THE EVALUATION OF FOREST LAND IN BRITISH COLUMBIA

by

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ABSTRACT

The general increased demand for all types of land by various users has intensified the problem of estimating the value of forest land, and of attempting to bring about its best use.

This thesis sets forth the theoretical conditions necessary for the optimum distribution of land resources, and analyses some of the barriers which exist in the real world, both in the market and in the sphere of public decision-making.

Current methods of evaluating forest land in B.C. are reviewed. The varied reasons for an appraisal: investment, expropriation, condemnation, damage appraisal, taxation, comparative evaluation and transfer of tenure, effectively divide this portion of the study, and form a basis for comparison.

Demands for forest land, singly and on a multiple-use basis can only be arbitrated by a supra government body recruited from a disinterested group of professional resource managers. It is imperative that this department be provided with the knowledge necessary to construct economic as well as technical priority scales, so that decisions can be rational, and lead toward the best use of the resource.

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INTRODUCTION

The purpose of this study is to show how forest land is evaluated in B.C, and whether the present system is designed to bring about the best use of the resource.

The imperfections of both the market and public decision-making allocative systems are explored. In the economic analysis, the conditions necessary for the optimum allocation of land resources are presented, and an attempt is made to show the many factors which prevent it. Barriers to optimum exploitation through the market mechanism are investigated. The historical development of public policy in this field, as well as present provincial policies and shortcomings are examined. Current methods used to evaluate forest land for various purposes are inspected.

It is hoped that such an approach, beginning at a purely economical optimum point and moving through current evaluation to a comparative assessment of public and market processes, will shed some light on the means to correct the misallocations found in both systems. This analysis should allow the decision-maker to advocate such policies as will bring about improvement even when the situation is not clear-cut.

CHAPTER I

BARRIERS TO OPTIMUM RESOURCE EXPLOITATION THROUGH THE MARKET MECHANISM.

A. Efficiency in resource use.

Maximum efficiency in resource use can be defined in two ways: spatially, where an optimum is found in the distribution between uses, and temporally, where the best distribution between time periods is obtained. In the former, each scarce resource factor will be employed in its best use to return the highest profit to its owner at one point in time. With this perfect dispersion of factors it would be impossible to move a resource factor from one employment to another without diminishing the net national product (a Pareto optimum). The maximum temporal distribution is obtained when the resource is being used at a rate which maximizes its net present worth.

Spatial efficiency

Early British economists found a basic orderliness in their free enterprise economic system. Adam Smith (1776) called it the "invisible hand", by which each individual, while following his own selfish end, was led unerringly to achieve the best good for all under a freely competitive price system. This system functioned in an

economy where everything had a price, including the factors of production, and adjusted automatically to changes in demand and supply. In the long run, production tended toward a natural equilibrium and maximum spatial efficiency in resource use since all factors sought to be employed in their most profitable use. Trade and commerce in that age, both in England and in North America, did indeed enjoy a freedom which approached the perfect competitive market.

In economic terms, a purely competitive market is characterized by large numbers of buyers and sellers, a homogeneous divisible product, and the inability of buyer or seller to influence price by purchases or sales. One must also assume that the sole motive in any market transaction is profit maximization, and that the prices and costs can be readily calculated. In the short-run market it is assumed that firms will increase production until Marginal Cost = Marginal Revenue, with the constraint that Marginal Cost is rising (or Marginal Revenue falling) so that the long-run equilibrium, with no excess profits in the industry, and the optimum size of each operation at the lowest point in the Long-run Average Cost curve, is obtained. Free entry and exit to operators in the industry in the long-run equilibrium, a perfectly elastic supply of each factor of production, and a perfectly elastic demand for the output as far as each individual firm is concerned, are further assumptions of this market.

The basic tenet of perfection in an economic market is the perfect knowledge and foresight of all transactors, and thus it is conditioned by complete certainty. It follows that the lending and borrowing rates will be equal, and that the internal rate of return on an investment will,

at the margin, always equal the market discount rate. No externalities can be present to prevent the free functioning of the market equilibrium of supply and demand. There can be no economies or diseconomies in production, and no intangible costs or benefits to confound the market. It also follows that social and private costs and benefits are equal throughout the economy. In order that supply and demand may move to an equilibrium there must be a perfect mobility of factors. This implies a strong tenure over factors but not necessarily a complete ownership. A purely competitive market which is perfect is called a perfect competitive market.

Under conditions of perfect competition, prices determine production, and tend to bring about the optimal allocation of scarce resources. Land of a certain type, for example, would normally be used in the line of work which promises the highest net return. It is only when perfect competition in both product and resource markets prevails that resources would automatically be allocated to maximize the net national product. Thus, when every firm has adjusted the quantity of every factor employed until the Marginal Factor Cost = Value of the Marginal Product, and each firm's output is at the optimum level of Marginal Cost = Marginal Revenue, and supply and demand in the perfectly competitive market is at an equilibrium, the actual price paid for each factor of production will equal the Value of the Marginal Product of the factor for each firm, with all available factors employed. At this point there will remain no possible shifts in inputs and outputs without a misallocation of factors, and a decreased net product; and, therefore, a Pareto optimum will have been reached.

Temporal efficiency

Optimum temporal efficiency, or the best rate of use, must now be considered in order to arrive at the maximum total efficiency in resource exploitation. In this case the rate of production will be optimal when the present worth or value (net discounted revenue) of the resource is maximized. The criterion takes account of the timing of revenues and costs, and weighs them according to their occurrence in time, thus, discounted periodic returns and costs are scrutinized, and the one "distribution mix" over time selected which promises the largest present worth.

In terms of economic rent,[1] the present value of any useable resource is always equal to the sum of its discounted future rents:

$$P.W. = \frac{a}{i}$$

Where a = average annual economic rent

i = discount rate

P.W. = present worth

When the economic rent is maximized, the present worth of a resource is at its maximum.

B. Factors preventing the optimum allocation of the resource among uses.

The optimum allocation of resources among uses can be thwarted

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1. Robinson (1933) defined economic rent to include all payments accruing to a factor unit of production in excess of its opportunity cost.

by non-price impediments, by incorrect market values, and by direct interference with the price mechanism.

Land as a factor of production has various inherent limitations. The total supply cannot be increased, and so, traditionally, it presents a perfectly inelastic supply curve, where market rent or purchase price is a cost which is more price-determined than price-determining. However, to individual users, the supply curve will appear less than perfectly inelastic, and may, in some markets become quite elastic (Robinson J. 1933). The immobility of land between uses stems from its fixed location as well as its inability to change uses in the short-run. Long-run adjustments may resolve the latter, but in some instances the former will remain. Less than perfect mobility will persist where incomplete tenure[2] exists.

Historically, in Canada, land and forest resources haven't gone to the highest bidder but have been dispersed by government using various non-market methods, and often buyers have been blind speculators (Scott 1958). The long-run equilibrium in most cases is nowhere in sight, nor likely to come about. Not only was the original allocation faulty, but current governmental and institutional controls continue to limit factor uses, and often the original uses influence their use perpetually, despite large economic changes. For example, in B.C., Crown land may be purchased outright for agriculture and for a number of other uses, but not for forestry, although various incomplete tenures for forestry are available such as the Tree Farm

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2. Complete tenure implies legal ownership, while any other type of rental, lease, etc., is termed incomplete (Barlowe 1958).

Licence, which in some respects limits the tenant in his management of the resource.

Ignorance on the part of the forest owners, governmental and institutional influences, and rigidities of custom and habit may prevent forest land from moving from low-paying uses to higher ones. In addition, the market for forest land usually has too few transactors, and an unequal disposition of buyer and seller. Lack of knowledge of land and forest values not only prevents these resource factors from reaching their optimal use positions, but also inhibits the producer from calculating his costs and returns, or even determining supply and demand curves in the market.

Perhaps one of the most important non-price impediments is that of maximizing elements other than the traditional profit in an operation. Cyert and Marsh (1963) analysed the goals of the firm and its executives, and found many alternative objectives. Flora (1966), who investigated the time discounting of fifty major woodland owners in New England, found that for some, the original investment in forest land was made to ensure a continuous wood supply for their mill. Others sought deferred income for their retirement or heirs. Still others wanted aesthetic values and recreation.

To these factors should be added the natural barriers of optimum scale and large capital outlay which are required in many forestry operations, and artificial ones such as the power of concentrated geographic forest ownership or tenure.

The existence of monopsony elements in the timber market will

result in incorrect market values. Monopsony, taken in its broadest sense to include monopsony, oligopsony and other less completely monopsonistic markets, is characterized by one or a few interdependent buyers who can control price, and many sellers or producers of the resource. A distinguishing feature of this market group is its upward-sloping Total Supply curve (although to the individual sellers it may appear perfectly elastic) so that Marginal Factor Cost is greater than Average Factor Cost. Thus, the typical monopsonist restricts the quantity of the factor used, and holds down its price so that it makes less than its optimal contribution to the whole of society.

Such an oligopsonistic market structure was analysed by Mead (1966) in his study of the Douglas fir lumber industry in the U.S.A. He found supply and demand price inelasticities in both product and factor markets. While a competitive structure existed in the lumber market, implicit and explicit collusion among buyers of timber made the factor market an oligopsony. A wide price disparity was found between competitive and non-competitive timber sales. Large firms wielded a market power in national forest timber purchases, and showed a significantly lower average cost for national timber than did the small firms. Economic concentration in timber resource ownership was low, but was increasing.

On the basis of Mead's markets we would expect to find excellent performance in lumber production, and something less in timber production or resource management. This was not the case. Progress in technology and product innovation has been poor in the forest product industries compared with other industries, and research

has lagged badly. Price performance, too, was unsatisfactory, but might have been due to the inelastic supply function of timber. Mead found that any gains from economic progress occurred to the owners of timber resources.[3] The oligopsonistic structure in the timber market should indicate a relatively poor performance in timber resource management, but it was found to be surprisingly good. However, management would be improved, Mead felt, if the trend toward concentration of ownership of timber resources was increased. Too, the federal government could avoid some of the adverse effects of the oligopsonistic market by holding competitive wholesale log sales rather than timber sales.

A similar study of the B.C. coast forest industry would be very valuable in providing guides for government and industry.

Much of the basic reasoning behind the premise that the competitive price system is optimal is that a producer profits by marketing useful goods and services, and by promoting his own interests he necessarily promotes the interests of society. But there are instances where social and private interests do not coincide. Some actions of producers benefit others but they themselves are not paid, an external economy; or they diminish the total returns to society and are not charged for it, an external diseconomy. Often market values are quite correct in what they choose to measure, that is, the relative scarcity of factors and the value the producer and the consumer assign them; but other benefits and costs, and intangible and

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3. Statistics for 1940-1964 showed that lumber prices increased 4-fold, but stumpage prices 16-fold (Meade 1966).

social values must be assessed and included in the overall estimates of true value.

