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PROCEEDINGS OF THE SIXTH AMERICAN
FOREST CONGRESS

Sponsored Under the Auspices of the American
Forestry Association, October 6-8, 1975,
in Washington, D.C.

PREPARED FOR THE

SUBCOMMITTEE ON ENVIRONMENT, SOIL
CONSERVATION, AND FORESTRY

OF THE

COMMITTEE ON
AGRICULTURE AND FORESTRY
UNITED STATES SENATE



MARCH 25, 1976

Printed for the use of the Committee on Agriculture and Forestry

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FOREWORD

The Subcommittee on Environment, Soil Conservation, and Forestry is pleased to print the proceedings of the Sixth American Forest Congress held under the auspices of the American Forestry Association in Washington, D.C. on the occasion of that organization's 100th anniversary.

The views represented in this document do not necessarily represent those of all the members of the Committee on Agriculture and Forestry.

JAMES O. EASTLAND,
Chairman.

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The following is a list of the names of the persons who have been elected to the office of Mayor of the City of New York, for the year 1898, by the Board of Aldermen, at their meeting held on the 1st day of January, 1898.

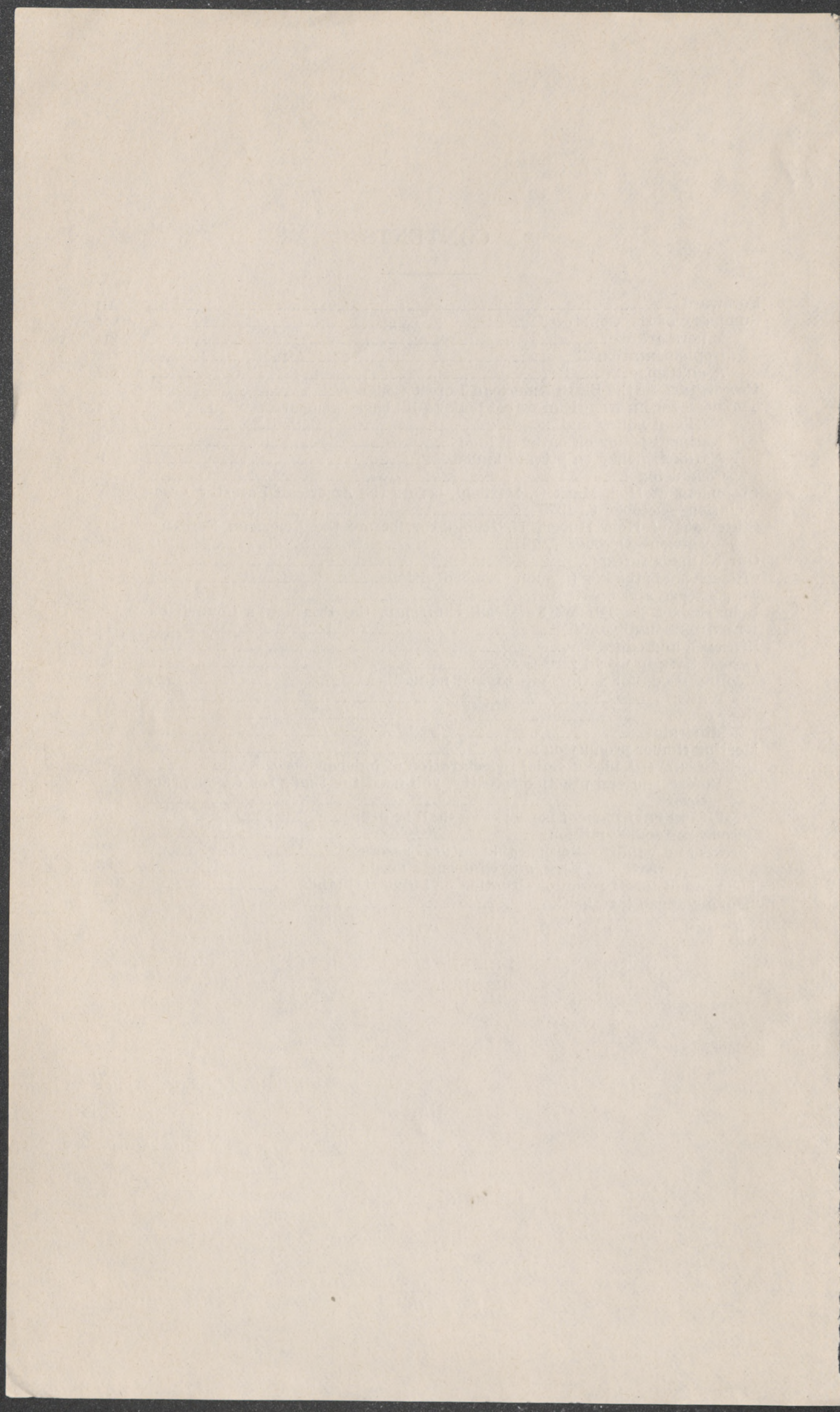
Mayor of the City of New York

John A. B. Smith

1898

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SUMMARY OF THE CONGRESS

[By R. Keith Arnold, Associate Dean of the LBJ School of Public Affairs,
The University of Texas at Austin]

A summary of this Sixth American Forest Congress may resemble a satellite weather picture on T.V. It presents the whole overview, highlights major storms, shows cloud and clear areas; but with that image alone, we cannot fathom the dynamics of the situation. In this focus on the mainstream of the Congress, I will try to avoid the eddies and minor crosscurrents. At the same time, though, we must identify the several major issues which together form the thrust we seek.

As background for identifying major issues, we have discussed and analyzed during this meeting:

1. A status report on forestry resources and practices;
2. A perspective of the role of forestry in the economic, environmental, and social well-being of mankind;
3. A review of the political realities of natural resources management;
4. An agenda for the future—the planks which comprise the AFA policy for the next decade.

No Congress summary would be complete until it reviews our progress, identifies the principal threads which must be woven together, and provides a transition and a forward look to “now what.”

WHERE ARE WE?

Where are we at the close of this Congress? It seems to me that first we share the enthusiasm of a century of progress and a sense of togetherness in setting our sights for the coming years. Secondly, we understand the importance of our deliberations and know just how high are the stakes. Thirdly, we will, I believe, reflect with pride on our accomplishments.

As we look at where we are, it is important that we review the elements of our enthusiasm. We do share a genuine enthusiasm for a century of progress of the American Forestry Association—independent, nonpolitical, truly broad-based and multidisciplinary, forward looking, and a leader in the development of sound policies and practices for the management of the Nation's forest resources. Though not alone in its leadership role, the AFA has paced the development of forestry from its initial timely emphasis on tree planting through programs on fire and pest control, timber production, watershed management, wildlife, and recreation to the current recognition of forest amenity values as coequal functions in planning alternatives and in management decisions.

We further share enthusiasm for what I would call the “coming of age of forestry.” Some might describe it as the second coming of con-

servation; others might prefer ecosystem management. Still others may suggest conservation of the environment. In any event, we are talking about the interrelationships of all natural resources, the second broad grouping of planks in AFA's policy for the future. The focus is on interdependence—interdependence among natural resources—interdependence among economic, social, and environmental values—interdependence between industrial and environmental interest—interdependence between business and government—interdependence between national and international policies.

Interdependences stem from a few basic facts. Forests cover more than one-third of our land area and are intimately related to major life support processes of air, water, and soil formation. Furthermore, one cannot attack such national or international problems as energy, transportation, housing, food, and that ultimate and undefined goal, quality of life, without considering forestry policies and practices.

Forestry comes of age as these fundamental relationships are recognized and become increasingly important to man's life-style, if not his very existence on earth. All resources are in short supply from the world-wide view. Coal, oil, and gas are most critical to us now because they are exhaustible and not reusable. Most metals are also exhaustible but can be reused. In contrast, forest resources provide a wide variety of products which are renewable, reusable, and also biodegradable. To assure the inexhaustibility of forests, to achieve the potential of recycling, and to employ the capability of biodegradation—in effect to maximize sustainable yield of needed renewable resources—we need a level of investment, a level of understanding, and a level of management far above that of today.

Forestry further comes of age with the progress of forestry science as emphasized by the AFA policy program on research. The very nature of the interdependencies, coupled with the need for increased production, puts a high premium on knowledge of ecosystems we manage or preserve, on new studies of economic determinants of production and utilization systems, and on improved understanding of social needs and values.

Another sign of the coming of age of forestry is the professionalism required for its practice. Led by the 20,000 members of the Society of American Foresters, a wide variety of professionals and scientists prepare prescriptions for forest practices. For example, foresters join with landscape architects, engineers, and wildlife or fishery biologists to plan and carry out timber sales. Psychologists and sociologists participate in campground development and simulation models which are used to plan the protection and management of wilderness areas. Forestry policy analyses and management tasks require a broadly-based management expertise backed up by multidisciplinary professional and scientific specialists.

With this review of elements of our enthusiasm for a century of progress, let's now look at our understanding of the importance of our deliberations at this Congress. Forests and forestry are international concerns. AFA's emphasis on world forestry is found in its introduction to that subject. "Increasingly forests are recognized as a global resource transcending international boundaries . . . The forest is the world's most extensive undermanaged, renewable resource . . . Forest products of all kinds are playing a strong role in international trade

... Forests are recognized as critical and integral elements of global environment."

We live in a world where starvation stalks; erosion proceeds unabated; air, water, and soil pollution accelerate; and questions of man's survival are raised. We live in a world where technological change has outpaced our ability to cope with the results. In our world one billion people live on less than \$75 a year. Somehow we in forestry must relate the hard investment and management decisions of industrialists, legislators, and administrators to international population restraints, human values, and social goals. In simplified fashion, I see three sets of decision limits for forestry—those dealing with economic determinants; those dealing with limits to biological productivity; those dealing with irreversible changes in ecosystems and irreversible loss of the use of genetic stocks by future generations. These limits must be on international as well as national bases. We can and must look for international areas of compatibility rather than of conflict.

IMPLEMENTATION

Enthusiasm and importance are the scissors which can provide the cutting edge of policy implementation. But pride of accomplishment must extend beyond a completed policy statement to successful action. If we achieve success to the end that forests with their renewable, reusable, and biodegradable products adequately serve worldwide social and environmental needs, we are going to need more than more of the same. We can no longer only "do more" but still fall short of policy expectations that project maximum productivity. We can no longer look ahead in ten-year increments to a Seventh American Forest Congress and another chance. The preamble to the Centennial Program gives appropriate emphasis to the action phase. "It is imperative, therefore, that effective programs be implemented . . ."

We do need more than accelerated investment in our renewable natural resources. By "more than more" I refer to the necessity to innovate and institutionalize, and at this meeting we have identified six areas in which it is critical for innovation, institutionalization, and investment to occur if we are to approach maximization of production of renewable natural resources. These six areas are:

1. The need for new economic, ecologic, and social data bases for forest policy analyses and decisions.
2. The need for an order of magnitude increase in scientific knowledge about forestry systems.
3. The need for new professional disciplinary interactions to match the requirements of interdependencies.
4. The need for new involvement of citizens.
5. The need for world leadership.
6. The need for continuing policy analyses.

Before we look at each of these six needs, let's consider the reasons for the necessity for innovation and institutionalization. Their themes have been played throughout the Congress and need only be mentioned in summary fashion here.

Interrelationships (the first of these themes).—Forestry policies and decisions are made within the web of modern life and must be made in the full glare of publicity, the full knowledge of secondary

and tertiary impacts, the full impact of unrestrained population growth—in fact to be a part of the big picture.

Complexity.—Forestry policies and decisions apply to the most complex series of ecosystems known on the earth. Fred Smith, who formed and managed the ecosystems programs in the International Biological Program of the United States said it best: "Forests are the greatest achievement of ecological evolution—the largest, most complex, most self-perpetuating of all ecosystems. It is in forests that natural regulatory processes excel, producing the most stable of all ecosystems. It is in forests that man has his best opportunity to work with nature. Development of this opportunity is the major challenge to foresters in an increasingly crowded and demanding world."

Diversity.—Not only provides stability to ecosystems, it describes American forests which include some 300 ecosystems and over 100 commercial timber species. Diversity precludes generalized management decisions.

Time.—We can no longer substitute time for knowledge and employ trial-and-error methods. The "future is now" applies to forestry decisions even though forestry must of necessity be a long-run venture. The pace of change in economics, politics—particularly world politics—and environmental requirements has eliminated the luxury of time we have had in the past to reach correct decisions through successive approximations.

Future generations.—This is the most difficult theme of this meeting. Exhaustible resources will be exhausted—the critical questions are when and how much their exhaustion will be compensated by technological change. But with renewable natural resources, we can better identify with future generations. Productivity in perpetuity is sound as a general goal but difficult to apply. We can and must increase productivity as dictated by physical and economic need of a growing world population. In terms of future environment, I agree with Brubaker that the limits we face are: To avoid irreversible impacts on ecosystems, irretrievable losses of genetic stocks, and irreversible damage to large global systems.

With the themes of interrelationships, complexity, diversity, time, and future generations in mind, let's turn to the first subject for innovation and institutionalization—the need for new economic, ecologic, and social data bases for forest policy analysis and decisions. The first innovative step has already been taken in the Forest and Rangeland Renewable Resources Planning Act of 1974 which directs the Secretary of Agriculture to:

"... prepare a Renewable Resources Assessment . . . the Assessment shall be prepared not later than December 31, 1975, and shall be updated during 1979 and each tenth year thereafter, and shall include but not be limited to:

(1) an analysis of present and anticipated uses, demand for, and supply of the renewable resources of the forest, range, and other associated land with consideration of the international resource situation, and an emphasis of pertinent supply and demand and price relationship trends;

(2) an inventory, based on information developed by the Forest Service and other Federal agencies, of present and potential renewable resources, and an evaluation of opportunities for improving their yield of tangible and intangible goods and services . . .".

This act, through expanding the traditional forest survey from commercial timber to recreation, wilderness, fish and wildlife, rangeland grazing, and water, reaches toward economic baselines. We need similar innovative legislation to assure an adequate level of research for ecological and social baseline establishment.

The second area is the need for an order of magnitude increase in scientific knowledge about forestry systems. Diversity and complexity dictate this necessity by indicating that there are no simple general solutions to forestry problems. Full knowledge of environmental impacts and effects of alternative action on related resources require basic information that now does not exist. Research is the only hope to invent Spurr's "complex unit to measure quality of life in integrated economic and social terms." Of utmost and immediate importance is to know short- and long-term ecosystem response to cultural and other management operations.

The third area of innovation and institutionalization is the need for new professional and disciplinary interactions to solve the problems of complexities and interrelationships. This is another way to stress that the forestry policy and management decision making process require the involvement of a wide mix of professions and scientific disciplines.

The Society of American Foresters recognizes the importance of diverse professionals working together and includes in its membership scientists and professionals in fields closely allied to forestry who hold a bachelor or higher degree in their special field and who are rendering or have rendered substantial service to forestry.

