

FOREST RESOURCES IN THE FUTURE OF THE PACIFIC NORTHWEST



The 1985 Starker Lectures, College of Forestry

PREFACE

Forest resources have played a major role in the development and settlement of the Pacific Northwest. The harvesting and marketing of timber has been a catalyst for economic growth. That these resources would always contribute dominantly to the region's economy was taken for granted until recently.

Doubts about the future of the forest resource-based economy were raised by studies in the 1970's that forecast declining timber availability. The updating of management plans for the public forests to accommodate environmental concerns and demands for non-timber resources contributed additional uncertainty.

In the early 1980's concerns about timber supply gave way to concerns about markets. Demand and prices for Pacific Northwest wood products plummeted in the face of declining housing construction and increasing competition from the South and Canada. Holders of high-priced public timber contracts purchased in the late 1970's faced bankruptcy if forced to complete their contractual obligations. Profits fell, mills closed, workers were laid off, some companies went out of business. The future looked anything but bright. Some even forecast that the forest industries of the Pacific Northwest would fade into the background as the region burst forth in a new era of high-tech-based economic diversification.

Such forecasts ignored some basic facts. The forests of the Pacific Northwest are not going away. Even as the gloom and doom prognostications are being written, the forests continue to grow, their future existence assured by zoning, planning and the regulation of land-use and forestry practices. While it may be true in some areas that future harvest levels will be less than those of the past, we have legislated and regulated sustained yield forestry into the future of the Pacific Northwest. And, as the limits of competition from the South and Canada are approached, along with rapidly expanding markets on the Pacific Rim, a substantial return is likely on today's investment in Pacific Northwest forests.

At the same time, much progress has been made in assuring the protection of wildlife, non-commercial vegetation and wilderness. There are still disagreements about the use and management of forest land, but never has there been more knowledge and confidence about our capabilities to protect the environment and produce enough timber to sustain a significant portion of the region's economic base. The reconciliation of land-use questions has been long and arduous, and continues today, but resolution of the major issues is in sight.

It would seem that forest resources will continue to play an important role in the economy of the Pacific Northwest, but not everyone agrees. The 1985 Starker Lectures provided an opportunity to discuss the future prospects from several different perspectives.

Sociologist Evan Vlachos provides a backdrop of a changing world, noting the folly of "getting entangled in the interminable listing of trends and developments, or to only project current trends." He emphasizes that the future of the Pacific Northwest is not only what could or might be, but it is also the collective expression of hopes and dreams, and of the shared vision of its people. The prophets of doom and gloom, or boom and zoom, will always be with us, but in reality we can influence what happens in the future. By broadening our information base and thought processes with regard to alternatives, and learning to accommodate risk and uncertainty, we can make the future what we want it to be.

Corporate executive Charles Bingham discusses how his company is preparing for the future by changing its structure and controlling costs. Complacent Pacific Northwest forest products firms lost out to competition from the South and Canada during the past 10 years. Some companies were forced out of business; most others have had to restructure in some manner. Mr. Bingham forecasts that those with a long-term perspective and the ability to adapt to changes will prosper. The forest industries will remain "one of the principal guarantors of the region's future."

Economist Marion Clawson explores the state of the Federally-owned forests of the Pacific Northwest and the role they will play in the future. He concludes that the management of these forests can be improved. The Federal agencies have become defensive and show limited initiative in dealing with the new and difficult problems they face. Dr. Clawson offers some innovative alternatives for change and counsels future public foresters (the forestry students of today) that people will continue to be increasingly more important than trees in forest management decisions, and that cost-consciousness will weigh more heavily than the old myths and clichés about regulated forests, sustained yield, and multiple-use.

Finally, economic historian Richard Alston shows the relationship of forest resources to the economic and social development and growth of the Pacific Northwest. Noting the historical significance of forest resources to the economic base of the region, Alston projects more of the same for the future, but with qualifications. The focus of the past was on timber production, and many today still believe timber is the only economic contribution the forests can make. Dr. Alston asserts that we must learn to respect our forests as holistic ecosystems that consist of more than marketable commodities to be exploited with a cut and run mentality. The forests of the Pacific Northwest provide many benefits that are important to the people who choose to live and work in the region. We shouldn't forget that the value of human capital far outweighs the value of timber, energy and minerals.

John H. Beuter
Professor and Associate Dean
College of Forestry, Oregon State University

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INTRODUCTION

THE FUTURE OF RENEWABLE RESOURCES

by

Evan Vlachos

The title and presumed scope of this presentation seem grandiose and ambitious. Yet, the challenge of speculating about "Forest Resources in the Future of the Pacific Northwest" prompts a general overview of both trends and visions characterizing a "looking-forward" posture. Thus, some broad considerations must be articulated in the form of a general outline of the role of forest resources in a rapidly evolving society. A more diversified backdrop must be provided concerning larger social driving forces, major transformations and national and international interdependencies that affect and in turn are affected by the nature, availability, and character of various resources.

In this context, the remarks that follow are organized around four evolving themes:

1. Outline present and forthcoming sources of change as well as major trends and transformations culminating in driving forces shaping a fast transforming society.
2. Concentrate on the importance of the "images" about the future and on the importance of the polarization between scenarios of doom (pessimism) and scenarios of boom (optimism) in order to explicate our understanding of presently perceived "crises."
3. Elaborate the meaning of the above for natural resources and, by concentrating on both forestry and the West, illustrate how socio-economic shifts are affecting present and potential future responses.
4. Finally, articulate some response mechanisms to all the challenges of a transforming world and indicate some means for apprehending, mobilizing for, and coping with the future.

Knowing that other speakers will concentrate on such specific topics as a multi-national forest products industry, management, and changing socio-cultural context, the present effort revolves around the broader themes of what a futuristic approach entails and around the significance of regional, national and international trends and developments. However, scattered throughout the following pages, are some more specific questions with regard to Western forests and the forest industry and the challenges of surviving under changing technological, environmental and social circumstances.

To sum, then, the emphasis of the present approach: the key argument is for adopting a certain perspective toward understanding renewable natural resources and potential future alternatives. Such an interest emanates from the need to develop a cogent framework for describing, analyzing and assessing the role of forestry in future environments and the long-term consequences of present actions and policy options.

Dr. Evan Vlachos is Professor of Sociology and Civil Engineering, Colorado State University, Ft. Collins, Colorado.

THE TRANSFORMING ENVIRONMENT

Writing on the role of forecasting Geoffrey Vickers observed with some bemusement:

"Never before were so many books written about forecasting and policy making. Never before did forecasters and policy makers command such powerful techniques or such abundant information. Never before have human affairs so manifestly escaped from prediction and control."

"There is no paradox; the anxiety has produced the books. Nor is it an enigma; why suppose that human affairs should be predictable or controllable beyond some modest limit? It is nonetheless important, not least because it has revealed how complex, today, is the situation of men peering into their own future and how simplistic are some of their methods and assumptions."

From the speculative pronouncements of the Oracle of Delphi to the elaborate computer models of today, similar questions characterize the search for understanding the future: What will happen? What is the proper course of action? How can we control change? But the understanding of the future does not contain only the hopes and expectations of things to come. It also entails an understanding of the consequences of present actions; an ability for shaping new worlds; a means for handling uncertainty; and, a rationale for developing strategies to influence the achievement of desired states.

The study of the future, therefore, does not only become a continuation of our interest concerning the potential course of events, but also a commitment to plan more concertedly the world around us. It calls upon us to use the knowledge of the past, the understanding of the present and visions about the future in a new framework that challenges traditional assumptions and established ways of thinking. Even more, it forces upon us the demanding task of explicating preferable futures and achievable goals.

Despite the nobility of such a commitment, there are two important observations to be made about the current cynicism and suspicion by which many people view expert pronouncements about the future. One has to do with the fact that a lot of assumptions of foresight and forecasting seem to be grounded in special interests related to the assumptions of particular groups; and, second, the strong determinism arising from underlying assumptions of "historicism," i.e., a barely disguised reliance on strong assumptions of inexorable social evolution (notably the idea of progress). One threatening effect of this last preoccupation might be the suppression of alternative images of the future, which may have not been supported by on-going scientific analysis. In essence, in addition to the heavy emphasis on probable futures, one must not ignore the more remote plausible futures and the consciously desirable or normative preferable futures. Not only what could or might be, but also what should be. Thus, how to understand and plan effectively for complex and fast-changing environments becomes the essence of our current quest.

There seems to be general agreement that we are passing a phase of a great transformation with potential for further expansion or equally well for catastrophic consequences for our collective life. This period of transformation is characterized by certain broad fundamental changes in our outlook and activity including, among others:

- .exponential changes in technology with incremental changes in social life;
- .need for adaptation;
- .significant morphological changes;
- .increases in the knowledge capital;
- .significant ideological transformations.

These broad movements of the "transition" or "transformation" are pointing out towards a more holistic, interdisciplinary and systems approach to a complex society; to a growing emphasis on understanding secondary and tertiary effects, thus bringing the future into sharper focus; a more comprehensive look at nature; and, new outlooks on international interdependence.

It is not only that technical problems proliferate faster than social solutions can be found to meet them, but also the very quantity of problems changes their qualitative character. Thus, each successive set of new or residue problems is more difficult to solve than predecessor problems.

It is at this point that the burgeoning field and literature of futurism offers lists upon lists of critical dimensions, variables, forces, developments, trendlets, trends and megatrends for understanding the on-going transformations. Books, newsletters, computer bulletins, trend alert sheets, and consultant reports offer a continuous barrage of data and information and report on the slightest tremors of on-going changes. Our difficulty is not only that of providing the ultimate list of trends (which cannot be finalized in a fluid, fast-changing environment); but, also, that of separating between "interesting," "important," and "significant" trends and developments. It is only the last that could provide us with some valid and reliable signals, rather than us drowning in the noise of ephemeral if not faddish events.

Yet, we still have the responsibility of providing some tentative categories of "environmental scanning" that would enable us to understand the sources and nature of present and forthcoming transformations. Without specific reference here (although there is a short discussion later) we can summarize the sequence of our thinking by considering:

- a) forces generating change
- b) major transformations
- c) the two converging major trends of complexity and control
- d) the overall drift towards a post-industrial or "cybernetic" society (services and information).

This argument is accentuated by increased awareness of what the human presence is doing to the surrounding ecosystem and the natural laws concerning young and mature ecosystems. The key question has to do with the tolerance, resiliency, or recuperability of the surrounding environment and reflects a concern with the general assimilative capacity of the environment to absorb human intervention or to meet increasing human demands.

All the above considerations can be seen as both threats or as opportunities for developing forest resources in the Pacific Northwest and for dealing with the nation's need to provide balance in three important dimensions:

1. efficiency - growth in material development such that a solid basis of economic sufficiency may be maintained;
2. equity - fair access for different segments of the population to all available resources;
3. effectiveness - the overall significance of any policy vis-a-vis the pursuit of larger social goals.

"Development" and "preservation" are the emerging dual themes of any contemporary discussion of natural resources planning. The remaining unspoiled natural environments have high incremental value to the nation. At the same time, natural resources are needed for continued national economic viability. In addition, present and future problems are accentuated by the fact that although the nation is rich in natural resources, many of them are to be found in both fragile ecological systems and landscapes highly valued for their undeveloped state (especially in the West, where major tracts of public land still exist). Thus, rapid development and the attractiveness for development of many parts of the nation may impose very high environmental and social costs and have far-reaching consequences. At stake is the totality of an open environment, of values contained in the associated natural environments, and of a long historical tradition concerning open spaces.

For forest resources in particular, there must also be some degree of compatibility among the various uses such as the maintenance of an attractive environment, general conservation, wood production and harvest, natural watershed, wildlife, wilderness and the provision of recreation opportunities. Given forestry's nature, one must take a long range view of the world, while at the same time manage wisely resources at the present.

In order to look a little bit more carefully at potential or preferable futures in the Pacific Northwest, we may want to begin with relevant lists of trends (driving forces, critical variables, events or developments) that affect or have consequences for the region and the nation as a whole. Needless to say lists abound and any respectable writing on the future will have its own conception of what are "significant" trends or developments. More relevant for the argument at hand are three sources of lists of relevant trends for the future of forest resources; the material generated by a national workshop on "Future Challenges in Renewable Natural Resources" in 1979 (FCRNR); the ensuing publication

of Renewable Natural Resources (Dennis Little et al.); and, the draft of October 1983 "Focus on the Future; A Forest Service Strategy" (FF) of the Forest Resources Economics Research USDA/Forest Service. Using as a backdrop the background material of the first effort (FCRNR), a list of critical shifts which may impinge on renewable natural resources includes:

1. Fundamental shift in society and lifestyle (social revolution in the making) with such trends as simplicity, decentralization, wise use of resources, information, mobility, etc.
2. Major climatic changes as a result of the use of fossil fuels, desertification and the accelerated conversion to coal.
3. The role of the future supply and cost of energy and of such alternatives as fusion and biomass conversion.
4. International relations and the conflicts between less developed and developed countries.
5. Land use management and holistic planning, including questions of forest and rangelands as well as productivity of the land.
6. Institutional capability through research and technology as well as the selection and education of appropriate personnel.

A more extended list of trends for the future appears in the draft FF, following the preamble of problems facing strategic planners (i.e., lack of specific objectives, short run views of the world, and historical information representing only one pattern of events). The following 14 major trends and events (lumped under six major categories: demographic, technological, institutional, economic, global, and personal values) are viewed as external to the Forest Service, but likely to have an impact. At the same time, more important than the likelihood of any single trend or event is the coincidence of events which come together time-wise and reinforce each other to have a major impact on society. Impact is likely to be influenced more by timing and magnitude than whether or not the event will occur:

1. Increased population (domestically and globally) which will increase demands on natural resources.
2. Changes in age distribution, family structure and employment status.
3. Population movement to the South and West in more widely dispersed communities which in turn will increase pressures on the National Forests.
4. Immigration patterns affecting the national cultural context.
5. Advances in telecommunications which will affect the amount and availability of information.
6. Technological advances and breakthroughs which will impact the kinds of products demanded from the forests and the structure of the industries which process and distribute these products (e.g. genetic engineering, material substitutes, labor savings devices, etc.)

7. Declining confidence in institutions, particularly the government with continuous preoccupation with budgetary problems.

8. Increases in per capita real income with a resulting expansion in the demand for renewable resources.

9. Escalation of energy costs.

10. Different economic growth patterns, especially rapid expansion of the service sector and chronic unemployment among certain groups.

11. Maldistribution of resources leading to severe scarcity in some countries.

12. Expansion of international power beyond the two super-powers of recent history.

13. Changing individual lifestyles especially with regard to traditional measures of success or individual concern for institutional and professional goals.

14. Public concerns over environmental issues and land use conflicts which will increasingly be part of Forest Service decisions.

One can understand, why, then, in view of the above trends, there is in this draft document a clarion call for a Forest Service that as an organization is simpler, leaner, and more efficient; characterized by a management style that is flexible, responsive to the public and caring; staffed by a cadre of professionals who are the recognized leaders of their field; and animated by a focus which emphasizes wise management and use of the world's forest resources.

Finally, the present writer in the volume of Renewable Natural Resources attempted to combine in the following figure trends and developments (Figure 1) in the context of four alternative scenarios (representing the range of optimism-pessimism) and related overall thrust to critical issues affecting natural resources.

One of the most dangerous things in forecasting is simply trend extrapolations based on the assumption "if things remain the same or continue as before." And the longer the time span, the more the possibility of grievous error (if not blunders depending on the assumptions made). In this context, there have been also efforts to extrapolate current trends in the Pacific Northwest which might provide us with glimpses as to what might be happening in the region.

A potpourri of ills such as high interest rates, the strong dollar, entrenched unions, competition from the South and other countries, high transportation and unbreakable contracts are hampering the region's timber industry (see in this regard The New York Times, June 16, 1985). But there are also such bright spots as efforts for concerted planning and the attraction of high technology (the hope for a "Silicon Forest" between Portland and Vancouver). The rate of population growth seems also to have stabilized and awareness of both threats and opportunities is on the rise. In any case the specific dimensions of the transforming Pacific Northwest can be more expertly addressed by other

more qualified persons. But, before moving into the final topic of responding to the challenges, we need to point out some fundamental dilemmas that run throughout any preferable futures of natural resources, such as:

.change vs. stability

.preservation vs. development

.tradition vs. modernity

.remoteness vs. accessibility

.complexity vs. simplicity

.centralization vs. decentralization

.uniqueness of region vs. sharing with the nation.

As a long-term observer of the Pacific Northwest has observed, we tend to revere our Western forest industry much like the family farm -- as a way of life. But what are the long-term consequences of on-going policies to stabilize timber-dependent communities in the West? Would perhaps the Western forests reach the status of some European forests and achieve the psychological, mythological, and social significance which contrasts to the present high commodity value attached in timber production?

RESPONDING TO CHALLENGES

Change, perennial change, has been a constant companion of mankind. Conditions are changing fast, political and social institutions are in constant flux, our perceptions of things to come shift with a predominance of negative forebodings, and we are still searching for some utopian harmonious relationship between the individual, culture, and the environment. If we believe in the notion that we can interact with our destiny, then we must apprehend the forces shaping our future, control drift and learn how to cope with changing environments.

With regard to natural resources, their "final development" is characterized by:

1. A mature resources infrastructure serving a well-developed economy;

2. Trends of continuing economic development, resource exploitation, and population growth; and

3. Remaining resource alternatives that are becoming more costly, more complex, and environmentally and socially more perturbing. Consequently each new type of resource development alternative is characterized by continuous conflict and controversy.

Growth and development as well as continuous change vis-a-vis resources set into motion a variety of cause-effect-cause chains and trigger a whole interrelated system of impacts and consequences that create new economic and environmental conditions; change the social opportunities for existing population groups; produce new or different services and products; and create new institutional responses to changing and complex circumstances.

