# SPACE, TIME AND PERSPECTIVES IN FORESTRY'

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**THE FOREST INDUSTRY LECTURES**

Forest industry in northwestern Canada is cooperating with Alberta Energy and Natural Resources to provide funds to enrich the Forestry Program of the Faculty of Agriculture and Forestry at the University of Alberta through sponsorship of noteworthy speakers.

The Forest Industry Lecture Series was started during the 1976-77 term as a seminar course. Desmond I. Crossley and Maxwell T. MacLaggan presented the first series of lectures. The contribution of these two noted Canadian foresters is greatly appreciated.

Subsequent speakers in the series have visited for periods of up to a week, with all visits highlighted by a major public address. It has indeed been a pleasure to host such individuals as C. Ross Silversides, W. Gerald Burch, Gustaf Siren, Kenneth F.S. King, F.L.C. Reed, Gene Namkoong, and Roger Simmons. The subjects of their talks are listed on the last page.

This paper contains Mr. Kenneth A. Armson's major public address given on 26 November 1981.

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Mr. Armson received his B.Sc. in Forestry from the University of Toronto in 1951, and a Diploma in Forestry from Oxford University University in 1955. He worked for the Research Branch of the Department of Lands and Forests in Ontario for a year and a half after his graduation. He then became a member of the teaching staff of the Faculty of Forestry, University of Toronto, rising to the rank of Professor during the twenty-five years of his association there. lie has been with the Ontario Ministry of Natural Resources since 197X.

He is the author of over forty scientific papers as well as numerous other articles. He is experienced in the forests of north-western Europe and in the major North American forest areas. He has consulted on silviculture and forest soils to the Governments of British Columbia. Ontario and Nova Scotia. He is a past-President of both the Ontario Professional Foresters Association and Ontario Forestry Association, and is incoming President of the Canadian Forestry Association. He was awarded the CIF Forestry Achievement Award in 1978 in recognition of his national contribution to forestry.

Perhaps most notably he is author of the textbook "Forest Soils" which is a widely-used Canadian reference. He was also author of the so-called Armson Report, commissioned by the Ontario Government to deal with problems of forest. management in Ontario, published in 1976. His recommendations were such that he was appointed as Special Advisor to the Ministry to help to put them into effect, and subsequently appointed as Chief Forester to continue this mandate. His work in the field of forest management has been widely recognized in Canada and he has been a strong force behind the resurgence of interest in the problems of forest renewal.

## SPACE, TIME, AND PERSPECTIVES IN FORESTRY

Canada is a forest country, yet philosophically, culturally, and politically, we have throughout our history failed to recognize that it is a forested nation, and the basic characteristics of the forest itself.

I do not intend to bemoan this fact, and indeed it may be that my statement is contested, but rather I wish to attempt to analyze our forests in relation to ourselves and our institutions. In developing this thesis I am keeping in mind two observations of Marston Bates (1960). The first is that reason seems to be a property of individuals, not of the species or organized groups, and the second is that ecologists are still lost in the biological communities they are trying to analyze. To be fair to the ecologists this last statement can be equally true for foresters

Just over a year ago (Armson, 1980), in a presentation dealing with forestry in Canada - the state of the art - I suggested that in this country our forestry has been subject to three streams in our culture: mythology. exploitation, and catastrophes. The mythology of Nature and the natural forest together with the basic urge to exploit natural resources which is present in all human societies, and the manner in which societies respond to catastrophes have all played a part in determining how we view and deal with our forest resources. I would like now to extend this analogy with streams and recognize other flows in our watershed contributing to the philosophical and political mainstreams, of what may more appropriately be termed the woodshed. In order to do this, it seems logical to start with the dimensions of space and time and using them look at the forest from various perspectives. Alberta is indeed a most apt setting to pursue this analogy. Yet, if I use one that you feel comfortable with. I hasten to add that much of my content must be based on material from the eastern part of this nation, for historical reasons if none other.