In the challenging field of recreation evaluation some progress has been made in trying to bring these values to the market. A rather ingenious method was outlined by Pearse (1966), and while the rigid assumptions make the model unwieldy, the idea encourages the measurement of the heretofore intangible values associated with this industry.

The price mechanism may not be allowed to function freely because of price fixing and other controls by state and private groups. One common area of interference is in product price supports or subsidies to favored industries such as agriculture. These distort the true cost of using land resources. Many other situations reflect interference: union demands for increased labour factor prices without corresponding increased production to warrant it (particularly in the forest industries), and government restrictions on the use of land. Some taxes, too, interfere with the most efficient economic use of land, and here the forest industry appears to bear an unjust load (Moore 1957). All these prevent the true adjustment of supply and demand elements.

The most restrictive factor is the real world, a place of constant dynamic changes in technology and use, which prevents an equilibrium in the market.

C. Factors preventing the optimum rate of resource use.

While the supremacy of the present worth criterion is fairly

well established as the soundest of the theoretical economic criteria for determining the correct rate of resource use, or optimal intensity of development, it has inherent disadvantages. The assumption that one can predict the demand of the output, its price, the costs involved in production, and the market discount rate, applicable at every point in the future are heroic. It is readily seen that most of the future values in, for example, a forest investment project, are not available even for one period.

In estimating the present worth of a resource factor through time the discount rate is crucial, and must be stated a priori. Not only does a slight change in the rate used magnify changes in the present worth, but it often produces a change in the relative attractiveness of different rates of factor use, the time-distribution mixes. High discount rates favor early returns. The criterion in its simplest form, assumes that discount rates remain constant over time.

It should be remembered that it is only in the perfect competitive market that borrowing and lending rates are identical. When they differ, some controversy exists between those who favor discounting at the cost of borrowing capital, and those who discount at the alternative lending rate. It has been suggested (Hirshleifer 1958, Victor 1968) that if funds are self-generating within the development, the discount rate should equal the re-investment rate, that rate which capital could earn in its next best use. If capital is borrowed to develop a resource, then the rate of interest on the loan for the investment should be used as the appropriate discount rate, provided the returns from the output of the developed resource

are used to repay the loan. Also, some difficulty arises when the re-investment rate is the rate of return on other opportunities foregone because of some restraint. The rate of return on the marginal investment isn't evident until the investment program itself is determined, yet the program cannot be determined without knowing the discount rate.

Another problem in using the present worth criterion appears when there must be a choice made between "mixes" of different capital intensities. As an absolute rather than a comparative index, the criterion favors large investment over small ones. In the case of limited capital, present worth tells nothing about the relative efficiency at which development projects earn net returns.

This criterion is best applied when only one project is available to fill some given need, and where alternatives exist it may be less useful.

Other criteria have been used extensively for determining the economic feasibility of resource development and for ranking various projects. Both the benefit-cost ratio and the internal rate of return criteria have merit. Benefit-cost ratio can be expressed in non-monetary terms and can measure profitability per unit of cost, or the related efficiency with which resources are used. It is eminently adaptable where investment funds are in short supply relative to projects, and does not favor monetary largesse; but it suffers with the present worth criterion from the necessary *a priori* discount rate. The beauty of the internal rate of return is that it can be used without specifying a discount rate. However, there is the implicit

assumption that all returns in the project can and will be re-invested at the same rate of return of the original investment. It has been shown, too, that this criterion is not a single-valued function, and the possibility of multiple positive solutions may occur with more than one negative section in the cash flow sequence (Johnston et al. 1967).

The perfect competitive market and all the criteria discussed assume complete certainty and knowledge of outcomes from actions. But the real world is one of uncertainty and risk. With risk one can objectively assign a probability to the event, but uncertainty presents a much greater problem in that one has no information about future events. Exciting fields have been opened in the search for means to deal with uncertainty. The tremendous new ability gained for planning and allocating scarce resources in decision theory, mathematical programming, model-building and simulation cannot be over emphasized, but it must be remembered that these tools are only guides for the decision-maker, neither refined nor infallible. It is doubtful if any two problems in forestry will be exactly alike, and the element of human judgement based on experience and intuition, and perhaps common sense, will always be present. But as the field becomes more complex, and the simple relationships become a maze of interrelationships, and the time element becomes of utmost importance, any method which will point toward the correct path must be considered of some value. Vaux (1966) neatly summed up by saying "Rough data at the right moment will help the decision-maker more than refined data available only when the time for decision is past".

CHAPTER II

DEVELOPMENT OF PUBLIC POLICIES IN THE TREATMENT OF FOREST LAND WHICH HAVE LED TO THE PRESENT DISTRIBUTION IN B.C.

A. Historical development of policy.

It is a self-evident fact that both federal and provincial policies have not aimed at allocating land resources to the highest bidder or to the optimal use. The basic agricultural policy in Canada rests on the classical concepts of Malthus and Ricardo. These early writers saw an increasing demand for food brought about by population pressure, and where the value of farm products would rise relative to manufactures. Their ideas penetrated the land allocative policies which encouraged wide-spread ownership in agricultural lands in order to bring about an equitable distribution of the supposed greater income which would accrue to land rather than to labor. Conflict in these demand-oriented policies has been inevitable in the face of large surpluses in both Canadian and American agriculture. Countries with low dietary levels are compelled to devote a major portion of their resources to food production, but in Canada, with her abundant supplies of food, the need for any special treatment for agriculture surely no longer

exists.

Other than for agricultural use, where land has been consistently sold outright or pre-empted, there has been a strong tendency for governments to retain ownership to land in alternative uses. Those critical of Crown ownership of forest land in B.C., might remember that it evolved partly because early sawmillers refused to buy forest land (Hardwick 1962). In 1865 the government was forced to institute a system of granting the rights to cut timber on Crown land without alienation of the land itself. These first leases were restricted to those actually engaged in cutting lumber, spars or timber, as a measure to encourage the sawmilling industry. The pattern of Crown ownership which developed[4] was the result of those early expediencies, and, as Sloan (1956) has pointed out, the decisions were not based on conservation or on long-term sustained yield policies, but on the immediate objectives of obtaining Crown revenue, and of helping in the development of a new industry.

The present legal definition of forest land in B.C. as used by the government has an historic development (Sloan 1956). Originally there was no distinction drawn between timbered and untimbered land, and the earliest disposals of Crown land in 1858 carried with them all the natural resources appurtenant thereon (including timber). The Land Act of 1891 classified land roughly into use classes. First class lands were suitable for lumbering or cultivation, and those to be used for lumbering were to contain not

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4. 95 per cent of forest land in B.C. is Crown, by far the highest in Canada.

less than 5000 feet per acre to each 160 acres, and sales were limited to tracts between 160 and 640 acres. In 1896 timberland was defined as land carrying 8000 fbm per acre for Coast forests, and 5000 fbm per acre in the Interior. Legislation prohibited its sale, although the ruling was not strictly enforced for some time. This definition is still in effect.

The alienation of Crown lands, especially forest land, as payment for railways in B.C. is a bizarre and colourful story in itself (Robinson E. 1962). By 1913 some 18½ million acres of Crown land had been granted for railway purposes. It must have included most of the arable land in the province (Cail 1956). It went on record that when 2 million acres of prime forest land on Vancouver Island, the celebrated Esquimalt and Nanaimo Railway lands were to be alienated, a cautious M.P. from New Westminster felt "that the government should hesitate before they give away all this land". Since those generous days of land grants there has been some prudent repurchasing. The Columbia and Western Railway lands and the Southern Railway lands were both bought back by the government. A 1956 proposal by Sloan aimed at the repurchase of the E. and N. Railway forest lands for about 108 million dollars.

Hardwick's (1962) fascinating tale of the historical development of the forest industry of Coastal B.C., and resultant geographic distribution, pointed out the effects of provincial government policies, their aims, and the extent to which they were realized.

The first mills on the B.C. coast located on tidewater on

sheltered bays in the region of the best Douglas fir stands. Early operations saw the tremendous advantage of cheap water transportation of logs, and of deep-sea port facilities on Burrard Inlet for marketing their products. This happy combination was responsible for the large growth in the coastal forest industry. As stands became depleted around Vancouver, logging extended up the Coast, bypassed Howe Sound because of its steep slopes, and gradually started a flow of logs southward to the sawmilling centre of Vancouver. This flow of logs has continued during the development of the industry, extending beyond the sheltered inner water between Vancouver Island and the mainland to the more exposed coastline, as advances in log-towing made this possible. The sawmills, except for Alberni, were concentrated around Vancouver because the whole Douglas fir region which was accessible to tidewater was economically accessible to Vancouver conversion plants. Pulpmills, because of their water and hydro-electric requirements followed a peripheral pattern of location, and as they used hemlock rather than Douglas fir, chose to be near stands outside the prime Douglas fir region. This stream of raw material converging on main centres allowed a certain specialization in the industry which intensified with time, so that economics in processing were possible.

The beginning of the Vancouver log market, an almost perfect market for raw material,[5] was also one of the main factors forming this unique pattern. Logging operations and manufacturing operations were

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5. This market is still strongly favoured by some, but it has shrunk to a point where it attracts only about 20% of the total logs cut in the Vancouver Forest District, and is a basis for trade rather than sale. (B.C.Forest Service Annual Report and Average Log Prices 1964).

almost completely divorced. Loggers put their products on the open log market in Vancouver through a broker, confident that buyers with diversified needs would guarantee them competitive prices. Because the manufacturers were reasonably assured of a steady supply of their individual requirements they could increase their plant size to reap economies of scale not possible in an isolated region.

Forest industries began to integrate when some doubt arose that the supply of raw material would continue indefinitely. Companies had to protect their investments by gaining control of an assured supply of logs. Sustained yield legislation encouraged this type of integration, making long-term tenures of forest stands to established manufacturers. Because a certain size was almost mandatory to reap the benefits of this system of licensing, small operators were pacified by Public Working Circles, sustained yield units controlled by government. This division has produced hard feelings among small loggers and millmen, and is still highly controversial. The sustained yield policy, by curtailing the cut in an area, forced many operators to seek timber farther afield. Government stumpage zones, too, were established to promote a dispersion of conversion plants, but this policy has largely failed. Only the"grouped mill" at Port Alberni, relatively near its timber supply, has evolved in a manner visualized by the government.