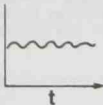
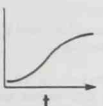
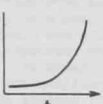

THEME	THRUST	TRENDS/DEVELOPMENTS	CRITICAL ISSUES
SCENARIO A	-Zero growth	-fundamental shifts in lifestyles -stringent planning measures	-Stewardship of earth/harmony
STEADY STATE/	-Appropriate technology	-taxing for externalities	-Husbandry of resources
NO GROWTH	-Strong environmental policies	-adequate energy guaranteed -maintenance of "green tickets" (farmlands)	-Balancing multiple uses
	-Permits required for all activities	-emphasis on open space/higher density -high public confidence -closed cycle economy	-Determination of social well-being/quality of life
	-Rural renaissance	-reduced demand for wilderness -distribution of population according to national needs	-Carrying capacity principle
	-Conservator society	-reduced energy demands/alleviation of pressures on renewable natural resources	-Avoid stagnation
SCENARIO B	-Balanced orderly growth	-growing concern over environmental issues	-Reaching voluntary simplification
MODERATE GROWTH	-Carrying capacity	-some zoning -energy supplies somewhat adequate /energy efficiency improved	-Successful marketing
	-"Muddling through"/ mixed approaches	-small town development, but also continuous metropolitanization	-Extent of planning
	-Laissez-faire	-sustained, but not excessive demand for timber -use of biomass -"recreational hinterlands"/ urban parks	-Assimilative capacity of ecosystem
		-stimulation of smaller growth centers in the West/regionalism -emphasis on values of security and survival	-Qualitative considerations
SCENARIO C	-High economic growth	-advanced high speed communications	-Develop hierarchy of needs
RAPID GROWTH	-Expansion/aggressive multiplication	-increasing population -some localized disasters -abundant energy/new sources	-Development of a "genesis" strategy
	-Government stimulation of activities	-prime land conversion continues -agricultural genetics -large urban agglomerations/ megalopolitanization	-Maintenance of sustained yield
	-Optimism	-increasing demand for timber -heavy use of grasslands/rangelands for meat production	-Capital investment
	-Maximum individual economic choice	-emphasis on exports -classification of all lands for optimum use	-Energy
	-Post-industrialism	-technological breakthroughs	-Maximum productivity
SCENARIO D	-Socio-political upheaval	-increased population/overpopulation/disproportionate population growth patterns	-Synthetic sources of food and fiber
CATASTROPHE	-Conflict, stress, strain	-modification of atmosphere by carbon dioxide -collapse of expectations/ retreatism from the system	-Achievement orientation
	-Wild card events, surprises abound	-economic dislocations, depression, crisis of confidence	-Citification of countryside
	-Pessimism	-technical breakdowns -deforestation	-Abuse of pesticides/crop reduction
	-Resource shortfalls	-significant losses of species -civic breakdown/abandonment of major cities	-Thermal build-up
			-Interruption of the food chain
			-Exhaustion of strategic resources
			-Absence of viable political ideology/strategy
			-Severe energy supply problems

FIGURE 1.

Looking backward, there are some hard-earned lessons as how to cope with the future. For example, we have come to recognize that:

- .scarce resources require thoughtful planning.
- .we need to bring together all groups in the form of participatory and anticipatory democracy.
- .what we value can become a rallying point.
- .we must accommodate fundamental shifts in values.
- .contingency planning allows for flexible responses to fast changing conditions.
- .while futures cannot be predicted, they can be created.

In trying to describe our transforming environments and coping mechanisms to a metabolizing Pacific Northwest, one can adopt three basic postures: the first can be described as the optimistic posture which recognizes potential technological breakthroughs, good management, rationality of the system and a developmental ethos associated with high technology, economic expansion and mastery of the surrounding environment. Contrasted to the optimistic school, the catastrophic preoccupation envisages destruction, erosion, overgrazing, and a long-term disastrous drift towards a wholesale destruction of the world around us. In the midst of these two extremes lies what we may call a "middling" position or a middle-road posture that recognizes some localized disasters but is cautious in both the responses and policies to be adopted, by simply maintaining a traditional wisdom approach where some setbacks are also offset by eventual prudent management processes.

Central to these three preoccupations or postures, ranging from highly optimistic through a middle-of-the-road approach to an apocalyptic fascination are such contested issues as the extent of climatic changes, the role of human intrusion (especially urbanization and industrialization), the practices of forest development and use, the overdraft of water, the effects of soil erosion and salinity, and the extent of energy development.

Connected also to the above are such larger concerns and concepts as carrying capacity, tolerance and resilience of the ecosystem, thresholds and trigger points, and more broadly, the interdependence of resources. Finally, transcending all such discussions are such critical items as available time span for decision making; relevant, valid and reliable data in order to be able to make proper decisions; and, the concern with long-range, interactive, diachronic effects in the interrelationship between population, culture, and the biosphere.

Another way of looking at the previous postures and considerations is to recognize also three alternative approaches linking natural resources and the future, namely an ameliorative approach (problem solving); a trend-modifying approach (with heavy emphasis on extrapolative capability); and, a normative approach (goals and preferable futures).

What these three approaches imply is that our responses vis-a-vis the future of renewable natural resources may revolve first of all around the perpetuation of the status quo, in other words, continuation of current practices and policies that may aggravate other problems or eliminate alternatives. Or, we may respond by "fine tuning" the present system - by correcting the obvious disparities between policies and practices, by providing temporary relief measures, and by encouraging competitive dynamism in a free-market society. And, finally, we may adopt an innovative approach characterized by dramatic new initiatives and changes in current policies.

Again, the effort to live with an uncertain future entails among others:

- .a shift from short-range crisis management to a long-range risk management or a proactive posture
- .foresight building and capacity towards flexible and extended time horizon planning
- .structural transformations in our society and major institutional overhaul
- .understanding of our cultural metamorphosis in terms of fundamental shifts in social values.

Knowing that we must learn to survive in the context of ambiguity and uncertainty, we are asked to combine diagnosis (problem identification) with prognosis (alternative futures) and action (concrete strategies and tactics). Such a synthesis requires an imaginative coalescence of knowledge, prudent judgment and reasonable implementation options. Yet, we should not forget that working with the future is also a learning experience and an iterative process.

Our conclusion, then, is not to get entangled in the interminable listing of trends and developments or to only project current trends. We need a skillful combination of structured reasoning and disciplined imagination. Improving background information; broadening the thought process in terms of uncertainty, probabilities, alternatives and cross-impacts; adopting an overall posture of tolerance towards ambiguity; and, accepting risk and uncertainty as a challenge all will facilitate the passage towards the future. In this context, the future of the Pacific Northwest is not only what could or might be. It is also the collective expression of hopes and dreams and of a shared vision of the region in the years to come.

THE FOREST INDUSTRIES' FUTURE

by

C. W. Bingham

On behalf of the Weyerhaeuser Company, may I say how pleased we are to be invited by Oregon State University to present our view of the future of the forest industries here in the Pacific Northwest. The subject is timely and the selection of the campus of this great university to hold the forum is most appropriate.

We are particularly pleased to be here because this school's graduates have made an enormous contribution to the research programs of Weyerhaeuser Company, as well as to the timber and general management ranks of our organization. Many of our key executives, both in the past and currently, have either received undergraduate or graduate degrees from Oregon State University.

I would also like to express our appreciation to the Starker family for their generosity and foresight in funding this series of lectures at this particular period of time.

My remarks may be briefly summarized as follows:

The Northwest Forest Products Industry today is forced to compete in a period of very low raw material and finished product prices caused by oversupply and a strong U.S. dollar.

The industry is undergoing major structural changes: reductions in capacity, changes in ownership, and a realignment of markets, customers and costs.

Looking to the future, I have no doubt that this industry will remain a vital, large component of the world's forest products industry and of the Northwest's economy. Those producing units that comprise the industry will have less overhead, be more entrepreneurially managed, and have lower costs of production. The interests of labor and management will be brought into better harmony and investors will receive a fair return, adjusted for risk. Forestry will be practiced intensively on a site-specific and economically sound basis.

Let me try to enlarge on these points with the use of some slides and a more robust discussion.

Before discussing the importance of the industry to the Northwest, let me steal a comment from my friend Lee Robinson of Longview Fibre.

"We shouldn't be pessimistic about the future of the industry here in the Northwest; after all, it is still possible to make a small fortune in this industry on the West Coast. All one has to do is start with a large fortune!"

We should start with a recognition of why this industry exists as a major factor in the Pacific Northwest. It is, simply, that our forest lands and species are among the world's most productive. In comparison with the 77 cubic feet per acre per year of mean annual increment in total stem volume for the Douglas-fir region, the comparable figure for the south is 32, for Canada, 33, and for Scandinavia, 39 (Figure 1). These differences are even greater when the forest is intensively managed. And, in addition to soil and species productivity, the timber grown here has excellent intrinsic values, allowing

Mr. Charles Bingham is Executive Vice President, Weyerhaeuser Company, Tacoma, Washington.

manufacture of a diversity of products for both structural and decorative purposes. Douglas-fir is a truly remarkable species.

Occasionally there is some discussion at rather high levels in both Washington and Oregon that forest products is a sunset industry in the Northwest and should be accorded lower priority in terms of formation of public policy. Yet, despite the severity of the industry's problems, we remain the region's largest employer, with more than 125,000 people still on the payrolls in Washington and Oregon (Figure 2). Moreover, our income per job is very high and each job has a significant multiplier effect on the economy.

Employment peaked in the last cycle at just below 160,000 in 1977 through 1979. At the bottom of the trough, in 1982, 120,000 people remained employed in the industry. Employment rebounded to 125,000 in the third quarter of 1984 as a great deal of curtailed capacity came back on line, and then eroded again as prices fell back.

If we take the relative stability of pulp and paper employment out of the picture and focus only on lumber and other solid wood products, we see that employment peaked at 136,500 in 1978, fell to 94,500 in 1982, and has cycled between 100,000 and 110,000 since.

Thus, if we focus not on jobs lost in the industry, but on jobs retained - and on the possibility of future jobs - we get a sharper picture of the importance of the industry to the present and future economies of Washington and Oregon.

We also should recognize that demand for lumber is very strong. Lumber production in the United States is above the 1978 peak, despite a somewhat lower level of housing starts (Figure 3). With demand this strong, we normally would expect strong prices. However, comparing the 1978/79 period with today, prices have not risen this time (Figure 3). In current dollars, the average price of a thousand board feet of Douglas-fir two-by-fours was \$150 in 1974. It has been about \$200 in 1985. That amounts to a nominal increase of 33 percent - but when the high inflation years of the late 1970's are taken into account, it is a substantial price decrease in real terms. On the other hand, for comparison, the price of a Chevrolet Impala in 1974 was \$4,000; in 1985 it is \$10,200. That represents a 155 percent nominal increase, or a significant real price increase. If today's two-by-four price were \$383 per thousand, which would be the equivalent increase for us, we would be very happy indeed!

The problem, of course, can be traced to oversupply in North America as can be shown by comparing lumber production with capacity (Figure 4). First, the new capacity investments in Eastern Canada and in the South, and in the Northern British Columbia interior, along with productivity investments in this region, have served to increase continental lumber manufacturing capacity by 10 to 15 percent since the top of the last cycle. Currency exchange rates have compounded the problem. We have found that classic Economics 101 works, and that in any true competition, excess supply will have the effect of the low cost producers taking market share away from high cost producers.

This has forced many producers in both coastal British Columbia and the Pacific Northwest out of their traditional markets - the U.S. Northeast and Midwest - causing those mills still operating to seek new markets.

Secondly, the strength of both the U.S. and Canadian dollars against other currencies has eroded many export opportunities, with some volumes normally exported spilling back into the North American market.

And, while the Canadian dollar is strong in world trade terms, it has dropped 30 percent against the U.S. dollar, allowing the Canadian mills to incur costs (Figure 5) in 70-cent dollars and to sell production to the U.S. for 100-cent dollars . . . an envious position.

An example of how the currency difference benefits British Columbia producers can be seen by looking at transportation costs. In 1984, they had a delivered-cost advantage of \$50 per thousand board feet of dimension lumber selling into the Seattle market - compared to local U.S. mills! The Los Angeles market offers another startling comparison. British Columbia had a \$65 per thousand board feet delivered cost advantage over coastal northwest producers.

While we are talking about various producing regions and their cost structures, we should note that while the Pacific Northwest remains the high labor cost area, the South has become the highest-cost region in terms of raw material delivered to a mill. This makes Southern mill total costs equivalent to the Northwest cost, and higher than in the inland zone - before transportation. In fact, if the two dollars were to return to relative parity, the cost bases of the major producing regions, before transportation, would be essentially comparable. And, if the dollar should continue to weaken against offshore trading partner currencies, we would resume our position of full competitiveness in off-shore markets - as a region. One can see why market selection and transportation costs have become so very important to our industry.

There have also been dramatic changes within the various segments of the Pacific Northwest industry. As one industry historian recently pointed out, it is a case of the world turned upside down. We in the large, integrated producer sector are beginning to feel much as the British must have felt at Yorktown.

In the 1980-83 period, the change in ownership of Pacific Northwest production capacity began to accelerate (Figure 6). Half of the capacity changing hands was sold by large companies to small businesses. None was acquired by the large integrated companies.

Large integrated producers are now the smallest of the producing sectors in the West, with 22 percent of capacity versus 53 percent in the small business sector (Figure 7). The trend from big to small accelerated rapidly in 1984 and 1985, with a number of major producers essentially withdrawing from the Douglas-fir region. And, it is not implausible - absent change - that some of our Weyerhaeuser mills which are now closed or in long-term curtailment in this region will end up in similar hands.

Already, 60 percent of the remaining plywood production in the state of Washington is coming from employee coops and small businesses, as is the majority of the Willamette Valley production.

Why is this important?

Because, from a regional point of view, it marks a major structural change in the makeup of the industry, and thus a change in the expectations that the public may have of it.

The West, on average, has high timber costs, high labor costs, and high transportation costs to many markets. The "average," however, masks the range of producer cost differences and strategies within the Douglas-fir region.

In the past, the larger companies generally enjoyed better-managed access to markets, stability of raw material supply and cost, and capital at reasonable rates. They also tended to carry high levels of corporate overhead and complicated management structures, some of which were designed to help local communities.

The smaller companies often enjoyed lower fixed costs per unit of output, lower variable costs, and an ability to adapt quickly to change. Some of them engaged in speculative bidding on public timber--to their later regret. Others who didn't have been in a good competitive position, following the collapse of timber values.

As the economic realities of the early 1980's have taken hold, with lower product prices and a rapidly changing marketplace, other dramatic changes are occurring. Price inflation was taken abruptly out of timber values as lumber, plywood and log prices crashed. Today's timber values (Figure 8) are less than half of what they were in the late 1970's . . . again, Econ. 101 in action!

At the same time, converting asset values have been reduced. For example, in the late 1970's, to build or acquire 100 million board feet of state-of-the-art lumber manufacturing capacity would have cost a purchaser as much as 25 million (Figure 9). Today, a purchaser can acquire similar capacity in the region for 10 to 20 percent of that. As you can imagine, if one combines the wide range in labor rates available, the wide range of raw material costs during the last few years, and the many opportunities to secure assets at low costs, we now have a very, very wide distribution around the "average" production cost.

The deflationary wringout has necessitated action, changing the management assumptions and planning horizons dramatically for large integrated producers, such as Weyerhaeuser Company, that wish to stay and compete in the region. The task of an industrial manager in a free-enterprise economy is, after all, to take capital, raw material and human resources and produce goods and services at a profit and at a cost and quality the consumer can afford, and at competitive prices. (Econ. 101)

There are a number of groups who have a stake in the success of this effort. These "stakeholders," include, certainly, employees, communities,

suppliers, and customers. And, they also include the shareholders -- whether individuals, mutual funds, pension funds, or university endowments -- who have supplied the needed equity and own the enterprise. For half a decade, the expectations of the shareholders have not been served in proper balance with those of the other groups.

Our industry always has been volatile, with excellent returns on the high side of the cycles, and low returns or losses on the low. For instance, in 1978 and 1979, the three largest producers had an average return on wood products converting assets of approximately 25 percent. Those returns dropped to a negative 3 to 5 percent in 1982. However, despite the recovery in demand to the levels of the last cycle, returns at the current level of high demand peak are less than 10 percent on average, as a result of overcapacity. Now, compare that with the 10+ percent that risk-free T-bills yield and one can understand the dilemma.

A common step taken by integrated companies choosing to stay and compete in the changed environment in the West and for a number of specific valid reasons, not all have so chosen, has been to reduce corporate overhead and simplify management structures. To use Weyerhaeuser Company as an example, since 1981 we have in real terms reduced our salaried workforce in logging, lumber and plywood manufacturing, and related support areas by nearly 50 percent, and we have flattened and simplified our management structure.

To illustrate, a standard timber production unit organization in 1980 had 37 management, supervisory, and clerical salaried employees at levels below the lumber superintendent (Figure 10). In the first phase of redesigning the organization, one layer of supervision was removed, and by 1982 14 positions had been eliminated, leaving 23 (Figure 11).

The same organization today has 14 positions below the lumber superintendent, versus 37 five years ago. Note also that yet another level of management has been removed -- this time above the lumber superintendent level. The wood products manager no longer is there (Figure 12).

Our salaried workforce -- not just in the west but throughout the country -- has undergone two extended salary freezes and benefit reductions, in real terms reducing compensation. We have also rolled back our top management compensation.

We and others in the industry have also moved to change our raw material costs, through log mix and log pricing. We have been differentiating and changing our product mix and upgrading product quality, packaging, marking and presentation to better market our products in the higher-value niches and to better compete with other building materials. For example, the increase of expenditures in the growing repair and remodel market presents an important opportunity to market our products (Figure 13).

As a result of the management and salaried workforce reductions, we have been not only able, but required, to increase hourly worker involvement in decision making and problem solving. We have, through

technology infusions, employee suggestions, and by working with the unions to change work practices and schedules, been able to bring about substantial productivity improvements.

But, that hasn't been enough. As I have described, the forces of the marketplace have been changing the region's industry from a high wage structure, strongly unionized industry, to largely an industry with a lower pay and benefit structure than that of the large-company sector. Much of the industry now has a labor cost component roughly 40 percent below that of the major integrated producers. While this is helping the Pacific Northwest as a region become "on average" more competitive in North American and world markets, for those of us who historically have been at the high end of the cost structure, that is faint comfort.

Thus, reluctantly, we have been forced to move toward trying to convince our unions and hourly work force that reductions in wages and fringe benefits also are required if many of our units are to survive the transition.

Let me take a moment to stress very specifically that Weyerhaeuser Company is hoping not to break its links with the unions. Since the days of Phil Weyerhaeuser and Harvey Nelson, we have operated in logging, lumber and plywood with the same unions and an attitude of mutual respect even in periods of hard bargaining and strikes.

Both the International Woodworkers of America (IWA) and the Lumber Production Industrial Workers (LPIW) have worked with us in attempting to improve the competitiveness of unionized logging and millwork, through work rule changes, productivity incentives, work organization, and other changes. It has had major favorable impact on productivity, but in an industry in which the low cost producer now sets the price, churning out more product to sell at a loss does not help a great deal.

We have in recent months tried to bargain within the economic parameters of individual mills, to bring wage and benefit costs at our mills within regionally competitive parameters. Because of other manufacturing cost variables, a few of our mills do remain regionally competitive even with present wage and benefit rates. Most do not.

We have successfully negotiated changes at two Washington mills to date. Both involved significant rollbacks. We have made three attempts in Oregon to date, without success, resulting in the closure or long-term curtailment of four major facilities.

This is not a pattern that we would have chosen, nor one we could have imagined in our forecasts only a few years ago. But, we and others in our segment of the Northwest wood products industry simply have to face the reality of the structural change that has occurred.