There are many facets to forestry, but central to its activities is the manipulation of the forest to produce products or conditions which society considers worthwhile. Historically, throughout the world, the prime manipulation has been an exploitative one in which the costs of extraction of wood and conversion into usable materials have been amply repaid by the market place. The existing forest growing stock is treated as a static resource to be harvested and converted, at a profit, into capital. The size of the market place hinges largely on transportation and political conditions. There is another type of exploitation or conversion of the forest in which wood production is secondary, and that is clearing for other uses, particularly agriculture. Whether to produce saleable products or to convert the forested land to some other use such as agriculture, both activities are similar in the manner in which the forest is perceived in terms of space and time. Both treat the forest and its land as quasi-infinite. The nature, location and access to the forest are important indeed, but its finite extent is not of basic concern. In terms of space, therefore it is perceived as being essentially limitless. The rationale and basis for actions upon the forest are external to it and do- not take into account the forest as a finite entity complete with its own attributes and processes. Lower's (1938) classic history of the exploitative development of Canada's forests clearly substantiates this fact.

It was in the main lucky accident and the use of modern transportation that allowed the Canadian forest industries to develop. If Napoleon --- had not tried to bring Great Britain to her knees by cutting off her Baltic supplies of timber, and thus made his efforts echo in the transatlantic backwoods, probably few rafts of timber would have gone down the rapids of the Ottawa. Without the canal and the railroad, many of the pine trees of Ontario would still be standing in their native glory."

If one were looking for the founder of Canadian forestry and forest industry it seems to me that Napoleon would be the prime candidate. His interest in forestry in France provided a major impetus to the establishment of the pine forests of Les Landes, and in the process of building roads throughout the counry to provide for better access he decreed in 1811 that these roads were to be protected from the sun by the planting of roadside trees. A law which as Cronin says (1971) "was to change the look of France".

The reference to Napoleon serves to emphasize that in North America we were treating our forests as infinite in terms of space and our activities were based on immediate needs for wood or agricultural fields. It is significant that even Lower (ibid) in his discussion of Canada's forests fails to note the dynamic nature of the forest or the major vectors of fire and insects which have always been important in determining our forest's composition and structures.

The conditions and inducements of a present situation are usually overriding where most humans arc concerned. Thomas Southworth the Director of Forestry in Ontario refers to this in his 1903 report where, speaking of agricultural settlement in Ontario's Clay Belt he stated —

"When an opportunity is offered to supplement their slender resources by marketing the forest growth, it cannot reasonably be expected that men to whom every dollar is an object, will discriminate closely between timber which may advantageously be cut without detriment to the general interest, and that by which reason of its location or the character of the soil it clothes ought to be preserved."

Statements such as this together with the concerns expressed at such gatherings as the first American Forestry Congress held in 1882 in Cincinnati. and Montreal, and the first Canadian Forestry Congress held in Ottawa in 1906, all take a different position or perspective of the forests in terms of both space and time. The forests, particularly the pine forests of Ontario, were not only perceived as finite in extent and therefore being rapidly diminished in terms of their existing worth, but the necessity for protection and regeneration were recognized as activities which would extend or renew them over time. The response of society of the time was predictable: the protection of the forest from fire was seen as an important and necessary activity particularly when not only timber but also communities and humans were endangered or destroyed as in the Porcupine fire of 1911 and the Matheson fire of 1916. Thus, as a result of catastrophes of fire the forest was seen as a resource to be protected as well as exploited. There was now a firming up of the space dimension = it is the merchantable forest which primarily has to be protected; this in turn involves a time clement to protect that which is exploitable in the foreseeable future. It is significant that at the Canadian Forestry Congress in 1906 there were clear statements in which the forest was seen as a finite entity to be managed for industrial, environmental. and provincial and national benefits. Dr. Judson F. Clark, the first provincial

forester for Ontario, considered that there were three reasons why Canadian forests should be managed for the production of wood crops in perpetuity. These were the necessity of sustaining the forest industry, the value of forests in the hydrologic cycle, and the economic benefits to provinces and the Nation as a whole.

I doubt that we have heard any more succinct rationale since. Thomas Southworth at that same Congress estimated that for Ontario, a permanent productive forest area of 40 million acres which would produce annually 150 board feet per acre (approximately 25 ft'/ac or 1.75 m'/ha) at 50.75 stumpage would mean a revenue of S30 millions per year to the province. What is to-day's perspective on this same province? We assume now that as of 1978 there were approximately 51 million acres (208 thousand km') of productive Crown forest land for forest production. Our current harvest of approximately 6 million cunits equates to a mean annual yield per acre of about 12 ft'/ac/yr (0.84 m'/ha/yr), but our production policy is aimed at producing 9.1 million cunits by 2020 A.D. from, presumably, the same productive land base or a mean annual yield of 18 ft'/ac/yr (1.26 m'/ha/yr). These yields are considerably lower than actual mean annual increments, but if compared to Southworth's figures, at current stumpage values, the annual harvest brings in $1.75 compared to the $0.75 estimated in 1906. Inflation means that this represents an actual reduction in revenue per unit of wood. The point 1 wish to emphasize is that as a result of this perspective - one which is or should be "a stock in trade" of the forester - the space and time relations of the forests are quantified and we use rates, i.e. mean annual yield or increment, to draw together production per unit land area per unit of time. Fundamental to this perception is the recognition that the rate of growth is dependent on sustention of the forest growing stock and this requires a continuous and successful regeneration process.