An example of innovative institutionalization was the creation in 1972 of the Renewable Natural Resources Foundation to facilitate coordination and cooperation among professional societies and organizations having leadership responsibilities for renewable natural resources. Members include: American Fisheries Society, Society of American Foresters, Ecological Society of America, American Geophysical Union, The Wildlife Society, American Association for Conservation Information, American Water Resources Association, The Institute of Ecology, Association of Interpretive Naturalists, American Association of Botanical Gardens and Arboreta, and Society for Range Management. This new Foundation has already purchased a 35-acre estate near the Belt Way here in Washington so that these and other appropriate societies can headquarter and work more closely together.

The fourth area is the need for new involvement of citizens. The United States, through its democratic processes, opinion polls, and public hearings, certainly leads in the involvement of citizens in the policy process. Informed public opinion as the key to successful policy development and implementation is a truism. It is here though that we in the forestry profession are reaping the harvests of past oversimplification of a highly complex and diverse situation. For how many decades did we publicize selection cutting and brag about the fact that we planted a tree for each one cut. Smokey Bear for years preached the text that "fire is bad" without distinguishing between wildfire and the use of fire as a tool. We not only require new educational means of informing citizens on complex and diverse situations, but there needs to be a new coupling of public opinion and policy implementation.

The fifth area, our stake in world affairs, is obvious. Since military and economic leadership are no longer paramount, we obviously must look for other ties to the world community of peoples. Forestry offers a great opportunity. Since forests cover one-third of the globe, developing countries and developed countries have a clear common interest and can meet together on mutual problems. Both sides can learn from the other. Renewable natural resources can play a strong role in strategic policy through world trade and the fact that renewable resources of cellulose can be stockpiled on the stump. Stockpiling, in a new and broad sense, can involve new governmental and non-governmental policies to encourage maximum, efficient production and to determine disposition of the production to meet national and international needs. This suggests a balancing rather than regulatory role of government.

The sixth and my last area is the need for continuing policy analysis in response to the criteria of time and interrelationships. The accelerating momentum of change belies our ability to even describe the world as we know it today. We must invent something beyond periodic policy assessments. In the past they have been sufficient. In the present they are clearly inadequate; and in the future, will be worthless. The President's Advisory Panel on Timber and the Environment recognized this need in its recommendation for a national board or council on forest policy. Policy formulation is a continuing, complex, and comprehensive task which has been accomplished on an ad hoc basis up to now. At the close of this Sixth American Forest Congress, it is obvious to me and I believe to you, that we need something more.

A CHALLENGE

I would like to close this summary with a challenge to the American Forestry Association. I challenge it to do more of the same and more than more of the same. In terms of the first part of the challenge, we expect no less than its continued pacing of forestry in the United States. Its one-hundred year history documents the success of its programs in education, policy formulation, citizen involvement, and a public forum for meshing divergent viewpoints. In terms of more than more, I would like to make three specific suggestions:

1. The American Forestry Association should establish a continuing forestry policy analysis form. It has the background, respect, and ability to so do. Though there are many possible formats, one can see a continuing forum of Federal administrators, industry leaders, conservation group leaders, educators, and citizens with the employment of a small staff to critically assess emerging policies and review existing ones—in large measure to serve on a continuing basis to meet complexity, interrelationship, and time dimensions of our policy dilemmas, just as the periodic congresses have been able to do in the past.

The Directors of the American Forestry Association took a first step at their centennial session last Sunday when they proposed that Congress establish a "Joint Study Committee to prepare a Policy for American Forestry" and update forest management statutes. If Congress or the Executive Branch do not act on this resolution, I believe that AFA must. Though an AFA Task Force or Commission may not have the clout of its recommended Joint Study Committee; it has a track record which says that it can develop a contemporary rational

policy for American Forestry and have that policy implemented through appropriate legislation. The Society of American Foresters will directly support either alternative action—but action there must be.

In addition to the above immediate action, there are policy questions which must be addressed on a continuing basis. Some examples are:

- What is an optimum mix of public and private capital for recreation development? What criteria should be used to help decide?
- Under which circumstances, if any, can wilderness be considered a renewable resource? What are the consequences for treating wilderness as renewable?
- What should be the role of Federal forests in meeting long-term renewable resource needs? Demonstration areas? Complementary to private lands, for providing non-market resources such as big game and large trees? Strategic reserves for national emergencies?
- Under the multiple-use concept, what criteria should we use to determine an optimum mix of resources? Efficiency, effectiveness, and panel-of-experts opinion, public reference polls?
- At what rate should the old-growth timber on the National Forests be liquidated? Should the non-declining even-flow policy be revised? To what extent and how rapidly should expected changes in utilization be reflected in timber management plans? What criteria should be used to establish the minimum size for a National Forest timber plan? Should private lands be included in sustained-yield calculations?

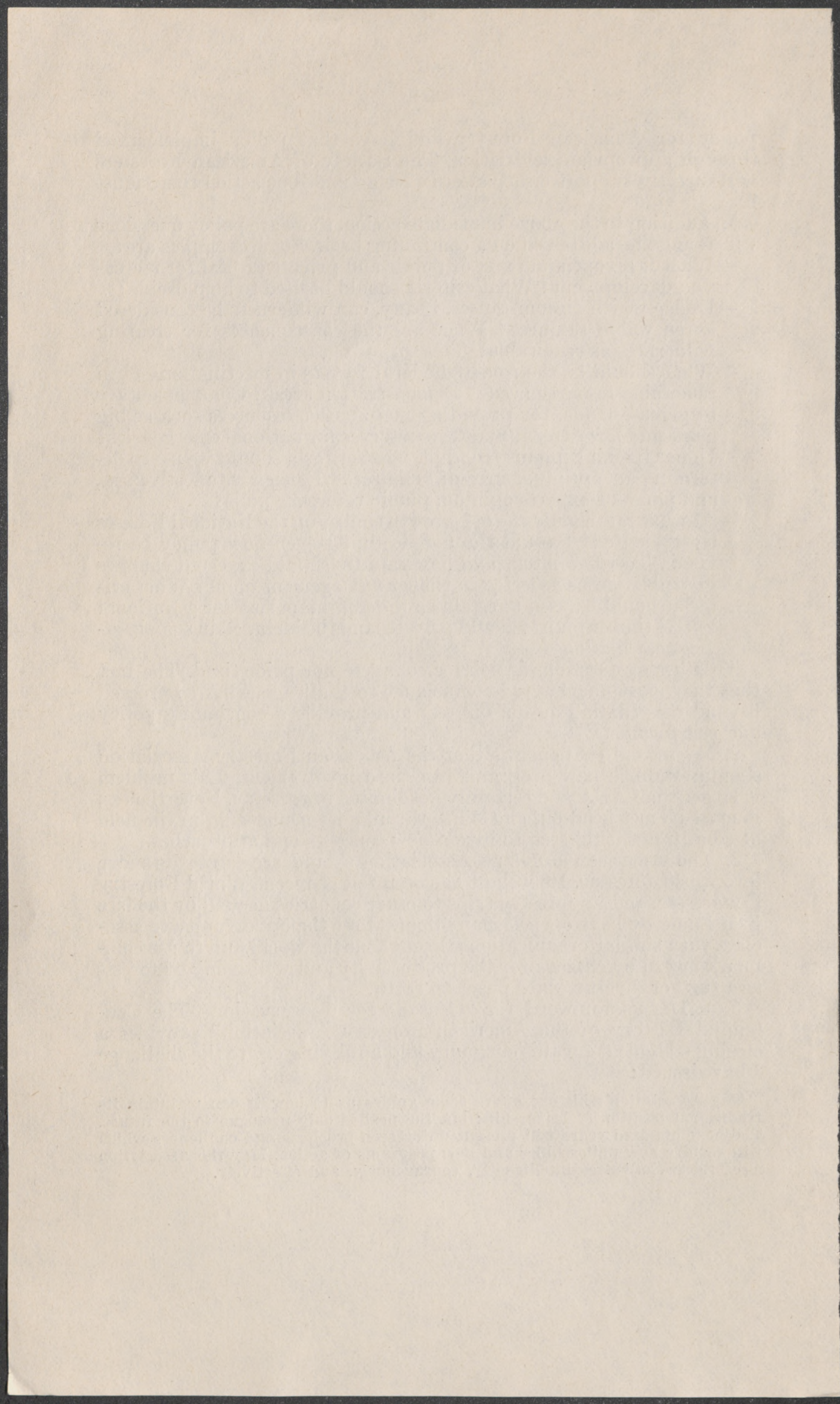
This list of questions is neither complete nor prioritized. The fact that they exist unanswered compels me to challenge AFA to proceed beyond this Sixth Forest Congress and provide a continuing policy analysis forum.

2. My second challenge is that the American Forestry Association should establish new programs in citizen involvement. This problem is larger than AFA and certainly not limited to forestry. Nevertheless, it must be met head-on, and AFA through its momentum in the field of education should seek to invent new concepts and approaches.

3. The American Forestry Association should accelerate its move into world forestry. Its weight has been felt at recent World Forestry Congresses, and its forestry trips to other countries headed by the late Ken Pomeroy have opened many doors. I see the opportunity to associate with similar organizations throughout the world and to use common concern by citizens for the productivity and well-being of forests as a further thrust toward peace on earth.

Sam Dana's foreword for "Crusade for Conservation—The Centennial History of the American Forestry Association" provides a closing statement for this summary and a rallying cry to the challenge I have issued:

The Association's history offers some guides as to how it can maintain its traditional position of leadership; but the past is only prologue to the future. The next hundred years will present unforeseen problems and challenges which will require new philosophies and new programs of action. May the Association meet those challenges intelligently, courageously, and effectively.



**PROCEEDINGS OF THE SIXTH AMERICAN
FOREST CONGRESS**

THE HISTORY OF THE SIXTY AMERICAN
FIRESTONES

THE NEED FOR AN AMERICAN FOREST POLICY—ITS BASIC ELEMENTS

[By Stephen H. Spurr]

It is difficult to say anything original at this moment in history about American forest policy. Our national concern with ecology and the environment took articulate form one hundred years ago—with specific regard to preserving our existing forests, reforesting denuded land, and managing our forest to maximize the several goods and services, tangible and intangible, that derive therefrom.

Here in 1976, when our national environmental concern is with air and water pollution, the litany about land and forest conservation is apt to seem all too familiar, even if true. Far from awakening a crusading response in our contemporaries, the reaction we are more likely to meet is either one of inattention or even of critical disbelief.

While we who have been personally concerned with forest conservation over the years have seen enormous strides toward forest management for the continuous supply of timber and other products of the forests including livestock, game animals, fish, water, and human recreation, the unpleasant truth is that many of our contemporaries either don't believe that the intentions of our forest managers are pure, or that, even if they are, they know what they are doing. Much of the public equates foresters with wood butchers. A surprisingly large number are opposed to harvesting of trees at all.

It is against this social and political background that we must take a fresh look at an American forest policy that has been evolved painstakingly over a century that has the support of the great majority of those intimately connected with forest conservation and that indeed has accomplished much over years past.

NATIONAL POLICY AND GOALS

The term policy, however, means a great many things. I choose to limit my interpretation of it in order to give direction to what otherwise may prove to be a flight into generalities. Let me start, therefore, with a definition of terms.

Policy is a multi-meaning word. Some of its definitions are provocative. I like the third part of the sixth definition in Merriam-Webster's third edition: policy is "the improved grounds (as parkland) of an estate or country house in Scotland," for example: "house stands in about 20 acres of well-wooded policies." That's what we are talking about today; "well-wooded policies." Only our task is not to landscape a Scottish laird's domicile. It is rather to provide the American people with woodlands that not only provide amenity but also the goods and services that we and our economy need. In short, our concern is with forest policy.

Forest policies, however, don't exist in a vacuum. By American forest policies, I take it that we are referring to national policies of the United States of America, and that we use the term in its context of meaning "a definite course or method of action selected . . . from among alternatives and in the light of given conditions to guide and usually determine present and future decisions."

But what are our national policies? They are neither written down nor spelled out in any single set of documents. Politicians and experts disagree as to what they are. There is no consensus even as to what subjects they deal with. Rather, what our United States national policies are must be inferred from acts of Congress in continuing or eliminating old legislation and in posting new laws, and from actions of the President and his cabinet in interpreting and carrying their assigned responsibilities. We can only assume that, over a period of time, such acts and actions reflect the will of the people. True, our policies are set as much by omission as by commission. True, our policies will change over a period of time, sometimes rapidly but more often slowly. True, our policies will continue to be largely unwritten and inferred. Yet, we can divine to some extent what they are, and we can press for what they should be.

Let me go back to the Merriam-Webster definition and remind you that a policy calls for a "definite course . . . of action." This means that we are concerned with defining principles and recommending actions that should be taken in the form of legislation by the U.S. Congress or in the form of order or regulation issued by the Executive Branch. There are lots of things that are thought to be inherently good, desirable, and worthwhile. Unless they should be affected by some specific action of the Federal government, though, policy issues are not raised. Some of us may think that large area clearcutting is acceptable; others may condemn it as an evil. We should be concerned only to the extent of dealing with the question of whether the Federal government should officially intervene in the decision-making process. Only in such a context does clearcutting on private lands become a national policy issue. We may all agree that reforestation of underutilized deforested land is a desirable aim on general principles. It is quite another matter, though, as to whether or not the Federal Government should offer incentives to private forest landowners to encourage them to plant trees, or indeed whether the government should require that forest lands must be maintained at a given level of productivity regardless of the economics of the individual case or of the objectives and wishes of the private landowner. These are the specific forest policy issues that must be treated. We all agree that logging in hilly or mountainous country will change the water regimen and possibly affect the sediment load of streams that drain the area. The policy issue comes as we attempt to determine at what point on the water course and at what level of sedimentation do these matters become a matter of public concern, if ever.

No matter what example we take, we come out with the same answer. An American forest policy must be specific and must deal with matters of national concern that merit consideration and action by the legislative and executive branches of the United States Government.

American forest policy must be viewed as a minor part of United States national policy in general. What is good for the country is not necessarily good for the forest, although I like to believe that what is good for the forest will prove in the long run to be good for the country. In any event, we are dealing with a small portion of what our Federal government is or ought to be planning and doing. We cannot disengage ourselves from the whole. U.S. policy on the import and pricing of petroleum will influence the possible use of wood as a source of energy and as a chemical feedstock. U.S. policy of logging public lands will affect the cost of housing and our national balance of trade. National agricultural policies that determine the numbers of grass-fed beef cattle will impact on grazing policies on public lands. Decisions that change the value of the dollar relative to foreign currencies will similarly change the recreational habits of American citizens and these in turn will change recreational pressures on our public lands. The Jones Act, in prohibiting the shipment of commodities on foreign ships between U.S. ports, effectively bars Alaskan timber products from the contiguous 48 states, but this is a small part of the impact of this particular legislation on the American economy. The sale of logs from the Pacific Northwest to Japan looks bad to those who believe that old-growth forests should be maintained on the mountain slopes of Washington, but good to those who believe that full market access will permit the most responsible conversion from old growth to managed second growth. In short we in forestry are only part of the big picture and we had better take this into account in our effort to shape a national forest policy. We can't continue to concern ourselves only with forest policy, but as specialists in forestry and conservation, we should participate in the formulation of related national policies.