So far we have been concentrating on the logging, lumber and plywood or what are generally considered the building materials part of the industry here on the West Coast. We need to keep in mind that roughly half of the cubic wood fiber consumed goes into the production of paper. We are often asked, as an integrated producer, aren't you making a great deal

of money on your pulp and paper operations, and aren't you one company, so why are you concerned about lumber and plywood? The answer, of course, is that we are a very large producer of pulp, paper, newsprint, and paperboard products on the West Coast, but those products are also subject to the same macro-economic factors which have contributed to the squeeze on margins on the solid wood side. It's a little bit like the fellow who was called by his doctor and told that he had some bad news and some worse news to tell him. The doctor said, "which do you want to hear?" The patient said, "Well, I think I'll just take the bad news first, please." The doctor said, "Well, the examination indicates that the cancer is spread throughout your body and that you only have two days to live." Whereupon the patient replied, "Wow, okay I hear that, but what could possibly be worse news?" The doctor said, "I delayed 24 hours in calling you." Well, I have delayed a few minutes in telling you that the margins are no better in the pulp and paper side of the industry.

In the pulp and paper industry, wages and benefits tend to be a smaller, but not insignificant, component in the overall cost structure. The export market looms even more important, and in the case of market pulp and linerboard, we are in a period of strong demand, but world overcapacity and weak prices.

During the cheap electric power and weak dollar days of the past, the Northwest became the United States' high-labor-cost region in these industries, as well. This can be seen by comparing the West with the other U.S. regions or other nations (Figure 14). But, we remained competitive in world markets, with total delivered costs to the European and the growing Pacific Rim markets well below those of the high-cost producers in Scandinavia, and were reasonably competitive with Southern and Canadian Producers. While the regional labor-cost spread is not as large as in wood products, the Midwest and Northeast producer does have about \$2 per hour advantage, and the South about \$1 per hour advantage.

The exchange rates worked in the United States industry's favor through 1980, and in dollar terms Sweden, Canada and West Germany all had pulp and paper labor costs that were higher than ours.

Today, the United States is the high-labor cost producer, with Sweden's costs, at the high end, being 72 percent of ours and, at the low end, those in Brazil 9 percent of U.S. costs. Brazil, by the way, is an increasingly large competitor with our regional production in world markets, and it along with other countries is becoming a supplier to U.S. paper markets as well.

The reason, of course, is not runaway wage increases here. Although pulp and paper worker hourly costs are similar to those in such other high-rate industries as steel and autos, in the past couple of years our increases have actually brought about a very slight real decline in wages. It is the change in the dollar's relationship with other currencies that has created the changes international relationship, as illustrated by the dramatic change that occurred between Sweden and the U.S. from 1980 to 1984 (Figure 15). You can see a dramatic reversal in wages due to currency exchange rates only. And, the change in wage cost relationships is mirrored in

all other production cost sectors. In addition, we in the Pacific Northwest have seen our electrical power cost advantage shrink significantly in the past few years.

With the majority of the Northwest's market pulp production normally sold overseas, with a significant portion of its linerboard, bleached paperboard and newsprint production aimed at export markets, and with large mills cranking out immense volumes of products 24 hours a day seven days per week, cost reduction is also the major issue in this sector. This is particularly so because the U.S. pulp and paper industry itself in the past 35 years has had an investment return below the average for all U.S. industry - more than one-third below the average so far in the 1980's - with investment capital increasingly scarce it will have to improve upon that record to ensure its future.

Now, my assignment was also to talk about the future. It would be just as inaccurate to project the trends of 1985 forward as it was to forecast forward from 1978 on an assumption of continuous boom in the industry.

As we have already seen, we must remember that the forest products industry remains the largest industrial employer in the Pacific Northwest, despite the fact that all major segments are currently depressed. And, even with the rollbacks proposed, it will remain one of the highest paying industries, with wage rates far above those in the much-courted "high-tech" sector.

I would anticipate continuing turmoil in the industry through the rest of the 1980's as the North American industry and particularly the Pacific Northwest industry is rebalanced by the inexorable forces of our markets. The industry that emerges will be very different than the Pacific Northwest forest products industry of the 1970's but for those of us who survive the transition, I believe the future will be strong and secure.

The industry will move into the 1990's much leaner and with less overhead. As additional responsibility for decisions is placed within the hourly workforce, I would expect that there will be increasing recognition on both sides that labor and management must work cooperatively toward the common goal - of economic progress of the unit. I think there will be common recognition that each unit must stand alone and be judged alone - that in a continental and world market, no company can succeed if it fails to deal with the losers in its investment portfolio of productive assets.

Thus, by 1990, I believe the worst will be over, and that there will be a much greater degree of stability in the Region's industry. And, as the advance material indicated, we will have substantial opportunities in the late 1980's and '90's, particularly in the pulp and paper products area, to increase our exports to Pacific Rim markets.

As we move toward and into the next century, I think the natural advantages of our forest soils, climate, and access to trade routes - as well as the tightening of softwood supplies worldwide while ours increases - will lead to a significant resumption of growth in this region's industry.

How that industry will be structured, who the leaders will be, is an open question which will be answered by corporate and unit performance during the years immediately ahead. Because of the structural changes that have already occurred, however, it is almost certain we will have a much more entrepreneurial wood products industry, with more small companies competing, and with even the large companies structured as aggregates of essentially independent units.

By its very nature, forestry requires that this industry keep a long-term perspective even as it struggles with the pressing problems of the present.

While in no way discounting the severity of the present problems, or the human costs and community disruptions of the present transition, I am tremendously optimistic about the long-term outlook. And, even during this difficult era in the Northwest industry's history, we must recognize that the majority of forest products industries here are working, are major contributors to the Pacific Northwest economy, and comprise one of the principal guarantors of this region's future.

I am not in the habit often of quoting former President Nixon. However, he is a man who has gone through a short-term period of disaster, and who has an intense interest in the longer term historical perspective. In remarks last month in Beijing, China, he had this to say:

Those who take the short view (of time) become so mired in the problems of today that they fail to see the hope of tomorrow. They tend, therefore, to focus on why things cannot be done. Those who take the long view ask how they can be done. And, those who take the long view are patient with difficulties, knowing that time often makes the impossible possible.

So, in closing, I would suggest that a strong future for the forest products industry in the Pacific Northwest is indeed possible - if we take the long view, and if we make it happen.

SOFTWOOD REGION GROWTH RATES

Cubic Feet/Acre/Yr

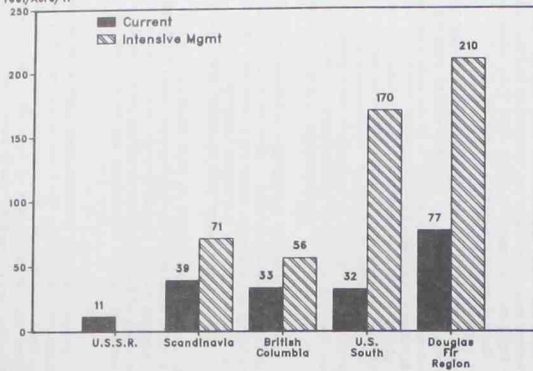


FIGURE 1

FOREST PRODUCTS EMPLOYMENT WASHINGTON AND OREGON

Thousands of workers

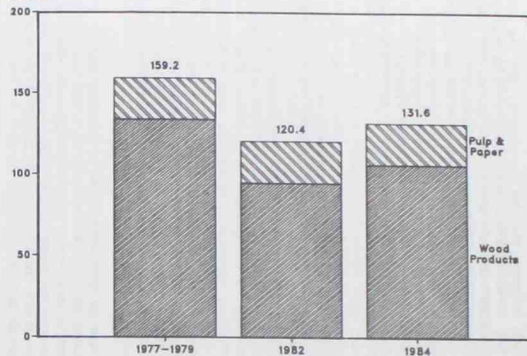


FIGURE 2

NORTH AMERICA LUMBER PRODUCTION BILLIONS OF BOARD FEET

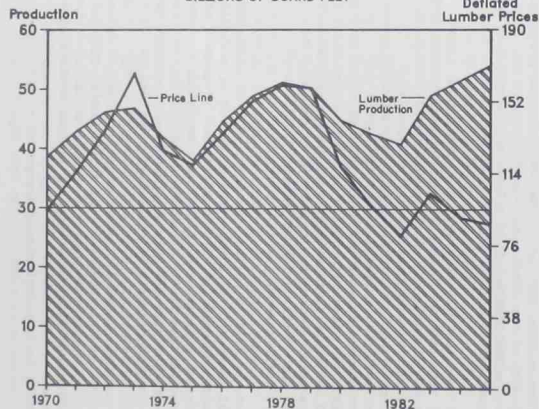


FIGURE 3

NORTH AMERICA LUMBER PRODUCTION

Billions of Board Feet

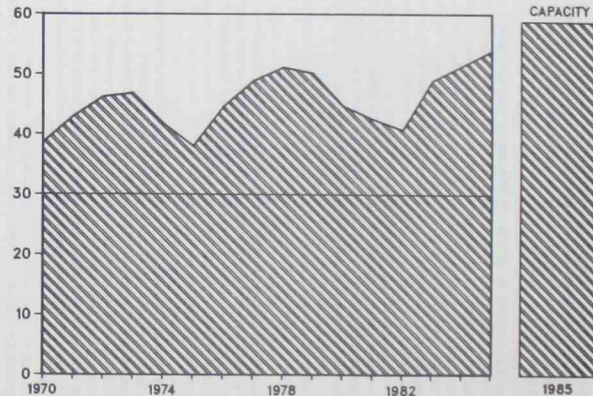


FIGURE 4

REGIONAL LUMBER COST COMPARISON* (1984 DELIVERED COST)

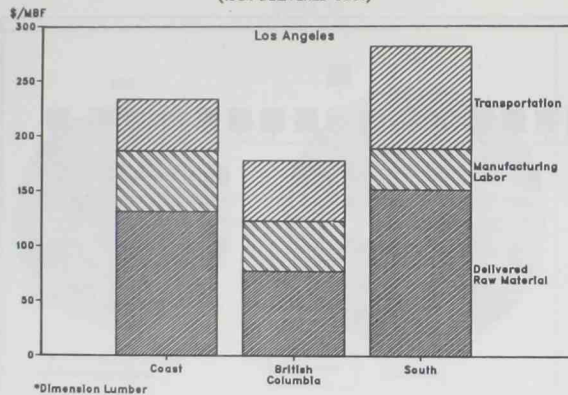


FIGURE 5

OWNERSHIP CHANGES 1980-1983 (BY TYPE)

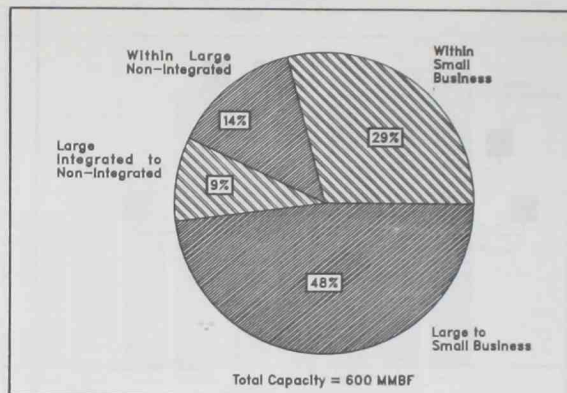


FIGURE 6

WESTERN LUMBER CAPACITY (BY OWNERSHIP TYPE)

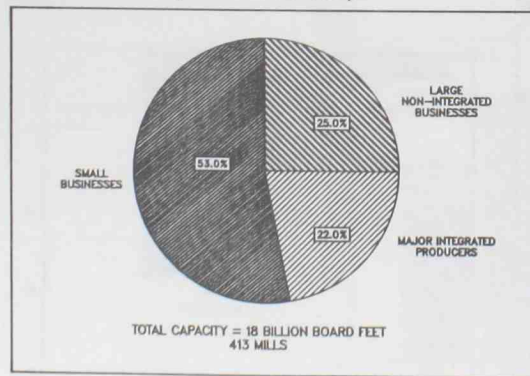


FIGURE 7

STUMPAGE BID PRICES

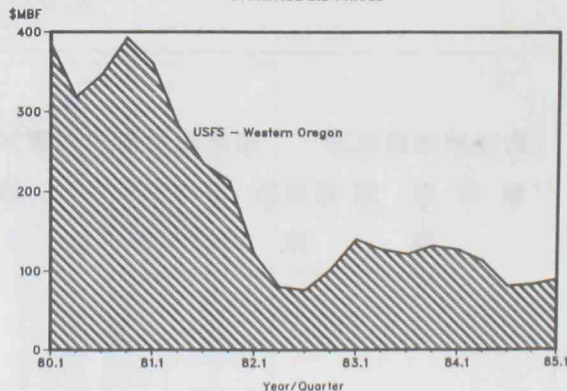


FIGURE 8

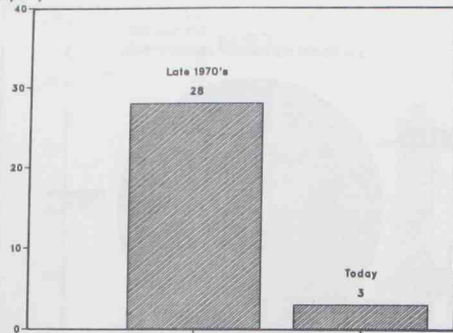


FIGURE 9

ORGANIZATION CHART
FOR A LUMBER UNIT - 1980

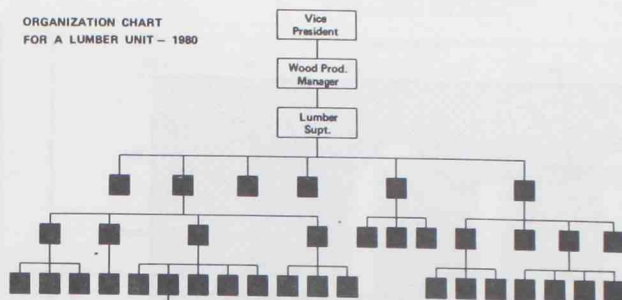


FIGURE 10

ORGANIZATION CHART
FOR A LUMBER UNIT - 1982

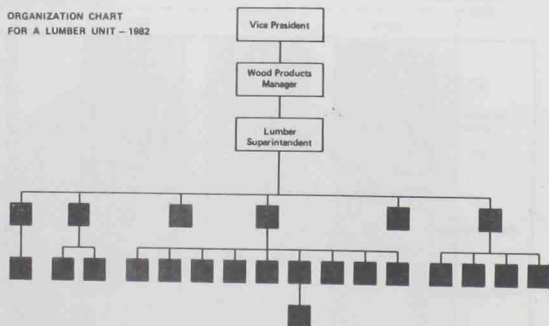


FIGURE 11

ORGANIZATION CHART
FOR A LUMBER UNIT - PRESENT

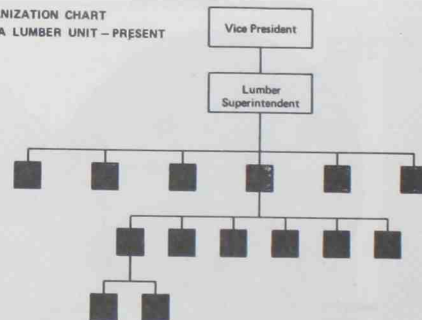


FIGURE 12

VALUE OF HOUSING EXPENDITURES
(1984 \$)

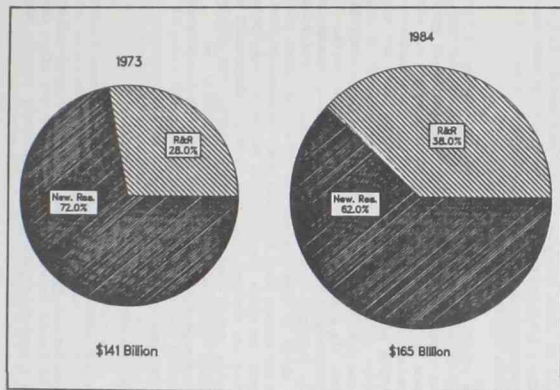


FIGURE 13

TOTAL HOURLY COMPENSATION
OF PAPERWORKERS
1984

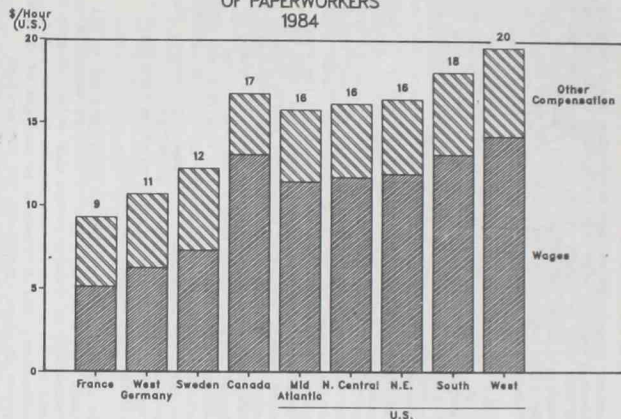


FIGURE 14

TOTAL HOURLY COMPENSATION
OF PAPERWORKERS
1980-1984

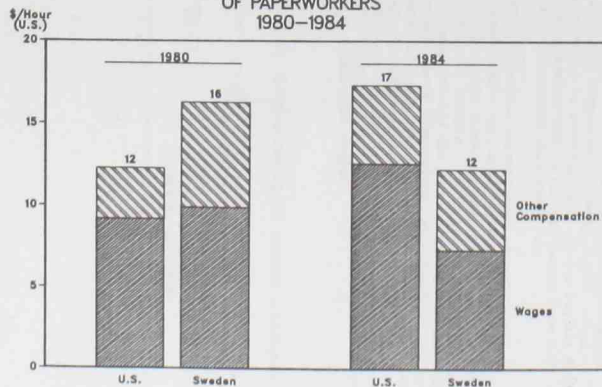


FIGURE 15

THE FUTURE OF PUBLIC FORESTS IN THE PACIFIC NORTHWEST

by

Marion Clawson

Western Oregon and western Washington are a heavily forested region, with over 80 percent of their area in some kind of forest (Table 1). Only Maine and New Hampshire among the States and only New England among the major regions of the country are more heavily forested.

These Pacific Northwest forests vary greatly by site class; 15 percent is in the so-called "noncommercial" category and 67 percent of the total forest area or 79 percent of the so-called "commercial" forests are in the top two productivity classes.

The forests of the region also vary greatly in their ownership. Nearly half of the "commercial" forests are publicly owned and of them the national forests are slightly more than half, or the national forests are 29 percent of the total commercial forest area. The O & C forests of western Oregon and the State forests are also important in area, and there are other federal and local government public forests as well. The private "commercial" forests also vary by ownership, with somewhat more forest area owned by forest industry firms than is included in the national forests. But there are also farm and other private forests of considerable extent. In addition to all these categories of "commercial" forest, there is a considerable acreage of so-called "noncommercial" forest, about which we have only limited statistical information.

In all discussion of forests everywhere and at all times -- and in this paper -- one must emphasize the variability of forests within each major category as well as the differences in forests between major categories. The differences in averages of different groups is often significant but the averages themselves include large variations. One must be careful not to over-generalize about forests as a whole or about forests of some particular category. What is true about some forest tracts within each category may not be true about other forest tracts within the same category.