The general long-run world demand for pulp has speeded the development of pulpmills in B.C. The new pulp economy tenure (Pulpwood Harvesting Area) superimposed on the original sawlog system has made large pulpwood supplies available, and technological advances

have made these economical to harvest. Despite soft, but gradually improving markets for pulp at present, there is a scramble in B.C. for the control of an inventory of pulp timber, for which payment is to be made later. Unfortunately, but perhaps of necessity, legislation requires that pulpmills be built at the same time. It is inefficient and precludes an economically "timed" pattern of development. Some recently built pulpmills are operating far below capacity and glutting the present over supplied market. If every proposed mill begins production on schedule, the situation might become more serious.

At present one of the most crucial economic issues in B.C. forestry is the offspring of the sustained yield policy, the allowable cut. The governmental use of rotation ages based on m.a.i. of wood volumes makes the cycle longer than if maximum value rotations were used. In addition, there is a gross underestimation of the provincial inventory. Ideally, financial rotations should be used (Smith and Haley 1964), as these can increase allowable cuts safely while taking into account the alternative rates of return. The inefficiency of the whole system is especially obvious when one notes that depletion due to decay and all mortality factors exceeds the cut.

The continuous stream envisaged by Sloan (1956) with growth and harvesting balanced, leans heavily toward conservationist principles and makes no allowance for changes in markets and technology in a dynamic economy. In addition, a policy which prescribes an inelastic supply in the face of variable demand can only lead to instability in the market (Haley 1966).

B. Park development.

Some mention must be made of the sizeable area of forest land held in federal and provincial parks. About 3.1% of the total provincial area is occupied by parks. It is difficult to estimate accurately the extent of commercial forest cover in these parks,[6] but there are considerable timber values which many (Kiernan 1964, Williston 1964) believe can be harvested with little or no harmful effect to the recreational values. Present legislation prohibits any resource exploitations in certain types of park.

Historically the first real provision for reserving land primarily for park purposes was the "Provincial Parks Act" in 1908, and for many years it served as a means of granting small recreational areas, together with the whole of their management to local park boards in municipalites and cities (Noble 1965). But from 1911 to 1930 large wilderness provincial parks were created. These were considered reserves for future use in that there were no formal plans for their development. However, during the depression, public funds and idle labour were allocated to develop various provincial parks, and this development has continued at different rates ever since. At the beginning of World War II the administration of the provincial parks was given to the Forest Service, more for expediency than for any other reason. The phenomenal rise in demand for outdoor recreational areas in the following twenty years created pressures for substantial

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6. See Table III page 25

development. Classes of park were defined, giving those with immediate development potential the strongest protection from any type of resource exploitation or commercialization. Other parks, often very remote and inaccessible, were reserved for future development, and were allowed some secondary resource use such as logging and mining, with the proviso that such uses would not interfere with primary recreational values.

At present 226 provincial parks contain some 6,400,000 acres, of which 90 per cent is concentrated in wilderness parks with comparatively little access. An additional 325,000 acres are loosely reserved "for the use, recreation and enjoyment of the public" and possibly for future park development (Noble 1955).

The four national parks in B.C.,which total a little over a million acres, with perhaps a third in forest land, are stretched along the Rockies, and were originally conceived as railway parks. They are administered by the National Parks Service of the federal government, and are well managed, and highly developed in certain areas. All types of resource exploitation, including hunting, are prohibited in these parks.

C. Present ownership in B.C.

Of the 366,000 square miles which make up the entire land and fresh water area in B.C. it is estimated that nearly 60 per cent is under some form of productive and low-site forest cover (B.C.Forest

Service 1957). The following two tables (I and II on page23 and 24) show the complete area classification of B.C. Areas bearing commercial forests occupy 50 per cent of the total acreage, while agriculture, urban, range and meadow together constitute less than 2 per cent. The large area of barren and non-productive tree cover, some 36 per cent of the total, will likely, of necessity, remain in its natural state forever (Kiernan 1964).

Four main ownership classes of forest land were recognized in the 1957 inventory of forest resources compiled by the B.C. Forest Service. These were:-

1. Provincial Crown
2. Private (provincial Crown-granted)
3. Crown land under licences and leases
4. Federal (Canada controlled)

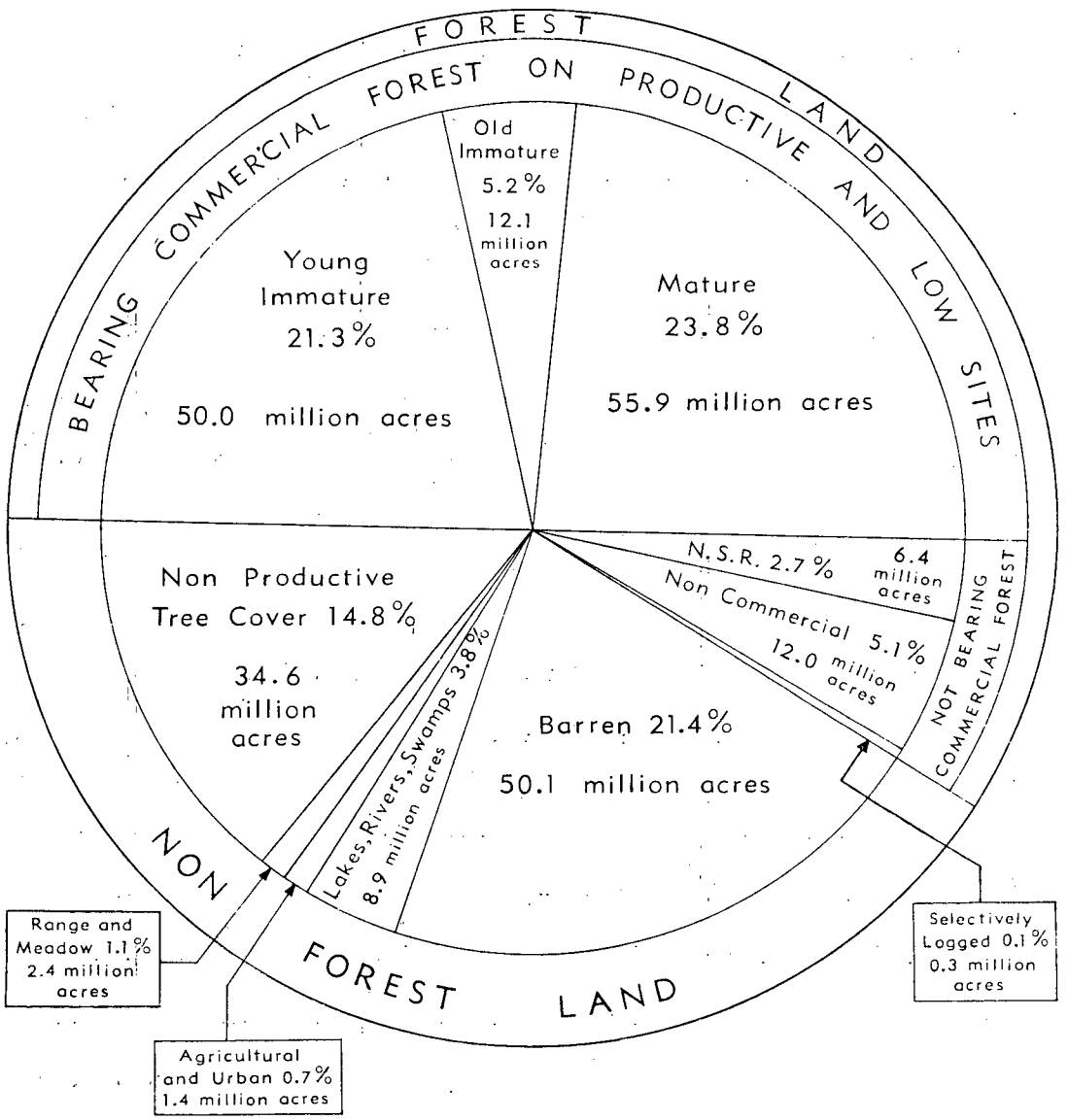
By using data from the 1957 inventory and the 1967 Annual Report of the B.C.Forest Service an up-to-date table showing ownership and administration of forest land areas has been assembled (figures rounded). For convenience, ownership classes 1 and 3 above have been combined. See Table III page 25.

Forest managed under some form of sustained yield now include over 85,000,000 productive acres in B.C., or about 60 per cent of the possible total.

TABLE I

FOREST AND NON FOREST LAND AREAS IN BRITISH COLUMBIA

Total: 234,115,331 acres



Bearing Commercial Forest 50.3% of total acreage.

Not Bearing Commercial Forest 7.9% of total acreage.

Basis: Entire land and fresh water area in British Columbia. (Table A-1 Province).

Figure 1

Source: Department of Lands and Forests, B.C., 1957 Continuous Forest Inventory of British Columbia Table A-1 Figure 1.

TABLE II .

Class of Land and Forest	Millions of Acres	
Forest Land		
Bearing Commercial Forest:		
Productive Forest	110.1	
Low Site Forest	7.9	
Not Bearing Commercial Forest:		
Non-commercial Forest	12.0	
Not-Satisfactorily-Restocked Forest	6.4	
Selectively Logged Forest	0.3	
Total, Forest Land		136.7
Non Forest Land		
Agricultural and Urban	1.4	
Barren	50.1	
Non Productive Tree Cover	34.6	
Range and Meadow	2.4	
Swamp	2.8	
Total, Non Forest Land		91.3
Water		6.1
Total, Province		234.1

Source: Department of Lands and Forests B.C. 1957 Continuous Forest Inventory of British Columbia page 14.

TABLE III

OWNERSHIP AND ADMINISTRATION OF FOREST LAND AREAS
IN B.C. (acres)

Provincial Crown	
Crown - unreserved and gazetted forest reserves	41,082,000
Public sustained yield units	75,700,000
Tree Farm Licences (Crown land)	8,200,000
Tree Farms (not in T.F.L's)	1,000,000
Farm Woodlot Licences	16,000
Watersheds	38,000
Provincial Parks	2,964,000
	129,000,000
Provincial Crown - granted	
Tree Farm Licences (private land)	1,400,000
Watersheds	25,000
Other private land	5,175,000
	6,600,000
Federal	
National Parks	375,000
Indian Reserves	560,000
Other lands	165,000
	1,100,000

CHAPTER III

PRESENT EVALUATION PRACTICES IN B.C.

A. Forest Investment

Under perfect conditions, land prices would be determined by market equilibrium of supply and demand, and, because of perfect knowledge, would equal the capital sum of the expected net returns, discounted at the market borrowing or lending rate (equal under perfect competition). This is the familiar net present worth criterion.