It seems to me that our national policies are all pretty much directed toward two goals: one of economic well-being and the other of quality of life. These two courses are sometimes common and often parallel. Until recently it was often assumed that they were congruent. Increasing population and social pressures coupled with decreasing food, energy and material resources have made it apparent that the two courses are becoming increasingly divergent. Therein lie the roots of our policy debate today.

The goal of economic well-being is well understood. It is that we as a nation should have low unemployment, a high or at least a continual growth in Gross National Product, and a low rate of inflation. It is that we as individuals should have incomes that increase faster dollarwise than the rate of devaluation of the dollar. Our forests are important in meeting these objectives in that they are our principal source of timber for lumber and plywood for housing and paper for communications. Plentiful wood at modest prices means moderately priced housing and cheap newspapers. Wood in short supply at high prices contributes significantly to shortages in housing and to overall inflation.

As Americans have become more affluent, we have increasingly shifted our goals from the satisfaction of material wants to a concern for social injustices and to the development of cultural sensitivities. The goal of quality of life used to mean a chicken in every

pot. Then, it implied two cars in every garage and a color television set in every living room. Recently, for many, it has meant leisure time and access to open spaces to spend it. Urbanity with its ghettos, suburban sprawl, transportation snafus, smoggy air, and dirty water increasingly represent the antithesis of quality of life, even for those with the two cars and the color television set. Our wildland parks and National Forests increasingly represent the thesis of quality of life, even for those with only a backpack and dehydrated pemmican.

Multiple use in the broad sense is eminently practicable. Forests can be managed to grow trees for timber and simultaneously to satisfy most hunting, hiking, and camping activities.

Both economic well-being and quality of life are desirable goals. Both can be satisfied to a considerable extent by our public and private forests in the largest sense. At a single place in the forest at a single point of time, however, the two goals are incompatible. The cutting of a single large tree supplies all-important wood to commerce but it is no longer there to be seen and enjoyed. Indeed, what remains in the form of logging slash is decidedly unattractive. The parallel does not exist for other natural resources, at least for the time-being. Coal and oil were not beautiful before harvest. Wheat and corn fields have a certain man-formed beauty that is destroyed by harvest, but we know that they will be there again in but a short season after harvest. Our emotional stress is over trees. Joyce Kilmer never wrote a poem about a coal seam. George Pope Morris never wrote:

Farmer, spare that pea
Touch not a single cow
In my youth they nourished me
And I'll protect them now.

Our national forest policies therefore must be directed to move us as a national people toward the twin goals of economic well-being and quality of life. Our national government has direct responsibility for managing our public lands. Federal agencies manage the National Forests, National Parks, Wildlife Refuges, and the public domain of the Bureau of Land Management and other public lands under legislative direction from Congress. The public here has a direct role in setting policy through its elected representatives and in seeing that its policies are carried out by its public servants. Our national government has much less to say about how private forest lands are managed. It is a continually evolving and still unsettled issue as to what is the appropriate concern of the public in how private land is used.

For all our forest lands, we need to define and continually to update and redefine our national goals. We know pretty well what our population will be. We have a pretty good idea of what our economic status should be and how we'd like to see our quality of life improved. From these bases, we should be able to set national goals for, say the year 2000, for output from our forests by major products—water, aesthetics, recreation and wood. Having an idea of where we'd like to be going should help us in our efforts to move forward. The President's Advisory Panel on Timber and the Environment was one step in this direction. The Humphrey-Rarick bill enables the Forest Service to move forward with the goal-setting and planning process. The policy statement proposed for adoption by this American Forest Congress provides valuable guidance. What remains to be done is to

get down to specific goals and to develop policies that will enable us to reach them.

NATIONAL POLICY ON NATIONAL LANDS

Let us examine national policies for national lands first. A number of Federal agencies manage forested lands under legislation and regulations peculiar to their individual status. Many BLM lands are simply leased to private users. National Parks are managed to preserve and provide access to areas of great scenic interest. The agency with the biggest and most controversial job is, however, the Forest Service. The simplest and most-inclusive policy governing the National Forests is The Multiple Use—Sustained Yield of 1960 which states:

That it is the policy of the Congress that the national forests are established and shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes The Secretary of Agriculture is authorized and directed to develop and administer the renewable surface resource of the national forests for multiple use and sustained yield of the several products and services therefrom.

We may or may not quarrel with the Forest Service as to how this directive is interpreted and put into effect on the ground. Few of us would, however, disagree with the basic principle to such an extent that we should wish to repeal or seriously amend the legislation.

What changes in our basic elements, then, are needed in American forest policy regarding our national public lands? Not a great deal, perhaps, in terms of general principles, but hopefully a continual improvement in the details of application. Generalizing from the body of legislation and Federal management practice, I suggest that proposed new legislation in this area should be tested against the following general principles.

First, our public forest should be used for the balanced production of goods and services for the benefit of mankind.—Just as man is only a part of the earth ecosystem, so are the forests. They should not be considered in isolation or be locked up from human access and use. Forests should rather be managed for the good of mankind taking into consideration the need for economic returns and the need to maintain our woodlands as part of the world ecosystem. The task of balancing tangible and intangible returns from the forest, of weighing economic and social benefits from the forest in a single computational model, and the decision as to how to balance the various goods and services derived from the forest to maximize their benefit to mankind will always be complex and difficult and will require the greatest talents of the professional forester in their determination. Inevitably, when different approaches to a problem indicate incompatible courses of action, subjective judgment must prevail. Nonetheless, these are essential management activities if we are to succeed in developing and in carrying out a satisfactory American forest policy. My own predilection is not to use the dollar as the unit of measurement, for this will inevitably weight the decisions in terms of simple economic returns, but rather to seek to find some inevitably more complex unit to measure quality of life in integrated economic and social terms. Only by so doing can we develop policies and reach management decisions that will give appropriate weight both to material goods and also to the intangible values and services that the forests provide.

Second, our national forests should continue to be managed as a renewable natural resource.—This is a proposition that may not always be economically defensible but which has in effect been established as policy by the several actions of the agents of the people of the United States. All seem to agree that the flow of materials and other goods from the forest should be reasonably balanced over a more or less clearly defined geographical area and over a moderate span of years.

We cannot know the future although the past and the present undoubtedly provide clues to it. We must take care that we do not construe too narrowly what we must produce to be willed to our heirs. We cannot, for instance, know the species and the size classes of trees that will be needed in the 21st century. We can predict with absolute certainty, though, that man will be much more populous and consequently will require substantially larger quantities of organic material photosynthesized by trees and other primary producers. This is why I have couched my statement in ecological rather than in economic terms.

Becoming more specific, the concept of forests as renewable natural resources follows logically from the basic assumption that a balanced man-forest ecosystem must be attained and maintained. It does not follow, however, that each and every piece of forest must be managed to these rigid objectives. Within the overall system, there must be constant adjustments to maintain the balance under changing conditions.

While it is desirable to develop maximum flexibility in order to facilitate this balancing, it may well be that some forests will be over-cut while others will be undercut in a given period of time; that some forests will be liquidated while other forests will be withdrawn from exploitive use; and that some forests will be used for many purposes while others will be restricted insofar as man's involvement is concerned.

In short, I do not argue for the arbitrary enforcement of sustained yield practices for small areas on a non-declining even-flow annual basis. Such a rigid approach may well prove to be unnecessarily restrictive. I do hold that, if we are truly committed to managing the forests as a renewable natural resource, then it is essential that we define our units of management at some larger level of integration and our period of planning at some reasonable span of years, and that we insist upon a continuous high level of production of goods and services for the defined area and span of time.

Third, a national forest policy must involve the development and application of sound economic criteria for the management of our public forests.—I have already indicated some of the factors that must be considered, such as the definition of the management unit, and the measurement of goods and services in terms of quality of life rather than in terms of the dollar. Nevertheless, the skills and tools of the economist must be brought to bear if we are to have a satisfactory and adequate American forest policy. Intensive management of our forest resources is highly desirable from many points of view, but its practice must inevitably be limited by economic restraints.

Fourth, provision should be made for professional management of forests under guidelines of established policy.—It is the appropriate role of policy bodies, both governmental offices and national associa-

tions such as the American Forestry Association, to instigate and promulgate national forest policies. It should fall to the professional, however, to put these policies into effect, drawing upon highly specialized technical skills in many fields of endeavor to introduce forest practices that will meet the general policy considerations and yet be practicable and effective under the specific conditions encountered. For example, it is clearly inappropriate to have a national forest policy on specific silvicultural practices such as clearcutting or the use of fire. Rather the objectives of public forest management should be spelled out, leaving the professional forester on the job the right and the responsibility of utilizing all of the tools at his disposal as long as they are not dangerous either to mankind or to the ecosystem in which he lives.

Fifth, the Forest Service and other major land-managing public agencies should be provided with legal and fiscal opportunities to manage forest lands, to improve their productivity, to harvest timber therefrom, and to provide other desired benefits.—In order that our public forest lands be well managed, the responsible agencies must have the trained professional manpower available with the funding and authority to practice their professions.

Alternatives to present methods of computation of allowable cut should be assayed in terms of better long-term planning for the wise use of our public timber. Alternatives to present timber sale procedures should be legalized and tried with the objective of providing for better environmental protection of the logging sites at the same time that complete and profitable utilization of the timber is encouraged. Existing forests should be adequately protected against fire, insects, disease, and, above all, from man himself. Regular funding on a long-range basis should be provided to ensure that lands that are planned to be forested are indeed fully stocked with trees. Our national agencies that managed forest lands have by and large done a good job with the resources at their disposal. They should be encouraged to do a better job in the future by being given the requisite manpower, funding, and authority.

I take my sixth principle directly from the Report of the President's Advisory Panel on Timber and Environment. The Federal land-administering agencies and the Congress should accelerate their efforts to complete the National Wilderness Preservation System as rapidly as possible. The Federal land-managing agencies and the Congress should develop a system of quasi-wilderness areas in the Eastern United States in which low-intensity outdoor recreation will be possible under natural forest conditions. Commercial forest lands not withdrawn for wilderness or other specific uses should be available for commercial timber production among other compatible uses and should be managed in accordance with appropriate national policies.

NATIONAL POLICY ON PRIVATE LANDS

Most of us would, I think, subscribe to the general principle that the less public regulation of private affairs, the better. The continuing debate is over the issue of how much is "less." From examination of recent environmental legislation, we can make some generalizations about the principles underlying American forest policy toward private land as it has evolved from our present body of law.

First, a word about owning land. Individuals claim ownership by a title conferred by the government. Historically, the title conveys only limited rights. Surface rights are often more clearly defined than aerial or subterranean rights. Frequently the rights are separated and held by differing people. In Texas, one may own the surface rights, another the mineral rights, and a third the water rights—and often the latter two are more valuable than the first. Furthermore, what the government giveth, the government can take away. Expropriation, eminent domain, and more subtle forms of action can all alienate an owner from his land. The fact is that no one of us owns land outright and without qualification. What the owner really has is a right to limited use of a piece of the earth's surface and an even more limited use to the air above it and the ground beneath it.

Our rights of private ownership are limited in two general ways. First, and there is general recognition in the law to this, no individual owner has the right to so manage his property as to adversely affect adjoining landowners or indeed, any other person. The body of legislation and regulation on air pollution and water pollution speak to this principle. In the area of land pollution, legislation is less developed. Certainly, though, we should not discharge waste that would lower the productivity or value of a neighbor's land. It would follow that we should not construct logging roads so carelessly that the eroding sediment would seriously damage the land of the owner next downstream. If there isn't a law against it, there should be. On the constructive side, land-use planning is a rapidly developing device designed to protect the property values of individuals by insuring that all lands are developed compatibly.

The second limitation is embodied in the growing concept that we as landowners are acting as trustees for future-generations and that we can and should be held legally responsible for so managing our property that we turn it over to our successors in as productive a condition as when we acquired it. The legal term for this is the right of *usufruct*, meaning that we may use the land as we will but only so far as we do not damage it or destroy it. The prime example of this principle currently before us is the proposed federal control of surface or strip mining. The majority of our Congress believe land reclamation after such mining to be in the public interest, not because strip mining may be a public nuisance but because it is thought that we have the responsibility of turning our land over to our children in good condition. Efforts to regulate forest practices on private forest land provide another example of this principle. High-grading a forest or falling to regenerate it after clearcutting may affect no private individual but the owner; yet, the argument is that there is still a long-term public interest that justifies governmental intervention.

For what it's worth, my instinct is to agree that private landholders have an obligation to so treat their lands as to maintain its quality and productivity, but that the level of management above that is their choice. In other words, the public interest is sufficient that the Federal government should make it unlawful to degrade the site, or to damage the ecosystem beyond the point when it can recover.

To the extent that it is considered desirable from the national point-of-view to encourage forest management on private lands, this should be accomplished through incentives rather than through regulation. There are many ways to approach this problem, some of them of

proven effectiveness and others that have been less than useful in the past. The proposed Centennial program for the American Forestry Association treats thoughtfully and wisely with the various aspects of public assistance to landowners and processors: education and public service, direct incentives, credit, insurance, and taxation. The President's Advisory Panel on Timber and the Environment has provided a useful critique of past experiences as well as innovative suggestions that deserve study and trial. There is much to be learned and incentive to proceed.

I submit that it should be our national policy to keep substantial areas of our commercial forest lands fully stocked, adequately protected and productive. This was the theme of the first American Forest Congress in 1882 and indeed was perhaps the principal tenet of the American forestry movement during the last half of the nineteenth century and the first quarter of the twentieth as the Clark-McNary Act testifies. Reforestation or afforestation may not always be financially justified from the standpoint of the small landowner or from the standpoint of economic analysis of a single isolated piece of land. When the unit of management concern is considered to be the nation as a whole, it follows that, if we are committed to managing the forests as a renewable natural resource, then we have a national responsibility for leaving forest lands fully stocked and productive.

By extension, this also means that it should be national forest policy to provide incentives or to otherwise subsidize the reforestation of those privately owned lands which from the standpoint of national policy should be in forests but which are uneconomical to reforest under the restraints imposed by existing conditions of private ownership.

CONCLUSION

As an educator and a research scientist, I cannot conclude without belaboring the obvious and putting in a plug for a vigorous and on-going program of both forest research and conservation education. In the former realm, both mission or problem-oriented research and basic research must be maintained. Investigations should be carried out at all levels ranging from the basic biochemistry and biophysics of living cells to the social and ecological considerations of human society and of the larger ecosystem in which man lives and operates. We must have vigorous programs studying not only the problems of tomorrow and of the next decade but of the next century and indeed of the indefinite future—for the latter will come far sooner than we anticipate. A major responsibility for such a program has long been primarily undertaken by the Forest Service. Universities and industry also have major roles to play. Our research programs dealing with forest problems should be continued and enhanced.