The variations within and among categories of forest classes are a direct result of the land disposal and land reservation processes in the history of public lands in the United States. That process was always a selective one. Each individual or corporation seeking private ownership of public lands and each public official seeking permanent reservation of those public lands chose the best tracts available, given the transportation, economic, and legal conditions of the time. In retrospect, one may argue that some bad choices were made; surely, information on which to base choices was often deficient. But, to the extent each decision-maker understood the facts, he chose the land best suited to his needs, among the choices available to him. The result was a highly varied land ownership pattern. One simply cannot apply laws, regulations, criteria, or management rules to all land, as if all land were exactly the same. This was true in the past, is true today, and will be true in the future.

FOREST STATISTICS

The best available statistics about forests, covering the entire forest area and available for a considerable span of years, are those produced by the USDA Forest Service. Indeed, these are often the only statistics available -- the only game in town.

Dr. Marion Clawson is Senior fellow emeritus, Resources for the Future in Washington, D.C.; formerly was Director of the Bureau of Land Management.

But those statistics are sometimes seriously misleading and are also often seriously insufficient as a base for wise decisions on forest policy. A forest industry man once told me that all forest industry was based on two great lies. One was "2 X 4"; when planned, what started out as a 2 X 4 is really 1 5/8 X 3 5/8, but we never say, "hit the mule over the head with a 1 5/8 X 3 5/8". Instead, we say, hit him with a 2 X 4, in spite of the fact that the piece of lumber is 27 percent short of the specification. The other great lie, this man said, was "mill overrun", or the idea that the mill somehow got more lumber out of the logs than should have been expected. As he said, mill overrun was built into the estimates of log volume and it would have been the absence, not the presence, of overrun which should have produced special notice.

I would add to these a third major lie: "commercial" as the term is employed to describe forests. Webster's New Collegiate Dictionary defines "commercial" as "suitable, adequate, or prepared for commerce ... viewed with respect to profit." The Forest Service in its Glossary (Forest Service, 1980) defines "commercial timberland":

Forest land which is producing or is capable of producing crops of industrial wood and is not withdrawn from timber utilization by statute or administrative regulation. (Note: Areas qualifying as commercial timberland have the capability of producing in excess of 20 cubic

feet per acre per year of industrial wood in natural stands. Currently, inaccessible and inoperable areas are included.)

Except for the reference to "industrial wood", this is a purely physical or biological definition, but one given a name which specifically includes a judgment about economic profitability. There is no consideration of the value of the wood per cubic foot, nor of the cost of growing it, nor of the cost of getting the logs out of the woods (including road costs). Likewise, there is no consideration of the environmental hazards of harvesting the wood which can be grown, nor of the possible values of the forest site of outputs other than wood harvest. When consideration is given to these factors, at least a fourth of the so-called "commercial timberland" is not truly commercial (Clawson, 1981). This percentage is probably lower in the Pacific Northwest than elsewhere but it is significant here also, as later discussion will point out.

This definition underlies all Forest Service comprehensive statistics on forest area, timber stand, timber growth, timber mortality, and other aspects of forests. It is nearly impossible to estimate exactly the situation if a more reasonable definition of "commercial" were employed. Later, I make some such estimates for the Pacific Northwest but, at the best, they are regrettably rough or approximate. The results of this Forest Service definition of "commercial" are unavoidably misleading to a significant degree.

TABLE 1.

AREA OF FOREST LAND BY MAJOR OWNERSHIP CLASS AND BY PRODUCTIVITY CLASS, WESTERN OREGON AND WESTERN WASHINGTON, 1977

(million acres)

Kind of area	"Commercial" forest ^a				"Noncommercial" forest				Total, all forest
	Total	Productivity class ^b			Total	Productive reserved	Productive deferred	Other forest	
		120 +	85 - 120	50-85	20-50				
National forest	6.8	2.9	1.6	2.0	0.3				
National parks & monuments ^c	0					1.3			1.3
O & C	2.0								
Other federal	0.1								
Indian	0.2	3.1	0.8	0.6	0.1				
State	2.1								
County and municipal	0.3								
Total public	11.4	6.0	2.4	2.6	0.4				
Forest industry	7.5	5.4	1.3	0.6	0.2				
Farm forests	1.5	2.5	1.0	0.8	0.3				
Other private	3.0								
Total private	12.0	7.9	2.3	1.4	0.5				
Total forest	23.4	13.9	4.7	4.0	0.8	4.2	1.3	0.3	27.7
Total land area								2.6	34.7

Blanks indicate data unavailable. Totals may not add, due to rounding.

^a "Commercial timberland: Forest land which is producing or is capable of producing crops of industrial wood and not withdrawn from timber utilization by statute or administrative regulation. (Note: Areas qualifying as commercial timberland have the capability of producing in excess of 20 cubic feet per acre per year of industrial wood in natural stands. Currently, inaccessible and inoperable areas are included)."

^b Annual growth in cubic feet per acre from fully stocked natural stands near age of maximum mean annual increment.

^c Crater Lake, Mount Rainier, and Olympic national parks.

Source: Forest Service, *An Analysis of the Timber Situation in the United States, 1952 - 2030*, Forest Service United States Department of Agriculture, Washington, D.C. Various Tables in Appendix 3, Forest Statistics.

But the Forest Service data on forests are incomplete and insufficient in several serious ways. The data relate only to "industrial wood"; even firewood is not included. There are some deficiencies of the definition even for industrial wood but, more seriously, the definition and the statistics apply only to wood for industrial uses -- there are no other equally comprehensive data, covering all forests, with uniform definitions, and including a number of years, on any other outputs of the forest than wood. Critics will say, with some accuracy, that this definitional characteristic reflects the sawlog bias of the Forest Service.

Because comparably complete data on other outputs of the forests are lacking, it is very difficult to estimate the interrelations of wood growing and other forest outputs. Analysis of forest outputs and of forest policy are unavoidably incomplete and biased because there is a lot of data on one forest output and very much less data on other forest outputs.

There are relatively few data available on the "noncommercial" forests, as Table 1 illustrates. In the Pacific Northwest, this category includes some forests highly productive for wood growing -- Olympic, Rainier, and Crater Lake national parks, for instance. Even in the Pacific Northwest, where most forests are highly productive, there are some areas covered with light stands of trees not capable of growing 20 cubic feet of industrial wood per acre annually, that are included in this category. Presumably there are some such forests in each major ownership category but, as Table 1 shows, there are no data on this point.

The Forest Service data are more detailed about the national forests than about any other class of publicly owned forests.

In many of the statistical tables, all public forests other than national forests are shown as one total. This is perhaps not too serious in some regions of the country where other public forests are relatively small but in the Pacific Northwest, as Table 1 shows, the "other public" forests are large in area and important in many ways. The Forest Service data do show a good deal of detail about the forest industry forests but often all other private forests are lumped into one total, in spite of considerable differences within this general category.

The Forest Service data on forests are based on sample surveys; that is, sample plots are located on the ground, the trees and other characteristics measured on these plots, and the sample then extended to the whole area, often as defined from aerial photographs. This procedure produces statistics but it does not produce maps. For instance, one can get maps showing the exterior boundaries of national forests and of some other public forest lands, but these often do not show private inholdings within such exterior boundaries, and -- most important -- they do not show the boundaries of the various productivity classes. A Forest Service officer or other knowledgeable person can often make some fairly accurate estimates of the location of such boundaries, by drawing on general knowledge or other sources of information, but the sample survey process does not produce maps showing such boundaries.

The employees of the Forest Service, of other public agencies, and of forest industry firms, and members of conservation and other groups, often possess much additional data and knowledge of forests in general or in particular locations. But such information is typically not comprehensive for all forests in a region or in the nation, or it is not quantitative, or it is not comparable over significant periods of time, or it employs definitions not universally accepted, or it has some combination of these deficiencies. Such knowledge may enable its possessor to interpret the Forest Service statistics in a way that persons not possessing such information are unable to do. Such knowledge is valuable but it is generally inaccessible to the analyst who seeks to study all forests in a region or nationally, over a period of time.

CHARACTERISTICS OF PACIFIC NORTHWEST FORESTS

The national forests of the Pacific Northwest have about twice as much volume per acre of both growing stock and sawtimber as do forests of other ownership categories (Table 2). It is unclear how these relationships would be different, were it possible to make the comparisons for the truly commercial forests. On the one hand, the less productive forests, by and large, had lower volumes of standing old growth timber than did the more productive forests. On this basis, comparisons of the truly commercial forests would reveal an even greater difference between national forests and other forests than is shown in Table 2. On the other hand, to the extent that timber harvest in the past has been more than proportional on the heavier stands of timber, present stands are lower on the better sites, compared with their old growth stands, than they are on the less productive sites. On this basis, the larger volumes on the national forests might be reduced somewhat if the comparisons were for the truly commercial areas only. This is one of the several points on which the available statistics do not permit the drawing of sound and important conclusions. The high volumes per acre on the national forests reflect primarily the presence of relatively more mature old growth stands on these areas, than on forests of other ownerships.

The national forests of the Pacific Northwest have a gross growth of wood per acre annually that is less than two-thirds the average gross growth of wood per acre from forests of all other ownerships. This lower gross growth of wood is due primarily to the larger volumes of mature old growth timber on the national forests, most of which is growing slowly if at all. Again, it is unclear how much different this comparison would be, were it possible to make it for the truly commercial forests only. While the less productive forests supported smaller volumes of mature old growth, their annual gross growth today may not be much lower than on the yet unharvested mature stands on the more productive sites.

On the national forests, annual mortality slightly exceeds net annual growth. That is, mortality is slightly more than half of gross growth. Half of the gross growth is for the bugs who attack standing or fallen trees, and half is for people who use the wood for lumber, plywood, or paper for various human uses. If one believes there is something noble about letting old trees stand until a storm, fire, or bugs bring them down, and then letting the fallen trees be

eaten by the bugs, and that there is something ignoble about cutting trees down to provide commodities usable by people, then this situation on the national forests is good, if not ideal. The mortality per acre on national forests is a third higher than on other public forests and more than twice as high as on privately owned forests. The high mortality on the national forests is, in part, a function of the larger volumes of mature old growth stands.

Because annual mortality is so high on the national forests, net timber growth is only about a third as high for growing stock and is much less than half as high for sawtimber as on forests of every other ownership class, including other publicly owned forests. This relationship of net timber growth per acre on other forests exists in most other regions than the Pacific Northwest. This low growth rate of timber on national forests has never inhibited the Forest Service from lecturing other forest owners, public and private, about how the latter should manage their forests.

The information in Table 2 relates only to the growth of wood; it does not deal directly with any of the other outputs of the forests of various ownerships. This is one of the deficiencies of the available forest statistics.

TIMBER GROWTH AND HARVEST IN THE PACIFIC NORTHWEST

On the basis of all the so-called "commercial timberland" (Forest Service definition) the national forests have a lower timber productive capacity per acre than do all other forest ownership forests (Table 3). This has led some forest economists and others to emphasize the lower productive capacity of the national forests, as a basis for a somewhat different management of these forests than of other forests (e.g., Krutilla, 1977). It is, of course, true that the national forests were established only after some of the most productive forests had already gone into private ownership, and thus to some extent the national forests were "left-overs" from the disposal process. However, if the two least productive forest sites are dropped out, and the

comparisons are made only for the two most productive site classes, most of the apparent discrepancy in forest productivity disappears. What is striking for the comparisons based on the more productive sites only is the near-equality among the various ownership groups. Table 1 has shown that the national forests include proportionately more of the less productive sites than do other major ownership classes. The apparent low productivity of the national forests is a consequence of the inappropriate definition of commercial forests.

The data in Table 2 show that the gross growth of wood per acre annually on national forests is much lower than the gross growth on forests of other ownerships. Table 3 shows that this gross growth, in terms of cubic feet of wood per acre per year, is much less, compared to the productive potential of the forests, for national forests than for forests of any other major ownership. This comparison is made for forests of all productive sites, because the available data require that the comparison be made this way; if the data were available, the differences would almost surely be greater if the comparisons were made for the truly commercial forests only.

Comparisons of net growth per acre, in relation to productive capacity, show the national forests as much less productive than the average forests of all other major ownership categories. This is due, of course, to the high mortality on the national forests. Net wood growth is less than potential capacity for all major forest ownership categories but is far closer to potential on other forests than on national forests.

The estimates of forest productive capacity in Table 3 are based on good natural forestry. With high yield or intensive forestry, output per acre could be doubled or more, partly because mortality would be greatly reduced by thinnings and utilization of the thinned material. Capacity, whether for natural forestry or for high yield forestry, does not measure profitability; in either case, some of the output may be more costly to produce than it is worth. But comparisons of physical or biological productivity, which ignore economic profitability, are as valid for intensive as for natural forestry.

TABLE 2.

STAND AND GROWTH OF TIMBER^a PER ACRE OF "COMMERCIAL" FOREST, IN WESTERN OREGON AND WESTERN WASHINGTON, 1976

Kind of area	Standing volume		Annual growth of growing stock (cu. ft.)			Annual growth of sawtimber (bd. ft.)		
	Growing stock (cu. ft.)	Sawtimber (bd. ft.)	Gross growth	Mortality	Net growth	Gross growth	Mortality	Net growth
National forest	6,630	40,595	71.1	35.8	35.3	392.3	189.1	203.2
Other public	4,558	24,541	125.2	26.6	98.6	614.6	138.6	476.0
Forest industry	3,375	17,910	117.0	16.8	100.2	579.0	77.8	501.2
Farm and other private	2,708	11,906	121.6	13.4	108.2	540.8	46.4	494.4
All forests	4,445	24,767	106.7	23.7	83.0	527.0	116.6	410.4

Numbers calculated by use of rounded areas shown in Table 1.

^aSoftwood plus hardwood.

Source: See Table 1.

In 1976 the harvest of timber from the national forests of the Pacific Northwest was greater than either gross or net growth but was substantially less per acre than the productive capacity of these forests (even when the less productive sites were included). The national forests, as the forest industry forests, were in the process of reducing timber inventory. Other public and other private forests were harvesting less than their net growth, thus building up their timber inventories. The reduction in inventory implicit in harvests greater than net growth for the national forests was from a base of a relatively very large inventory of standing timber per acre; for the forest industry forests, this reduction in inventory was from an inventory of standing timber per acre which was very much less.

The data in Tables 2 and 3 show that up to 1976, whatever laws, regulations, and rhetoric might proclaim, the Forest Service had been employing a substantially different set of economic principles in the management of the national forests than had been the owners/managers of forests of all other major ownership categories. The national forests had very much larger inventories of standing timber per acre, had lower gross growth rates per acre, had very much higher timber mortality per acre, and from other data we can ascertain that in both earlier and later years, the Forest Service was feeding out for private

use some of its standing inventory, but very slowly. Later we shall offer some judgments about the economic wisdom of this management strategy.

USES AND USERS OF PUBLIC FORESTS IN THE PACIFIC NORTHWEST

All forests in the Pacific Northwest and elsewhere, whether privately or publicly owned, produce several kinds of outputs, varying in quantity and quality, and irrespective of management actions:

Wood growth is an essential characteristic of forests; by definition, a forest must have the capacity to grow wood;

All forests are watersheds because rain and snow fall everywhere, irrespective of man-made property lines;

All forests have several kinds of wildlife, though both kinds and numbers may be influenced by forest management;

All forests have aesthetic or appearance values, but whether the viewer regards dense old growth stands, open stands where the sunlight easily reaches the ground floor, or thriftily growing second growth stands as the most attractive is a function of the viewer's tastes, not of the forest alone; and

TABLE 3.

PRODUCTIVE CAPACITY, ACTUAL GROWTH, AND HARVEST OF GROWING STOCK TIMBER^a, WESTERN OREGON AND WESTERN WASHINGTON, 1976, AND OUTDOOR RECREATION USE, 1977.

Item	National forests	National parks and monuments	Other public forests	Forest industry forests	Farm and other private forests	Regional average
1. Timber productive capacity, "commercial" forests - cu. ft. per acre ^b						
All commercial forests	109		126	132	120	122
Two most productive classes ^c	133		140	141	136	138
2. Annual gross growth per acre - cu. ft. ^d						
Actual	71		125	117	122	107
As percent of productive capacity	65		99	89	102	88
3. Annual net growth per acre - cu. ft. ^d						
Actual	35		99	100	108	83
As percent of productive capacity	32		79	76	90	68
4. Harvest - cu. ft. per acre						
Actual	77	0	97	179	55	110
As percent of gross growth	108	0	78	153	45	103
As percent of net growth	220	0	98	179	51	132
5. Recreation visits per acre ^e	1.09	3.24				

Blanks indicate data unavailable.

^a Softwood plus hardwood.

^b Sum of area times midpoint of each class interval, divided by total area in class. Fully stocked natural stands near age of maximum mean annual increment.

^c Classes capable of producing 85 or more cubic feet per acre annually.

^d See Table 2. Calculated for all productivity classes.

^e Average for all areas of class in whole area of two States.

Source: See Tables 1 and 2.

All forests have the capacity to provide opportunity for outdoor recreation, whether on developed sites or in relatively natural conditions.

These various outputs and their attendant uses are often compatible, one with another (Clawson, 1974). It is only timber harvest and wilderness preservation and use which are totally incompatible -- if either is the object of forest management, the other is fully precluded. For all the other uses, there is a wide range of quantities and qualities of output, dependent upon the forest management, but none can be totally excluded, even if it is desired to do so.

Single use or single output of a forest, to the exclusion of all other outputs and uses, is impossible. There will always be some wildlife, some watershed function, and some aesthetic or appearance output, no matter how the forest is managed. This does not say that either quantity or quality of these outputs is predetermined and invariable. But multiple use, in the sense of several outputs from the same area, is not only possible but is unavoidable. If the purpose of management is to produce wood for harvest, there will still be the watershed, wildlife, and appearance outputs; if the purpose is management for a specific species of wildlife, there will always be other species of wildlife, and watershed, and appearance outputs; and so on, for every other prime management purpose and associated secondary output. This is true whether the secondary outputs are wanted or unwanted.

Multiple use management of a forest may seek to achieve some desired mixture of outputs, which invariably means some trade-off of one kind of output as against some other kind or kinds of outputs. Such trade-offs always and inevitably involve some concept of relative value of each, whether such concepts include specific estimates of monetary values or are more intuitive and less clearly quantitative in origin.

There are many kinds of users of public forests in the Pacific Northwest, corresponding in part to the many kinds of outputs. That is, some people use established wilderness areas, others engage in various forms of outdoor recreation in a forest setting, some hunt or otherwise enjoy wildlife, nearly everyone is dependent in some degree upon water flowing from forested areas, and there is an extensive industry based on timber harvest and utilization. Many persons use the forests in more than one way; the sawmill worker may be a hunter on the weekend, and he and his family almost surely consume water which originated, at least in part, from a forested area; and scores of other use patterns exist.