In forestry, Faustmann (1846) presented essentially this concept for evaluating "land expectation value" (or "soil value" or "bare land value"). Despite its economic soundness it has been used to a surprisingly limited degree for determining optimum financial rotation age. Haley's (1963) empirical studies showed that the financial rotation was influenced by site quality, alternative interest rate and stocking index. Further, he found that it was closely correlated to the value growth function, and therefore influenced by any factors which tend to change this function, such as intermediate yields, accelerated growth, and the change in the relative value of timber grades produced. Pearse (1967) has shown that, in theory, an increase in establishment costs will always increase the optimum

rotation age, all other factors being equal.

Other investment criteria: benefit-cost and internal rate of return can be used to evaluate investments for various objectives, mindful of their limitations under certain circumstances.

All these criteria ignore risk and uncertainty in their simplest form. Marty (1964) attempted to show a method whereby forest investment decision choices could be made without ignoring uncertainties. In his system, alternatives are disregarded because of clearly low-return values or unprofitable returns, until a set of alternatives is left on which subjective judgement must be made. It departed from the fabricated neatness of other criteria and presented results based on available, not hypothetical, information, which are probably as near or nearer reality as those based on other more theoretical calculations.

The discussion in this section assumed profit maximization as the only goal in forest investment decisions. This is not always the case (Flora 1966, Helliwell, D. 1967, Espring 1958, Teeguarden and Von Sperber 1967).

For large integrated conservative corporations the plant investment promises the high return, and the investment in timber resources provides the crucial sustained flow of material where open market sources are uncertain, but does not require a high rate of return. Pearse (1965) observed that the value of immature or cutover forest land purchased privately in B.C. did not reflect its value as an investment for future forests, but rather was a means for increasing the allowable cut on the company's whole ownership and Crown tenure

under a sustained yield policy.

For the small timber owner, forestry investment is governed by such a multitude of factors that it is difficult to untangle the skein. Perhaps foremost in these is ignorance on the part of the owner of alternative investment opportunities. Also, fringe benefits may provide very desirable values to the owner, and, in many cases a "satisficing" rather than a maximum net return is acceptable. Who can pinpoint profit expectations? They are peculiar to the individual and could cover everything from a feeling of conviction to the merest toying with a wild hope.

State policies, too, do not usually assume profit maximization as the superior goal in their endeavours, nor are they built on rational economic analyses. As Besley (1967) noted in reference to North American forests, "Too often, especially when Government is the landlord, policy decisions may be based not so much on economic analyses as upon public sentiment, political expediency or administrative convenience".

Perhaps equally as important as the choice of an investment criterion is the interest rate to be used. Interest is usually defined as the price paid for the use of capital. Another definition, historically more controversial, considers it as the productivity of capital, analogous to rent of land or wage of labour. A vast volume of forestry literature has been devoted to the search for appropriate interest rates (Robinson, E. 1968), and this subject continues to evoke controversy in every field where it is used. We have moved a long way from the view of Martin Luther (1524) when he summed up the

prevailing Church attitude, "....that whole subject is such a bottomless abyss of avarice and wrong that there is nothing in it that can be discussed with a clear conscience".[7] Flora (1968) was encouraging when he noted that interest rates have been around longer than economists to argue about them

In forestry the guiding rate used by an owner in making time comparisons should depend on alternative opportunities available; fringe benefits; risk and uncertainty in forestry as compared with alternative investments, and aggravated by the long-run nature of the crop; and modified by any cost which the owner may incur in transferring his funds from timber to something else. The guiding rate can be an explicit tool for management in making forestry decisions, as in financial rotation age determination, or in prospective purchase of land based on a specified required internal rate of return. But not all management decisions can be based on explicit rates because of the imperfect knowledge of costs and yields. The great majority of small forest owners in the U.S.A. make their decisions guided by personal judgement, and here an interest rate can only be implied.

It has been suggested that for natural resource development society as a whole may have a rate of time preference or a social rate of interest lower than the market or private rate. Feldstein (1964) identified two types of discount rates: social time preference and social opportunity cost; the former reflects society's evaluation of consumption at different points of time, while the latter measures

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7. It is interesting to note that the softening of the Church's view on interest corresponded closely to the rise in opportunities to invest money, even church money, in production enterprises.

the value to society of the next best alternative use to which public funds could be put (the opportunity costs of funds, or market interest rate in a perfectly competitive market). In the real world the social opportunity cost depends on the source of funds and reflects the social time preference function. Feldstein agreed that the perfect market rate cannot be applied to public policy because of substantial imperfections in the market - the previous discussion of the divergence of lending and borrowing rates, and risk and uncertainty. In addition, the social rate of return on investment (the marginal output - capital ratio) may be greater than the private marginal efficiency of capital, because investment enhances the productivity of factors of production by increasing their income, a gain to society, but a cost to the private producer and investor.

However, the setting of the rate may be a purely social policy. It is sometimes felt that it is the size of the investment program actually adopted by the government that determines a marginal rate of return, and this in turn indicates society's rate of time preference, rather than the independently identified rate which fixes the volume of investment (Johnston et al. 1967). Thus, a conservative, developed country will generally favour a low rate, while a developing country, anxious for a faster turnover of capital, will tend toward a higher rate.

Some economists (Milliman 1962) protest a special social rate of interest, and contend that natural resources should follow the same planning periods and rates as those dictated by productivity considerations. Leslie (1967) felt that a special social rate of

discount is valid in forestry only insofar as the benefits produced are social rather than commercial. The classical arguments that wood is indispensible to society and has some intrinsic value for defence or regional development are no longer entirely valid (Gould 1964, Pearse 1966). Therefore, argued Leslie, the social rate of discount for foretry must rest solely on non-wood services which are of a collective nature, and not on the general forestry case at all. He also suggested that the rate for evaluating government investments should not be equal to the government borrowing rates, but higher, to recognize the marginal opportunity cost of capital diverted from possible investment in the private sector.

In most of Canada, and certainly in B.C., forestry investment rates and criteria are sadly lacking for Crown land, because government forest policy makers seem unable to recognize any cost associated with time, and so assume limitless and costless capital (the zero interest rate). B.C. policy is governed by the goal of maximum sustained yield, and on maximizing physical rather than economic returns in forestry (Haley 1966). In a province where 95 per cent of the forest land is held by the Crown and only used by industry under various long-term tenures, and where management is dictated by government, this policy becomes practically universal.

The industrial long-term tenants may, in fact, use some guiding rate of return in ranking intensification projects, although these rates remain a private matter to each concern, and constrained by government policy. The small proportion of private forest land remaining in B.C. may be roughly evaluated in terms of real estate

marketing principles, since much of it falls into this category.

Real estate appraisers in B.C. identify five methods governed by two principles.[8] Market transactions can be analysed directly by the comparative method and by the investment method. In the former, the appraiser studies the conditions and prices associated with the sale of comparable properties, and values the property in terms of the price he feels it will bring on the market.[9] The commonly used investment or income-capital approach is simply a form of the net present worth investment criterion. Usually the appraiser tries to determine the average annual flow of economic rent, and uses a discount rate which allows for risk, illiquidity and property management demands - a rate higher than government low-risk bonds (Barlowe 1958).

The indirect or no-analysis of market transactions approach includes the cost method, the profit method and the residual method. The cost method sums the costs associated with developing the property and the site value. A replacement cost variant is simply the cost of providing an acceptable substitute property. The profit method is a technique used for estimating the rental value of property already fully developed. This calculation is usually made by an operator to fix the maximum rent he can afford to pay for the property he needs. The residual method is used for evaluating property with latent values

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8. Notes from Real Estate Appraisal diploma course given by the Faculty of Commerce and Business Administration, U.B.C. 1967-1968.

9. At any moment of time, the market value of an interest in land is the price it might reasonably be expected to realize when sold by a willing seller to a willing buyer after adequate time and exposure to the market. (ibid.)

and, by definition, such property is not being used for its highest and best use. The value of the property, then, will be the value for temporary use plus the net value after full development, discounted for the "ripening time".

In practice, most appraisers use a combination of several methods in their work. All methods are not equally applicable and the evaluator must decide which method(s) best suit(s) the problem at hand.

The relatively few timber brokers in B.C. follow real estate practices, and lean toward direct analysis of market transactions. These timber land appraisers get a "feel" for timber prices with experience. Forested land in the Vancouver Forest District has a fairly wide range of values. Immature timber on a medium site is valued at $25 to $100 per acre at age 50.[10] To this can be added a sum for location, access, and possible alternative use. As timbered land approaches merchantable age it is roughly valued at going stumpage rates, plus a sum for location and alternative use. Most buyers in the Lower Mainland and Vancouver Island are not interested in immature forested property for potential timber values; in fact, there are still cases of farmers who see any timber cover as a distinct disadvantage to their operation. Others value some tree cover as an amenity to the site they wish to develop as a resort, but scrub is equally as acceptable for their purpose.

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10. Based on B.C.F.S. volume-age relationships for species.

Challies (1966) attempted a partial analysis of the Vancouver market for forest land and timber. He tried to draw up some schedule of values from advertisements of forested properties in B.C. This task was fouled by the inclusion, in many instances, of buildings, roads, fences and stock in total price of the property. He was able, however, to glean a few insights from his analysis of the market. Distance from Vancouver affected prices appreciably. Lower Mainland properties were generally higher priced than others. There was a tendency for large holdings to be priced for less per acre than smaller holdings. Challies felt that potential use accounted for this divergence; where small acreages would go to hobby farms or recreation sites, larger tracts would be used for ranches.

The Forestry Faculty at U.B.C. has taken an active interest in the evaluation problem, and has initiated a series of practical studies designed to explore the economics of reforestation and management intensification on the south coast of B.C. as well as more theoretical investigations of investment criteria comparisons (Smith et al.1961, Belik 1967, Osborn 1968, Victor 1968, Paille 1968).

B. Comparative valuation.

Comparative valuation in an operation, of the various uses to which land and other resources can be put, or to the intensity of use, is often the most difficult type to calculate; yet it is becoming increasingly necessary for the decision-maker to choose between alternative investment projects when any factors are limited. Criteria

used for investment can be applied to ranking various schemes. Benefit-cost, net present worth and internal rate of return can all be employed, together with Duerr's (1960) break-even method and marginal method. The net present worth criterion is inferior for ranking in that it compares absolute values, and thus favors large investments over small ones. It is only within the constraints of equal initial investment and life term that net present worth will coincide with the other two criteria.

