

The Nature Of Forestry

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Aims and objectives

In choosing a title for this contribution I have deliberately echoed the title of a lecture: "The Name and Nature of Poetry" given by the poet A. E. Housman at Cambridge in 1933. He relates how he was asked by an American source to provide a definition of poetry. In reply he said: "I can no more define poetry than a terrier can define a rat, but we both recognise the object by the emotions that it arouses in us." (Housman, 1933) Like most such analogies the comparison is inexact, particularly as I argue from the premise that forestry is a science, and not an art. I propose to discuss certain aspects of forestry in the hope of clarifying, at least to myself, something of its nature.

I start from the assumption that the primary purpose of forests is to improve the life-quality of humankind through the control and management of trees and their associated ecosystems. I would offer that as a useful criterion to which proposed actions might be referred.

However, at the more specific level the primary purpose of a forester is, of necessity, to secure an income. This can usually be achieved only by satisfying an employer, either as an employee or as a consultant. But among the conditions of employment of a forester, as with most professionals, there is also a requirement, either explicit or implicit, to provide advice

to the employer or client and thereby to guide the employer in the formulation of his objectives and how they may best be achieved. The nature of forestry as it has evolved is such that well-defined and ethically valid objectives will rarely if ever be found to be in conflict with the basic principle as it has been formulated above.

Forestry and the public

It is clear that public attitudes to forestry are changing. In the less developed countries the principal concern is with the use of a native or national resource, and the extent to which the benefits arising from that use can be assessed as improving the lot of the local population as a whole. Indeed that is a concern which might have arisen in various parts of the world over many centuries (Westoby, 1989) and not least in Ireland, particularly during the seventeenth and eighteenth centuries (McCracken, 1971). That the concern has developed so widely and intensely now is probably due to a recent combination of universal education, comprehensive and rapid communications, and local political awareness and self-confidence.

In the more prosperous countries a relatively extended period of peace and comfort over the past half century has enabled opinion leaders to develop their thinking on the longer term implications of current policies and actions, and to disseminate these

conclusions. Extended leisure has allowed more people to become aware of the value of forests as amenities and sources of recreation. All of these developments are correct and valid. They are rational developments of logical arguments based on common experience. The difficulty is that in many cases the arguments have been extended irrationally. Developments which are unexceptionable on any rational basis are likely to be attacked by fanatical devotees of some extreme school of thought, who may perhaps find in their enthusiasm a substitute for other, more internal forms of spirituality.

Forestry as science

I have said that forestry is a scientific discipline, but it is better described as a combination of different disciplines. Forest management planning is mathematical; forest protection is based on biology and physics; forest harvesting is largely engineering; forest policy relates to the sciences of sociology and psychology. The basic science is silviculture. Silviculture is less easy to characterise. It must be clear that by the standards of laboratory sciences such as physics, chemistry or physiology, silviculture is a very primitive science. The laboratory sciences develop by hypothesis and observation¹ in which the basic experimental unit, as in a physical measurement or a chemical reaction, is instantaneous or nearly so (Medawar, 1967 and 1969). In silviculture the unit of observation, to be totally valid, must be a whole rotation, anything from about 50 to 200 years.

There is of course, an acute scarcity of documented observations covering whole rotations, and in that situation we must try to find other avenues to

progress. There are at least two approaches. One is to assemble many observations over fractions of rotations and to try to assemble these, much in the way that dendrochronologists assemble overlapping sequences of tree-ring data. The other approach is to treat silviculture as a science similar to geology or cosmology, in which the close observation and analysis of current phenomena can then lead to the hypotheses which seem to us to best explain the development of those phenomena. This approach was described in a recent paper as "identifying the kinds of forests we want and trying to work backwards to see how they reached the desired condition (Smith, 1992)

Research

This leads to a consideration of the place of research in silviculture. A character in a novel by Henry James defines science as "the absence of prejudice backed by the presence of money" (James, 1905). That is a fair definition, but modern research seems to lay far more emphasis on the second element, the presence of money, rather than the first, and sometimes even seems to favour a "prejudice" which will lead to further funding. It must be said that the present approach to the appointment of researchers, on limited-term contracts, may be sound in relation to other sciences, but in silviculture it is not conducive to the carefully thought out, long-term forest experiments which we require in order to place silvicultural management on a sound scientific basis.

Services and controls

The various services provided by forestry to society have been discussed by previous speakers. There can be little doubt that for the foreseeable future

the main service that will be required is a supply of wood for industry, or in some countries for fuel. In any enterprise it is a pre-condition of efficient management that there be a commercial motivation on the part of the owner and the management. Forests can be managed so as to produce wood very efficiently indeed, but the more intense is the management concentration on efficient wood production, then to that extent also the provision of other socially desirable services is likely to be diluted. It is here that the State, acting on behalf of its citizens, becomes involved. Local attitudes and traditions will largely determine the nature of the State involvement, whether it will intervene by means of the carrot or the stick. Stick-based intervention has the disadvantage that ownership may decide that its freedom is so prescribed that it no longer wishes to continue the enterprise, and thus the social functions may themselves be put at risk. Usually there is a judicious combination of stick in the form of statutory controls in respect of functions which are socially vital, such as wood supply, erosion control, or water quality, and carrot in the form of subsidies in respect of modifications which are socially desirable such as landscape, recreation and some aspects of conservation.