Much of the economics and other literature about forests distinguishes between "commercial" or "commodity" uses and outputs, which typically are priced in some kind of a market, and the noncommodity or personal uses of the forest which are typically not priced in a competitive or economic market, though they may have prices established by administrative action.

A more meaningful distinction is between those forest outputs which are consumed, usually on site, by the final user or consumer, and those forest uses or outputs where the first consumer is a middle man

between the forest and the final consumer. For instance, outdoor recreation, including enjoyment of a wilderness area, is "consumed" by the visitor on the spot; he or she travelled to the production site for the consumption. But a timber processor buys logs from a public forest in order to convert them into lumber, plywood, paper, or other product, which is sold to a final consumer. The timber purchaser is similar to the recreation outfitter or guide; the home buyer is similar to the recreationist.

There are indeed differences among different kinds of forest users, but there are great similarities among them also, and it is a mistake to assert that fundamentally different kinds of considerations affect different kinds of uses and users. Each is concerned to get what he or she most wants from the forest, both in quantity and quality, and at a price or cost which can be afforded and which is generally less than the costs or price of the next best alternative. Each is likely to be equally selfish in pursuing his or her objectives, but each may be willing to negotiate with competing prospective users to achieve a use-mixture from the forest which most nearly satisfies all prospective users.

Users of public forests today for all the outputs of the forest in the Pacific Northwest, as in other regions, are typically rather well educated, socially sophisticated, and have middle to high incomes. The horny-handed, unwashed, and illiterate woods pioneer is long since gone. The typical user today has knowledge and expertise about the forest use or uses in which he or she is most interested. This does not in the least mean that this more or less typical user is without biases -- far from it! This typical user is not reticent about expressing his or her views about public forest management and is not reluctant to use political power in an effort to gain what he or she wants. This typical user of public forests today is far less willing to accept the statements and the judgments of the public agency forester employee on faith alone, than was the forest user of a generation ago. As far as the public is concerned, today is a wholly new ball game compared with yesterday, and the forester must accept this fact.

PUBLIC FOREST PLANNING AND MANAGEMENT

Practical planning and management of public forests -- that is, planning and management decisions which will stand up under criticism and attack -- is complex and difficult. It requires information of five different kinds and analyses of five different kinds -- not merely each, but all of them (Clawson, 1975):

1. The physical and biological feasibility and the consequences of some proposed action must be considered carefully. There is nothing gained, and much may be lost, by proposals which simply will not work. For instance, it may be impossible to get adequate natural reproduction of a timber stand after some form of timber harvest -- whether that harvest is a partial one and the desired species will not grow in shaded areas, or whether that harvest is one species (as in a mixed pine-hardwood stand) and the hope is that the harvested species will regenerate when in fact the site will be taken over by the species not harvested. It is not merely the immediate feasibility of the proposed action that

must be considered, but its longrun consequences, if it is carried out. Will selective cutting really downgrade the forest over the next several decades, or not?

2. What is the economic efficiency of the proposed action? Will the benefits, both monetary and non-monetary, to whomsoever they shall accrue, be greater than the costs -- and greater, in proportion to costs, than from any alternative action on the same site or from alternative uses of the same inputs on some other site? If cost is literally no object -- if one has a blank check on the Federal Treasury -- then a great many actions are possible; but if one is really concerned with social welfare, then costs and returns must be considered and balanced. Economists have developed much methodology for doing so -- benefit-cost analyses or ratios, internal rates of return, discounted present net worth, etc. Since all such analyses apply, to greater or lesser degree, to the future rather than to the present, there is inevitably a considerable degree of uncertainty about such analyses -- uncertainty which is not lessened by use of more elaborate forms of analysis. I should add that economic efficiency for public forests is valued more highly by the professional economist than it is by the general public or by the legislator.

3. Economic equity is concerned with who pays the costs and who gets the benefits. For public forests -- as for many other kinds of natural resources -- the costs are born, at least in the first round of cost-sharing, by the general taxpayer; the benefits accrue to user groups, again at least in the first round. This disassociation of costs and benefits leads to many of the most difficult and persistent political problems in federal actions related to natural resources. When the Federal Treasury bears most of the cost of water developments (irrigation, flood control, navigation improvement, etc.) while some interest group gets most of the benefits, there naturally enough arises much political pressure from that user group for federal action. It is economic equity -- often by some other name -- which is likely to get far more attention from legislators than is economic efficiency. Who supports and who opposes some action? Who claims that some action will harm him or her, and who says it will benefit him or her? These are the sounds to which the legislative ear is often attuned.

4. But the social or cultural acceptability of some proposed action may be as important as any consideration of economic efficiency or economic equity, and quite separate from such economic considerations. For instance, specifically for public forestry, there is a strong emotional objection to clearcutting, on the part of many conservationists and observers -- objections which are impervious to any analysis of silvicultural feasibility, economic efficiency, or economic equity. There is widespread opposition to nuclear electrical power generation, impervious to any analyses of comparative risks of nuclear and other power sources or to economic costs and benefits. There is support for uncontrolled free-ranging wild horses and burros, impervious to any ecological analyses of the consequences. And one could go on, listing many other cultural attitudes which determine political support and opposition, at least by some people. Ordinary people in most societies around the world are often unaware of their cultural biases and

attitudes -- they simply know that they prefer or demand certain actions or relationships, which they typically regard as normal or natural. The anthropologist or the stranger from a different culture is more likely to study and to measure these cultural attitudes and biases.

5. Lastly, the operational or administrative practicality of any proposed action must be evaluated. There is little gained, and much may be lost, by adoption of some proposal which simply cannot be carried out. A proposal which assumes no political support or opposition is simply unrealistic, for instance. But some proposals would require a level of professional expertise at the ground level which is most unlikely to be forthcoming. A proposed planning procedure may require information which is now and likely will be in the future unavailable, or requires so much time that answers will not be forthcoming when needed, or is so complicated that operating personnel cannot understand it. Persons experienced in governmental resource management can supply many instances of proposals which were simply impractical of operation.

None of these five approaches alone is sufficient in the management of public forest lands.

Physical-biological considerations are basic but not sufficient; one cannot reach decisions which will stand up, based on silviculture or ecology only. But, equally, economic efficiency alone is not enough; economic equity, cultural attitudes, and administrative practicality may greatly affect apparent economic efficiency. In planning and management of public forests, any attempt to shortcut the process by ignoring or eliminating any one of these five considerations will almost certainly fail, and in the end take more time and more effort than if all had been considered initially.

Even if all these considerations could somehow be worked into a complex formula -- and this would be very difficult, since each relies upon different kinds of analysis -- it would be impossible to maximize all five in a single analysis. Rather than maximize, the process may seek to satisfice -- that is, to employ each consideration to or above some minimally acceptable level, while at the same time considering the other variables. Planning and action which uses all these five factors is more likely to depend upon negotiation among interested parties (or professional specialists) than it is to depend on rigorous mathematical analyses.

None of these five factors is absolute and unchangeable over time. If something is profitable enough, cultural opposition to it is likely to melt away gradually, or administration can be improved so that the economic gains can be realized. Even physical and biological feasibility is subject to modification as new research opens up new possibilities. The forester, whether in private or in public employ, simply must consider the trade-offs between and among these five factors. Moreover, his or her actions may well change some of these factors. In particular, public attitudes or cultural factors are affected by actions of public employees, whether those actions are so intended or not.

Public participation in planning and in decision-making is both possible and today is likely unavoidable in each of these five stages of phases.

Public participation is a complex but important matter at every stage. The most important consideration is to try to involve every significant group in the total public, letting their competing interests partially offset one another and letting each serve as a critic and evaluator of other positions (Culhane, 1981). The final decisions must be made by the private or public employee; only he or she can be held responsible for the actual decision and its implementation.

INTELLECTUAL AND IDEOLOGICAL BASES OF AMERICAN FORESTRY

The intellectual and ideological bases and history of forestry, like those of every other profession, are important, and to a large degree, affect the profession today. American forestry has a Germanic origin (Clepper, 1971; Dana (first edition), 1965; Ise, 1925; and Zivnuska, 1952). In spite of the passage of nearly 100 years, American forestry today still reflects that origin. Bernard E. Fernow and Carl A. Schenck were born and educated in Germany; Filibert Roth was born and partly educated in Germany, partly in the United States; Henry S. Graves and John C. Gifford were born in the United States but received their forestry education in Germany; and Gifford Pinchot was born in the United States, received his formal education in France but was much influenced by the German forestry experience. Not only did these men practice forestry in the United States as they had been taught in Germany, but they or their contemporaries provided forestry education in universities and other schools which employed forestry concepts imported from Germany.

German forestry experience in the late 19th century was particularly inappropriate for American forestry then and later, for three major reasons. In the first place, the German forests had long been under positive management and had an age distribution of their trees closely approximating the ideal of equal areas in each major age class. It was possible to cut an approximately equal area each year, reforest it, allow the trees to grow naturally, and some day cut again, with one cycle following another in an orderly fashion. Forests in the United States at that time consisted largely of old growth, which were dominantly trees of mature or older ages, and of some cut-over areas, typically not regenerating at all or at least satisfactorily. One reason the cutover forests were not regenerating was that fires were deliberately set to prevent just such regeneration. There was a widespread belief, based on considerable experience, that the forested areas, when cleared of trees, would go into cultivated crop farming, and hence that the removal of the trees and the prevention of regrowth were economically and socially beneficial. While much of our best cropland today had indeed then been cleared of its original forest, these practices were extended to many areas totally unsuited to crop production. In the late 19th century there was a notable lack of thrifty second growth stands of ages intermediate from seedlings to mature tree. There was a great imbalance in age distribution of American forests on a national scale, and an even worse one by regions or localities.

The Forest Service, beginning in 1905 when it was first created and extending to the present, set out to remodel American forests to fit the German concept of balanced age distribution, rejecting any idea of

remodeling forestry concepts to fit the forests actually existent. Some "progress" toward a balanced age distribution has been made over the past 80 years and if American taxpayers are tolerant enough, such a balanced age distribution may be achieved in another 150 years -- assuming that our children, our grandchildren, and our great-grandchildren still want such balanced age distribution on the national forests.

In the second place, Germany in the late 19th century was a wood deficit country, growing about half of its timber consumption and importing the other half. The demand for German timber could thus be nearly constant, year after year; fluctuations in demand could be met primarily by varying the volume of imports. Germany was able to "export" its demand instability to its supplier countries (e.g., Poland). The forestry theories which developed were strictly supply side theory. Faustmann, who is so often quoted and cited in the professional literature, and all his followers have omitted demand from their formulae about proper age of timber harvest. I find it strange that modern economists still employ methodologies which include supply but omit demand. Even such a distinguished economist as Samuelson has applied his methodology to forest management decisions only after assuming away all the demand aspects and problems (Samuelson, 1976).

The United States was a timber exporting country in the late 19th century; we as a nation have ambitions to build an export volume today. Indeed, wood exports from the Pacific Northwest to Pacific Rim countries are already large, especially in a regional context. The United States does import very significant volumes of wood products, especially from Canada, and especially from western Canada. Will these imports keep the United States permanently as a net importer of wood? These imports from Canada are primarily a transportation problem rather than a wood supply problem, but they clearly should be a forester's concern.

In the third place, German foresters could and did plan total national and total regional timber supply because they provided all or most of the wood from public forests. The Forest Service has sought to plan national and regional timber supplies in the United States in spite of the fact that the agency controlled only a part of such supply. As noted in Table 1, the agency has about a fourth of the potential timber supply for the Pacific Northwest. No matter what the agency does on the forest land it manages, total regional supply will be affected primarily by what happens on forests of other ownerships.

If the Forest Service really owned or controlled all the forest land of the Pacific Northwest, would it plan to manage the part in the national forests as it is in fact planning their management? Instead of striving for a balanced age distribution and a sustained flow of timber from this part of the total forest area, might it not plan now to cut more heavily from the remaining old stands and to achieve a balanced age distribution and a sustained flow of timber on an overall or total basis? It is interesting to speculate how the early German foresters would have managed the national forests of

the Pacific Northwest, had they been faced with forests of the actual characteristics of the present national forests, instead of the forests they actually did manage.

From this intellectual history of forestry, the Forest Service has developed a number of concepts, some of which are little more than myths, but which are persistent and powerful. There is total commitment to "sustained yield" and at least some support for its illegitimate offspring, "even flow". There is much support to the idea of an exactly equal volume of timber harvest each year. These are singularly static concepts; they assume an unchanging world, decades without end, where demand, production technology, processing technology, and transportation technology remain unchanged. Probably everyone endorses the idea of maintaining the productive capacity of American forests undamaged, and in fact enhanced by new methods of management; but the idea of a constant annual flow of timber from only one segment of the total forest area is indefensible in the judgment of many analysts.

Partly because the sustained yield concept when applied to old growth timber stands is so costly in real as well as monetary terms, some foresters have invented the "allowable cut effect." This asserts that if the managing agency undertakes some action now which it is expected or hoped will increase timber supply at some point (perhaps distant) in time, that present harvest of timber can thereby be increased as if the hoped-for future supply were actually available today. This idea is obviously absurd; but, having invented methodology which constrains present management, the proponents of allowable cut effect have sought to invent a magical escape from the dilemma which they created for themselves. The obvious question is: why not escape the dilemma by direct action in timber harvest.

Closely allied to these concepts of sustained yield, even flow, and allowable cut effect has been the concept of community stability. Under the 19th century conditions in Germany, sustained yield management of the entire forest area did provide an approximately equal annual cut of timber, which meant equal annual processing, steady annual employment, and steady local economies. But these were static concepts. In the United States, the cutting, abandonment, and moving on practices of the forest industry over the decades produced communities which often had short lives. Lumber camps and mill towns were established and abandoned, in the Pacific Northwest as elsewhere. It is doubtful if the advocates of community stability would today wish that these early communities had been preserved, for they typically did not conform to our present ideas of satisfactory local communities. Today, woods and mill workers can travel much farther from their homes to their work, and the whole idea of "community" has changed. There is little or nothing the Forest Service can do today that will be effective in preserving the forest-based communities of the Pacific Northwest, even if it is agreed that it is desirable to sustain those communities. It is misleading to argue that it can do so, when so much of the timber is in other ownerships.

In recent decades the United States has been the host to thousands of foreign students annually, who come here seeking undergraduate or graduate education in

many fields. By and large, and with some exceptions, we teach them what we teach the students from our own country. Many of those who come learn about American ways and go home, seeking to apply there what they have learned here. There are many tragic-comic stories of such efforts -- the man who studied soils at an American university, had shipped to his country several large boxes of the soils of the local area so that he could continue his studies at home -- and many others. Many of us are much disturbed by these episodes and wonder if our education is really a positive contribution to our foreign visitors. But we rarely seem to realize that we sent our students abroad to study forestry about 100 years ago and that they came home to try to practice here the forestry they had observed there, in spite of the drastically different conditions. More than that, those effects persist now, even after so many decades, and in spite of the development of an indigenous forestry profession.

PUBLIC FORESTS ARE INCREASINGLY THE SUBJECT OF PUBLIC ATTENTION

All public lands have been subjected to increased public attention in the past 30 years or so. For many years before that, such lands had been of concern to only a small minority of the total population, and primarily so only in the West. I focus my remarks on the national forests, because the subject of our interest is forestry, but many other aspects of other public lands have also attracted much public attention in recent decades.

One of the best measures of public attention is the laws passed by the Congress. Congress rarely moves until some problem or situation is pressing or acute and until action is demanded by significant numbers of people. Since 1960 there have been several major laws applicable only to federal lands -- The Multiple Use and Management Act of 1960 and the Public Land Administration Act of the same year; The Wild and Free Roaming Horse and Burro Act of 1971; the Forest and Rangeland Renewable Resources Planning Act of 1974; the National Forest Management Act of 1976 and the Federal Land Policy and Management Act of the same year; and others, important but perhaps less so than these named acts. There have been other laws, not directed specifically at the federal lands but which have had a major effect on them -- the Bureau of Outdoor Recreation Act of 1963; the Wild and Scenic Rivers Act and the National Trail System Act, both of 1968; the National Environmental Policy Act of 1969 (actually signed into law on January 1, 1970); the Alaska Native Claims Act of 1971; and many others, of perhaps less direct importance to the federal lands as a whole (Dana and Fairfax, second edition, 1980).

The initiative for the earlier Acts of this list came primarily from the Forest Service (and, to the extent the laws affected federal land outside of the national forests, from the Department of the Interior); the Congress reacted to the proposals from the federal agencies. Since 1970, however, the initiative has come primarily from the Congress, with the federal agencies reacting to the Congressional proposals. As John McGuire, chief of the Forest Service during much of this latter active legislative period said, after he retired: "Although the Forest Service had engaged in program planning at intervals since World War II, the 1974 Act originated in

Congress, not in the executive branch. It came about because of senatorial dissatisfaction with the annual budget presentations for the Forest Service." (McGuire, 1982).

In these later laws Congress was willing to allow the Forest Service authority for some discretionary action, but a smaller degree of such discretion than the agency had once possessed, and discretion within more carefully defined limits and for more clearly specified goals than formerly.

But there has been, in recent years, increasing criticism of federal land management from interest groups and professional workers of many kinds. When the Forest Service or the Bureau of Land Management have circulated draft plans or drafts of proposed regulations, these have often drawn thousands of letters of comment. The criticisms have come from the forest and other industry groups affected, from environmentalists and preservationists of many organizations, from social activists generally, and from academics.

One of the most extreme forms of public criticism is the lawsuit brought by some critic against some federal agency. There have been hundreds of such lawsuits in the past 20 years (Dana and Fairfax, second edition, 1980). The ability of dissatisfied groups to bring lawsuits was much increased by the Environmental Protection Act of 1970, as well as by some other legislation, but also by a much more permissive attitude of the courts today than was the case a generation ago. Lawsuits are expensive for all parties, often delaying decisions for many months, and often producing decisions which the economist would describe as "suboptimal" -- meaning, not as good as might have been arrived at by some other process. One may reasonably judge that lawsuits are employed only when the aggrieved party feels very strongly or only when the stakes are large.

There has been much recent criticism that the costs, especially of national forest management, are excessive in relation to the results, that the outputs from the national forest are too low, and that the very large sums of capital embodied in the national forests are inefficiently managed (Clawson, 1976a, 1976b; Nelson, 1981; Lenard, 1981; numerous reports from the Wilderness Society; and in recent years, numerous Congressional hearings). Beuter has succinctly and graphically stated the case (Beuter, 1985):

This paper has shown some weaknesses in the business practices of the Forest Service: a costly timber appraisal system that often yields appraised values that have little to do with market reality; an apparent lack of cost control for land management services funded through timber sale contracts; the lack of accurate, detailed timber sale costs and an inability to track costs over time; a confusing and potentially inequitable means of paying for roads built by timber purchasers; and timber sales that lose money and regional timber sale programs that are unlikely to be profitable, even in the best of times. The BLM has less of these problems but it too lacks an adequate accounting system and has had questionable cost control when funds were easily available in times of high timber prices.