A sound program of education in forestry must operate at all levels through specialized but non-professional training in our colleges and universities to highly professionalized training in forestry, affiliated professions and in research in forest science of the highest order.

To conclude, it is not my part today to go into detail into the proposed Centennial Program for the American Forestry Association. It is a carefully conceived, well-worded and sound proposed policy. It has my support. It is, I believe, harmonious with the basic principles

that I have suggested must form the basis for any American forest policy statement.

Over the past century we have made great progress in American forestry. We have by and large closed out the era of cut-out and get-out logging. We have generally stopped the uneconomic conversion of forested land to submarginal farm land. We have come close to stabilizing the proportion of our land surface devoted to commercial forests. We have preserved significant parts of the forest landscape. We have begun to increase the productive capacity of the American forests through better management widely applied by forest industries and public agencies.

We have done much but much remains to be done. Demands for human use of our wild and forested lands will increase with an increasing population. So will our need for timber for housing, communications, and other uses. The basic resources in the form of forests are there. The capability exists for managing them to meet a substantial level of expanding future needs. Our American forest policy should be addressed toward reaching this goal.

STATEMENT OF HON. MARK O. HATFIELD, BEFORE THE AMERICAN FORESTRY ASSOCIATION—OCTOBER 6, 1975

[By Mark O. Hatfield, a U.S. Senator from Oregon]

One of the most frustrating aspects of a government which is too large and too centralized is that it seems to take a serious crisis to get it to act—and too often it merely reacts to the immediate crisis rather than responding to and dealing with the real root problem.

The energy crisis is an example of the phenomenon. Long gasoline lines at the neighborhood service stations were commonplace before the government reacted—and it still has not responded. We must draw the important distinction between a reaction and a response—a reaction involves the “quick-fix” treatment of the symptoms, while a real response involves a look at the underlying problems and solutions to them. The saying that the President has one energy plan, the Congress has 535 and the nation has none is a tragic and well-worn joke, but it is descriptive of the present situation.

There is no question but that our energy resource problems needed attention long ago, but there were always other pressing issues—such as the Vietnam war, or civil rights—all important, all crises demanding attention and getting it. And when energy became a crisis it also took the nation’s attention.

Another resource issue has been festering for years, one that all of us here are familiar with, and I am not being facetious when I say that here, too, we face the very real prospect of a major resource crisis.

The health of National Forest management has been at best dubious for a long, long time. Created to “furnish a continuous supply of timber for the use and necessities of the citizens of the United States,” as stated by the Organic Act of 1897, and to be administered “for outdoor recreation, range, timber, watershed and wildlife and fish purposes,” as mandated in the Multiple Use—Sustained Yield Act of 1960, we as a nation have simply failed to do the quality job of forest management we ought to be doing.

While problems have surfaced periodically—relating to timber supply, wilderness or recreation, the reaction has been consistently insufficient and can be summarized in two words: study it.

In March 1969, the Subcommittee on Housing and Urban Affairs of the Senate Committee on Banking and Currency held hearings and reported on softwood timber supply and price problems as they were affecting the housing program.

In June of 1970, the Public Land Law Review Commission issued its report to the President and the Congress on the retention and management or disposition of federal lands, which equal one-third of the nation’s land mass.

On June 19, 1970, Robert P. Mayo, formerly director of the Bureau of the Budget, reported for the Cabinet Committee on

Economic Policy the findings and recommendations of the White House Task Force on Softwood Lumber and Plywood.

In March of 1973, a White House Timber Sale Task Force under Secretary of Agriculture Earl Butz was formed to study continuing increases in softwood lumber and plywood prices.

In June of 1973, the National Commission on Materials Policy issued its report on timber supply problems.

The long-awaited report by the President's Advisory Panel on Timber and the Environment was issued last year.

All of these studies have concluded that the timber-growing potential of the National Forests must be developed more fully to meet future demands for forest products and for wilderness and recreation. All indicate that timber yield can be increased while benefitting the environment.

The General Accounting Office—the watchdog of the Congress—has concluded that through stepped-up reforestation and timber stand improvement efforts, the timber yield on the National Forests could be increased by 94 percent per acre.

Yet, with this plethora of studies, we still see some 3.3 million acres on the National Forests in need of reforestation. We still see what can only be called second-rate management of the public resources.

And the fact that we are failing to deal with our demand for additional timber does not mean that we are meeting recreation or wilderness needs. The Forest Service presently shows a backlog in campground maintenance and rehabilitation of over \$38 million. When we are growing less timber than we should be, each acre taken out of production becomes more critical, so that there is often a reluctance to designate unique, alpine areas as wilderness. All users of the Forests lose when they are improperly managed, and this is the present case on the National Forests.

The reason for this is not so much the fault of the Forest Service itself as with its place in the federal bureaucracy and the general failure of that bureaucracy to understand the nature of natural resources.

The Forest Service—responsible for the stewardship of 187 million acres of land—is located within the Department of Agriculture. And Secretaries of Agriculture have not been noted for their knowledge of or interest in forestry.

This difficulty at the departmental level is exacerbated by an Office of Management and Budget which has been deaf to the logic of investing in the public lands now for a return in future years.

In past years, when funds appropriated by a sympathetic Congress for reforestation and other forest programs could be impounded—they were. Even last year, with impoundment authority sharply limited by a new law, OMB caused a delay in the expenditure of reforestation funds which may have cost us a year in the reforestation effort. OMB has had almost dictatorial control over programs it knows nothing about.

In addition to these institutional difficulties, the Forest Service has been caught in the middle of a controversy which ranges from the "cut and run" philosophies of the old timber barons to proponents of a philosophy which ignores any sort of scientific approach to forestry. Each side has been caught up in major battles over the use of specific areas, losing sight of the broad policy issues. Each has viewed the other

as having the most evil of intentions, while it alone has the public interest at heart. The result has been that there has been no clear consensus to guide the Forest Service except that each group wants more—more wilderness, more recreation, more timber.

Yet, in spite of these difficulties, there has been a large measure of progress in the past few years. Congress has been asserting its authority over the budget, limiting the executive's ability to impound Congressionally authorized and appropriated funds. Those of us on the Appropriations Committees of the Congress have been successful thus far in putting the Forest Service on a 10 year program to eliminate the backlog of lands in need of reforestation. An "areas of agreement" coalition, sponsored by AFA, has worked together—representing all forest user groups—to propose a balanced budget for the Forest Service.

The Forest and Rangeland Renewable Resources Planning Act—introduced by Senator Humphrey—has been enacted. This legislation calls for long term planning to insure the nation of an adequate supply of forest resources in the future. Under the bill, the Administration must also develop budget proposals to meet our long term goals. We don't have enough experience with the Act to know just how effective it will be, but it does offer real promise.

All of these steps, however, will be only superficial if the recent decision of the U.S. 4th Circuit Court of Appeals becomes the effective law of the land. Each of the problems I have outlined pales in comparison with the one which is now taking form. It may be more than just another problem, but a real crisis in resource management and availability.

It is becoming clear that we have based entirely too many assumptions on what may be a very shaky foundation—the Organic Act of 1897. Enacted 78 years ago, when the practice of forestry and the state of the public lands were very different from today, this legislation established the management authority for the National Forests. The Act held that "No national forest shall be established, except to improve and protect the forest within the boundaries, or for the purpose of securing favorable conditions of water flow, and to furnish a continuous supply of timber for the use and necessities of citizens of the United States."

Ironically, if the court's decision stands, it is this Organic Act which will precipitate the crisis in forestry. While commonly referred to as the Monongahela or "clearcutting" decision, its impact could go much further than the boundaries of West Virginia's Monongahela National Forest or the practice of clearcutting. The court held that only "dead, physiologically matured, and large growth trees" may be sold. All trees to be sold must be individually marked. This prescription limits severely the uses of many important modern silvicultural practices.

At present, the decision applies to West Virginia, Virginia, North Carolina and South Carolina. Timber sales, which were cancelled after the decision, were resumed a few days ago, but at the rate of only 30 million board feet for the balance of the fiscal year, as compared with 285 million board feet which would have been sold during this period. This is a reduction of nearly 90 percent.

I am not a lawyer, and cannot make judgments about the possibility of an appeal, but as a layman it seems likely that the impact of the court's decision could spread to other areas of the nation, where similar cases are already pending, thereby creating a far more serious lumber shortage than any in recent history.

This sort of crisis would bring about a governmental reaction, but not necessarily a good one. With the supply of timber from National Forests drastically reduced for a period of time, pressures to increase it might bring about a higher level of cutting than can be justified by present reforestation efforts. Or the shortage could drive us to increasing dependence upon lumber imports or the so-called substitutes for lumber in housing.

These substitutes all entail very high environmental and energy costs. Production of aluminum is tremendously energy-consumptive: 29,860 BTU's are necessary to produce one pound of aluminum. Mining and the reduction wastes have large environmental impacts and deplete finite resources. Concrete is just a step down from aluminum in magnitude of energy consumption and also uses non-renewable resources.

In addition to heavy power requirements, the synthesis of plastics releases into the environment a wide variety of reagents and intermediates which are foreign to natural ecosystems, often toxic and accumulate in the environment. Ecologically, the synthetic polymers are literally indestructible, and therefore generate important, often poorly understood, environmental impacts.

To state a very obvious point, we can no longer afford the luxury of extravagance in energy consumption.

Ecologically speaking, wood is clearly the most desirable material to use to meet our housing needs. The energy utilized in growing trees is solar—free of charge. With sound forest practices, there is little strain on the environment. Wood is organic and biodegradable—it returns to the soil as part of the natural cycle. Wood is a renewable resource.

If the court's decision stands, we cannot be sure of how the government will react—we can only be sure that when the housing material shortages reach crisis proportions, the programs of the Congress and the Administration to stimulate homebuilding will be meaningless. Pressures from the homebuying public, from those involved in the construction and forest products industries, will force the government to react, but there may not be a sound response to the overall problem.

We must develop legislation now to deal with the potential problems of the Monongahela on a temporary basis, but we must realize that it will only be for the short term and it will not be an adequate response. Such legislation should not be prescriptive as it relates to forestry silviculture practices—different tools must be used for different situations.

Guidelines developed over three years ago by the Senate Public Lands Subcommittee are presently being utilized by the Forest Service to insure that clearcutting is properly used—a legislative prescription discussed by some of my colleagues might be fine for a particular forest or a particular species, but totally inappropriate for other areas of the country. We cannot legislate biological growth factors.

While temporary legislation can deal with the immediate problem, we must also develop comprehensive legislation which responds to the many serious problems we have in managing our forests. The elements of a true response must include a financing mechanism.

In 1971, I proposed the American Forestry Act, a bill aimed at reforestation of both the public lands and the small, nonindustrial lands. Field hearings were conducted in the South, the West and the Northeast. The bill aroused opposition in some quarters because it would have utilized receipts from timber sales to finance forest management activities. The logic of its critics was that this would provide a built-in incentive to cut more, perhaps without the necessary steps to protect the resource. This was not my goal—and we have safeguards to prevent this from happening, but there may be other alternatives which do not evoke this fear.

Last year, for example, the Congress enacted legislation to put the Bonneville Power Administration in the Pacific Northwest on a self-financing basis by authorizing it to issue and sell revenue bonds and revenues from power sold to pay off the bonds. Such a system could be developed for the Forest Service which would allow the agency to move ahead with a major reforestation and timber stand improvement effort.

It is also time to include a new statutory land classification in the options of forest managers. At present, in the eyes of many, we have either multiple use lands or wilderness. Other classifications are developed on a piecemeal, ad hoc basis. The battle lines have already been drawn around many areas which deserve protection but may not qualify for wilderness designation and may require more in terms of land management than is authorized under the wilderness act.

I would, therefore, propose a statutory back country designation to include land without permanent public roads, which can be reached primarily by trails, which possesses unique recreational values. It would be managed for a near-primitive recreational experience. This designation would allow some of the basic amenities desired by many of the National Forest users including more intensive trail signing, toilets, shelters, and water systems. Steps could be taken to deal with diseased timber or insect infestations. Limited timber sales by helicopter, balloon, or other unconventional methods. Back country could be managed to handle the people and would relieve pressures on wilderness, which can be damaged by overuse.

This same comprehensive legislation ought to correct some of the deficiencies in present laws, including the language in the wilderness act which permits mining.

This is the other way we could respond to the challenge posed by the Monongahela—seizing it as an opportunity for creative action.

Gifford Pinchot, the first Chief of the U.S. Forest Service, wrote that “The rightful use and purpose of our natural resources is to make all the people strong and well, able and wise, well-taught, well-fed, well-clothed, well-housed, full of knowledge and initiative, with equal opportunity for all and special privilege for none.”

If we do any less than move now to affirm these principles, we will be inviting a forestry crisis of mammoth proportions.

STATEMENT OF HON. HUBERT H. HUMPHREY, BEFORE THE AMERICAN FORESTRY ASSOCIATION—OCTOBER 7, 1975

[By Hubert H. Humphrey, a U.S. Senator from Minnesota]

When the first Congress of the United States met, our Nation had barely 3.9 million people. And the forest was viewed as a barrier to development. Exploiting it was a challenge.

When in September 1875 the American Forestry Association was formed in Chicago under the leadership of that outstanding physician-conservationist, Dr. John Warder, the effects of a century of wasteful exploitation of our forest were becoming all too clear.

Credit also should go to the American Association for the Advancement of Science and to the huge cross-section of interested citizens for alerting the American people to the need for the conservation of our renewable resources.

I am here today as a citizen with long and deep interests in the relation between our spiritual and economic well being and the condition of our natural and human resources.

I am a conservationist, and proud to be one.

I also am a professional policymaker—a politician if you wish—one of 100 Senators selected by the voters to translate ideas into national policies.

I am a politician who believes that there is an evolution of policy just as there is for the plants and animals. I believe we must try to improve things, while being willing to examine what is evolving.

I also believe very strongly that we should bring people and ideas together in this evolutionary process. I am a Democrat in political philosophy—a member of the Party that believes that an elected government is the peoples' way of fashioning and achieving those goals.

Today let us talk about the Forest and Rangeland Renewable Resources Planning Act of 1974. This Act, which I helped initiate, is dedicated to the principle of policy evolution. It seeks to address the situation on some 700 million acres of range and grass lands and some 700 million acres of forested lands—two-thirds of the 2.2 billion acres in our United States.

It gives us as a nation the ways and means to shape the destiny of our land by helping determine the way we address the issue of our renewable resources.

The Act provides the means to assess regularly our renewable resources—including soil, water, forest and range plants, animals, fish, birds and even the insects.

