, I am trying to separate forest science from forest technology, both essential and interwoven components of a forester's technical equipment.

Coming new to forestry, I have been struck by the extent to which forestry thinking has been dominated by the concept of sustained yield. Enlightened forest management has always rightly regarded forests as renewable resources; but the maintenance of production by wise use has been concentrated into obtaining the highest per acre yields that can be sustained in perpetuity. It is—or should be—possible so to manage any renewable resource system that a certain yield can be sustained over long periods (we cannot really think in terms of perpetuity: for one thing we do not know what may happen to the earth's climate in anything but the short term). Obviously such a management system has major advantages from a biological point of view, advantages which, when combined with the economic benefits such as continuous availability of products and the opportunity of meeting input costs from current earnings, should lead us to depart from it only with the greatest caution. Nevertheless it seems to me that the doctrine of sustained yield has obtained an unreasonable stranglehold on forestry thinking. For instance, I very much doubt whether a rigidly pursued policy of management for sustained yield really suits a developing country at the "take-off" stage in economic growth. I believe there are occasions when deliberate mining of timber resources may be of economic benefit, without excessive difficulties being placed in the establishment of more stable systems at a later date. Forest policy must, after all, be viewed in the light of the total economic circumstances of the community. Secondly, even under relatively stable economic circumstances, a system of rigid sustained yield management may be insufficiently flexible to take advantage of temporary shifts in the market price of timber. One particular instance of the application of sustained yield management—The Harvard Forest—has been analysed in detail by Gould for an operating period of 50 years. The most important conclusion of his analysis was that "the objectives of volume production, income flow and capital appreciation could not have been equally well satisfied by any single management programme, especially one controlled exclusively by biological growth rates". An alternative method—the data being examined in retrospect—would have been to increase cutting at times of high prices, which would not only have been of value to the forest enterprise, but also to the community since, presumably, high prices reflect increased demand. Taking advantage of peak prices by cutting half the in-



ventory and investing the funds obtained would have yielded a net gain of more than twice that from sustained yield management, even assuming that there were no losses from subsequent hurricane damage, although these did, in fact, arise. Cutting practically all the inventory at the time of peak prices would have brought a net gain 4 times as great as sustained yield management. In terms of capital invested, Gould showed that the returns from the Harvard Forest were less than those earned by endowment funds managed by the University. The decision to commit the original capital investment to a forestry venture could not therefore be justified retrospectively on economic grounds alone, unless it could be bolstered up by the provision of secondary forest products and such intangibles as national security or rural employment. I do not know how widespread is a poor return on investment in forestry, but if the experience of the Harvard Forest turns out to be typical, the sooner proper attention is paid to the economic value of secondary forest products and the sooner the "intangibles" are measured in terms acceptable to the economist, the sooner may foresters sleep soundly in their beds.

Obviously one of the difficulties of this approach to management lies in knowing when prices are at their peak—but forestry shares this difficulty with many, if not all, productive industries. Nevertheless it is clear that a sustained yield based on the biological increment must be interpreted in a very flexible and pragmatic manner if proper advantage is to be taken of changes in demand and price.

Turning now to the technological aspects of the way foresters carry out their responsibilities, it seems to me that in these matters there is little room for complaint. I may well be wrong, but I have the impression that we may be wasting the skills of some highly trained forestry graduates by employing them on tasks which men with a good technological training could better undertake, but this is tied up with the whole question of specialization among foresters. Particularly since increasing emphasis on multiple purpose use will lead to a demand for specialists in such fields as game or water management, there is likely to be a marked rationalization of forestry education over the next few decades. I shall return to this point later, but at this juncture merely wish to record that on technological matters—site preparation, choice of species, planting and silvicultural practises, for instance, the forester seems to me to be very well equipped.

The next question on my list was this: If foresters are not doing their job properly—why not? One important point cannot be overlooked; speaking primarily of the United Kingdom, I very much doubt whether the finance invested in forest research is in any way compatible with the importance of the industry in the national economy. Short term matters—disease control, for instance—may be adequately looked after, but the absence of a central Forest and Woodland Research Institute where the long term aspects of research



can be studied (and are not nearly all problems facing forestry of a long-term nature?) is a serious disadvantage, and one which will become more serious as time goes on and forestry is increasingly required to justify its efforts.