Now as soon as a unit of production is defined in these elements of space and time we can proceed to a further sophistication of quantification in relation to quality of product, forest growing stock, land area, and time or rotation age. The perspective with which these elements in space and time are viewed by those administering the public forests and representing the major landowner - the provinces - is quite different, for the most part from which it is viewed by those who represent the main users - the industry.

The financial return or total benefits received have then to be related to the inputs or costs necessary to sustain the benefits - if indeed a continuous flow of benefits is considered desirable. We have now the crux of what is, I believe, our major problem to be resolved at both the professional and political levels.

Both the landowner and the users of the forest land, in many instances have differences of opinion as to the space and related growing stock required for each use. The perception of space necessary for a given use differs depending on the time element understood. Quite simply, most foresters recognize the sequential progress of harvesting, regeneration, tending and forest development as a normal pattern with a time span of several decades. Other users do not. Their use is related to the relatively short span during which they individually or collectively utilize the area. This is particularly true of recreational use where the user over very short periods of time wishes to be reinforced by the continuing sameness of a forest experience.

At the risk of digression I wonder if that concern for 'preserving" forests voiced by various groups reflects not only a genuine concern for particular forest environments but to a large degree is the reflection of present society. This society is urbanized and contains a significant group which is highly educated in the formal sense, mobile, has to a considerable degree discarded or weakened the cultural supports which have traditionally provided the reinforcement of sameness and continuity, and is generally concerned, even apprehensive about the ability of governments to make decisions acceptable to the group (Salomon, 1981). This group tends to look outward for evidence of stability, in other words it looks for a finite space in which all attributes are fixed at some instant in time - the preservation of this or that piece of forest or other real estate. I have, perhaps, overdrawn this picture, but I believe it is essentially a true representation.

There is little, if any, evidence however, that these same groups have voiced any appreciation or understanding of the results of major catastrophes such as fires in central and western Canada over the past two years, the spruce budworm catastrophe in Nova Scotia and Newfoundland, and bark beetle here in Alberta and British Columbia. It seems ironic that the environmental groups which have been most vocal in demanding greater regulation and even reduction in forest harvesting with respect to other values such as wildlife and recreation have been virtually silent during the occurrence of major catastrophes resulting from fire and insects. I can only deduce from this that their perspective of the forest in space is primarily limited to those areas which have in the main been allocated or committed to timber production; in other words it is the use by other humans that defines their space, and their time span is only that period during which the space is occupied by the user. The sequential use of space, - the time span from harvest of the natural forest through to maturity of the next forest stand - is not generally perceived by many yet it is the fundamental period in our perception and application of forest management.

Perhaps, an example of how a particular forest area is perceived in space and time by an ecologist will serve to highlight this problem.

In southwestern Ontario the Deciduous Forest Region (Rowe, 1972), unique in Canada, is dominated by deciduous trees such as many types of oak, hickory, and the Carolinean species tulip, black gum, blue ash, magnolia, and paw paw. A number of these species are intolerant and can best be maintained as a forest component by some regulated disturbance such as cutting. A tract of several hundred acres of such forest - the Backus Tract - is owned by a Conservation Authority in Norfolk County. The Backus family who owned the forest for a century and a half regularly cut in the forest for fuel wood, timber and also had a maple syrup operation. There is no doubt that this cutting was a major factor in maintaining these species in the forest. For over twenty years the forest has been managed for the Conservation Authority by the Ontario Ministry of Natural Resources and during the I960's a ,series of commercial cuts were made, in which trees marked for removal by a professional forester were taken. The objective in marking was to improve the quality and structure of the forest and develop a more regular growing stock yet at the same time maintain, if not increase, the regeneration of the Carolinean species. These