It then provides the vehicle for focusing public policy decisions on these 1.4 million acres.

What for example, should be the role of the private land owner as well as the Federal, State and local governments?

Another important concept imbedded in the bill is flexibility. In this Act we recognized the inevitability of change and provided the basis for developing improved information on which to gear policies and programs.

We tried to create the machinery that gives us facts so that the fear and uncertainty of change is reduced. And we sought to avoid being caught up by events because we were not looking at what was happening around us.

In this Act we also tried to keep the range of actions within manageable proportions. The Act, recognizes the pivotal role the Department of Agriculture and its Forest Service play in administering forest and range lands, and in aiding the private sector management of similar lands.

It is one thing to recognize that there is a governmental role, but is quite another to be able to respond. A major challenge that we face as a people and as a Nation is to improve our ability to come to grips with issues.

Today, with well over 200 million people in the United States, decision making and policy formulation are far more complex than when we had but 4 million people in our new Nation.

When the AFA was founded, I am told you had perhaps 35 members. They looked at the resource situation, as they saw it, and they hammered out a policy and a program which was a good one. Today you have 80,000 members.

AFA is an excellent example, of how the coming together of a group of people—who are willing to get the facts and bring them to the attention of their fellow-citizens—helped focus on the issues and identify the needs.

The whole system of renewable resource conservation still rests on the foundations that this small band of pioneers helped to design. When they began, lumbermen thought that forest management on a scientific basis was pure folly.

Fire protection was viewed as perhaps useful for mature timber lest it be burned up before it was cut down. The public forest—whether Federal or State was regarded as a public picking ground. The best thing that could happen was to get rid of the trees and convert the land to a farm.

The range lands of the United States were the battlegrounds of the homesteader and the cattleman. The only question was whether the sod would be broken by the plow or by the thousands of cattle and sheep that ranged across the grasslands.

I do not suggest that all that happened was bad, either in outcome or in motivation. But the record is clear that the 35 original members of your association were forward-looking. They said that if man uses the renewable resources wisely, they will help man sustain himself in perpetuity.

Now, 100 years later, we have a much clearer understanding of the fundamental truth of this fact.

This past century has been one of major change. Oil and the internal combustion engine—both reliant on non-renewable resources—have worked changes on our whole way of life.

I am sure that when the first meeting of AFA was held in 1875, a number of your members came on a passenger train whose engine equaled 500 horses. Some probably came via "one-horse power"—a horse, pulling a "Democrat"—the popular two seater shay of the day.

For your meeting here today some came by 727—a jet powered by the equivalent of about 9,000 horses. A few probably came by train pulled by 4,000 horses, and many came by car with a 200 to 300 horse power engine.

Our use of energy these past few decades has been as profligate as our use of wood used to be. When your organization first assembled in Chicago, many of the city streets were cobbled with wood paving blocks. And the rails the trains ran on were ties of now prized and expensive hardwood lumber.

It is clear that the energy events of the past few years are going to change how we view and how we use the forest resources.

America's forests and rangelands are assuming new and larger importance. We are learning to work with nature, but time is not on our side.

We have learned that some resources are renewable. They can be husbanded or used again and again if not abused.

We know that we have a massive job of reclamation on both forest and range land in order to restore the vigor and quality of their resources.

We have learned that the forest and the range have many resources and their uses can be multiple.

And we have learned that there is a value to the quality of wildness.

In addition, we have learned to respect Nature—there are ecological interconnections that we must work with, not against.

In January, 1976, we are going to test ourselves on how to apply what we have learned. Under the Forest and Rangeland Renewable Resources Planning Act, this process already is well under way.

The Department of Agriculture now has in circulation for public study the raw material that every interested citizen is asked to study. In fact, the law—which provides the rules for this test—requires you as citizens to contribute to the body of facts and to the proposals.

In January you will be asked to come forward and tell the Congress whether or not all of the relevant facts are there and whether they are comprehensively displayed. You will be asked in the second part of that test either to pick what you think is the best course, with your reasons, or to suggest other alternatives and back them up with reasons.

And further, you will be asked to help us in the Congress to select the best course to chart for the years immediately ahead.

In this unique and comprehensive test, we in the Congress will likewise be examined on our ability to carry out our responsibilities under this new law.

We will be evaluating your ideas and measuring them against the proposals of the Executive. And, you will have an opportunity to examine the answers we give.

This legislation was the product of many people working together with diverse views. I am confident that when AFA decided to support this legislation, it did so with the understanding that it was making a commitment for its 80,000 members to work actively and continuously toward the improvement of our renewable resources.

This law is not a one-time thing. It provides that annually we can adjust our sights, and that each 5 years we can substantially overhaul our priorities and program. Every 10 years we will have a new comprehensive resource assessment that will give us the base for significant changes in both direction and speed.

I certainly hope that this Act will do more than help us chart the right courses for our renewable resources. It also should serve as a model that can be applied to many other areas.

Last week when I spoke to the Society of American Foresters, I discussed in some detail the West Virginia timber harvesting decision and some of its impacts.

I will not replot that ground today. However, I would like to expand a bit on what I said.

I called on the membership of SAF as professional foresters to express their views and cooperate in positive and constructive reform.

And I call on you as a key citizen group to help work out this issue, as you helped get the Resources Planning Act adopted. I hope that your Areas of Agreement approach will help galvanize all conservationists toward some cooperative solution as to how the National Forests should be managed.

I am prepared to help.

Shortly, I plan to re-introduce Section 201 of the original version of the Resources Planning Act. This will give the public and the Executive agencies a bill on which to focus in order to decide what form new legislation should take.

The fundamental issue we must face is whether forestry should be practiced in the courts, or in the woods.

The next issue we face is whether Congress should write tight instructions into law, or allow the professional resource manager the flexible authority needed to apply the best scientific forestry practices in a manner that assures complete respect for the environment.

My sentiments are similar to those of a former chief of the Forest Service, who told your organization in 1935, "Forestry is a profession that will not tolerate political dominance."

To best resolve these issues, Congress is going to need all of the help that you can give.

In 1905 at the American Forest Congress, Teddy Roosevelt issued marching orders for all of us here today when he said:

"You are mighty poor Americans if your care for the well-being of this country is hoping that well-being will last out your own generation. No man here or elsewhere is entitled to call himself a decent citizen if he does not try to do his part toward seeing that our national policies are shaped for the advantage of our children and our children's children."

We have a right to be confident about the future because we have accomplished so much. We have *no* right to be complacent because there is so much to do.

For many years it was my good fortune to work closely with Senator Clinton Anderson of New Mexico, both in the Congress and earlier when he was a Secretary of Agriculture. Let me share with you a thought of his—a philosophy that I share.

"Conservation is to a democratic government by free men as the roots of a tree are to its leaves."

On this occasion which marks your 100th anniversary, I want to join with you in saluting that hardy band of 35 conservationists who set us on the course of wise resource management. Now, as a group with 80,000 members, I hope you will swell your impact to meet the challenges ahead.

I see no reason why we cannot be pragmatic and idealistic at the same time. As the great American conservationist Carl Schurz said:

"Ideals are like stars; you will not succeed in touching them with your hands. But like the seafaring man on the desert of waters, you choose them as your guides, and following them you will reach your destiny."

OUR NATION'S FORESTS

[By Hon. Earl L. Butz, Secretary of Agriculture]

When the first colonists to America stepped ashore they looked on untamed forests and virgin woods choked with underbrush. There were no well manicured farmlands or rows of neatly trimmed wooden houses in the suburbs, or quiet communities with schools and churches.

But something equally good faced the newcomers. They looked out on the new land and knew that here they were seeing more potential than they had ever before witnessed. In the richness of the wilderness the settlers saw the resources and inspiration needed to yield a new life. They dug in and started the development work that ultimately produced the rich nation of today; the nation that we all enjoy and too often take for granted.

For those of us living in 1975, visiting a mountain wilderness area can bring the same sort of feeling. We can see the open countryside and feel a new breath of life. The beauty and the potential of untouched land recharges our spiritual batteries, giving us a lift we can get in no other way.

It would be sad indeed if on some future day Americans had no such wilderness area they could visit and get such a feeling. That's why our forefathers established a heritage of conservation and land preservation we still carry on today. Americans have set up the National Park Service, the Forest Service, the Soil Conservation Service and many other federal and state agencies to help take care of the land. We have also set aside over 12 million acres of Wilderness Areas—94 percent of which are in our National Forests.

For some people, these efforts are not enough. They look to the large acreages in the National Forests and want to stop virtually all alternate uses except backpacking and nature hikes.

This attitude is as unreasonable as the one that would ruthlessly exploit our national forestlands until every log, rock, mineral deposit, animal, fish, hidden trail, and clear stream would be endangered. One extreme plan is as unworkable as the other.

It is a legitimate concern to want a healthy, well-balanced environment, a place to take a physical and spiritual breather from the crowded life of the cities. But that desire has to be balanced against reality. Against the growing need for farmlands and grazing land for growing food. Against the need to unearth more mineral resources. Against the need to cut more timber and to turn out more wood products each year.

The pressures on our National Forests will increase with every passing year. They will increase as long as we want comfortable homes, outdoor recreation, maple dining room sets, walnut furniture in our living rooms, plywood sheeting on our walls and roofs, or newsprint for our morning paper.

The uses of forest products and forestland are manifold and expanding. The need for grazing land, for example, will increase some 40 percent in the next four decades, some of this will be found in our National Forests. A rational policy to meet this demand as well as all the others has to be administered. It will have to be a plan that will perpetuate our forests as well as utilize them. Common sense must prevail.

The battle over the nation's forests and forest products is nothing new. Some people have felt for a long time that forestlands should be privately held. Others argue for more federal control. Some want lower grazing fees on Federal Forestlands; others want higher fees. Some want to clearcut trees; others argue that it is best to take only scattered trees, or none at all.

Our national view of forest resources and how to best care for them and utilize them is in a constant state of evolution—as it should be. Changing times makes changing demands; this has always been so.

Frankly, for those first settlers, the proliferation of trees must have seemed a mixed blessing. To clear enough land for barest subsistence they often had to cut away the trees. They girdled trees and stripped the bark from them, leaving them to dry. The following year they cut down the dead trees, grubbed out the stumps and roots, then planted their first crops.

Some environmentalists today call that a ruthless practice. But at that time it was a necessity of survival. In our comfortable lives of today, living in a highly developed country, we forget that nature guarantees no man a living, that he has to make his own way. For the pioneers that meant clearing trees. For us today it means sensible forest management.

When the early settlers finally pushed through the Cumberland Gap, struggling away from the East Coast, they drifted through the rolling lands of Ohio and onto the vastness of the Midwestern Plains. To do so, they first had to cut their way through the trees of the Allegheny Mountains. The timber they cut was not wasted; it was used for bridges, split rail fences, cabins, and riverboats. The abundance of easily available building materials did much to help develop this nation. Men with little in the way of finances, but long on muscle and creative energy could go into the wilderness and make a new beginning. They were no longer tied inexorably to the poverty of the past.

In 1803, when President Jefferson sent Lewis and Clark up the Missouri River into the newly acquired land of the Louisiana Purchase, he nearly sent them to their deaths in the distant mountains of the Pacific Northwest. The explorers stumbled through snow-covered stands of pine trees for days before finally winding down the western slope of the new nation and into the safety of a milder climate. They were awed by the breadth of the timberlands of the west and the potential they saw.

Today, those same mountain ranges carry the nation's largest stands of the Western White Pine and Douglas Fir. Much of it is being reforested and well managed on a continuing basis. What was once an almost insurmountable wilderness has become a valuable, renewable resource—with little of the esthetic value damaged.

The forests of the Northwest are now used by loggers, hikers, cattlemen, picnickers, miners, fishermen, and nature lovers. Some of

the land is privately owned, but most of it is federally owned and administered by USDA's Forest Service. The multiple use of the area is a tribute to the fact that such programs can and do work.

The same sort of progress in sensible, multiple use of forests can be seen in many parts of the country. One of the guiding factors in developing these programs has been the American Forestry Association. Your association has long been a leader in recognizing that forests can, and should, provide a variety of goods and services—wood products, outdoor recreation, wildlife habitat, quality water, and just plain wilderness. You deserve high praise for the assistance given to USDA, the Forest Service, and the nation, in assuring the best possible kind of forest management. Your support of adequate research for future forest improvements is also vital.

Public involvement and participation from groups outside government is vital in good administration of National Forests and public lands. Sometimes I wonder if the general public realizes what a tremendous stake it has in public lands. National Forest lands contain about 18 percent of this nation's commercial timberland, and also provide about 20 percent of the entire water supply.

Fully one-third of this Nation's lands are publicly held. That figure usually shocks the easterner or the midwesterner, but comes as no surprise to the residents of America's West where the vast National Forests and grasslands stretch for seemingly endless miles.

Another not widely known fact about public land is just how much of it falls under the jurisdiction of the Department of Agriculture. Many people think of USDA only as an agency dedicated to improving the farmer's lot, and assuring high levels of nutrition in the nation at reasonable prices. But we're also one of the nation's major land managers. Through the Forest Service, we directly manage more than 8 percent of the surface area of the United States, about 187 million acres. This is an area equivalent to the combined area of West Virginia, Virginia, Pennsylvania, New York, Ohio, Kentucky and North Carolina.

Also, because the Forest Service directs programs in State and private forestry, and carries out technical assistance and research activities available to all forestland owners, its influence is extended to about a third of the nation's land.

That's a pretty big responsibility. No organization in or out of government has a more extensive research program covering plant growth, soils, water, air management, and plant pathology than the Forest Service. It is also backed up by its own, and the rest of USDA's specialists: mineral specialists, landscape architect, archeologists, geographers, hydrologists, range specialists, wildlife experts, and land use planners. That's about as broad a group of specialists as you are going to find anywhere.

I would add, without equivocation, that every one of them is dedicated to the job of determining how to best utilize and preserve this nation's land resources. These men and women have grown up working with the soil and studying the complexities of environmental relationships. They are not fly-by-nighters or quick-buck artists out to make a name for themselves or sell a new book or start a new organization. They represent the finest technicians of scientific inquiry.

I think that with this kind of expertise, tied with the involvement of a responsible public, we can best plan for the future use of our National Forests. The Department is now in the process of drafting a Consumer Representation Plan by which consumers can better participate in such decision and policy-making processes.

Also, there is the Forest and Rangeland Renewable Resources Planning Act of 1974. The purpose of it is to do exactly what we've been talking about: to match the needs of the people with the present use and potential future use of our natural resources. The Assessment and Program developed for the Resources Planning Act is now in draft form and is in the process of public review. Forest Service Chief John McGuire will be telling you more about it.

A long-range look at the nation's renewable nature resources is essential. It will allow us to look ahead and act on the basis of solid information, rather than following the current, public tendency of jumping from crisis to crisis—some real and some imagined.