Teeguarden (1967) investigated various economic investment criteria which could be used for ranking reforestation investment opportunities on the Roseburg District projects of the Bureau of Land Management in the U.S.A. federal government. Contrained by a dictum issued by the Oregon-Washington Director of the bureau "....to use each available dollar where it will give the maximum results on the regeneration of non-stocked forest land", the criteria of benefit-cost, net present worth, internal rate of return and discounted wood yield per dollar invested were analysed.[11] It selected the benefit-cost criterion as the most suitable because investment funds were in short supply relative to investment projects, and projects were mutually exclusive (area constrained). The discount rate of 3 per cent was chosen by a reiterated process so that the benefit-cost ratio from 1 to larger values for all top-ranking projects could be undertaken within the budget. This presented a problem in itself, because if the budget should vary, the ranking must be recalculated. The benefit cost priority scale proved optimal, too, in that it was insensitive to speculative elements tied up in estimates, such as changing wood prices. With changes

11. The rate of return criterion was later omitted because the alternatives were mutually exclusive.

in interest rate to 5 percent, there were only some minor shifting in priorities in the lower end of the scale because thinnings depended on the interest rate.

A further study (Teeguarden and Von Sperber 1967) of the same project tested the attributes of capital budgeting using a benefit-cost ranking, and a linear programming solution. They found that if capital is the only limiting factor (and the benefit-cost analyst has this knowledge in advance), both criteria give the same answer; but if another resource is limiting, then the linear program results are better, and in addition, it does not require prior knowledge of which resource will eventually be limiting.

Marty and Newman (1967) described a project designed to assess the effects of various management intensifications, and to determine the relative efficiency of each by timberland class. Comparisons were made using an interest rate at which the added costs of intensification increased toward the added stumpage values generated.

Duerr (1960) illustrated a problem in comparative appraisal of unmarketed values in his textbook. He used a "common value approach" (social opportunity cost) determined by public policies and decision-making with amendments over time, which effectively implies a narrow range of social values.

Comparative valuation, in its widest sense, is simply a method for allocating resources to their highest and best use.

C. Expropriation and condemnation.

Expropriation is the term used in Canada to describe the compulsory taking of property for public use. There appears to be no limitation imposed on the supremacy of the Canadian Parliament to expropriate; and expropriation without compensation is perfectly legal[12] although rarely effected. The basic framework of valuation is legal rather than economic, and it is laid down as a general principle in Canada that value is taken to be value to the owner[13] as it existed at the time of the taking. This arises out of the legal fiction whereby the actual owner is thought to be without title, and the value to him is the amount he would pay rather than be ejected from the property.

A number of cases has been entered in Canada to try to establish market value as the proper basis for compensation. English and American courts use this criterion, but Canadian "value to the owner" still prevails. However, even in this country market value is an important part of the evaluation process, since it automatically establishes the minimum values to the owner, to which must be added "other values" to arrive at value to the owner. These other values, which defy precise measurement, remain largely a matter of opinion. Through a series of legal cases dealing with this evaluation problem the following emerges:

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12. MacDonald, J. in Nelson v P.G.E. Rlwy. (1918) 1 Western Weekly Report 597 at 603.

13. Cedar Rapids Mfr.and Power Co. v Lacoste (1914) Appeal Case (Gr.Brit.) 569, an appeal to the Privy Council from Quebec.

1. No personal or sentimental attachment of the owner toward his property which are not commonly accepted will be recognized.

2. All restrictions on the use of the property must be taken into account, and also the reasonable possibility that these restrictions will be removed.

3. Potential value and disadvantages must be taken into account, but here only the present value of these advantages and disadvantages is allowed. But there is a ceiling to future returns as cited in a ruling of an appeal of the False Creek Reclamation Act:[14]

> "It is evident that while all opportunity of employment for certain purposes in regard to the position of land to be acquired is to be taken into account, there comes a point where the opportunity becomes so remote as to be negligible".

4. Special adaptability describes some use to which the land might reasonably be expected to be put in the future, if the land is not already in its highest and best use. The evaluation in this case is fixed at some point between the present use value and that of its best use, remembering that the land might, in fact, never realize this potential.

5. In a case where the only possible purchaser is the expropriator, the "added values" are still possible, although the only possible use for the land is that to which it is put by the expropriator.

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14. Exchequer Court 23, Dominion Law Reports (2nd) 94, Supreme Court of Canada (1963) Supreme Court Ruling Report 455.

6. The owner is entitled to a valuation of his property in one use only (highest and best) and not for both present and potential use.

7. Market value is what a willing purchaser would pay a willing vendor for property as a whole. This ruling was based on a case where a timber lot had been expropriated.[15]

When part of the land is taken (severance) the evaluation is similar. The compensation payable is the difference between the value to the owner of all the land before expropriation and the value to him of the remaining land after expropriation. In the case where no land is taken, but the land is rendered less valuable (injuriously affected) by reason of the undertaking which an adjacent expropriation has taken, the right to claim compensation is contingent on the damage being an injury to the land itself and not to business, that it be occasioned by construction of some public work and not on its use, and that it be such as would be actionable under common law but for the statutory power.[16] The basis for compensation is narrower than the case where land is actually taken, in that value is taken to mean market value.[17]

In the expropriation of lands by the B.C.Hydro and Power Authority for flooding or for right-of-way, the value to the owner approach is used.

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15. King v Woodlock 15 Exchequer Court Report 429 at 434.

16. Autographic Register Systems Ltd. v C.N.R. (1933) Exchequer Court Report 152 at 155-6.

17. Re 1335 Howe St. Ltd. v City of Vancouver (1955) 14 Western Weekly Report 337 at 340-341 (Supreme Court).

Timbered land is valued on one schedule for owners actively engaged in forest operations, and on another lower schedule for all other owners. This has caused some ill feeling among owners, but the process is perfectly legal.

Kenwood (1967) analysed forest and forest land values in the Vancouver Forest District for possible acquisition for right-of-way purposes. His method followed the legal "value to the owner" approach, although compensation was not paid on the whole of the anticipated profits. He identified three separate values: mature timber, immature timber and bare land. Mature timber was evaluated at the anticipated Conversion Return calculated from the difference between current average Selling Price and local operating costs. Immature timber values were estimated from an internal rate of return curve drawn for each timber type and site. The inherent reinvestment assumption of this criterion and other limitations make it less than optimal in most cases. However, the rotation age of 100 years assumed by Kenwood in his calculations precludes the complete adoption of the net present worth criterion (and the calculation of "a"). It is important too to know whether capital or opportunity for forest investment is the limiting factor. Bare land values were assessed by direct analysis of comparable market transactions. Kenwood suggested that the Faustmann method (but employing the internal rate of return for the discount rate) might be used in combination with a market analysis. Both methods introduce problems; the true Faustmann by the correct a priori statement of the interest rate, and the latter by extensive imperfections in the market. In addition, one could question his non-economic, but perhaps more

realistic, treatment of annual fixed costs and re-establishment

It can be argued that the methods used in this analysis are less than optimal for assessing bare land and immature elements. However, in the study the value of these two factors contributed a relatively small per cent to the total appraisal, so any theoretical error would not affect the final figures seriously. A market analysis, no matter how limited or imperfect the conditions may be, can be justified, too, as an acceptable legal appraisal.

D. Damage Appraisal.

Appraisal of damage to forests and forest land from fire, insects disease, inundation, fragmentation and other factors is tied closely to expropriation values. While the latter means complete transfer of ownership, the former assumes retention of title to a less valuable property; and in some instances closely approximates the aforesaid "injurious affection" cases.

Flora (1968) reviewed the alternative forest damage appraisal measures, their advantages and disadvantages, In the case of standing timber appraisal, he argued that market value of a stand in no way completely compensates the owner, since profits from logging and the continual loss to allowable cut in a managed forest are not counted. The value added method of appraisal, where the effect of large-scale resource damage is supposedly reflected in value added through further processing (and changes in G.N.P.), does not always give a reliable

estimate, because of price changes, inelastic demands, substitute effects and the mobility of labour and capital to other fields. Flora suggested using the sum of consumers' and producers' surplus as a measure of society's benefit from a resource, and which enables one to appraise losses as they occur. This has far more meaning than the usual price quantity method. He was strongly critical (and justifiably) of the zero rate of time preference often advocated by government agencies. For damage appraisal, damage postponed is usually better than damage now, if time is considered, and it allows waiting costs and treatment costs to be assessed within an economic frame.

In 1954 a sub-committee of the Western Forestry and Conservation Association (Allen et al. 1954) outlined a procedure for appraising damage in pre-merchantable stands. They recognized the need for guides in this type of appraisal because of the increasing number of litigations for forest damage, the non-standardized commodity involved, and the lack of a reliable market because of its size and imperfections. The method which they recommended consisted of calculating the age at which the stand would reach financial maturity, and then in calculating the value of the stand when destroyed.

Their calculation of optimum rotation was not theoretically correct. Firstly, their "soil value" (S) was a given value. They justified this by stating that a forest owner should have some knowledge of the approximate value of his soils. The basic error is that the soil value (net present worth of bare land) or its annual equivalent, the economic rent, "a", cannot be determined before the rotation age, and is an integral part of the whole calculation. The

optimum rotation is determined by solving simultaneous equations with two unknowns, "a" and "t" (Gaffney 1962). Haley (1967) has shown that the exact calculation of soil value may sometimes be highly significant. In calculating optimum rotation Allen et al. maximized the internal rate of return, which is not the same as maximizing the net return to the fixed factor, land. If the criterion of internal rate of return is used, and the rotation chosen which maximizes the annual earning power, a very early age is indicated, an age where there is the most rapid increase in timber value, and the stand is most productive. This is surely not the appropriate age. (See Figure I).