objectives were in fact met by the harvesting of the 1960's. When, recently, as part of the management of this forest a second period of harvesting was planned, many naturalists and environmentalists opposed the planned harvesting and the Conservation Authority requested the Ministry to discontinue any further harvesting. Strangely, one of the key arguments used by those opposed to any harvesting was that the area should be preserved for use as a benchmark of a natural community in a changing environment (Maycock. 1981). The fact that the benchmark - a finite area - was the product of nearly two centuries of intervention by man and the activity one of harvesting seems to have been completely overlooked. Further, the perception of the forest community on that finite area as a benchmark - a static, fixed, immutable reference point - only serves to emphasize the absence of a recognition of time and biological processes as phenomena and the fact that the forest is itself part of the changing environment. Yes, I believe that second observation of Marston Bates that I started this talk with was correct, ecologists can get lost in the communities they analyze.

I would now like to turn to the perception of forests in space and time, particularly as a they occur in the forestry community. These perceptions arc conditioned by three features of the professional forestry community in Canada.

First, 94 per cent of the forest land in this country is Crown land, predominantly provincially-owned. Only in three maritime provinces, - Prince Edward Island, New Brunswick and Nova Scotia - does the area of privately-owned woodlands exceed that of Crown land. The consequence is that governments administering these lands must attempt to satisfy a wide range of user-groups soma of whom will for one reason or another be in competition for the same piece of real estate. In many instances the remedy is often a compromise which satisfies no one or a deliberate effort to avoid making a decision. As de Bono has noted "In a changing world to do nothing may be the biggest risk of all." In any event the space may be well-defined but the time perception is short. Sometimes the decisions are a mixture of time perceptions. For example, the Temagami Forest Reserve in Ontario was established in 1901. Under the Forest Reserves Act of 1898 such areas were set aside :.."as may be deemed advisable for the purpose of future timber supplies". Yet at the same time the areas were to be kept in a natural state, were to be centres for recreation and initially at least, mining and logging were excluded. When the Temagami Reserve was created with its large stands of pine, the pressure to log was great and it was permitted except for islands and the Skyline Reserve on the mainland which by regulation in 1905 were excluded. The net result has been that with little management input over a period of nearly 80 years, the cutovers have regenerated variously depending on the time, vagaries of weather, occurrence of seed crops and soil conditions, while the stands in the islands and skyline reserves are in various stages of transition from pine to other species such as maple and balsam fir (Gilbert, 1978).

A second major feature affecting the perceptions by foresters is their limited employment base. There are two aspects to this base that should be recognized. The major employers are few and large; either you work for government or you work for large forest industry companies. This employment pattern embodies a second characteristic and that is that the forester is

typically in an employer/employee relationship and not that of a client/professional. It is only to be expected that the perceptions of the employee/forester will be coloured to a large degree by those of the employer. This is not to say that in a client/professional relationship such colouring may not occur but it is less likely and usually more transitory.

The third feature of the professional forestry community I would address is related to education. Although tempting, I shall not come out boldly in support of the statement of the Abbe Galiani that, "education is learning how to endure boredom and injustice", but I offer it as a part truth. For myself, who has, for over a quarter of a century, been guilty by association at least, for any of the inadequacies or failures in forestry education I can claim the opportunity for retrospection. There are three aspects which I believe have often resulted in fault professional perceptions. The first is when the education is based on largely irrelevant theory or inapplicable practices. V.S. Pritchett described certain academics as having it detached themselves from the reality of life and being full of self-important and comic irrelevancies. Where this is true perceptions of the real forest must of necessity be inaccurate and thus misleading. The second aspect is in that body of knowledge, experience and. technology drawn from other fields and disciplines and applied to the day to day forestry enterprise - mainly concerned with exploitation of the land and forest. Emphases here in the educational system reinforce those who are looking for absolute answers and marketable skills and abilities. But it also hardens the perception of how these may be applied both in space and time. The greater the firming up of the porthole of perception the less the likelihood that other perceptions can be entertained. I offer an example of where different perceptions of the same space, but with different time-frames have interlinked.[1] During 1977-78 the Forest Engineering Research Institute of Canada (FERIC) investigated the possibility of increasing productivity in harvesting by development of a new type of skidder tire. This development did not proceed but in 1979, a large pulp and paper company located in northern Ontario discussed with FERIC wide tires for use on skiddcrs operating on peat soils. These productive wet soils comprise a major portion of the productive forest land on their timber limits. During this same period field foresters of the Ontario Ministry of Natural Resources, in cooperation with company foresters were preparing the silvicultural prescriptions by forest type and site for inclusion in a forest management agreement. The current method of harvesting in frost-free period was contentious. Harvesting operations in the winter caused little to no damage but during the frost-free period the peats were deeply rutted, rendering regeneration difficult if not impossible. Further, much of area would become colonized by bull-rushes. The silvicultural