Whatever we do, we must work to make common sense prevail, in place of emotions. Right now USDA and the Forest Service is in the process of determining the course to take in regard to the Monogahela National Forest. As you know, the 4th Circuit Court of Appeals recently handed down a ruling which said no trees can be harvested for sale in the Monogahela decision unless they are dead, mature, or of large growth. This case has grave implications as far as the future of flexible forest management is concerned.

However the problem is resolved, we must make certain that one isolated case does not become the basis for dictating national policy.

Rigid, national prescriptions based on the problems of one area seldom work well in other areas. Such rulings result only in barriers to localized, professional judgments—which in the end would degrade our national forest resources and threaten their future.

America's needs are changing. The day of the log cabin, or the homestead for every family is gone, but the day of needing timber and National Forests will always be with us. Our forests are a vital, national trust and we must work to perpetuate them, assuring both preservation and balanced utilization.

CITIZEN HOLDS THE KEY TO PUBLIC LANDS DECISIONS

[By John R. McGuire, Chief, Forest Service, U.S. Department of Agriculture]

Discussing the resource situation on all Federal lands seems as formidable as David tackling Goliath. And Federal land administrators are not allowed to carry sling-shots. However, I'll do what I can under the circumstances.

The Forest Service recently released an assessment of all the Nation's renewable resources—and this ran almost 400 pages, with a sizeable portion of that bulk devoted to Federal lands. In fact, some critics even suggested that the report itself caused a national paper shortage. So, in order to avoid the risk of using up a considerable portion of the national oxygen supply, I'll hit what I consider the highlights of the resource situation on Federal lands.

I could tell you that the Bureau of Land Management has the most Federal rangeland, or that National Forests contain 94 percent of the Nation's Wilderness, or that National Parks serve as the treasure house of the Nation's unique and spectacular natural wonders. But these statistics tell only a small portion of the story. The true resource situation can be determined by answering one fundamental question. Are the Federal lands doing their share to meet the resource needs of the American people, and if not, why not?

This question has concerned Federal land agencies more and more in recent years. Yet no public administrator can answer it. Only the owners of these lands—the American people—can give us an answer. And many Americans, as individuals or in small groups, have given us their answers. Those answers vary. Often they conflict. They range from an outraged "hell no" to a resounding "yes." How, then, can a Federal land manager hope to find a consensus among the Nation's 213 million people? Who will guide us in the wise use—or even suggest the extravagant waste, if that's what the American people want—of one-third of our Nation's land? Incredible as it may seem, especially to those who live in the East, Federal lands do account for one-third of the U.S. land base. These figures are even more astounding when only forest and rangeland are considered. Here the Federal portion jumps to about 46 percent, if you include the vast acreages of forestland in Alaska.

At first glance it would seem that two agencies administer the lion's share of this Federal land—the Bureau of Land Management with 62 percent, and the Forest Service with 25 percent. But size is not the only indicator of importance or influence. The Park Service has jurisdiction over only about three percent of the Federal lands—but this is a vital three percent in terms of recreation and protection of unique natural splendor. Likewise, the four percent administered by

the Fish and Wildlife Service is vitally important to the Nation's wildlife resources. That agency's lead responsibility for designating critical habitat for threatened and endangered species, not to mention its other responsibilities, marks it as a leader in wildlife resources.

I should mention that Federal influence—and Federal funds—extend far beyond the Federal land boundaries. For instance, the Forest Service cooperative programs for State and Private Forestry extend to 630 million acres of land. Its research programs reach out to influence perhaps as much as two-thirds of the United States.

The makeup of the Federal lands varies so greatly that it's difficult to generalize on them. It's almost impossible, for instance, to compare the National Parks to BLM grazing lands or to the multiple-use National Forests. Federal agencies have different mandates and different responsibilities. But they do have one thing in common. During the last decade or two, all Federal land agencies have had to initiate and respond to tremendous changes. Even the definition of "resource" has changed in the public's mind. Traditionally, recreation was not really considered a "resource." Today, it is. So is esthetic beauty. Yet who can really quantify esthetic beauty, let alone tell us how much we have, or how much we need?

All this has led to a new public awareness of all natural resources. It has also led to a great deal of controversy. This controversy can enhance the Federal lands, but at times it also threatens to destroy them. An honest exchange of viewpoints is good. It initiates change where change is needed. And Americans do care about what happens to their lands. More and more, citizens are becoming very knowledgeable about concepts, such as land use planning, silvicultural methods, and the complex interrelationships among various resources. The public can guide Federal land managers in the direction that will best meet changing needs and desires.

But I believe there are times when emotionalism seems stronger than reasonableness. We are fortunate enough to have a wealth of scientific knowledge relating to our renewable resources. Many times, the answers to our land management questions are embodied in that scientific knowledge which man has worked centuries to accumulate. Yet, in the heat of emotionalism, groups intent on only one narrow purpose may suggest solutions which are not really solutions at all, but which contradict what we know about the land and its resources. In some instances, I fear that we are listening to a very vocal minority which professes to speak for the non-vocal majority.

At the opposite extreme, there are those who refer to the present resource situation as though it were unalterable, inflexible—in short, prescribed by the fates or by Mother Nature. This is not the case at all. With our renewable resources, the present situation only reflects what we have made of those resources. The present situation certainly influences the future of those resources, but it does not mean that we have to follow our old patterns of land management. Renewable resources are not static. With planning, perception and research development, they can be managed to meet changing needs.

We can assume that the base of Federal forestland, except Alaska, will remain about the same as it is now. Counting all ownerships, the amount of forestland in the U.S. may actually shrink, as more land is

needed for cities, highways, and the like. But demands on forestland are not shrinking—they are escalating rapidly.

Congress has already recognized the importance of long-range planning for our renewable resources. In 1974, Congress enacted the Forest and Rangeland Renewable Resources Planning Act. This requires the Forest Service to make periodic assessments of all the Nation's renewable resources, on all lands, and prepare long-range plans for Forest Service programs. Both an assessment and a program are due by the end of this year. These documents should provide a firm foundation on which Congress can base its budgetary decisions.

Resource programs are intrinsically long-range. Often, in the past, a program has been started with a financial flourish, only to die the next year or so because its economic lifeline was cut. I am hopeful that the Resources Planning Act will enable the Forest Service to better meet public needs for forests resources and that it will serve as a model useful for other natural resource agencies.

In fact, the Assessment, which is still in draft form, is perhaps the closest thing we have to a comprehensive situation statement. It deals with all renewable resources in this country, under all ownerships. It predicts that by the year 2020, resource demands on all U.S. lands will increase dramatically. For instance:

- Demand for all major outdoor recreation activities will increase, from as little as 50 percent for motorcycling to over 400 percent for sailing.
- Timber consumption could more than double, at today's prices.
- Range forage demand will increase more than 60 percent.
- Consumptive use of water will increase by more than 40 percent.
- And, pressure on wildlife and fish resources will also increase substantially.

More than ever, Congress is taking an interest in natural resources. It has introduced numerous bills pertaining to the Forest Service and other Federal land agencies. For instance, there are proposals for an Organic Act for BLM. There have also been numerous proposals for land use planning legislation. The last Congress held 10 oversight hearings on specific Forest Service programs and activities, as well as requesting two oversight briefings from the agency.

Perhaps no resource is more controlled by Congress than wilderness, which has to be designated by Congress. Nor is there any resource which is more surrounded by controversy. It is one of the easiest resource situations to quantify—we know to the acre how much designated wilderness we have. But, ironically, it is also one of the most difficult areas in which to assess need. Today, there are a little over 12 million acres of wilderness. Ninety-four percent of this is on the National Forests. But, there is potentially much more wilderness. Proposals are now before Congress for an additional 26 million acres, which, if designated as wilderness, would more than triple the designated wilderness in this country.

Today, the courts are also taking a much more active role in resource management decisions. For instance, earlier this year, there were 28 lawsuits pending against the Forest Service. Seventeen of these involved environmental issues.

Perhaps one of the most controversial issues to reach the courts has resulted in the Monongahela decision, which holds that the Forest

Service was in violation of the Organic Act of 1897 in its timber harvesting practices on the Monongahela National Forest in West Virginia. Specifically, the Court ruled that trees in the Monongahela cannot be harvested unless they are "dead, mature, or of large growth" and have been individually marked for cutting. Although the Court's decision applies only to that particular case, some groups and individuals feel that it could be extended to all the National Forests, through a series of additional lawsuits. Since the decision involved a strict interpretation of the Organic Act of 1897, it will probably be up to Congress to determine whether the law, in its strictest interpretation, is adequate for today's timber resource situation.

This is part of a controversy that has been raging for many years, over the role of Federal lands in helping meet the Nation's timber needs. And the National Forests seem to be at the center of the storm. National Forests contain about 18 percent of the Nation's commercial timber lands. Other agencies, such as BLM and the Bureau of Indian Affairs, have another three percent. This does put the Forest Service in the best Federal position to help meet the Nation's timber needs. And the Nation's needs are growing—for timber, and for every other natural resource. At times, however, the Forest Service has been accused of being only a timber agency, and I'd like to counter that claim. Less than half of the 187 million acres of National Forests are classified as commercial timberland. Admittedly, timber is one of the major outputs of the Forest Service. But so are recreation, wilderness, water, wildlife, and rangeland. As I mentioned, National Forests contain about 18 percent of the Nation's commercial timberland. But they also contain over 94 percent of the Nation's Wilderness. And they provide 20 percent of the water supply for the entire Nation.

Another issue, which may become a controversy in the next several years, involves a vast amount of land in Alaska. The Federal Government administers 712 million acres of forest and rangeland. Of this, 48 percent is in Alaska, a State often forgotten by residents of the other 49. Most of this land is being held by the Bureau of Land Management, in what might be called a "bank account." The land is not being intensively managed now, but is waiting to be divided under the Alaska Statehood Act. Some of the land will go to other Federal agencies, some to the State, and some to the Alaskan natives. Congress has until December 18, 1978, to determine the specific allocation of the Alaska lands.

As you can well imagine, the Alaska lands represent one of the greatest challenges in the entire resource arena. The resolution of this issue will affect each and every American.

Right now there are nine bills before Congress proposing a wide variety of land ownership patterns for Alaska. For instance, they propose anywhere from zero to 28 million acres of new National Forests.

The Administration's proposal embraces recommendations made by the Secretary of Interior to create 18.8 million acres of new National Forests. Another 64 million acres are recommended for National Parks, Wildlife Refuges, and Wild and Scenic Rivers.

The Alaska issue is not a question of which agencies will get the largest share of the Federal pie. Alaska has a great deal of land—and that land has a tremendous diversity. Flying over the State, one sees the Alaska Range, the Brooks Range, and other spectacular country.

Parts of these scenic mountain ranges are worthy of National Park designation, and it would be inappropriate not to preserve their beauty. But there are many other areas in Alaska which are ideal for multiple use. The diversity of Alaska's land is so great that it can easily accommodate several Federal land systems.

This is an issue of national magnitude, since all Americans are owners of the Federal lands, wherever they may be. Yet few people in the other 49 States recognize Alaska as a national issue in land use planning. This recognition must come quickly if Americans really want to voice their opinions on this issue. The outcome of the Alaska lands issue could radically change the resource situation on Federal lands.

I've mentioned some of the major issues concerning the resource situation on Federal lands. I don't expect you to remember the statistics I've quoted. But, do remember one thing. The resource situation on Federal lands is not static, not inflexible. It can be changed and molded to fit future needs through sound principles of land management. But only the American people, through direct involvement and through their elected representatives, can point the direction for change.

Those of us who manage Federal lands are here to serve you, as members of the American public. Do not forget to remind us of this from time to time.

But, likewise, try to remember that there are 213 million Americans to serve. And many of those 213 million are demanding drastically different options on the same, relatively limited land base.

Earlier I said that the fundamental question is, "Are the Federal lands doing their share to meet the resource needs of the American people, and if not, why not?" Only you, as American citizens, can answer that question

TO CONSERVE AND TO CREATE

[By Hon. Russell E. Train, Administrator, U.S. Environmental Protection Agency]

Not long after I received Bill Towell's invitation to speak at this luncheon, I was sitting at home reading Catherine Drinker Bowen's fine new book on Benjamin Franklin (written just before her death) when I happened across this passage describing what Franklin saw as he journeyed up the Hudson in 1754:

Westward stretched the forest, endless, primeval, reaching on and on. No one in the sloop would have ventured to call the forest beautiful. Rather, it was "solemn, interminable, barbaric, harsh"; none meets the adjectives often. Trees were man's enemy and must be felled. Until they were gone there could be neither crops nor fruit; no safety, no ease, no civilization.

And for well over a century in the new land, the air, I suspect, offered to the human ear few sweeter sounds than the chop of an ax and the crash of a falling tree. For as the trees fell, man flourished; as the forest receded, civilization advanced.

So, at least, it seemed until, in 1875, a few farsighted citizens decided that, by the time it's a hundred years old, even a country as rich as we are ought to know better than to assume it could go on forever burning the resource candle at both ends. They saw that our vast forests had already been dangerously decimated and that, if we continued simply to "cut and run," we would sooner or later run out of room to run and forests to cut. They understood that, if we were to achieve enduring growth in this country, we must learn to conserve as we create—we must, indeed, learn that what we conserve is no small part of the life and world we create for ourselves and for those who will follow us. As we celebrate our Bicentennial, mindful both of our magnificent heritage from the past and the challenges of the future, we might well take as our theme—"To Conserve and to Create."

We celebrate Earth Day in April, and say that it all started five years ago. But I think that, in a very real sense, it is Earth Day that we celebrate here today, and that—if we must put an exact date on it—it began one hundred years ago, on the day when a small group of concerned citizens founded the American Forestry Association. If it took a hundred years for that first formal conservation effort to take firm root throughout the length and breadth of our society—as it now has in the form of the environmental effort—that should come as no surprise to you, who are accustomed to such long waits between planting and harvesting. You can take great pride in all you have done to make possible the strong environmental progress we have made over the past several years.

It seems a lot longer than ten years ago when I first addressed an annual meeting of this Association in Jackson Hole, Wyoming. It

was your 90th Annual Meeting held jointly with the National Council of State Garden Clubs. I had just become president of The Conservation Foundation, and Bill Touell had only recently joined the Forestry Association. We met to consider ways of taking advantage of what I called the "truly extraordinary opportunity for constructive conservation accomplishment" that had been created by such events as President Johnson's Message on Natural Beauty, the White House Conference on Natural Beauty chaired by Laurance Rockefeller and, particularly the inspired effort that Lady Bird Johnson had set in motion to encourage citizens themselves to play an active and effective role in building a healthy environment.

We have, as you well know, taken good advantage of that opportunity in the decade since. At all levels of government, and throughout our society, we have made excellent progress toward developing a strong institutional base for effective environmental management. I cannot think of another instance in which this or any other society has moved more rapidly or comprehensively to come to grips with such a complex set of problems.