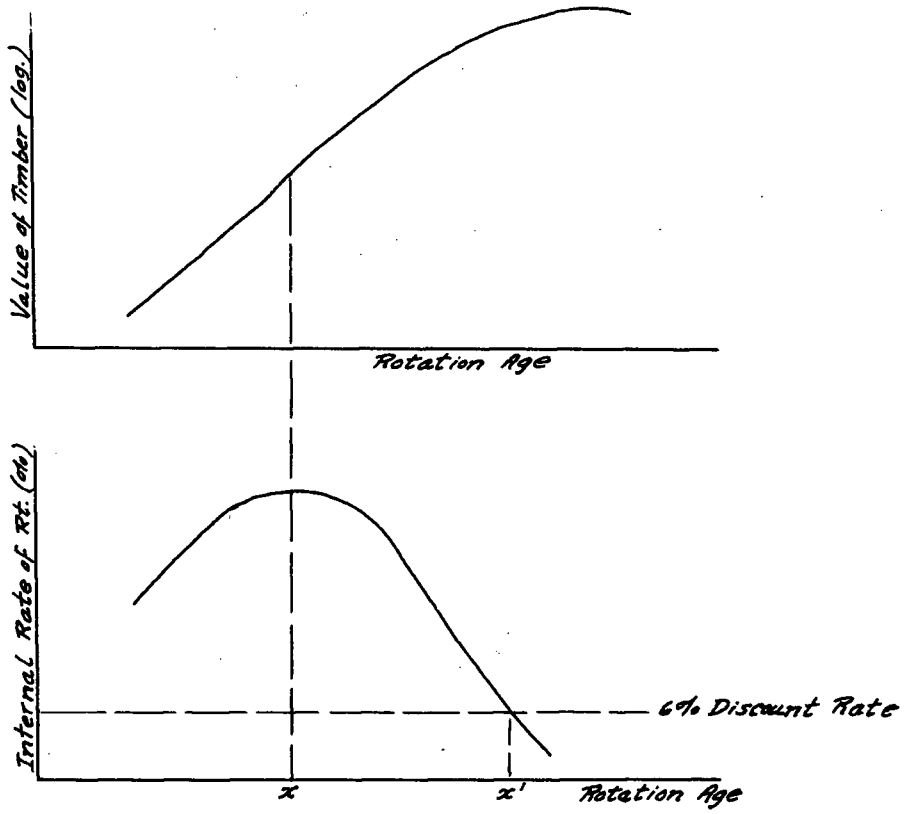

FIG.I. A comparison of proposed methods for determining the optimum financial rotation.

The rotation chosen to maximize the present net worth will coincide with that of the internal rate of return criterion only where the discount rate is equal to the internal rate of return, at X prime in Figure I.

The value of the immature stand when destroyed was estimated from an internal rate of return curve based on cost of establishment (investment) at zero and stumpage (returns) at rotation age. The so-called "independent variables": soil value (S), and the capitalized value of annual expenses ($E = \frac{e}{.op}$), were carried as constants. The first error occurs in the ambiguity of the complete equation lacking more than one rotation, so that no values are expected beyond the first harvest, and then in the annual expenses, E, taking the correct form for future rotation calculation to infinity. Secondly, some confusion seems to have arisen in the meaning of soil value. The original soil expectation value (in German literature called "Bodenerwartungswerte") is the net present worth of bare land. The annual equivalent, "a", is the soil rent, or economic rent. Soil value, S, appears incorrectly in their equations.

The B.C.Forest Service (1964) has drawn up a schedule of values to guide in the appraisal of damage caused by forest fires. Mature timber is valued at average current stumpage prices if merchantable, otherwise as "Non-commercial Cover" at 25¢ per acre. A table for immature timber (1964) gives a series of values per acre to various species (and combinations), by zone, based on stand age. The immature values of each type are a function of the mature stumpage

price, and appear to be the discounted value at 2 per cent for each age,[18] although many of the lower age groups are given a flat rate of $25 per acre. Sparsely stocked immature stands are given half value.

This directive makes an appraisal simple, cheap, and definite enough for different appraisers to get similar answers. One could, perhaps, question the evaluation method used for immature stands based on a 2 per cent discount rate. It would be an interesting exercise to carry planting, protection and other costs of a stand forward at the interest rate at which funds could be borrowed (by government bond issue)[19] to compare with these stand values. In court cases it is customary to lean heavily toward the "cost value" method, since past costs are usually easier to obtain and to verify. However, the theoretically correct criterion to use is the "future revenue foregone", since it is an economic principle that historic costs should not influence present value.

E. Taxation.

There are many who believe that land, as distinct from the products of labor, is a free gift to mankind, and that its annual value should be devoted to public purposes (various writers in Schalkenbach Foundation 1955). Henry George, in his "Single Tax Theory", wrote in

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18. One part only of the calculation involved in the "future revenue foregone" method of appraisal.

19. "Cost value" method of appraisal.

1886 that the value which the growth and improvement of a community attaches to land should be taken for the use of the community. He envisaged an increase of the single tax on land values until this tax took all of the annual rental value of land for public purposes, but with fee simple ownership left in private hands. His convincing works were widely read through the world, and many "colonies", albiet on a small scale, were established along these ideal lines in the U.S.A., enclaves which ably demonstrated a national solution to the land problem, and the advantages which follow from public appropriation of the economic rent of land.

Land taxes in general serve many purposes in regulating the economy, but the foremost is as a means of raising public funds to carry on the responsibilities of the state. That the methods used should be equitable is clearly assumed, yet one finds many instances in the taxing of forest lands, in particular, of government bias; of ignorance and discrimination; of heavy tax burdens for some owners and lighter ones for others.

Pearse (1967) investigated the effects of various taxes on forested land upon the optimum forest rotation. An annual property tax as a per cent of value would shorten the forest rotation, because as the forest grew more valuable so the tax would increase, and the owner would be persuaded to skew his use distribution toward the present. The economic rent would thus decrease. An ad valorem severance tax on a fixed per cent of the value harvested would reduce the economic rent, but not disturb the rotation age. Perhaps the soundest tax is one levied on the economic rent, or annual site value.

One could safely tax up to the full economic rent without altering the optimum rotation age and without distorting production incentives.

Forests are taxed by many different methods in other countries. Finland's unique system (Saari, 1959), which taxes the productive capacity of the soil, that is, theoretical income determined partly by forest site types devised by the celebrated A.J.Cajander, approaches the ideal from a practical point of view. It is simple to administer, avoids tax evasions, overcomes the uneven public revenue problems of other systems, and, above all, seems to satisfy the forest owners. In addition, owners can concentrate their sales in favourable business cycles and sell large quantities without the fear of progressive taxes, and, at the same time, practice sound forestry.

The elaborate and varied forest land tenure and tax system in B.C. makes any serious tax discussion a treatise in itself. Moore (1958) made an exhaustive study in this field, in which he included all the Canadian provinces, and was thus able to make illuminating comparisons. Besley (1951) confined his analysis to B.C., and offered sound proposals for tax reform. Robinson, E. (1958) investigated the types of management possible under these different tenures and taxes in B.C.

Since 1958 a series of tenures has been introduced with a view to superimposing a pulp economy on the original sawlog one. The right to cut pulpwood (the "smallwood" timber defined by the close utilization standards) on a broad area of Crown timberland, and perhaps covering several Public Sustained Yield Units, is granted to a pulpmill owner for 21 years under the Pulp Harvesting Area tenure. Pulp Timber Sales were devised for those pulpmills which could demonstrate a need for

raw material, and would put all their holdings under close utilization standards. They are not awarded by open bidding. In the main, these sales cover stands in the Public Sustained Yield Units which do not exceed a 30 per cent sawlog content, and so do not infringe on the regular quotas of the working circle timber loggers.

Perhaps the most significant change has been the introduction of the Timber Sale Harvesting Licence, which is a new flexible form of the timber sale in Public Sustained Yield Units, and a means of sharing responsibility. It is also an efficient method of amalgamating quotas in the working circle.

Other forms of tenure in B.C., have not changed appreciably since Moore's 1958 analysis, but forest land tax rates have increased, and the effect of the discriminatory provincial logging profits tax has largely been ameliorated by tax exemptions at the federal level.[20]

The wealth of penetrating analysis by Moore and his associates cannot be dismissed without some comment. The purpose of their study was to discover whether investment in forests was discouraged or encouraged in relation to other investment as a consequence of the weight of tax they bore. They also tried to determine whether the Crown's regulation of its forests and the price levels set for its timber were profit maximizing, and therefore in the public's best interest. They found that government regulations and statutes impeded the optimum allocation of resources in forestry. B.C.provincial property

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20. The Carter Commission on Taxes, 1963-67, found the present method inequitable because the B.C. provincial government received the larger share of the revenue; and recommended a return to the pre-1962 sharing basis. The forest industries are opposed since the total tax would be larger.

taxes on privately held forest land, they found, were very heavy, and would lead to early confiscation, or an uneconomic rotation. The tax rates for timberland were higher than for other rural property, and the burden of carrying these charges for long periods often precluded forestry uses or retaining ownership to cutover lands. The owner could, of course, have elected to place his forest land under Tree Farm tenure where the weight of tax dropped to about 20 per cent of the net income, but was higher on very young stands. This gave immediate tax relief, but there was a certain reluctance to surrender private forest land to a policy of government regulation. Moore also felt that the property tax could never be equitably adapted to such dissimilar entities as bare land, mature timber stands, and sustained yield farms, nor could one accept the fiction that all B.C. forests were on a fully operating sustained yield basis.

Moore proposed taxing methods for both immature and mature forest land which have much merit. An arbitrary tax weight (in line with government budgetary requirements and industrial conditions) could be established such that a given per cent of the potential timber value, e.g. 50 per cent, would be delivered as tax. Using discounting formulas, the value of the government share (50 per cent of stumpage at rotation age) would be pro-rated into annual installments which would accumulate at compound interest for the optimal rotation to a sum equal to 50 per cent of crop value. This method would provide stable revenue and be easy to administer. The operator, too, could improve his property by intensifying management without tax increases, much like his Finnish counterpart, and though the method might be somewhat arbitrary, it would be equitable for all industry.

With regard to the "capital gains" issue in Canada there appears to be just cause for reform. At present, if land and timber are sold en bloc, revenue from the sale is termed a capital gain, and not taxable. On the other hand, if timber alone is sold, then the revenue is considered a business profit, and taxed accordingly.

The timberland appraisers of the B.C. provincial government assess the values of private immature timberland[21] from the market analysis of like properties. The department has assembled an annual schedule from scrutinizing all market transactions of immature timber. Originally this schedule was published, but it received so much misinterpretation, and each average figure had to be defended, that the practice has been discontinued. All the figures used are arrived at by easily accessible sales data from newspapers and Forest Service open files. The appraisal in question is placed above or below these average figures.

The Lands Department at one time also published an annual average value per acre of all B.C. private timber lands (see Table IV, page 51). The averaged values in themselves have little meaning, but the yearly changes are significant not only in the value but in the size of the Crown-granted timber lands.

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21. Land and timber are considered inseparable under the B.C. Taxation Act.

TABLE IV

AREA AND AVERAGE VALUE PER ACRE OF CROWN-GRANTED TIMBER LANDS.