In circumstances where the State uses tax revenues to subsidise the purely commercial aspects of forestry, such as the initial creation of the forest, then it is quite reasonable that the State should require in return that the constitution and management of that forest should reflect the sectoral requirements of the society which has provided the subsidy. It will often happen that modifications induced by incentives will in themselves be of

direct commercial advantage to management. For example, I believe that an increased proportion of conifers such as Norway spruce and Douglas fir, and of some broadleaves, as a result of the new EU based forestry programme, will result in a significantly advantageous improvement in the quality and value of forest produce.

Wood as a fuel is a major service provided by the forest. It has been estimated that half of the wood harvested worldwide is used as fuel (e.g. FAO, 1993). But the provision of fuelwood, or biomass, is not now seen as a major objective of forest management in temperate or in boreal forests. Considerable research has been completed and the results are in the published literature or stored in files. But a crisis in respect of the environmental or other implications of the continued use of fossil fuel and nuclear energy must arise sooner or later. Wood must then figure as a major acceptable alternative, with advantages over other sources, such as wind power or wave power.

Forest ownership

The ownership of forests is a matter which arouses strong public opinion. This became clear when a proposal was made by a non-political source in 1986 that Irish State forests should be sold. It is also clear from the current debate on a similar proposal in Britain. The apparent emphasis in the British public debate on the question of public access sidesteps the major issue, that of public control, particularly of exploitation and regeneration. At different times and in different social systems, forest ownership has ranged from royal or State ownership, though ownership by large integrated timber-using industries to small woodlands in

private ownership. All in their own way can contribute to the needs of society. The key is adequate and appropriate control by society, mainly in order to modify extreme short-term reaction to market forces. State control of private forestry activity is now a universally accepted concept and is applied with varying degrees of rigour in different countries throughout the world. Even in the USA, "the land of the free" (Key, 1814) the Supreme Court found in 1946 that State control of forestry on private land was fully in accordance with constitutional rights and provisions (Cubbage and Siegal, 1985).

The future

Looking into the future is always an uncertain matter. In the 1960s there was speculation that the hungry nations of the world could be fed with artificial protein, an idea that ended with remarks such as that reported from a leader of one such nation: "My people want steaks like everybody else". There might well be a similar response to the undoubted progress in genetic engineering, and the promise of trees with artificially predetermined characteristics. I may be permitted to express a measure of personal biased satisfaction that it will not happen in my time.

On the other hand we might ask should we concentrate now, for instance, on planting Norway spruce and Douglas fir and managing them with a firm intention to match and compete with the best Baltic white-wood or Oregon pine? Should we be growing oak with the intention of producing top quality timber in perhaps 150 years? My answer to these questions would be yes.

Valuation

But ultimately the question arises of the commercial value of forestry, or to be more precise the commercial value of forests. The most logical approach to this, and one that has been universally accepted, is the net present worth, or the value now of all future income and costs discounted to the present at a rate which represents the real long-term earning capacity of investments, and ignoring all previous cash flow. In the case of man-made forests it is natural to compare this value with the net historical cost, if only to see whether the costs of the investment have been justified, and, more importantly, to see whether further investment can be justified. Such a comparison was carried out by the Review Group on Forestry in 1985. It found that the Irish State investment in forestry, in spite of severe restrictions on the quality of land made available, in spite of the trials and errors inevitable in such a pioneering enterprise, in spite of the constraints on operational freedom associated with Civil Service procedures, that investment had earned a real compound interest return, on top of inflation, of around 2% (Review Group on Forestry, 1985).

The net present worth (NPW) or net discount revenue (NDR) approach to forest valuation has long been adopted in Ireland, and in Britain where State-owned forests are also largely of human creation. But recently we have seen the Forestry Commission of Great Britain change to an open market valuation, based on a hypothetical assumed sale of the forest estate between a willing seller and a willing buyer and assuming its existing use. The adoption of this new approach has reduced the 1992 valuation from £2,788 million under the old system to £1,700 million under the

new, a reduction of 39% (Forestry Commission, 1994).

In this context it must be borne in mind that the market value of forests is heavily influenced by artificial and temporal factors, not least of which are the State incentives and subsidies available in support of forest establishment and management. But while these factors may distort the apparent or commercial market value of forests, their real value to the State and to society remains unaffected.

Thus the position is that State investment in forestry is commercially justified in itself, even before we begin to consider all the social values which have been the subject of today's discussion.

Public control

Seen in this light forests have always been a vital concern of governments, and to be preserved and maintained as such. All organised States have laws, of varying degrees of stringency, designed to ensure the sustainment of forests and all of the benefits which derive from them. But just as in life the price of liberty is eternal vigilance, so also in forestry we must never lose sight of the danger consequent on an excessive emphasis on a commercial return, or profit, particularly in relation to the primary output, wood, which is equally both the factory and the product.

What conclusion does all this lead to? It leads me to conclude that forestry is an indispensable public service, with an essential commercial motivation on which it depends for its

sustainment, but that that commercial motivation in itself constitutes a potential threat to sustainment, requiring that the whole activity be closely monitored and controlled at government level.

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