Although our major environmental laws have been on the books for only a relatively short period of time, we are already seeing very real improvements in the quality of our air and waters. Since 1970, for example, we have cut sulphur dioxide levels by some 25%, and fine particulate levels by about 15%. Many of our rivers and lakes, especially the Great Lakes, are perceptibly cleaner. We still have a long way to go, but we have made genuine progress that will help make our lives healthier and more enjoyable.

I have repeatedly stressed my view that EPA's success in carrying out the Clean Air and Water and other laws will be determined, not so much by our zest in issuing regulations or by our zeal in enforcing them—though these are important, particularly the latter—but by our willingness to work together with (and I stress those words) the citizens of this country, not simply after the fact, but in the very formulation of our regulations, guidelines and plans—by our willingness to make the people affected by our decisions and regulations a full partner in the process by which we arrive at those decisions and regulations. In no respect is this need to get the people affected by what we do involved in what we do more urgent or important than in our effort to reduce water pollution from nonpoint sources. By its very nature, this effort will require active and effective cooperation between everybody concerned—between the newer environmental interests and the century-old natural resource conservation movement, between EPA and the State regulatory agencies and the forest and agricultural land management agencies and private industry.

It is to assure precisely that kind of cooperation between the forest management, conservation, and environmental communities that EPA has joined with the Forest Service and your Association in holding seven forest practices and water quality workshops throughout the country. As I have suggested, we share common concerns and we stand on common ground. Good water pollution prevention practices are also good soil and water conservation practices. And I am determined that we take full advantage of your expertise and experience in developing approaches to nonpoint source control in the Nation's forests that enable us to achieve our objectives under the law at least cost and

greatest benefit. I want to pay special tribute to your president, Voit Gilmore, for the job he did as Chairman of the first workshop in Atlanta, and to the Association for putting the workshop together. I think we all learned a good deal from that workshop, and I look forward to the results of the rest of the workshops over the coming months.

I know of your concern over the court order earlier this year requiring us to apply the permit approach to water pollution sources that we had exempted from the permit requirements of the National Pollution Discharge Elimination System. By February 10, 1976, we are required by that court order to propose regulations to cover point sources in silviculture. Before the court decision, as you know, we had regarded all silviculture sources of water pollution as nonpoint. Let me say, to begin with, that we have asked the Department of Justice to appeal the decision. In the meantime, we are holding a series of "town hall" meetings across the country to seek the advice of the citizens and groups most affected and informed on the questions involved.

We seek to learn, not only how we might best carry out the court order if, as it turns out, we must do so, but whether there are specific changes we might want to recommend in the Water Act that would help us in dealing with this issue. My view is that it simply makes no sense to take the federal regulatory permit approach to many of the sources of water pollution—especially those in agriculture and silviculture—that the court order would require us to take. By their very nature, they are best dealt with primarily at the State and local level as part of an overall, integrated approach to such sources based upon best management practices. Later this month we will be holding "town hall" meetings in Denver and Portland that concern themselves with the implications of the court decision for silviculture. I hope you will take advantage of them to give us your best help and advice.

When I addressed your Association ten years ago, I stressed the fact that, in asserting the need to make "conservation values" and "ecological principles" an integral and ordinary part of the way we make decisions and do our business, that did not mean that they "should become the overriding determinants of policy." "What we should aim for," I suggested, "is to make such values a respected part of the decision-making process, to have them weighed in the balance along with economic and other criteria. At the present time," I went on to say, "they are largely overlooked so that alternatives supported by ecological standards are simply not made available to decision-makers." I also stated my view that: "When conservation values mean added costs, we should acknowledge this frankly, estimate the costs as accurately as possible, and provide the public and decision-makers with the facts necessary to making intelligent choices among the available alternatives."

We have, in the years since, accomplished much on both fronts. Environmental concerns are being taken into account, with increasing frequency and effectiveness, throughout our society. And EPA has consistently demonstrated its determination to do whatever it reasonably and responsibly can to minimize the adverse impacts of its regulations—on particular industries as on particular cities, on the nation's economy as on the nation's energy or food supply.

Late this summer, one of the most respected of the national survey organizations, Opinion Research Corporation, sent to its management clients an in-depth survey and analysis of "public attitudes toward environmental tradeoffs." Its results represent, I think, an accurate and instructive reflection of the public's commitment to environmental protection and progress and its feelings on some of the tradeoffs involved in achieving it. Let me cite just some of its results and conclusions:

- Given a choice, six people in ten say that they believe it is more important to pay the costs involved in protecting the environment than to keep prices and taxes down and run the risk of more pollution.
- Nearly nine out of ten say that we are paying now for the pollution that we have caused for many years.
- Nine out of ten say they believe that, if we don't start cleaning up the environment now, it will cost us more money in the long run.
- During the past year, a majority of the public have said that they believe it is likely the U.S. will run out of its supply of clean air (64%) and pure water (54%) within the next 50 years.
- Clean air and pure water *topped* a list of 11 resources the public was asked to rate in terms of those the U.S. is most likely to run out of in that period—including oil, natural gas, coal, fish, copper, aluminum, meat, wheat, and iron. This ranking, moreover, was made almost a year after the Arab oil embargo and subsequent energy shortage.

One last item: in the detailed results of the survey, public responses to specific propositions are broken down by various categories such as sex, age, education, family income. There is one category called "Environmental Activists," which is broken down by regions of the country. In response to the statement—"Cleaning up the environment is important, but it should be balanced with the need to keep people working"—95 percent of the "Environmental Activists" in every region agreed, almost precisely the same percentage that agreed in every other category and in the public as a whole. Most environmentalists, in other words, are willing to seek a reasonable balance between environmental protection and other vital human needs.

What all of this adds up to is, I think, two things: First, that the environmental movement and the pollution control effort is going strong and here to stay. And second, important and vital as that effort is, it's not all there is. We need clean air and water. But we also need jobs and profits, we need industry and houses, we need food and factories, we need energy and minerals, we need products and machines. And I am determined that we at EPA do everything we can to meet our responsibilities in ways that won't put people out of business or out of work and that won't impose excessive and unreasonable costs.

I regard the need to minimize the social and economic impacts of EPA's efforts as one of the Agency's most important responsibilities. EPA has, in fact, been preparing economic analyses on its standards and regulations years before the President's requirements for inflationary impact statements. By the time our standards and regulations reach final form, they have received—and they reflect—the scrutiny of other Federal agencies, industry, environmental groups, and the gen-

eral public. While I cannot claim the process is perfect—as no process is perfect—it is the most open and rigorous process of economic impact analysis performed by any agency of the Federal government. And we will do all we can to continue to improve that process.

I must, at the same time, make it clear that when I talk of “balancing” environmental and other concerns I do *not* mean—as some others do—that we should permit the sacrifice of essential environmental values and public health needs for short-term energy and economic gains. We cannot forget when we talk about “balance” and “tradeoffs” that environmental concerns are nowhere near taken into account as amply and effectively as they should be. The “environment” is a relatively new concern, and we have barely begun to achieve the full inclusion of environmental costs and benefits in the Nation’s balance sheets. Because environment is a new concern and—at least in the explicit sense—a new cost, it runs the risk, everytime a new crisis comes along, of falling prey to the “last hired, first fired” principle.

Now, having said that, let us be perfectly clear that the costs of meeting environmental regulations are not new costs at all. They have been there all the time. When a power plant spews out uncontrolled sulfur oxides, the costs are real in terms of increased respiratory disease, medical bills, even increased mortality. It is society as a whole that is bearing those costs. When we require the power plant to clean up its pollution, to install and operate flue gas desulfurization technology, we are simply shifting the cost from society as a whole to the plant and its customers. Thus, the question is not “should we pay these costs?” because we are already paying them. The only real question is *who* should be paying them. Moreover, it usually turns out that the cost of cleaning up pollution at the source is a good deal cheaper than the costs of adverse health effects and other damage otherwise borne by society as a whole.

There are still some who refuse to believe that the American people are deadly serious in their demand for environmental progress and protection and cling to the hope that somehow there will come along a crisis so compelling that they can employ it to deceive the American people into believing that environmentalists are to blame and that the answer is an environmental retreat of one sort or another. There are still some who seek to hold environmentalists responsible for every ill wind that blows.

For example, I have recently read several newspaper editorials which directly suggest that EPA and its 1972 ban on DDT bear major responsibility for the current outbreak of encephalitis—that we environmentalists are somehow to blame for the tragic deaths from this disease. One of these papers, the Dallas Time Herald is due credit for its honesty in subsequently stating: “The editorial condemning the EPA for banning DDT was based on information which later proved incorrect. We regret the error.” The facts have not, however, deterred some members of Congress from making the same baseless charge on the floor of the House of Representatives or, indeed, the Secretary of Agriculture himself from spreading the same story on repeated occasions. What are the facts of the matter? First, DDT had largely been abandoned for mosquito control in the U.S. before 1972 ban on DDT because mosquitos had become DDT-resistant. Second, EPA’s 1972 DDT ban specifically excluded public health uses from the ban. Indeed,

EPA has in recent months given permission for such use on several occasions (for example, on rabid bats) where requested by responsible health officials. We can act rapidly in such cases. Third, at least ten products are registered and available for use against adult mosquitos, particularly malathion, and a good many more are registered for use against mosquito larvae. Against adult mosquitos, malathion is the product preferred by health agencies because of its superior knock-down power. Fourth, not a single health agency in the nation has requested the use of DDT in combatting encephalitis. Those are the facts.

It strikes me that there is far too much paranoia and suspicion, far too much of a "we're the good guys and you're the bad guys" attitude, far too much defending of turf and displaying of muscle, far too much of a tendency to see every difference in perspective and point of view as a "do-or-die" issue—far too much of this sort of high-decibel, surface noise surrounding the effort to carry on a constructive conversation about how best to get on with the job of incorporating environmental concerns into the day-to-day business of this country. There is, I think, far too much of an inclination, in dealing with the very difficult judgments involved in so many environmental decisions, for too many people to behave as if everything were being acted out against some absolute and immutable sky, as if the issues and the outcomes were always "either-or" and "all-or-nothing," forever and for keeps. I must say that environmentalists themselves can be just as susceptible to this kind of thing as anybody else.

Let me say here that most of the easy problems have long since been dealt with. What we have before us now and for the long term are highly complex issues whose resolution will seldom please everyone and all too often will probably please no one. But I must admit to some weariness with the constant flow of inflated charge and countercharge. If a decision does not go as far as our environmental friends would like, it is immediately characterized as a "sellout," patently made under political pressure. If the decision goes against industry, it can only be because EPA gave in to environmental bias and emotionalism—or so I read. If we develop preliminary data on a new problem, such as a suspect chemical in drinking water, and postpone calling an instant press conference on the subject until at least the scientific data has been reviewed, we are obviously conducting a "coverup," hiding the facts from the public. If, on the other hand, we do try to provide such information, we are, of course, being unscientific and indulging in scare tactics.

Now, I am not so naive as to believe that somehow the competition for media attention will go away or that we will all become immune to the lure of a headline or of a 30-second spot on the evening news. And I know that EPA itself is not entirely innocent in these matters. But let us at least try to deal with the issues on their merits (of course, running the risk in so doing that the media may ignore us) and let us try to accept as a working hypothesis until the evidence builds up to the contrary that the other fellow, whoever he may be—industrialist, farmer, forester, worker, environmentalists, or even bureaucrat—while perhaps wrong in any given case is operating in good faith, trying to deal with complex issues objectively, calling the facts as he sees them as best he can, and not engaging in a conspiracy against the

public interest. A conspiratorial view of the world is romantic and often attention-getting but it is often destructive, particularly of the very institutions we really need to promote the public interest.

I hope that we environmentalists can rally together to fight for the real essentials because these are under serious attack from many quarters today. Just last Friday, the House of Representatives narrowly defeated by just 8 votes (175 to 167) an effort to give the Secretary of Agriculture veto authority over EPA's pesticide regulatory authority, an authority given EPA in 1970 to protect public health and the environment. The ostensible purpose of the amendment is to insure balance to our regulatory program. In my mind that would give us about as much balance as you would get by putting the coyote in charge of the sheep pen. This issue may well come up again in the House later this week, and *we need your help now!*

Recently, the New York Times, which has over the years been a major and an effective force for environmental progress, carried on its Sunday front page a story whose two-column headline screamed: "Conservationists Assail EPA Rules Cutback." From the virulence of the headline, you might have assumed that EPA had just granted a ten-year delay in meeting clean air standards to the steel industry or to power plants. Actually, if we went on to read the story, you would have discovered that I had put in motion within EPA an effort to reduce unnecessary regulations and to make more understandable those regulations we do publish. The story then went on to say that some environmentalists (who turned out to be two) regarded the EPA effort to try to simplify and streamline its regulations as a signal that—and I quote—"the Ford Administration has abandoned the national commitment for clean air and water." Well, let me say this: There may be efforts in some parts of the Administration, in the Congress, in industry, and in the public to pull back on environmental programs but my effort to reduce and simplify our regulations and our paperwork has absolutely nothing to do with those efforts. The truth is that, far from abandoning our effort to clean up air and water pollution, we are simply doing what any good bureaucracy should be doing—especially one in the pollution control business—and that is to try, as best we can, to clear up some of the paper pollution that we have generated a great deal of over the past few years. I realize that we cannot make everybody happy. The paper industry, for one, will be upset. But I suspect that all the citizens and groups—environmentalists included—all the industries, all the local and state governments—everybody, in fact, with the possible exception of the legal community—will be delighted to discover that we are making a very serious effort to put some order and economy and efficiency into the vast volume of regulations that we issue. In all of this effort, there is not the slightest suggestion that we fail to carry out our statutory responsibilities or relax our environmental efforts.

The latest figures I was able to obtain show that as of July 1, 1974—well over a year ago—EPA's share of the Code of Federal Regulations added up to some 2000 pages, was almost 3½ inches thick and weighed more than 5 pounds. I am sure it has grown considerably since then. I think it is high time we went on a diet—not by cutting down on essentials, or in any sense abandoning or impairing our effort to carry out our environmental laws—but by trying to write our regulations in

clear and concise English, by trying to cut down unnecessary overlapping and duplication and, in general, by doing all we could to reduce red tape and get rid of gobbledygook. If we can succeed in doing that, then I think we will be performing no small service to any and all who are required to read or comply with our regulations. I do not believe our success will be measured by the quantity and complexity of the regulations we issue; it will be measured by how clean the air and water become. And I want to be absolutely sure that our regulations help speed and smooth the way to making them clean. "Best Management Practices," like some other things, must begin at home.