YEAR	AREA (acres)	AVG. VALUE PER ACRE (dollars)
1911	824,818	8.72
12	874,715	8.60
13	922,948	9.02
14	960,464	9.66
15	913,245	9.55
16	922,206	9.73
17	916,726	9.61
18	896,188	9.60
19	883,491	9.48
20	867,921	11.62
21	845,111	10.33
22	887,980	11.99
23	883,344	11.62
24	654,668	15.22
25	654,016	40.61
26	688,372	39.77
27	690,438	39.01
28	671,131	38.62
29	644,011	38.41
30	629,156	44.74
31	602,086	43.77
32	552,007	43.73
33	567,731	41.18
34	557,481	37.25
35	535,918	37.13
36	515,924	36.61
37	743,109	23.32
38	754,348	23.05
39	719,112	22.73
40	549,250	27.70
41	543,633	26.99
42	527,995	26.34
43	543,044	25.15
44	571,308	25.28
45	591,082	26.32
46	601,148	26.64
47	596,900	25.01
48	571,439	no value
49	597,790	"
50	631,967	"
51	682,746	"

Source: Department of Lands, B.C. Annual Reports. Table 19.

F. Transfer of Tenure

When land "changes hand" or transfers from one owner to another, there may be little effect on the economy if the new owner uses the land in the same way and on the same scale as the former one did. However, the impact of the change may be far-reaching when the new objectives and uses differ markedly from the old. Most residentially developed lands are cushioned legally by zoning laws against uses which inflict diseconomies on the area, but the spillover effects are not as apparent or so restrained in the hinterland. Certainly there is a marked government policy bias toward the original use - perpetual use idea, despite economic changes. In many instances it can be shown that land is still being used in the best possible way, but in other cases, a thoroughgoing economic analysis might show that other more productive uses should be initiated on that particular land. The evaluation must consider all the effects of the change. As Hughes (1968) pointed out, reclassifying productive forest land in the Prince George area under the pressure of agriculture and settlement produces a serious side-effect on the management plans of the Public Sustained Yield Units. The added cost of servicing scattered independent farms also should not be overlooked.

Flora (1967) explored the very great effect of forest land withdrawals for public (non-timber) purposes. He attempted to measure all costs and benefits from forest land using multipliers and the mitigation principle. The various multipliers: the employment multiplier, the industrial income multiplier, and the regional income multiplier while showing the tremendous reverberations of primary forest activity,

fail to reflect price and technical changes, and some social and intangible costs. The mitigation principle tries to replace in kind the value lost, but it completely ignores the monumental task of assembling the trading stock.

One of the most serious problems facing ARDA (Agricultural Rehabilitation and Development Act in Canada) is the determination of the total effect and cost of changing land use so that each parcel of land will yield the greatest benefit to Canadians.

CHAPTER IV.

MULTIPLE DEMANDS IN FOREST LAND

A. Forest land use conflicts.

As most uses of land tend to expand, conflicts naturally arise because of the scarcity of the factor, and population growth intensifies the competition. Forest land can be used for growing a wide range of wood products. It can be a sanctuary or hunting ground for wildlife, a watershed to store water or to prevent erosion and floods. It can also be a recreational area which, in itself, may include a group of widely varying and often conflicting uses. Not only must these uses be accommodated in some way on a fixed quantity of forest land, but the encroachments of non-forest land uses such as urban, agricultural and industrial, must be met.

If our objective is to use each acre of land in a way that will yield the maximum benefit to society, then we are obliged to follow the economic principles outlined in the first chapter, and attempt to ameliorate the real imperfections involved in their application. This is a difficult but not a hopeless task. Pearse (1968) has pointed out that often an understanding of the correct use of available data will help in the determination of optimal land use

patterns, and, in the case of multiple-use, of the appropriate direction of adjustment.

Bandy (1967) spoke to the Canadian Institute of Forestry recently of the conflicts arising between separate B.C. government agencies: Forestry and Wildlife; Grazing and Wildlife; Forestry, Fisheries and Water, where their unilateral development overlapped. Often, the original terms of reference of a favored agency are extended not as a result of any ecological, sociological or economic study, but by rather arbitrary means. He saw the problems intensifying.

Hughes (1968) noted this increasing demand for land in B.C. and the pressures on the forested acres for other uses. He felt some uneasiness at the considerable loss of forest land by expropriation for industrial roads, transmission lines, pipe lines, hydro reservoirs, settlement and recreational reserves, and hoped that the development of economic land-use policies would stem this flow. Hughes drew attention to the particular vulnerability of forest land to the pressure of agriculture and settlement. Forested areas which have a high economic use as forest land are being re-classified by the land examiner, and in many instances this loss has had serious effects on the productive capacity and management of Public Sustained Yield Units.

Technical and economic data are urgently needed at this point in order to develop scales and priorities in land-use policies. A formidable program along these lines is now underway in Canada called ARDA. The Canadian Agricultural Rehabilitation and Development

Act[22] was passed in 1961, a sharing agreement between federal and provincial governments. It began with scattered and isolated programs aimed at agricultural problems, but has since shifted to issues of rural poverty, and expanded its sphere of reference to include the initiation of resource and manpower surveys, and research aimed at establishing criteria for action under the legislation. It is involved with regrouping farms into economic units and intensifying soil and water conservation projects, designed primarily to assist agriculture. It should be remembered that the control of land use is largely in the hands of provincial rather than federal government. A study of land use becomes a natural prerequisite to all these goals.

Under the Canada Land Inventory, now part of ARDA, land capability is being assessed, and schedules have been drawn up by scientists in each resource defining classes of productivity. For example, forest land includes seven classes, which produce in excess of 100 cubic feet per acre per year in Class I, down to forests in Class VII with less than 10 cubic feet per acre per year growth, and so poor as to be of no immediate commercial value. Similarly, agricultural land has been divided into classes which range from high agricultural productivity to soils which have no capacity for arable culture or permanent pasture. The reports of the initial surveys and schedules have much merit, but an alarming situation appears to be developing as the information gathered is applied to various regions.

The Special Sale Area in the Prince George region in

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22. This was changed to the Agricultural and Rural Development Act in 1965.

B.C.,[23] an ARDA project begun in 1964, is a case in question. Both forestry and agricultural soil surveys, separately allocated the total acreage into their near respective classes. In the recommendations of the report, incredible comparisons were made between forestry and agricultural classes, as if a class number showed some equality. Since no economic values were imposed on these physical capability classes, it would seem dangerous to arrive at these conclusions. Perhaps the one encouraging note was a final suggestion that economic studies be initiated, but this seemed rather belated after many important issues had all but been decided.

Bulmer (1966), a cooperator in ARDA projects in the Nova Scotia Government, challenged the National Committee on Forest Land to produce a plan outlining just how this orderly development of forest, agriculture and other resources was to be carried out; and what methods were to be used in determining the financial investment to be expended on each capability class, after gathering the vast amount of information across Canada. No clear answer has been forthcoming.

The ARDA objective of raising the level of income of rural communities does not appear to have been achieved to any significant degree, either. A special study, prepared for the Economic Council of Canada, examined how effectively ARDA and other federal programs have contributed, or appear likely to contribute in the future, to the growth of rural incomes (Buckley and Tikanyi 1967). These economists concluded emphatically that ARDA agreements in effect until 1970 do

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23. A report on the land capability for agriculture and forestry for this area was completed in 1966, but not published. Mimeo.

not fill the most important gaps in policies for rural Canada. There appears to be a reasonable tendency in ARDA assistance policies to evade the question of what might truly constitute an effective solution for marginal farm units. They found that many land and water resource investments, which constitute the bulk of ARDA programs, would not satisfy either the minimum criterion of economic efficiency, or the objective of a more equitable income distribution in favor of the poor. Of the projects analysed there were many in which a dollar was spent so that a rural marginal farmer could earn about 50¢. Buckley and Tihanyi lamented the fact that ARDA funds were not channelled into comprehensive manpower mobility programs aimed at removing underemployed labour from marginal lands; nor was there any commitment to share the social services cost of the readjustment to migration in the contracted communities. Rather, projects were initiated which raised rural incomes infinitesimally, and prospects not at all.

B. Multiple Use Concept.

The multiple-use philosophy has been widely acclaimed as the panacea for all land use conflicts. Simply stated, land resources should be used on a multiple basis if two or more simultaneous uses of a resource will yield a greater benefit than one use alone. Economic theory is explicit in the multiple-product model. Maximum net benefits are possible when resources are allocated among the multiple uses in such a way that the marginal returns per unit of input from all uses are equal (Zivnuska 1961). Or, expressed another way, the primary use

should give way to other uses to the extent that the net benefit from these other uses exceeds the sacrifice in the primary use (Pearse 1968).

It is here the controversy begins. Many resource managers erroneously believe that the multiple-use concept means introducing secondary uses only in so far as they do not detract from or diminish the value of the primary use. Even those with a more realistic approach are bound by loyalties to their specific resource use, and resist changes which might reduce the area under their jurisdiction. Moreover, distributing uses on one area by systematically evaluating them according to economic and sociological principles is beset by serious problems of data measurement, institutional rigidities, traditions and sociological impediments. Zivnuska (1961) noted the very low stock of knowledge of the physical relationships, values and costs, involved in the competing uses made of forest land. Difficulties arise in the case of intangibles and social products such as recreation and aesthetic values, which are not normally marketable. However, even though these can't be quantified in precise monetary terms, they must be considered subjectively in decision-making (Pearse 1968).

Economic multiple-use models have been built on iso-cost and iso-revenue curves (Gregory 1955), and joint functions expressed. They generally fail to include "spillover" effects and social and intangible values. These problems are being approached in many new ways (Pearse 1966b). However, it seems evident that decision-making involved with multiple-use can never be expressed wholly by precise economic formula or rule, but must rely on the knowledge and judgement of the policy maker, and how well he is able to assess all costs and benefits

(Zivnuska 1961).

In B.C. some progress has been made in the integration of resources. Clauses designed to protect salmon spawning grounds have become an integral part of government timber licences, leases and other forest tenures. Cooperation between Land Service, Parks Branch and Forest Service is evidenced by joint field examination and decision-making *in situ*. The Forest Service also includes provision for the integration of other resource use development in all current Public Sustained Yield Unit working plans (Hughes 1968).

C. Possible solutions.

Historically, all major resource interests in B.C. have been in conflict with one another at different times (Black 1968). Zivnuska (1961) saw controversy as the very medium for multiple-use decisions in the public sector, where it would serve to bring out forcefully the varied interests affected by the decisions to be made. But a continual clash of forces may not serve the interests of society. Rather, some supra-body, a coordinating government department, might be set up to arbitrate as objectively as possible the demands of various land use agencies, and attempt to resolve conflicts within a larger frame of reference (Bandy 1967, Pearse 1968_a). Not only must the technical and economic priority scales be established but a well balanced and disinterested group of professionals must be recruited to make these crucial decisions.