[1] I am indebted to M. Hamilton, President, Forest Engineering Research Institute of Canada, Montreal, for certain of the background information.

prescription required that the preferred time of harvest be in the winter and posed a dilemma for the company. The result was that in 1980 the first use of wide-tired skidders took place and this has increased during the past year, in addition another company has been using such equipment in conjunction with a feller-buncher equipped to be mobile on wet peat sols with little if any surface disturbance. What is interesting is that the productivity of these wide-tired skidders is significantly greater than those which are -conventionally equipped. The wide tires now in use are essentially from stock sizes already available. From a silvicultural standpoint this technological change creates more favourable conditions for regeneration without having to use expensive site preparation (shear blading) following conventional winter harvesting.

The time frame with which FERIC originally approached this single rather simple question was short - how to improve productivity of a skidder. Yet the time frame which has emerged is embracing the establishment of the new forest. It also means that the professional judgement of 1979 with respect to manipulation of a certain forest condition has undergone a total reversal. Frost-free operations now are preferred.

A third and final aspect of education I would like to mention is the emphasis which is placed on forest planning. and what seems to be a notion in some quarters that development of plans should be the primary occupation of a professional forester. Let me make clear that I am not opposing planning. What has happened, however, is that plans instead of being means to attaining objectives have become ends in themselves. Plans have become viewed by many as solutions to problems. A plan may have a short time frame but of necessity it must be open-ended. If plans are simple, take account of reality, and define the objectives clearly - they should as their time of implementation proceeds, facilitate the ongoing planning process. I sometimes think that the planning process has borrowed too much from engineering and architecture schools of planning where the plan for a bridge or building has a fixed and for the most part static time frame. As foresters should know better than most others forests are dynamic. They should also realize that the society and institutions which administer and operation the forest estate are usually neither fixed or static. John Fowles (1969) said that "a planned world (a world that fully reveals its planning) is a dead world. It is only when our characters and events begin to disobey us that they begin to live". A forest management plan gathering dust on a shelf is a microcosm of a "dead world", and it is of no value. Plans which arc continually tested against the real world, amended to meet new situations, arc live plans. More than that they reflect the awareness of the persons who create and use them and it is by their deeds, productivity and ingenuity that they should be professionally judged.

Finally, in discussing the dimensions of space, time, and perspectives as they relate to forestry I would like to return to an aspect of our society and many of its institutions which influences both our perceptions and also how forestry is perceived by others in society.

An underlying principle in our institutions, political, legal, religious, financial, educational, and professional is that of adversaryism. It reflects human nature, - of. course, but in becoming entrenched institutionally it must produce certain well-defined perspectives and not infrequently it applies, arbitrarily, a time-frame which may be totally inconsistent with objectives related to forest management. One of the clearest examples is to be found in the various forest

legislation which governs the activities of licenses on Crown forest land. Only relatively recently since World War II have we seen the emergence of contractual arrangements between the owner of these lands and forest operators. In all instances the development of these agreements has coincided with a recognition by both sides that forest management to sustain a timber supply in the long run is necessary to achieve objectives that arc commonly held. Such a mutuality of interest is not something that can be assumed lightly or that will not be subject to continual erosion. In a society which has traditionally accepted the role of government as a protector of public resources against a continual assault by cntcrprcncurs the notion of agreements and a working together is viewed as suspect if not anathema. In this they are supported by the evidence of past record and the normal state of distrust - a perception which is reinforced by the general actions to which we are exposed, especially in the political arena. It would be naive, in the extreme, to ignore this state of affairs which generally will not change. If we are realists we must assert the importance of forests and forestry to society and aim at widening or changing those perceptions which make our efforts less productive than they should be. Sydney Harris said "An idealist believes the short run doesn't count. A cynic believes the long run doesn't matter. A realist believes that what is done or left undone in the short run determines the long run." I believe foresters are realists in that sense. But with that realism must go both knowledge and integrity, and I close with some words from Samuel Johnson —

> "Integrity without knowledge is weak and useless, and knowledge without integrity is dangerous and dreadful."

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[2] Not yet available.