An outsider may judge that the specifics of some of the criticism of some of these groups are confused or poorly stated, but the general thrust of all of them is pretty clear: national forest and other federal land administration is too costly in terms of the results achieved.

Many persons and groups -- the environmentalists, in particular -- have complained repeatedly that the federal agencies give inadequate consideration to public attitudes. Some of this may be dismissed as simply the gripes of the losers in the contests over public land management, but surely there is some basis to at least some of these criticisms (Clawson, 1983). For a long time, the federal agencies made decisions on the basis of their best judgment, without much input from others, after which they sought to sell the public on the wisdom of those decisions. The necessity, imposed by law, to consult the whole general public at every stage in the planning process confronts the agencies with a new set of rules to which adjustment has not been easy.

My greatest concern with the Forest Service today is that it follows or reacts, and does not lead intellectually or professionally as it once did. Controversy over national forests has been with us since the beginning; Gifford Pinchot loved a fight, and when no one tried to fight him, he went looking for a fight -- as his own autobiography dramatically attests (Pinchot, 1947). Over the decades the Forest Service has consistently fought for what it believed in -- winning some battles, losing others. I have not infrequently disagreed with their objectives but I have consistently admired their courage and their valor. Controversy is one sign of vitality. Today, and for the past twenty years, the Forest Service has typically been on the defensive and has shown a limited amount of initiative in dealing with the new and difficult problems it faces. There has been a notable lack of new answers and new approaches, and this disturbs me.

ALTERNATIVES FOR PUBLIC FOREST MANAGEMENT

If the present management of the public forests in the Pacific Northwest and elsewhere in the country is unsatisfactory to a major degree, what can be done about it?

The many possibilities form a continuum, with one proposal gradually merging into another. I discuss several ideas separately but most of them could be combined in varying proportions with some or all of the others. Whatever is done should be selective as to the characteristics of the land and as to the character of the public demand for the outputs of the forest. It would be highly undesirable to try to foist exactly the same program of management on all public forests, regardless of their nature and regardless of public demand for their goods and services. The land laws, especially those relating to disposition of public land to private ownership, have always been selective as to land characteristics, and with good reason.

In considering future management of public forests, it must be recognized that no single person and no single group will be in a position to make final decisions, acting alone. Under our modern American system of government, decisions and actions by government (whether federal, state, or local) always

involve a high degree of compromise among contending interests. Substantial agreement among most actors might indeed adopt courses of action opposed by small minorities but, typically, agreement or at least tolerance of all major actors is necessary. An analyst, such as myself, may make proposals or offer ideas, which may in fact become highly important in any decisions made, but no single person within the governmental decision process or outside of it can dictate the final answer. Even a powerful President may have to accept some compromises he would not choose.

One major tactical decision must be made by any person or group which seeks to change the management of the public forests: shall the proposed changes be incremental in scope and character, but directed to some end, or shall an attempt be made for a major shift in policy direction? At first glance, it may seem that incremental changes are easier to achieve, but this may be a mistaken view -- the fights over incremental changes may be as fierce and as prolonged as fights over major changes, and the gains less, even if the fight is won. Often only a major change will attract support and produce results.

When we come to major alternatives for management of the public forests in the future, there are several alternatives (Clawson, 1983). One alternative, and perhaps the likeliest of adoption, is to continue "business as usual" -- to seek only the minimum changes from present practices. Public agencies resist change, but so do interest groups. They both distrust change. They may complain about the present but immediately resist any attempt to change present arrangements in any significant way. The present management of the public forests is costly in terms of public funds expended and still more costly in terms of opportunities foregone or lost. But there have been no serious suggestions of dishonesty or fraud and it can fairly be argued that the management of the public forests is not much, if any, more inefficient than the conduct of governmental affairs generally. Though there has been much criticism of public forest management in recent years, as described above, it may be hard to rally enough public and political support for change, especially since there will surely be disagreement as to the precise nature of desired change.

The first step in changing public forest management is to preserve the basic outlines of the present process but seek gradual reform, particularly by changing some of the more costly and less effective present practices. Such a policy would seek to avoid some of the present worst practices by gradually substituting something better -- a gradualistic approach. For instance, the costly and misleading timber appraisals of the Forest Service might be totally abandoned or greatly simplified and greatly reduced in cost. This type of gradual reform seems to be what Congress chose in the 1974 and 1976 Acts; those Acts were in many ways significantly re-directions of policy, yet they retained much of the present structure, form, and practices. If this general approach is chosen, how much change, how far, and how fast? Is incremental reform really easier to achieve than is more basic change?

One change, rather large in its nature but still within the present basic structure of the public forest management agencies, would be the establishment of public log markets (Wead, 1964, 1965, and 1976; Clawson, 1978). Under the 1976 Act, the Forest Service has the legal authority to cut and remove timber from the national forests, by force account or by contractors, and to sell the logs in a public market. Thus far, this authority has not been used. This procedure would seem particularly appropriate in the Pacific Northwest, especially if other federal and state forest agencies cooperated in the establishment and operation of such public log markets; even private timber owners might be encouraged to participate. This would completely do away with timber appraisal in the woods, would open up the timber sale process to more competition, and would enable the Forest Service to have more control over potentially environmentally damaging harvests in the forest. While this would involve rather substantial change in present public forest management practices, I would still include it as a reform, not as a basic change of the system.

A far more basic and sweeping change would be to give public forest management agencies much greater freedom in use of receipts from the forests they managed, but at the same time to force them to live within their income (Beuter, 1985; Nelson, 1981; and Teeguarden, 1982). Nelson would apply this idea only to those national forests which seem to have genuine commercial timber possibilities; Beuter and Teeguarden seem to propose its application to all national forests. We sometimes lose sight of the fact that the national forests as whole for the whole decade of the 1950's did secure enough receipts to finance not only their current operations but also their capital investments (Clawson and Held, 1957; Clawson, 1967). Agency personnel would generally welcome freedom to use funds but they would find the discipline of limiting expenditures to receipts a new and challenging hurdle. In these proposals, expenditures for recreation, watershed, and wildlife -- those activities not normally yielding cash receipts -- would be financed by direct appropriations limited to these functions. The limitation of expenditure to receipts would be effective for timber and for range. My judgment is that many national forests could not achieve these objectives, even by total cessation of money-losing timber sales. These proposals would almost surely mean an end to timber sales in many Forest Service regions.

Another major alternative would be to turn all or much of the federal forest and other land to the States in which the lands are located. Both Oregon and Washington have significant amounts of forest land, as Table 1 showed, and each has had extensive experience with forest land management and with timber sales. While this is technically a practical proposal, at least for some federal forest land, it does not seem a very realistic one, politically.

Still another major alternative for public forests in the future is to sell all or much of them to private parties -- conservation groups, if they were interested, as well as industry firms. If this is adopted as a significant approach to the future management of the forests concerned, the nation must expect to sell some or all of the most productive forests. The idea of selling what the agencies do

not wish to retain, as proposed a few years ago, flies in the face of history and of economics. The junk the federal agencies do not want is junk no private buyer wants either. The land disposal process has always been a selective one, as we have noted, with the "best" lands going to private ownership. The difference between what any private group -- industry firm or conservation organization -- can produce from the best lands, is much greater, absolutely and relatively, than from the less productive lands, than any public agency can achieve. This proposal will outrage many groups and persons but it should be noted that some conservation organizations have begun to acquire significant areas of land. The terms of sale would be highly important, of course; and it is most unlikely that many areas of public land would ever be attractive for purchase by any organization under any terms.

Last among major alternatives in a much greater use of long term leases, both to commercial firms and to conservation organizations. A great deal of federal land is now committed to leases of varying lengths and for much forest and grazing land the present user or harvester has what amounts to a major longterm lease. I argue that the process could be regularized and systemized, with terms suitable to the use and the user, and with major conservation and other benefits to the nation (Clawson, 1983).

One new idea in my suggestions for greater use of longterm leases is the idea of pullback. One person or organization would apply for a longterm lease, under provisions of legislation; any other person or organization would have a right to "pullback" a significant part (perhaps as much as a third) of the area applied for, to be leased by the user of pullback, under the same terms as applicable to the original applicant. Various contenders for public forest and other land would thus have to deal directly with one another, reaching compromises and standoffs, and without trying to influence the public management agencies so directly and single-mindedly as at present.

Some of the foregoing alternatives differ greatly from present public land management -- that is their purpose; all would be controversial. Objections would be raised, over and over, that some of them represented sharp breaks with past tradition and past practice, and indeed they do. It should be recalled that the ideas of national forests, national parks, federal wildlife refuges, sustained yield, benefit-cost analysis, and many other ideas we take for granted today, were equally novel and controversial when first proposed. The American society is dynamic and changing, in ideas no less than in artifacts. Merely because something is new and different does not mean that it is necessarily good; but neither does it mean that it is necessarily bad. We Americans have been inventive and innovative in the past; there is little reason to think we shall not be equally innovative and inventive in the future, nor any reason to think that these traits will not apply to government as well as to other aspects of our lives.

THE FUTURE OF FORESTERS IN THE PACIFIC NORTHWEST

What does all this consideration of forests in the Pacific Northwest mean to the young forester, about to embark on a lifetime career in forestry? While

there are differences between public and private forestry, I am convinced that the similarities are greater than are the differences, hence much of what might be said about foresters in public forest management applies more or less directly to foresters in private forest management.

First of all, during his professional lifetime the young forester will almost surely face increasing demands from the public for all kinds of outputs from public foresters -- wood, in its various forms; outdoor recreation, water, wildlife, aesthetic, or visual aspects; and any others that anyone cares to name. This increased demand will not necessarily be to the same degree for all kinds of outputs nor necessarily be to the same degree in every location. Moreover, increased demand does not justify unlimited investments and unlimited expenditures on public forests. But it is unlikely that the demand for any output anywhere in the Pacific Northwest will decrease, and for many outputs the demand will increase nearly everywhere.

Increasingly, people will be more important than trees. Technical forestry solutions will still remain important but more and more it will be a consideration of what people demand, will accept, or will tolerate. The forester will increasingly be the negotiator, the mediator, and the seeker for consensus, as well as the technical expert.

The public forester must in the future be increasingly concerned with cost effectiveness -- what is achieved for what is spent. This will involve a consideration of all kinds of values, whether of cash or otherwise, and all kinds of costs. Among the latter, return on capital embodied within the trees and the land will become a major concern. There is every reason to expect increasingly tight governmental budgets, not only for the federal government but in the states and local areas also. Expenditures of public funds in forestry will increasingly be judged against possible expenditures of the same sums in wholly different governmental activities. It will not be enough to eliminate timber sales made at a loss, or deficits of timber costs over timber receipts; there will be increasing demands that the productive forests of the Pacific Northwest make a positive contribution to governmental treasuries. Foresters, public as well as private, will increasingly be forced to become businessmen, with a sharp eye for cost control and income possibilities.

All of these impending and fairly evident demands on the public forester of the future will challenge old concepts, old ways of forest management, and old "myths" about public forestry. The public forester of the future cannot get by simply by repeating old clichés, such as "greatest good for the most people in the long run", or "multiple use" or "sustained yield". Old ideas may still have value but new problems will require new approaches, and sometimes a new approach will require the abandonment or the major modification of some old idea.

Given this likely outlook for the public forester of the future in the Pacific Northwest, what is my advice to forestry students today? First of all, study diligently, get the best grades in your courses that you possibly can, and attain a professional competence and a professional recognition with the

forestry establishment. If you seek or are forced to become a change agent in the future, it will be enormously helpful to have a good solid respectable foundation on which to build.

In the second place, take a lot of "people" courses -- as many as you can fit into your required forestry courses. These should include economics, sociology, political science, anthropology, psychology -- and even psychiatry! You will likely judge many of these to be some what unreal, in terms of the world as you understand it, and you may well be right; but they may be no more unreal as they deal with people than are many forestry courses as they deal with trees. If your problems are going to be more with people than with trees, then you should learn as much as you reasonably can about people.

Once you are on a job as a public forester, forget most of what you learned in college -- give yourself a self-administered brain washing. Face up to the realities of the forest as you find it in your area of work, rather than to the forest of theory which might or might not ever exist there. Face up to the people with whom you must deal, regardless of whether or not they behave as various social theories say they should behave. Substitute realities for dreams and myths. As you carry out your responsibilities, consider carefully all alternatives, including modifications of ideas previously enshrined in the mythology. Analyze as hard-headedly as you can the likely consequences of every alternative action, including inaction. Consider who among your public wants what, and why, and how their attitudes may be modified or merged with those of others. Above all, allow for uncertainties in your analysis and for change. Reject pseudo-quantitative solutions, especially if complex, when the whole basis of the analysis is uncertain.

This general advice or these platitudes are, of course, easy for anyone to give; the real problems come in their application to specific situations and specific problems. That is where you come in! Last of all, be imaginative, innovative, daring within some limits, and be pioneers.

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is much the most enlightening about the conceptual
origins of American forestry but it is unfortunately
out of print and often unavailable to readers.)

INTRODUCTION

THE ROLE OF FOREST RESOURCES IN THE REGIONAL DEVELOPMENT OF THE PACIFIC NORTHWEST: AN HISTORICAL PERSPECTIVE

by

Richard M. Alston¹

Evan Vlachos, in the first Starker lecture, made the point that underlying the major transformations of recent history are two central themes: complexity and change. This paper elaborates on and applies these themes to the specific role of forest resources in the future growth and development of the Pacific Northwest.²

The essence of my message is neither novel nor difficult to understand. Western society is passing through a revolutionary transformation that is more fundamental than the phenomena of technological change, market cycles, shifts in market shares, or any number of isolated megatrends. The Pacific Northwest is not alone in its journey across the next watershed in history. What the future holds beyond the transformation is not precisely predictable, but it is mutable inasmuch as we create the future in the present. If from the lessons of the past we can learn to differentiate between those aspects of growth and development which are eternal and those which are ephemeral, we have a much improved chance that the future which we create will be one worth living. The role forest resources play in that future will be the result of choice, planning, and discretionary action.³

WHAT DO WE KNOW ABOUT THE DYNAMICS OF GROWTH?

What, if anything, do we know about the processes of growth and development? Can we find clues to the future based on our experiences in the past? What if any theories concerning growth seem relevant? Are the forest resources of the Pacific Northwest to be exploited in the early stages of regional development and then nudged into the background by more sophisticated enterprises as occurred in the Lake States and elsewhere? Are forest based enterprises obsolete or are they a sustaining base for future development?

The answers to these questions may, in part, be discoverable by reviewing the historical process of growth and development in America. It is important, however, to recognize at the outset that economic historians and growth theorists are not of one mind on the lessons of the past. Indeed, if I stress any one thing in this lecture it is that history can only offer clues to the possible solutions of our problems. We are all aware of the by now trite idea that those who fail to learn from the past are condemned to repeat it. But more important for the 1980's, we must recognize that those who dwell on the past, those who worship the status quo, and those who only entertain reactionary solutions to current problems will fail to recognize when the past is over, when something entirely new has arrived on the scene. As Stephan Rousseas (1982, p. 29) observes, history is messy and complex. It refuses to reveal its secrets easily to all but the most simple and desperate minds.

Nevertheless, if carefully and cautiously considered, there are some lessons from the past to guide us in determining the future role of forest resources in the growth and development of the Pacific Northwest.

Dr. Richard Alston is Presidential Distinguished Professor of Economics, Weber State College, Ogden, Utah.

A Brief Look at the Historical Record

Based on research conducted by Richard A. Easterlin (1960a, 1960b), Table I shows that interregional differences in per capita personal incomes have narrowed, in relative terms, from 1880 to 1980.⁴ Convergence is indicated if those regions that are above the national average tend to "fall" toward it while those regions below the national average tend to "catch up." Excluding for a moment the data for 1983 and 1984, we see that the tendency of regional per capita income to converge toward the U.S. average is unmistakable. Looking specifically at the Pacific region (Washington, Oregon, and California), for example, we see that from 1880 to the present there has been a consistent and steady movement from per capita income levels that were far above the national average (e.g., 204% in 1880 to the current situation which finds it virtually equal (e.g., 101%) to the national average. Between 1880 and 1940 the East North Central region (Michigan, Wisconsin, Ohio, Indiana, and Illinois) seemed to be an exception to the general trend. But, having diverged from the average during the earlier period, we find that since 1940 this region also consistently reflects the general movement toward convergence.

TABLE I.

CONVERGENCE OF PERSONAL INCOME PER CAPITA, 1840-1984
RATIO OF PER CAPITA INCOME TO U.S. AVER. PER CAPITA INCOME

CENSUS REGION	YEAR									
	1840	1880	1900	1920 ¹	1940	1960	1970	1980	1983	1984
New England	132	141	134	124	124	109	108	105	110	112
Middle Atlantic	136	141	139	134	124	116	113	107	110	108
East No. Central	67	102	106	108	112	107	105	102	99	100
West No. Central	75	90	97	87	84	93	95	97	96	99
South Atlantic	70	45	45	59	69	77	86	92	94	95
East So. Central	73	51	49	52	55	67	74	78	78	79
West So. Central	144	60	61	72	70	83	85	96	96	94
Mountain	-	168	139	100	92	95	90	95	93	92
Pacific ²	-	204	163	135	138	109	105	107	103	101
Washington	-	-	-	106	111	106	103	107	103	100
Oregon	-	-	-	97	104	100	94	98	94	91
Coefficient of Variation		50.0	42.1	32.1	30.1	18.6	14.0	10.3	10.8	10.5

¹ Separately reported data for Washington and Oregon are for 1929.

² Excludes Alaska and Hawaii; comparability uncertain since data for 1960-1984, calculated by author to correct regional redefinition in source, is not weighted by state population.

Source: 1840-1970, Historical Statistics of the U.S.: Colonial times to 1970. Series F 287-296, Part I, p. 242. 1980-83, Statistical Abstract of the United States, 1985, 105th ed., U.S. Department of Commerce, Bureau of the Census, Table No. 731, p. 440. 1984, Survey of Current Business, April, 1985, p. 38 (Preliminary data)

Examined as a group of states and regions we find that the range of dispersion around the mean (as measured by the coefficient of variation - the ratio of the standard deviation to the mean) steadily declines from 1880 to 1980. Whereas in 1880 the range of dispersion ran from 104 percent above to 55 percent below the mean, in 1980 no region was more than 7 percent above nor any region more than 22 percent below the national average. (Individual states show greater variance than regions, but even here the range has narrowed.) There seem to be stronger forces for convergence from above than from below the national average (Borts and Stein, 1964, pp. 20-21).

Although the period of time is too short to be an adequate representation of trends, we do find that since 1980 there are substantially more exceptions to the apparent convergence that dominated for the previous 100 years.³ In particular, we note that New England appears to be moving in an upward trend away from the mean, while the Mountain region appears to be moving in a downward trend away from the mean. Of particular interest to those from Oregon, we find a substantial deviation from trend since 1980,

falling from 98 percent of the national average to only 91 percent in 1984. (The state of Washington, and the Pacific region as a whole follow the convergence pattern.)