CHAPTER V

DISCUSSION

A. Market vs. public allocative process.

Many economists maintain that the tremendous motivating forces supplied by the competitive market organize and guide free enterprise toward efficient operation. Broadly, both the Canadian federal and provincial governments encourage free enterprise. They realize that a centrally-controlled economic system, such as in the U.S.S.R., cannot make the myriad decisions necessary for the efficient functioning of such a complex. That our economy never reaches the optimum point is not as important as the fact that the main force is directed that way. Some of the imperfections of the competitive market and the impediments to its free operation have already been discussed, but despite these, the market mechanism has many redeeming features. It permits unanimity without enforcing conformity (Friedman 1965), and may bring about a more equitable redistribution of income, provided that society feels that this trend is desirable (Leftwiche 1966). An added advantage of the market system is that it acts as an impartial arbiter between present and future for most resources in a manner far superior to any yet devised.

The case against a freely competitive market rests solely on

the degree to which factors prevent its ideal functioning, and not on itself, per se. Others feel that public decision-making is far superior to that of the market mechanism. Socialists believe that "one man - one vote" rather than "one dollar - one vote" brings about a more desirable distribution of income, albeit with less efficiency. Society as a whole may prefer the weights of the political process to those of the market. In some instances the market cannot express the collective demand for investment to benefit the future. In the case of "common pool" or "fugitive" resources such as oil fields, fisheries, wildlife, and some go so far as to include state timber resources, the laissez faire mechanism cannot hope to bring about the desired optimum resource allocation. This presents a problem of gauging the optimal rate of use, and for these resources, with little or no ownership present, no user is going to be concerned about saving anything for future periods. Government intervention is crucial in these cases.

In land resources, even though private rights are exclusive they are not absolute, and society has a strong vested interest in how land is to be used, particularly as it becomes scarcer. Social goals must be considered which do not always receive weight on the market. Under a free market the highest bidder gains control of the land resource, but this may not be compatible with the long-run interests of society, which may favor balanced growth, regional development, economic stability and general employment above efficiency in resource use. However, many of the specific arguments often cited for Crown forest ownership may not have true economic rationale. In the case of

economic stability of various communities, society must decide whether it is indeed worth the cost of tying a region to a static resource base. The cost of plant construction, too, can be argued down. Capital stock is only depreciated for twenty years generally, so what reason could be given for prolonging the forest industry investment period? Crown revenues would not suffer if forest land were alienated, and despite governmental desire to hold their forest capital, it should be justified on some prescribed interest rate other than zero, to assess the large holding cost. In the field of multiple-use in which social costs and returns are present it appears evident that government ownership is superior to private in some cases.

The evaluation of land resource use provides many examples of government-directed growth that failed. The abandoned farms on marginal agricultural land stand as constant reminders of these failures. Perhaps worse is a certain persistence in government to maintain these unproductive endeavours by subsidies.

One could question democratic representation in general. Is it in fact truly representative of the will of the people? Do minor groups have a voice at all? One could cite instances of flagrant "log rolling", and "trade-offs" between representatives which distort the whole system.

Certainly it is difficult to see how present governmental policy with regard to factor uses, fraught with psychological and historical bias, and downright ignorance and apathy; influenced by lobbying in the legislature; conditioned to income distribution and employment problems and to economic growth; forced to maintain power

over resources, can ever hope to bring about a maximum net product from resource use.

Perfection appears to be no more achieved in the public sphere than in the open market. We should neither impute an infallibility to the public decision makers nor regard the democratic institutions as utterly devoid of rationality. They are the combined wisdom and folly of a representative group of people who often succeed, but sometimes fail, in their endeavours.

B. Present provincial government policies and shortcomings.

In tracing the historical development of forest tenure in B.C. it was seen that government actions suited the immediate problems. In retrospect it is easy to uncover faults. The introduction of the sustained yield policy, no matter how unsound economically it is, must be applauded for the tremendous impetus it gave to sound forestry practices and to increased utilization of both primary and secondary forest products. It succeeded in converting a large army of forest harvesters into knowledgeable "foresters" within a decade or two. To many it seemed incredible that conditions that brought about the infamous Sommers Case[24] could have existed. Fragmented decision-making among government departments often resulted in a surprising degree of

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24. A case in which the Minister of Lands and Forests for the B.C. government was found guilty of accepting bribes for the rights to prime forest lands (Forest Management Licence tenure).

dictatorial power, including the power to give away rights to resources.

It may be realistic at this point to view the whole resource allocative process against the present B.C. political environment, the practical politics out of which actual policies are fashioned. B.C.'s system of government has been labelled The Politics of Exploitation because of its great preoccupation with economic development and the utilization of our endowment of natural resources (Black 1968). The present Social Credit form of government appears to suit the majority of voters, people heavily immigrant, and living in isolated communities; in that it is involved in materialism and not traditionalism, and has the action typical of frontier culture. The immediate objective of government must be always to retain power (Black 1968); and the supposed demands of B.C. voters are interpreted in policies which lean toward tangible, short-run and spectacular developments. It is believed essential for power, too, that all natural resources be retained under provincial ownership. It is highly unlikely that policy makers will be guided in their decisions by criteria of economic efficiency in resource exploitation. There is an unfortunate tendency to feel that some economic waste is not important in a province so resource wealthy. Any changes forthcoming must produce startling economic gains; or be beneficial to the majority of voters, especially the small entrepreneurs; or improve B.C.'s position in the world market (Black 1968). The present government cannot allow professional resource managers to influence policy in the critical areas of timing and the means of reserve exploitation (Black 1968).

Future governments may elect to relinquish legal title to

forest lands when it becomes evident that Crown forests are being managed efficiently by the tenants, and that public revenues can be collected from the forest industry without ownership of the timber. This would promote a competitive market in forest land, and place it equally in the land market for any other use. In this way the play of supply and demand in the open market would tend to allocate land to its highest use. The amount of land being used for timber growing (or any other forest product) could well diminish in such a market, if other land uses proved more profitable.

A note of warning was sounded by the Economic Council of Canada (1964). Progress does produce casualties, and in economic growth some industries will suffer. The Council felt that there is always a strong temptation for governments to subsidize these declining and inefficient industries. Rather, their duty should lie in facilitating the smooth adjustment from declining to expanding activities, and increasing the mobility and adaptability of resources to realize their highest return.

CHAPTER VI

RECOMMENDATIONS AND CONCLUSIONS

The role of the provincial government in the determination of land use is vital. If we accept, for the moment, the present basic system of Crown tenures of B.C. forest land, there are several immediate imperfections which could be improved, and which lie clearly at hand.

Our knowledge of forest soil capabilities is far from complete. Knowing what is technically and economically possible from each acre of forest land is a prerequisite for any intensive planning. These studies must be geared to reflect changing technology and markets, and so be adaptable to revision. An admirable series of such projects has been initiated by Dr. J.H.G. Smith and his associates at U.B.C.

Knowledge of the kinds of market existing in B.C. both in forest land (or timber) and in forest products, is sketchy, too. Studies on the lines followed by Mead (1966) in his Pacific northwest analysis in U.S.A. would lead to a fuller understanding of the market, and the means of overcoming certain problems would be clearer.

It is to be hoped (and there are rumours to this effect) that the provincial government will shortly specify a guiding rate of return in forestry projects, and thus formally accept the fact that timing of

future returns is just as important as their magnitude.

When sustained yield policy was first presented in B.C. in 1952 it was hailed by foresters as the "Great Step Forward", and it had much to recommend at that time. Coming as it did when timber shortages seemed imminent, it appeared to offer the ideal solution to supply problems, and guaranteed the profession a golden raison d' etre. Economically, sustained yield as a policy leaves much to be desired (Saari 1948, Pearse 1966_a, Smith 1968). It ties the economy to a static level of production in its effort to conserve. The unhappy consequences of the rigid allowable cut, rotation ages based on the m.a.i. of wood volumes, and a gross underestimation of the provincial forest inventory have already been noted. Reforms in these areas, which have been well studied and documented, are surely the next logical step in our development.

Not only must there be a shift from a preoccupation with the technical to economic aspects of the resource in utilization and in management, but some effort must be directed to coordinate land and resource planning for economic efficiency. Impartial resource administrators must be found who can set up a clearing house for the various demands for lands, and make decisions that will weigh adequately the alternatives possible in resource projects.

Although the federal government is not actually involved in the allocation of forest land in B.C., it has a very strong influence on the provincial economic environment. Canadian government policy appears to encourage competition in business, or at least a healthy rivalry (Brewis et al. 1965). One of its duties should be to seek out the imperfections in the market and try to lessen their effect

while remaining within the main constraints of a reasonable, but not necessarily full, employment level, and economic development at a prescribed, but realistic, rate. Some of the imperfections which I have mentioned in the text can be rectified as they are more clearly understood. Here government decision-makers must exercise Scott's (1958) "resourcefulness and responsibility" and not be influenced by external pressures or expediency. Another objective should be the removal of barriers between compartments of the capital market. Thus, the fewer barriers to the movement of funds from one market to the other, the greater is the ability of borrowers to compare terms in each market, and so to decide on the merit and ranking of various projects (Brewis et al. 1965).

A final word is needed. The optimum efficiency level in resource exploitation was based on profit maximization. Many may argue that forest land has value far beyond the immediate dollar value of forest products. I have pointed out that intangible values should be fitted into any appraisal, and most can be evaluated reasonably. However, there are some factors which cannot be priced, and these may be very significant to some people. The businessman with his suburban vegetable plot undoubtedly realizes the diseconomy of every carrot he grows, and the housewife, too, senses the ultimate price for her home made bread. There may be large groups of people who psychologically sustain a complete alienation from these kind of homely pursuits in order to move toward the ultimate efficiency in an industrial economy. Others, caught between these two extremes, may strike out on a new tangent, embracing entirely new values which would render many things obsolete, and conceivably alter the present course

of economic development. We have only to recall the short history of B.C. from a fur-bearing preserve of the Hudson's Bay Company, to a frantic gold-mining economy, to the present dispersion in which forests account for the most valuable industries, to see the possible changes in emphasis. What future demands will alter this pattern? Graham (1968), director of planning for Vancouver, foresaw a population of 4 million in the lower Fraser Valley by 2020, and at least one-third of the land surface devoted to recreation. Perhaps B.C. will become a vast recreational area in the future to serve the needs of many millions of people from all parts of the world.

In another thesis such varied possibilities could be explored in the light of widespread unrest in well-fed countries. Even Galbraith's (1967) vision of the New Industrial State, in which people would readily surrender individual freedom to participate in a greater production of goods and services might be shattered by this revolution in values.

"Omnia mutantur, nos et mutamur in illis"[25]

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25. All things are changing, and we are changing with them.

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