Returning to the question of forestry education and increasing specialization among foresters, I have never ceased to be surprised at how much is expected of a forester after he has left the University. He must be able to command a full range of silvicultural techniques for forest management, which involve a detailed and delicate understanding of primary biological production and the factors affecting it, as well as an extensive knowledge of the end product, its marketing and its utilization; the management of wild life—usually from the view point of pest control but increasingly as a resource; the safeguarding of water catchments; civil engineering as related to extraction routes and methods, bridge-building and flood control; the list could be continued indefinitely, but one important function—labour relations and public information—is always assumed and rarely taught. It is noteworthy that departments of wild life management, for instance in developing countries, have often grown up within the Forest Department, and the French department of "Eaux et Forêts" speaks for itself. I am not of course suggesting that all forestry graduates are called upon to serve in the entire range of these capacities, but that such adaptation has come to be expected of them. It is a great tribute to the value of forestry training that this should be so.

To some extent, it is only to be expected that foresters have been able to move into related topics, since the underlying principles of the management of all biological renewable resources must be the same. But if this is so, why should so wide a gulf have arisen between foresters on the one hand and agriculturalists on the other? No one with an acquaintance of both industries can deny that this gulf exists, and this assertion is supported by the small number of people who have tried to move between the two industries. But, as I know from personal experience, having attempted to make the crossing myself, the difference between the two goes very deep, despite their obvious biological similarity. Each has evolved a completely different attitude to the resources on which it depends, and, in the long run, attitudes of mind are more important in such differentiation than technical considerations. Typically agriculture is concerned almost exclusively with the early stages of plant succession and aims at maximizing the high rates of productivity which are associated with the low biomass of pioneer vegetation. Consequently the short-term aspects of production are emphasized and the accumulation of biomass ignored—so much so that agricultural systems are frequently contrasted with ecological ones, as if agriculture were not indeed just one such system, albeit an extremely unsophisticated one. In contrast, forest ecosystems, and others which involve secondary production

systems, aim at the accumulation of biomass, the excess of gross production over respiration and other losses being fed back into the productive system. This difference, simple as it may be, is, I am sure, at the root of the matter. It would be equally valid to say that foresters have a different sense of time to many other people—this is self-evident, given the length of a forest rotation—but I think it is too facile an explanation of the forester's approach to his resource, although it certainly leads the forester to an extraordinarily responsible attitude, which above all must be retained whatever else happens in the forestry education of the future. Essentially, agriculture seeks a high rate of interest from a low biological capital; forestry, a low rate of interest from a high biological capital.

It is precisely the foresters' attitude to resource management—conservation in its best possible sense—that makes them so adaptable and useful. None the less, I am convinced that the time has come when the traditional jack-of-all-trades training of foresters should be examined, and examined most critically. This is what we have attempted in Edinburgh. Increasing emphasis on multiple use and public pressure for access for recreation demands the training of specialist resource managers—wild life, hydrology, forest parks all make special claims on a man's technical and conceptual equipment—and I look forward to the time when the great state forest services employ a range of resource managers, each with the specialist training appropriate to the job he does. No one would suggest excessive specialization, and each man must know a great deal about the other's task if a harmonious programme of management is to be achieved. One of the most heartening signs of the last few years has been the quiet acceptance of these and similar views, and the emergence of distinctive teaching objectives amongst the forestry schools.

It is probably true that the public image of the forester is better in Western Europe than in some parts of the world. The President of the Canadian Institute of Forestry has recently written—"I am conscious of the warning that unless we stir ourselves, forests may turn out to be too important to be entrusted to foresters". The picture of the ugly wastes that past management practises has left in the public's mind will not be easy to eradicate". I cannot believe that the public image of the forester in this country is in disrepute. The forester is variously blamed for large regular plantings of coniferous species; for taking over agricultural land and for restricting public access—but in the mind of most people I suspect that he is regarded affectionately as a happy open-air type with green corduroys and a Tyrollean hat. But the day of reckoning cannot be long delayed, and the forester will have to account for his stewardship along with everybody else.