Future Implications: The BEA Projections

The convergence pattern exhibited over the past 100 years is widely recognized. Indeed, while guided by sophisticated analysis of regional trends in manufacturing, population, and other important variables, it may have been one of the major considerations that guided the analysts at the U.S. Department of Commerce, Bureau of Economic Analysis (BEA), in their 1985 projections of the growth rates of regional and state incomes to the year 2035. Table II summarizes selected material from their extensive study.

Two observations are in order. First, the projected growth in real per capita income for the nation is an increase of 85 percent over 1983, slightly less than doubling over the 52 year period. This is a substantial reduction from earlier forecasts.⁶ Second, the projections embody the convergence hypothesis. Note that all five states shown in the table (including, significantly, Oregon) are shown to reduce the relative dispersion between their own and the projected national average.⁷

Tables III, IV, V, and VI show that this convergence will be accompanied, according to the projections by the BEA, by a substantial relative reduction in the

importance of one and a slight relative increase in another important sector of the forest products industry in the Pacific Northwest. The lumber and wood products (L&WP) industry is projected to represent a substantially smaller proportion of own state manufacturing as a source of personal income for all of the states reported here. It is also projected that in all five states there will be a reduction in the proportion of the nation's L&WP attributable to the states reported. Collectively the projected fall from a 1978 level of 39.5 percent of personal income generated in the national L&WP industry to only 27.1 percent in 2035 is substantial. The paper and allied products (P&AP) industry is projected to show more variation in terms of impact, with the region as a whole more than making up the projected reduction in the state of Washington.⁸ The projections for employment, shown in Tables V and VI, suggest that the 15,100 jobs gained in P&AP between 1978 and 2035 will not significantly absorb the projected loss of 36,800 jobs in L&WP over the same period.⁹

A Crude Interpretation of the Historical Record

The rather convincing story told by the historical record, and embodied in the BEA forecasts, suggests that it doesn't seem to matter what regional resources, planning activities, or political conundrums in favor or against growth are in place, the outcome is short lived. Every successful region is seen to eventually lose its advantage and ultimately grow at a rate slower than the national

TABLE II.

PERSONAL INCOME PER CAPITA BY PLACE OF RESIDENCE 1969-1983, AND PROJECTED, 2000-2035 (1972 dollars)

	1969	1973	1978	1983	2000	2035
UNITED STATES	4,201	4,740	5,213	5,470	7,369	10,105
OREGON relative (US=100)	3,982 .95	4,574 .96	5,272 1.01	5,048 .92	7,046 .96	9,885 .98
WASHINGTON relative (US=100)	4,490 1.07	4,826 1.02	5,680 1.09	5,692 1.04	7,492 1.02	10,252 1.01
CALIFORNIA relative (US=100)	4,844 1.15	5,200 1.10	5,940 1.14	6,203 1.13	8,035 1.09	10,910 1.08
MONTANA relative (US=100)	3,557 .85	4,505 .95	4,697 .90	4,665 .85	6,506 .88	9,227 .91
IDAHO relative (US=100)	3,482 .83	4,277 .90	4,573 .88	4,473 .82	6,290 .85	8,904 .88

Source: 1985 OBERS, BEA Regional Projections, pp. 3, 13, 29, 57, 79, and 99.

Note: Difference in reported ratio for Washington and Oregon for 1983 in Tables I and II was not investigated by author. It is assumed that the difference results from the preliminary nature of the data in Table I. In any event the difference is not significant enough to alter the point being made.

average. Every unsuccessful region is seen to eventually begin to catch up and ultimately grow at a rate faster than the national average. Taken at this level, and focusing on the long- rather than the short-run, the implication is that resources put into efforts to raise a region's growth rate are wasted. Let the forces at work play out and the same long run result will be attained without substantial investment in planning (nor massive subsidies to attract industry via low tax rates, subsidized training, loan guarantees, or special bonding). The long run, it seems, favors "laissez faire."

Two Not So Crude Explanations of the Historical Record

There are probably as many explanations of the historical record as there are researchers. Here we shall briefly review two that have attracted large enough adherents (disciples) to qualify as "paradigms."

THE NEOCLASSICAL ECONOMICS EXPLANATION

The historical data are precisely those predicted by neoclassical economic theory for a closed but regionally diversified competitive economy. With the aid of a few critical assumptions concerning information availability, technological diffusion, scale economies, and resource mobility, neoclassical economic theory predicts that if an industry or region is earning supernormal returns to the factors of production, forces will be set in motion that will

bring the situation to an end. Lower paid workers in other industries or regions will migrate toward the higher paying jobs and regions. Capital will be attracted to the supernormal profits obtainable. The effect will be to increase the supply of resources in the industry or region experiencing success, this in itself tending to reduce the supernormal returns. In the meantime, the outmigration of labor from the backward regions will tend to increase the returns to the factors which remain. If relatively lower wages still remain, this should serve to attract new enterprises seeking to take advantage of the lower costs thereby implied. In the long run, barring barriers to entry and assuming labor and capital mobility is unhampered, the industrial or regional differences cannot be expected to continue forever. There may be regional differences in the returns to capital and labor arising from initial inequalities in the regional endowment of natural resources, but these will eventually disappear. Input and product substitution and interindustry competition will even erode the economic rents earned on scarce natural resources.

Neoclassical theory predicts that within states and regions the movement of capital and labor toward higher returns will reduce differentials. In American history this was accomplished by increasing agricultural productivity and by transferring laborers from relatively low productivity jobs in agriculture into jobs in manufacturing where increased capital had enhanced productivity.¹⁰

TABLE III.

LUMBER AND WOOD PRODUCTS AS SOURCE OF PERSONAL INCOME, BY PLACE OF RESIDENCE, 1969-1983, AND PROJECTED, 2000-2035 (Millions of 1972 dollars)

	1969	1978	1983	2000	2035
UNITED STATES	4,880.1	7,362.2	6,002.8	9,807.0	13,591.0
% US L&WP	100.0	100.0	100.0	100.0	100.0
% US Mnfg.	2.5	3.2	2.8	2.8	2.6
OREGON	678.2	1,043.9	748.2	1,049.2	1,297.6
% US L&WP	13.9	14.2	12.5	10.7	9.3
% Ore. Mnfg.	39.0	40.1	33.8	26.5	20.7
WASHINGTON	443.0	710.6	521.1	706.6	778.7
% US L&WP	9.1	9.7	8.7	7.2	5.3
% Wash. Mnfg.	14.1	19.2	13.6	10.1	7.1
CALIFORNIA	514.4	778.7	534.9	912.2	1,267.3
% US L&WP	10.5	10.6	8.9	9.4	9.1
% Cal. Mnfg.	2.8	3.5	2.2	2.2	2.0
MONTANA	80.2	129.1	97.4	150.4	191.5
% US L&WP	1.6	1.8	1.6	1.5	1.4
% Mont. Mnfg.	36.4	42.3	40.1	36.9	31.3
IDAHO	126.6	232.7	160.4	231.1	283.1
% US L&WP	2.6	3.2	2.7	2.4	2.0
% Ida. Mnfg.	37.7	39.0	30.3	22.5	16.8
REGION (5 State)					
% US L&WP	37.7	39.5	34.4	31.2	27.1

Source: 1985 OBERS, BEA Regional Projections.

Urbanization accelerated the process by responding to demands for social overhead capital such as housing, roads, schools, etc. The greater the original misallocation of resources (e.g., the lower the per capita income), the greater the potential for gain within the region from correcting this misallocation. Thus, once the forces of the market were set at work, the growth rates in the formerly backward regions had a greater potential to exceed the national or regional average.

We should add one brief word concerning the effect of trying to "stabilize communities." According to this neoclassical theory of regional growth, the one way to guarantee that the "convergence" process is thwarted (and to keep growth rates low) is to restrict resource mobility. To the extent that people and capital resources are encouraged (or otherwise subsidized) to stay in industries or regions that are growing at less than the national or regional average, the process of adjustment is prolonged or stopped entirely. The poor regions stay poor.

The policy prescription of the neoclassical model is laissez faire, helped along by a massive dose of free trade and reducing impediments to free mobility of labor, capital, and firms. Since all regions will

eventually grow at the same rate in any event, hurrying along the process of reducing "misallocations" will result in the highest possible national average per capita income and production.¹¹

Economic Maturity, Coalitions, and Stagnation

The problem with the neoclassical explanation is that the "simple process envisioned does not occur with the regularity needed to substantiate its usefulness" (Borts and Stein, 1964, p. 12). Capital tends to flow in the directions indicated, but labor does not. Indeed, since World War II, there has been a tendency for labor to migrate away from the relatively high wage areas of the industrial areas of the Northeast and older Midwest, toward the relatively low wage areas of the South and the Southwest. A completely different explanation of the tendency toward convergence of regional incomes per capita is necessary.

Just such an explanation may be found in what is termed the maturation hypothesis (Borts and Stein, 1964, pp. 13-17, 37-47; Richardson, 1969, pp. 347-357). Maturation within a particular industry is a widely recognized phenomena. Here the emphasis is on regional maturation.

TABLE IV.

PAPER AND ALLIED PRODUCTS AS SOURCES OF PERSONAL INCOME, BY PLACE OF RESIDENCE 1969-1983, AND PROJECTED, 2000-2035 (Millions of 1972 dollars)

	1969	1978	1983	2000	2035
UNITED STATES	7,057.7	8,603.0	8,664.8	12,362.8	19,409.3
% US P&AP	100.0	100.0	100.0	100.0	100.0
% US Mnfg.	3.6	3.7	4.0	3.5	3.7
OREGON	d	137.4	145.3	216.5	344.7
% US P&AP	-	1.6	1.7	1.8	1.8
% Ore. Mnfg.	-	5.3	6.6	5.5	5.5
WASHINGTON	217.6	217.5	259.2	339.7	492.3
% US P&AP	3.1	2.5	3.0	2.7	2.5
% Wash. Mnfg.	6.9	5.9	6.8	4.9	4.5
CALIFORNIA	379.2	484.9	484.9	731.5	1,209.4
% US P&AP	5.4	5.6	5.6	5.9	6.2
% Cal. Mnfg.	2.0	2.2	2.0	1.7	1.9
MONTANA	d	9.9	14.1	24.9	44.5
% US P&AP	-	0.1	0.2	0.2	0.2
% Mont. Mnfg.	-	3.2	5.8	6.1	7.2
IDAHO	d	17.4	26.8	51.5	86.0
% US P&AP	-	0.2	0.3	0.4	0.4
% Ida. Mnfg.	-	2.9	5.1	5.0	5.1
REGION (5 State)					
% US P&AP	-	10.0	10.8	11.0	11.1

d Deleted to avoid disclosure of confidential information; data are included in totals.
Source: 1985 OBERS, BEA Regional Projections.

Popular explanations for the maturation of industries and regions are prevalent. One suggests that the vigor of entrepreneurship declines over time and argues that saturation of demand reduces the growth rate because existing firms and managers hold tenaciously to old product lines. This argument is wide spread, but not wholly convincing since it fails to explain why new firms would fail to enter. New, young entrepreneurs can take advantage of the existing resource base in new product lines and new growth centers as long as barriers to resource mobility do not exist.

Another popular view is that industries and regions exhaust external economies and the economies of agglomeration. Once social overhead capital such as roads, schools, and office space is created, the argument goes, this source of growth is no longer a stimulus to the economy. Given the prevalence of urbanization, suburbanization, and reurbanization processes in America, however; this argument fails to be convincing. Why assume a maximum level of demand for such facilities? Once created, the stock of social overhead capital should continue to attract new and diverse industry.

Another problem faced by even the most successful industries, and one that adds weight to the convergence hypothesis, is that the growth process once begun does not automatically last forever. In virtually every industry, firms evolve through stages of development that resemble a "product life cycle."¹² In a regional context, we find that initial development of the region's agricultural or industrial base induces rapid increases in regional growth. It is a period of substantial growth and prosperity. But eventually, unless markets can be indefinitely expanded and there are no competitors in other parts of the world, the growth process matures and slows down. Although not a convincing argument in terms of regional convergence, it may explain why regional and national growth cycles occur and account for a certain portion of interregional resource transfer.¹³

Mancur Olson (1982; 1983) offers what many consider a convincing argument concerning the process of maturation and decline of regions, states, and nations. His theory is based on the concept of social rigidities and coalitions. The older a region, the more likely it is that special interest

TABLE V.

LUMBER AND WOOD PRODUCTS AS A SOURCE OF EMPLOYMENT, BY PLACE OF RESIDENCE 1969-1983, AND PROJECTED, 2000-2035 (Thousands of jobs)

	1969	1978	1983	2000	2035
UNITED STATES	678.0	841.0	717.0	940.0	907.0
% US L&WP	100.0	100.0	100.0	100.0	100.0
% US Non-farm	0.8	0.9	0.7	0.7	0.6
OREGON	73.8	84.7	65.7	76.0	66.7
% US L&WP	10.9	10.1	9.2	8.1	7.4
% Ore. Non-farm	9.0	7.5	5.9	4.9	3.8
WASHINGTON	48.2	58.6	44.3	51.6	44.1
% US L&WP	7.1	7.0	6.2	5.5	4.9
% Wash. Non-farm	3.5	3.4	2.4	2.0	1.5
CALIFORNIA	54.3	72.2	52.7	73.9	72.9
% US L&WP	8.0	8.6	7.4	7.9	8.0
% Cal. Non-farm	0.7	0.7	0.5	0.5	0.4
MONTANA	9.7	12.3	9.4	12.0	11.0
% US L&WP	1.4	1.5	1.3	1.3	1.2
% Mont. Non-farm	4.0	3.7	2.8	2.7	2.3
IDAHO	14.1	20.4	15.1	18.4	16.7
% US L&WP	2.1	2.4	2.1	2.0	1.8
% Ida. Non-farm	5.6	5.3	4.0	3.6	2.9
REGION (5 State)					
% of US L&WP	29.5	29.6	26.2	24.8	23.3

Source: 1985 OBERS, BEA Regional Projections.

Note: Output increases measured by real personal income as shown in Table III are not accompanied by proportional increases in employment. For example, between 1983 and 2000, the projections suggest a 40.2% increase in personal income but only a 15.7% increase in the number of jobs. This reflects an assumption concerning rates of increase in labor productivity in the L&WP industry and explains, in part, the projected 34.7% increase in real per capita income for Oregon during this same period, as shown in Table II.

groups and growth retarding organizations (coalitions) can create barriers to resource reallocation which threaten the status quo. "Distributional coalitions slow down a society's capacity to adopt new technologies and to reallocate resources in response to changing conditions, and thereby reduce the rate of economic growth" (p. 65). Examples in the Pacific Northwest that fall within Olson's "growth retarding" category include such things as, for example, lobbying for bail-outs for failing firms or contract relief when markets turn sour, seeking to "stabilize" timber dependent communities, heavily unionized logging and mill operations, and established barriers to entry through collusion and/or force.¹⁴

Addressing the issue of the paradoxical direction of labor migration directly, Olson asks why would workers accept the costs and upheaval of migration from high wage areas to low wage areas? His answer stems from his maturation and coalition theory. The older, high wage areas are most likely heavily unionized and cartelized and as a result the employers hire fewer workers than would be the case

if the areas were characterized by perfect competition. "The workers who would have liked employment with them...had no choice but to move to the South or other growing regions to take lower-paying jobs" (Olson, 1983, p. 922). The convergence hypothesis is upheld, albeit for substantially different reasons.

SELECTED LESSONS FROM THE PAST

Space and time prevent an indepth review of all of the important lessons that we have to learn from the past. We can, however, identify the most critical ones that have particular bearing on the future of the Pacific Northwest. Four of those lessons may be summarized as follows:

1. Industrialization is not the sole source of growth. Evidence based on the experience of both Europe and nineteenth century America belies the view that growth was merely the outcome of a process that transformed savings into capital. In its most crude, and perhaps most well-known formulation, the view was propounded by W. W. Rostow (1967). In Rostow's

TABLE VI.

PAPER AND ALLIED PRODUCTS AS SOURCES OF EMPLOYMENT, BY PLACE OF RESIDENCE, 1969-1983, AND PROJECTED, 2000-2035 (Thousands of jobs)

	1969	1978	1983	2000	2035
UNITED STATES	715.0	702.0	663.0	710.0	728.0
% US P&AP	100.0	100.0	100.0	100.0	100.0
% US Non-farm	0.9	0.7	0.6	0.5	0.5
OREGON	d	9.4	9.3	10.8	11.7
% US P&AP	-	1.3	1.4	1.5	1.6
% Ore. Non-farm	-	0.8	0.8	0.7	0.7
WASHINGTON	20.0	14.0	16.1	17.1	17.4
% US P&AP	2.8	2.0	2.4	2.4	2.4
% Wash. Non-farm	1.4	0.8	0.9	0.7	0.6
CALIFORNIA	36.8	38.2	37.5	41.9	45.3
% US P&AP	5.1	5.4	5.7	5.9	6.2
% Cal. Non-farm	0.4	0.4	0.3	0.3	0.3
MONTANA	d	0.7	0.9	1.2	1.4
% US P&AP	-	0.1	0.1	0.2	0.2
% Mont. Non-farm	-	0.1	0.1	0.2	0.2
IDAHO	d	1.3	1.6	2.5	2.9
% US P&AP	-	0.2	0.2	0.4	0.4
% Ida. Non-farm	-	0.3	0.4	0.5	0.5
REGION (5 State)					
% of US P&AP	-	9.0	9.8	10.4	10.8

d Deleted to avoid disclosure of confidential information; data are included in totals.

Source: 1985 OBERS, BEA Regional Projections.

Note: See note to Table V. We also note that Tables III and IV show that for the 5 state region the percentage of total U.S. personal income earned in L&WP and P&AP is greater than the percentage of U.S. employment in L&WP and P&AP shown in Tables V and VI. This reflects the higher average wage rate in the Pacific Northwest in these industries. Note that the projections made by BEA suggest a narrowing of the differential over time.

theory, economic systems went through a series of five stages that led from relatively backward, self-sustaining agricultural societies to highly capitalized industrial societies. The critical element, it was assumed, was a "take-off" period in which investment in capital facilities in the manufacturing sector increased substantially. Rostow presented what appeared to be conclusive evidence to support this theory, but subsequent research in the 1960's and 1970's failed to discover any such critical take-off period (Gallman, 1975; David, 1967; North, 1961; Lee and Passell, 1979, pp. 52-60). The growth rate of the United States did increase over time (as did that of Britain), but as Gallman (1972, pp. 41-42) points out the phrase "take off" centers attention on industrial growth, whereas the changes associated with the modern high rates of growth were by no means confined to the industrial sectors.

The growth process of the United States was a slow cumulative period of complex changes in all sectors of the economy without any sign of a turning point. The simple "take-off" view applied to the Pacific Northwest would imply that forest based enterprises served their purpose, but are now archaic and dispensable. Nothing could be further from the truth. Nor should one expect that a new "take-off" can be engendered in the region by attempting to import a white knight firm or otherwise entice new industries to locate in the region. Regional incomes may converge, but regions cannot be and ought not try to be clones of one another. Hopes of a Silicon Valley to replace the forest based industries west of the Cascades are more silly than they are naive.

2. Economic growth is not synonymous with economic development. The former implies a process of increasing output per person and results from using existing resources in existing tasks more efficiently. Economic growth resulting from such increases in efficiency is the source of regional convergence and is predicted by neoclassical theory. Development, as Joseph Schumpeter convincingly argues (1934; 1950), requires a different process - a process of radical change. New products, new markets, and innovation on a massive scale are required to prevent the maturation of regional economies.

We are now well into the so-called ages of "substitution" (Goeller and Weinberg, 1976) and "information". The implications implied by a changing world for the future of forest enterprise in the Pacific Northwest are clear. Continued "growth" of existing enterprise will not be sufficient to sustain the regional economy. The introduction of plywood in the wood products industry showed the vulnerability of continued emphasis on single product lines. Extruded beams and substitutes for other construction products are well on their way. Schallau and Maki (1985) argue that separate and apart from the competition from Canada, which provided for most of the increase in U.S. lumber consumption between 1970 and 1980, less expensive Canadian lumber forestalled the use of wood substitutes. They anticipate a substantial reduction in Canadian shipments to the U.S. in the near future. A focus on "development" not "growth" in the Pacific Northwest will be required to prevent the losses to substitutes so far avoided.

3. There are obviously obstacles to growth and development in a rapidly changing world. The most important obstacle is the unwillingness to change. Worsshipping the status quo prevents letting go of the past.¹⁵ If the forest resources of the Pacific Northwest are in a period of transformation rather than mere transition, then it will be necessary to identify and eliminate those obstacles that stand in the way of attaining a new socio-economic condition without undue stress and strife. One of the most obvious requirements will be redefining the relationship between the region's people and its forests. Earlier speakers in the Starker series have addressed the need for forthright planning and identified important implications for both the short-run and long-run.

4. History teaches us that while natural resources are critical to the healthy development of a region an even more important asset is the people it attracts and retains. The value of human capital embodied in the region far outweighs the value in timber, energy, minerals, etc. Regions that focus on their natural resources and pay little attention to their people are likely to learn the lesson of Appalachia. Neoclassical theory treats people as if they were commodities, with efficiency in resource allocation as the primary criterion of success. Successful regions have more humane, less objective concerns. Many economists comfort themselves with the assumption that any inefficient allocation of human or capital resources will be corrected as the region moves toward a new "equilibrium." But equilibria are quickly vanishing mirages. Adjustments take place, and regions evolve, but the most important lesson from history is that if we recognize that there is more to a region than markets and trade, we can control how painful the adjustment need be.

THE NEW AGE AND A NEW GENRE OF CHALLENGES

As Adam said to Eve, "We live in a period of change." Change is not new - it is inevitable. The Pacific Northwest is forced to change as any element within it changes and the process is constant. Defense contracts come and go; cheap electrical power becomes a nightmare (McKinsey, 1984); regional shares of output are shifted; new values are preached and old ones rejected; cult communities spring up, some later disappear; technological change alters input demands on capital and labor; large parts of the accumulated skills (human capital) embodied in the labor force are made obsolete; comparative advantage in traditional markets is eroded and trading patterns are altered; the relative roles of service and manufacturing sectors are expanded and contracted; power is shifted between urban and rural centers; new goals of social responsibility compete with the traditional focus on individual initiative and responsibility; and sights are set on expanded horizons. Such change created stress and enlivens conflict, but adaptation and adjustment make possible continuity and stability.

Throughout the past two centuries, the Pacific Northwest has experienced significant changes in the ways things got done, even what got done, and yet still maintained its essential quality. Political and technological revolutions came and went, yet the essence of the society remained intact. It remained intact, and will continue to do so in the future, as

long as the systems and institutions of survival are compatible with changing economic, social, and ecologic reality (Firey, 1960).

The problem now faced by the Pacific Northwest, however, is of a new genre.¹⁶ A society facing a new political, economic, technological, physical, and ideological environment may attempt to operate as much as possible in the old and familiar manner, and in the attempt will devise rules and institutions that are out of harmony with the new reality. Through attempts to maintain the status quo or to fine tune the present system it is likely that other problems will be aggravated and alternatives eliminated. As Evan Vlachos (1985) stated, however; successful societies are those which link non-reactionary problem and alternative futures identification with innovative action which combines both evolutionary and (if necessary) revolutionary change. Such societies come closest to providing for those dynamic social processes that are economically optimal, while at the same time being viable in the social and ecological sense.

The historical record tells us that the people who challenged the western frontier and established their homes and enterprises in the timberlands of the Pacific Northwest successfully met such demands - for a time. The potentially harsh environment of mountain terrain and dense forest were tamed through appropriate transportation, harvesting, milling, marketing, and technological adaptation (Cox, 1974). The timber barons, the woods workers, the mill and lathe operators, and the service industries that they attracted coalesced into a dynamic social order which, by almost any measure, thrived.

But today the social order in many respects is in chaos. The world has changed, and due to many factors including lower transportation costs, proximity to markets, lower wage and production costs, and environmental demands, the historic economic base of the Pacific Northwest, the forest products industry, is fleeing to the South and externally to Canada and the rest of the world. While competition steals markets, new social and environmental demands on the resource base raise costs, eliminate opportunities, and make familiar production processes obsolete.

It seems incomprehensible, unfair, and unrealistic that such a resource rich region is being denied its rightful place in the world economy. The facts are real and the process has been thoroughly described by others (Schallau and Maki, 1985), but it is not, therefore, made more understandable. The sweat and toil of generations of people seem to have been for naught. And the onslaught seems to be out of the control of many of the individuals who must bear its costs. The optimism expressed by C.W. Bingham in his Starker lecture suggests that we are not yet at a point where generalized malaise pervades. But his casual reference to the bright future "for those of us that survive" leaves little comfort for those who will not. The historic sacrifices, adaptations, and compromises of the past seem to be trivialized by the contemplated future.

FOREST PRODUCTS: THE EXPORT BASE OF THE PNW

We now turn away from the arguments for "convergence" and lessons from the past to consider alternative theories that suggest it is possible for regions to positively (and negatively) affect their relative growth rates. One such theory concerns the role of exports in regional development. We begin with the theory as it was developed by the late Harold Innis, an economic historian concerned with Canadian growth and development.

Innis wondered why it was that two resource rich regions of Canada, Nova Scotia with its cod fisheries and inland Canada with its vast timber and fur resources, experienced such vastly differing economic growth rates in the 19th century (Innis, 1954; 1956). His answer now seems obvious.

A region's natural resources provide the potential for growth, but do not guarantee it. In order for the region to be anything more than a colony, mined for its minerals, timber, fish, etc., it must be able to develop more than an export base. It must develop the forward and backward linkages that serve to enhance the possibilities offered by the export base (Hirschman, 1958). Innis' theory came to be known as the Staple Theory of Growth (Watkins, 1963). The basic assumption of the staple theory - so-called because exports are the leading sector of the economy - is that they set the pace for economic growth. Economic development tends to take the form of a process of diversification around the export base. The key idea of a staple theory, therefore, is the spread effects of the export sector, i.e., the impact of the export trade on the rest of the domestic economy and society. The staple theory, itself an extension of international trade theory, is elaborated upon by such concepts as economic base theory, input-output models, and location theories such as trade hierarchies, central place, and gravitational models. In general, economic base models are a special case of trade models.

Backward linkages are exhibited when the inputs required in the export base sector are produced in the regional economy. Thus, in the case of forestry, we would desire that transportation equipment, logging equipment, milling equipment, etc., be produced locally (within the region). Forward linkages are developed when the output of the export base sector are processed into final goods and services within the regional economy. Thus, in the case of forestry, instead of merely exporting logs and semi-finished products, we would desire that paper, furniture, lumber, and other finished wood products were brought to final production in the regional economy. With such forward and backward linkages come additional final demand linkages from the consumer sector - people working in the regional industries who in turn spend their incomes on (hopefully) locally produced goods and services. The greater the degree of backward, forward, and final demand linkages developed within the region, the less "leakage" of income and employment to external regions through imports and the greater the multiplier and accelerator effects.

The export sectors provide a potential base for economic growth. Without the development of internal linkages, however; the region might remain little more than a colony to be exploited by the outside

world. This is unlikely, however, since the trade patterns are not likely to be totally asymmetrical. More often what is found is that different subregions experience different multipliers for different types of export industries. Thus, Thompson (1983) found that the multipliers for the agriculture and manufacturing sectors are significantly different between high and low order centers. The higher order's manufacturing sector multiplier is larger than the lower order's manufacturing sector multiplier, and the lower order center's agricultural sector multiplier is larger than that of the higher order center.

This finding is consistent with the findings of Polzin and Schallau (1983), and Schallau and Maki (1983). In both of these studies the researchers found that substantial differences with respect to income and employment multipliers exist between apparently similar timber dependent communities. They also found that not all capital investments in a particular community yield the same impact on the community's growth and stability. Schallau and Maki (1983), for example, compared the impact on Douglas County, Oregon of alternative sources of timber supply - imported and domestic - and found substantially different impacts. The authors caution decisionmakers to be "very cautious in applying empirical generalizations to specific communities, especially rural communities, which are not Standard Metropolitan Statistical Areas" for which many of the standard multipliers were originally developed.

Schallau and Maki (1985) conclude that despite the loss of softwood lumber and plywood markets to the South, in 1980 the forest products industry was the largest basic industry in Oregon and the second largest in Washington. The authors argue that recent developments in the South and Canada suggest the possibility for a reversal of the shift of wood products industries. They also argue, however, that this does not imply resurgence in labor demand and employment. Unless measures are taken to reduce raw material, labor, and processing costs, more use of wood substitutes is likely. Capital inflows to "accelerate efforts to improve the efficiency of logging and processing methods, and the productivity of timber resources" are called for.

NEEDED: A NEW PERSPECTIVE ON PEOPLE AND FORESTS

I must bring this paper to an end, and will do so on a conjectural note. Recent studies by Thompson and Merrifield (forthcoming) and Schallau's ongoing work emphasize the widely varying impacts of regional resource development on subregional economies. They also show that a complex spatial pattern of direct, indirect, and induced costs and benefits awaits any change in resource utilization. An interesting finding, applicable primarily to "boom town" situations but also with application to subregions of the Pacific Northwest, is that net benefits of regional development activities are as likely to "trickle up" as they are to "trickle down." While it is possible that one might want to wait out the time while market forces push and pull resources to their most efficient area of production, it is also possible to help along the process. The forest resources of the region will continue to provide the economic base required for regional prosperity, but

they will do so only if costs are substantially reduced. This means people who are dependent upon forest based employment for their survival will find familiar job opportunities declining in the near future.

The central importance of human capital in the region's future suggests the solution and your history of attempts to stabilize communities and to provide for education makes it possible. So, too, does your memory of Boeing in the 1960's with its waste of human life and potential. Within the region, states can begin to take action "to help shift human resources into higher valued production. These steps could overcome bottlenecks and constraints that now retard economic change and also serve to ameliorate the burdens that make change and also serve to ameliorate the burdens that make change disproportionately painful to certain groups" (Reich, 1983, p. 239). The region can provide an alternative to forced out-migration through meaningful regional job acquisition and skills training programs supported by both public and private sectors. Direct subsidies to companies that provide real jobs, not just job training is a place to start.

Planning and the use of tax incentives are familiar to the Pacific Northwest. The pointless arguments and false choices between advocates of free markets and proponents of planning and government-business partnerships have been overwhelmed by the challenges that demand action not words (McKinsey, 1984). It is likely that merchants and industries in the higher order centers will be the direct and indirect beneficiaries of the training and resource reallocation in the timber dependent communities. A reasonable rule is that project beneficiaries should bear project costs in proportion to their share of benefits. Research is required to determine to what extent, therefore, the timber dependent communities should be forced to bear the full brunt and costs of the changing outlook for forest based industries. The Pacific Northwest has been an enduring battle ground in a war that has taught the rest of the nation the necessity to respect their forests as complex holistic ecosystems. Ecosystems that consist of more than marketable commodities to be exploited with a cut and run mentality. It is now time for you to teach, and for the rest of us to learn, that people are part of that precious ecosystem as well, and to act upon the knowledge that there is an alternative to the costly and dehumanizing neoclassical convergence and maturation process.

NOTES

1. The author is Willard L. Eccles, Fellow and Presidential Distinguished Professor of Economics, Weber State College, Ogden, Utah. Paper prepared for the Starker Lecture Series, Oregon State University, October 22, 1985. The author wishes to thank the Starker family for their on-going support of and commitment to excellence in forestry education and the Willard L. Eccles family which graciously supports his professional activities.
2. This presentation is kept as brief and non-technical as possible. My evidence may appear to be more conjectural, suggestive, and heuristic than sufficient. My arguments are foreshortened and my

conclusions may appear didactic or dogmatic. There may be errors of omission or commission. I offer no apologies. My interest is in opening discussion, not closing it; asking questions, not settling them.

3. See Ellefson and Stone (1984, pp. 348-378) on technological change; Bingham (1985) on market cycles; Schallau (1985) and Schallau and Maki (1985) on shifts in market shares; Waisbitt (1984) on megatrends affecting our lives; Toffler (1980) and Alston (1983) on watersheds in history; Heilbroner (1959) and Kahn, et al. (1976) on the mutability of the future; and Burch (1971) on images of a livable future.

4. The use of per capita personal income as a standard for assessing the rate of growth of an economy is widespread. But it is just not possible for the economist to establish a positive link between economic growth and human welfare (Mishan, 1971, p. 96). Moreover, relative income levels may be as important as absolute incomes in determining "happiness" (Easterlin, 1973). This is not the place to elaborate on the so-called "growth debate," but it cannot be ignored. See: Daly, 1977; Kahn, et al., 1976; Smith, 1979; Ridker and Watson, 1980.

5. Due to data limitations it is not possible to analyze the year-to-year changes on a state-by-state or regional basis prior to 1929. A cursory examination of the available data suggests great caution in making any generalizations from annual fluctuations. The forces that lead to convergence are a long term phenomenon. When, as I have (Alston, 1983), one argues that we are entering a new era where history is at best a weak guide to the future, it is particularly important not to jump at every indicator or supportive piece of evidence. It must be explained not just described. Every "futurist" should learn that "for example" is not a proof. The data for the year 1840 in Table I is included to remind us that "exogenous" events such as the Civil War matter (Alston, 1980).

6. (U.S. Department of Commerce, 1977). The 1977 BEA projections for the year 2030 had per capita real income tripling.

7. The 1977 projections were used by the USDA Forest Service in its 1980 Assessment (1980, pp. viii, 8-18). The report minimized the potential reduction in demand for forest products implied by lower growth rates by looking at only 10 years, when the cumulative impact would still be relatively small. It argued that lower growth rates would not have a major impact on projections of either the basic timber demand-supply outlook or the projected increase in timber prices. From the hindsight of 1985, the Forest Service may want to reconsider the importance of "small" errors in forecasting.

8. On the national level L&WP and P&AP are projected to lose some of their share of total U.S. manufacturing between 1983 and 2035 (-0.2 and -0.3 percent, respectively). If manufacturing is losing ground to the service sector, even holding their own has negative implications for future growth rates. See notes on the bottom of Tables V and VI.

9. Projections can be no better than the reasonableness of the assumptions and the willingness of the future to validate today's perception of it. See, for example, Beuter, et al. (1976). The authors did not anticipate the great depression of 1981-1983 as their projections for 1985 indicate. But they were careful to state that "the projections are not intended as forecasts of what will happen; they should not be interpreted as such. A projection simply indicates what would happen if its assumed set of conditions did indeed occur." Their projections of timber dependent employment in Oregon showing declines ranging from 3 to 25 percent by the 2000, depending on the harvest projection are, nevertheless, likely to be observed. Assumed increases in the productivity of logging and timber-processing activities caused reductions to occur despite significant harvest increases in some projections.

10. The key to America's early development was the ability to increase productivity across a broad spectrum of the economy, perhaps most importantly in agriculture. Increased agricultural productivity accompanied by a reallocation of resources from agriculture to industrial manufacturing was clearly of substantial importance, especially when increased training and investments in capital accompanied the shift. See: Lee and Passell (1979, pp. 56-59); David (1967); Richardson (1969). Economic historians and regional growth theorists are, of course, still debating the relative importance of the complex factors which led to early American economic growth.

11. Specific suggestions for increasing the efficiency of National Forest timber management programs include those of Teeguarden (1982), Beuter (1985a; 1985b), Clawson (1978), and Mead (1966, pp. 259-262). The so-called "Privatization" movement is based squarely on this foundation.

12. The most commonly referred to product life cycle (PLC) pattern is the S-shaped logistic function with four major stages: introduction, growth, maturity, and decline (Wind, 1982). They are sometimes referred to as the pioneering, expansion, stabilization, and decline phases. Many other classification schemes abound. Fad products do not follow a standard PLC curve, nor do specialty and generic products (such as lumber?) which have extended periods of maturity without actual decline.

13. Cox (1974) describes the death of the old cargo trade and provides a fascinating case study of the pioneering, expansion, maturation, and decline phases of the nineteenth century Pacific Northwest timber industry. Leven (1965) discusses five regional stages: insular, colonization, diversification, industrialization, and maturity and puts them in the context of economic base theory.

14. Olson's policy prescription is that there should be freer trade and fewer impediments to the free movement of factors of production and firms. Mead (1966) showed rather convincingly that the degree of competition tended to prevent effective collusion, except in the purchase of federal timber. Cox (1974, esp. pp. 255-283) documents the relatively unsuccessful attempts at collusion in the nineteenth

century. The existence of substantial special interest influence, however, is widely recognized. The career of Mark E. Reed is but one example (Ficken, 1979). See: Ellefson and Chopp (1978), and Ellefson and Stone (1984).

15. Douglas Dowd (1956) argued that the unwillingness of the South to change explains why it lagged significantly behind the West and the rest of the nation. Mancur Olson (1983) suggests that along with falling transportation costs, the willingness to be dismantled (forcefully, if necessary) led to the substantially above average growth rates of the Southern States after 1950. Of particular interest is his point that, from a national perspective, the flight of (forest based) industries to the South is desirable. Olson concludes, however, that the Southern advantage cannot last forever. Now that it has the same institutional arrangements as the rest of the country, it will probably accumulate much the same level of cartelization and distributional coalitions as the rest of the country. In that sense, he states, "the South will fall again."

16. Vlachos (1985) suggested four such transformations that have uniquely new implications: a) technology and management techniques provide more leverage; b) mistakes are more costly and irreversibility is increasing; c) less environmental damping; d) more complex goals that call for interdisciplinary, complex, innovative and forward looking approaches. Alston (1983) extends the list to include ideological challenges.

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