I am not in the slightest bit apologetic about this effort. EPA has been slow in some areas in getting out needed regulations and by reducing the nonessentials we should be able to put more resources to work on real priority needs. By and large, given the fantastic demands put upon the agency by Congress and given our limited resources, I believe EPA has done an extraordinary job in the regulatory field, and I am proud of the dedicated men and women who have made this possible. I have travelled all over the country in the past weeks, and I have talked with individuals and groups of all kinds. Everywhere I find strong support for environmental programs but everywhere I find also a growing impatience and resentment at interference by the Federal government. Only last week, I visited a state environmental protection agency official who told me that he had had to pull a number of his limited staff out of field enforcement and monitoring to put them to work dealing with EPA reports and forms. If that is true, you can be sure there are going to be some changes made. I am setting up a task force, with state agency representation, to see where we can reduce and simplify EPA forms and reports.

At the same time, while I am committed to a continued strong leadership role for the Federal government in environmental matters as contemplated by our statutes, I am also firmly committed to delegation of authority to State and local governments wherever this can be done. It is essential that they have the resources that will enable them to exercise these responsibilities effectively. To summarize, therefore, you can say I am committed in principle to giving as much responsibility as possible to those levels of government which are closest to the people and to streamlining and making more fully responsive those responsibilities which must continue to be exercised at the Federal level.

I have suggested that we stand on common ground and share a common goal: the efficient use and protection of our land, water and all of our natural resources. Indeed, the wise use and protection of these resources during the rest of this century is the underlying and overriding concern of this meeting and this Congress. It is, in my judgment, the needless and heedless waste of our natural resources that lies at the root of our energy, our economic and our environmental problems. These are simply symptoms of the fact that, in one way or another, we are living beyond our means.

The energy crisis, material shortages, and world agricultural shortages all demonstrate that we as a society have not been aware of the factors and forces that affect the availability of resources until we are facing imminent crises. Thus, we have begun a "crash" research

and development program on energy sources and are just coming to grips with the inflationary impacts of material shortages. The next decade will be crucial in determining our ability to feed the world's population. We desperately need an institution to analyze the factors and forces that affect the availability of resources and to set forth strategic alternatives that will be necessary to avert problems of this magnitude in the future. That institution should be able, as well, to assess not simply the availability of resources—not simply their supply—but the various *uses* of those resources as well as their environmental and other impacts.

When I first spoke to this Association ten years ago, I proposed the creation of a President's Council of Ecological Advisers. Five years later, under a different name, such a Council was established. I would today recommend the creation of a similar institution responsible for evaluating long-term trends in resource use and availability both in the United States and throughout the world, and for assessing alternatives in the use of scarce materials and in the development of new techniques or materials to extend their use. Indeed, perhaps the current Council on Environmental Quality should be reconstructed into something like a Council on Environment and Natural Resources, which would deal with the whole broad spectrum of critical issues involving the availability and use of our natural resources.

As you have long understood, the really critical issues before this country are not the immediate and isolated ones, but the interrelated and long-range ones—indeed, the day-to-day “crises” that seem to capture all our attention and consume all our energies are, for the most part, simply manifestations of far deeper problems that we never seem to get around to acknowledging, much less addressing. Our economic health and growth, our patterns of settlement and physical development, our social stability and strength—these both determine and depend upon a vast and intricate system of material, energy and environmental resources. Under these conditions, we cannot hope to come to grips with the issues before us unless we strengthen our ability to assess problems and programs, not simply in isolation, but in relation to each other; not simply over the short term, but over the longer span of 10, 20 or 30 years.

John Kennedy often told the story of a great French Marshall—I always conveniently forget his name because I can never remember how to pronounce it—who once asked his gardener to plant a tree. The gardener objected that the tree was slow-growing and would not reach maturity for a hundred years. The Marshall replied, “In that case, there is no time to lose. Plant it this afternoon.”

In terms of the critical issues before this country—the longer-range, interrelated issues that I have described—the afternoon is already upon us.

We need to start planting—now.

REMARKS BY RUSSELL W. PETERSON, CHAIRMAN, THE PRESIDENT'S COUNCIL ON ENVIRONMENTAL QUALITY

Way back in 450 B.C., Artaxerxes I, King of Persia, tried to restrict cutting of the legendary cedars of Lebanon. My modest research does not indicate whether Artaxerxes succeeded in this endeavor, but at least it proves that governmental regulation of the forest industry has a long history.

It has also, I was surprised to learn, a somewhat violent one. In 1772, the residents of Weare, New Hampshire, rioted when an officer of the King attempted to confiscate 270 pine logs reserved to provide masts for His Majesty's ships; on that occasion, two armed regiments had to be dispatched to enforce the law. By 1853, we had managed to change our government—but not our intense feelings about forests. In that year, an official from the Land Office in Washington barely escaped lynching when he tried to repossess some timber that had been cut from government-owned land around Manistee, Michigan. The government's answer, again, was force: armed sailors from the *U.S.S. Michigan* had to be landed to restore order. And earlier this year, following a state court ruling that restricted the cutting of redwood trees, Governor Brown of California was decapitated in effigy.

Decapitation in effigy is, to be sure, a vast improvement over an actual lynching. Nevertheless, as a government official preparing to talk about a resource that has stimulated so much controversy in the past, I must confess to a certain tingling sensation around my neck—particularly when it is clear that we are building to more confrontation about timber in the near future.

Between 1942 and 1972, the U.S. demand for wood and wood products increased by 65 percent. According to the U.S. Forest Service, that demand will double again by the year 2000. At present, annual growth of timber in the U.S. exceeds cutting—but that surplus condition won't last long. Within two decades or so, projected demand for forest products will outrun annual harvest, both on privately owned timber land and on the publicly owned lands managed by the Forest Service.

That day of reckoning is being hastened by the rapid cutting of old-growth timber on privately owned lands in the West. This makes short-term economic sense from a corporate standpoint, no doubt; stockholders in a private lumber corporation might support this rapid cutting.

But as a stockholder in a public lumber trust—the 92 million acres of our National Forests—the rapid harvest of old-growth trees on private lands gives me considerable anxiety. Inevitably, industry will reach the point when their old-growth stands have been completely cut, and the new stands have yet to achieve maturity. Lumber pro-

ductivity will fall off sharply, there will be a mounting gap between supply and demand, and industry will have to come after our lands—the forests that you and I and 213 million other Americans own in joint partnership. Heavy pressure will be placed on Congress and the Administration to increase the allowable cut on Forest Service lands.

Indeed, there are already signs of this mounting pressure. As you know, the Panel on Timber and the Environment recommended, in its 1973 report to the President, that average cutting on four western forests be boosted 39 percent. Industry sources also urge—as reflected in the “Green Paper” advertisements currently being sponsored by the American Forest Institute—that productivity on Federal lands be increased through intensive, high-yield forestry.

On their face, these proposals seem quite plausible. The Forest Service admits that the land under its management produces 50 percent less wood fiber per acre than industry-owned lands. Timber is a commercially valuable natural resource, and in a time of economic slump, it would seem desirable to boost productivity in every way we can. It's relatively easy to place a monetary value on wood and wood products, to total employment figures for the industry, and to point out, in short, the enormous economic value that forestry contributes to the nation. On the other hand, it's extremely difficult to place a dollar-figure on such other forest values as recreation, protection of wildlife habitat, and aesthetics.

Thus, the private timber industry will have several powerful arguments to present to Congress, the Administration, and the public when it urges an increase in allowable cut. Those who support the conservative harvest policies now followed by the Forest Service will undoubtedly be criticized as Utopian visionaries; increasing productivity and harvest on the Forest lands, by contrast, will be seen as the hard-headed, no-nonsense, practical thing to do.

My remarks today will tend toward the Utopian, visionary point of view. What I want to argue, however, is that a conservative attitude toward our use of the public forests is the hard-headed, no-nonsense, practical course to take.

Let me begin by pointing out that there are excellent reasons for the comparatively low productivity of Forest Service lands. The industry owns more productive lands, their stands are younger and more vigorous, and the intensive forestry practices used by industry produce wood faster. These practices include growing stands of trees all of the same age; artificial planting—generally of one species, thus establishing a monoculture; control of competing vegetation by fire, chemical, and other means; use of chemicals such as pesticides and fertilizers; the breeding of new genetic strains of “super” trees; and proper thinning as the stand matures.

The Forest Service also employs these practices, but generally to a lesser extent. The principal reason is that timber production is only one of the uses mandated for the public forests by law. In 1970, the Public Land Law Review Commission tried to alter this concept of “multiple-use” by recommending that some public lands should be “classified for timber production as the dominant use.” Environmentalists protested this recommendation, and the Forest Service has never adopted it.

Yet the conservative, multiple-use policies of the Forest Service could be changed by law. It would be well, therefore, to consider the

possible impact that a switch to intensive, high-yield management might have on our public forests.

You know what the common objections to high-yield forestry are. First among them is its tendency to favor monoculture: to promote extensive stands of single species of trees, of the same age. A basic principle of ecology is that diverse ecosystems are much more resistant to attack than ecosystems in which genetic variety has been cut to a minimum. Sometimes, nature itself develops nearly pure stands of single tree species without man's intervention—especially after fires; no matter how the monoculture is created, however, its susceptibility to disaster is heightened.

Modern agriculture depends on monoculture: our farmers grow fields of wheat or of corn or of sugar-beets, rather than simply tolerating whatever smorgasbord of crops nature sees fit to provide. But farmers learned that some hybrid strains, bred to provide man with the greatest amount of food, have gained that productivity at the expense of some self-protection. In 1970, 15 percent of the corn crop was lost when a high-yielding variety widely adopted in the southern states, proved unusually susceptible to leaf blight. The high-yielding varieties of Green Revolution wheat, remarkable as they are, have a high potential for widespread loss, owing to their genetic uniformity.

Silviculture, I realize, is not strictly analogous to the annual culture that characterizes most food-farming, and I do not mean to push a false parallel. The point I wish to make, rather, is this: an agriculture as varied and productive as that of the United States can weather a single year's crop failure. Agronomists can diagnose the difficulty fast, and—usually—supply a quick remedy. And consumers can eat cheap potatoes for a season instead of high-priced bread. But if foresters make a mistake with their crop, even the swiftest diagnosis may not repair the damage. If blight or a pest or a defect shows up when a stand of trees is 20 years old, we will be paying for that error for 20 years.

There are some suggestions that high-yield forestry is flirting with that kind of long-term, hard-to-reverse, error. Maximizing growth of the Douglas-fir in a single forest, for example, requires suppression of the alder. Yet the alder fixes nitrogen, creating fertilizer with the aid of the sun, and passes it through the soil to the Douglas-fir, which cannot nourish itself in this fashion. In addition, the alder—it is widely believed—suppresses root-rot, to which the Douglas-fir is particularly susceptible when it is 20 or 25 years old. Indications are, in sum, that the alder and the Douglas-fir are not entirely competitors, but partners.

Intensive, high-yield forestry need not, I realize, eliminate all other uses of forests. Progressive timber companies manage their own lands for multiple use, proving that high timber productivity is not necessarily incompatible with protection of watersheds and wildlife habitat, grazing, and recreational use. Nevertheless, multiple-use of any finite land system ultimately involves trade-offs: at some point, an increase in timber harvest must be purchased at the expense of one or more other values. And some practices necessary to accelerated management will compel tradeoffs that we may not anticipate.

For example, mature or dead trees, and logs, are essential for some forms of forest wildlife. Fully 40 percent of forest bird species nest

in cavities in dead trees and logs. Snags in national forests in California are used by 30 species of birds, 20 species of mammals, and thousands of other organisms, many of which are primary food for higher forms of wildlife. If timber production were to dictate the removal of dead trees and snags on a large scale, species of birds and other forms of wildlife that require mature forests might be reduced to relic populations.

In addition, accelerated management frequently calls for the extensive use of herbicides, to control competing plants and thus stimulate the growth of young trees. But the use of herbicides also short-cuts the successional stages of a forest—the series of modifications that occurs naturally after forest-land has been cleared. Each stage in this natural succession is accompanied by changes in soil condition, by a different set of plants, and by different species of wildlife that feed on the plants. Probably 80 percent of wildlife in eastern and western forests—including deer—are successional; they cannot exist in dense forests whose floors have been swept clean of understory by chemicals.

These are some of the impacts that we can anticipate from intensive, high-yield forestry. But if there is a single lesson from ecology that every citizen of the modern world should learn, it is that not all impacts *can* be anticipated. The earth has its own decision-making process—its own stubborn, sometimes mysterious and often nasty way of responding to man's hopeful interventions. History gives us a right to take pride in the astounding ability of the human species to manipulate our environment for our own benefit. But ecology warns us to maintain a certain caution about the limits of human expertise, and the brevity of man's experience on this planet. When we talk about intensive, high-yield forestry, we are talking about a quite novel, still experimental intervention in an ecosystem that has been evolving for millions of years. Despite the achievement that high-yield forestry represents, it is well to exercise caution before extending it to the public lands—for we have paid again and again a price for the misplaced certitude of experts.

Experts in civil engineering built the Aswan Dam; they knew about concrete and irrigation and the number of kilowatts that could be generated by a turbine-blade with a certain pressure from the Nile River behind it. But they didn't know about the water hyacinth and the aquatic snail and the blood-fluke; or what happens when an annual, turbulent flood is suddenly tamed to a quiet, smooth-flowing river. In consequence, millions of Egyptian farmers are infected with a debilitating disease called schistosomiasis. Experts built the St. Lawrence Seaway, which permitted ocean traffic to enter the Great Lakes from Atlantic ports; they knew about the costs of transportation, the expense of shifting a cargo from a ship to a train to a truck, the problems of designing canal locks that would permit an ocean-going vessel to enter the Lakes.

But they didn't know about the sea lamprey, which can swim better than any freighter, and which entered the Lakes along with the ships, destroying a fishing industry. Experts in chemistry developed phosphate detergents that enabled American women to wash washes whiter than white—but they didn't think about the capacity of municipal sewage systems to break down these new bubbles, and so, for a while, our waters were frothing at the mouth with an indigestible threat to our health.

Each of these examples reminds humans that our earth has its own response to our ingenuities, and that the best-laid plans of our experts have oft gone astray. I think the work that has been done in the development of high-yield forestry is admirable—but I also believe that we have not yet had sufficiently extensive experience with it to adequately appraise all the risks it entails. Prudent risk is the name of the game in free enterprise, and industry is entitled to take those risks on its own lands. But the public lands are a public trust, and we are not entitled to gamble them on a promising but unproved technology.

Does that mean nothing should be done to ease the projected shortage of wood?

No. I think several steps can be taken. The Forest Service itself recognizes that it can improve timber-management on its own lands, without going to monocultures or adopting timber production as the dominant use. In response to the Forest and Rangeland Renewable Resources Planning Act of 1974, the Forest Service has published a draft of alternate plans for the use and development of these resources out to the year 2020; this program should provide the best basis we have ever had for sound, public forest management. In addition, the Forest Service has begun testing a more liberal cutting policy on the Gifford Pinchot National Forest in Washington State. The crucial element in this decision was a long-term commitment of funds necessary to guarantee an accelerated program of reproduction and intensive timber culture. If this test proves successful, other national forests in the Pacific Northwest are likely to follow suit.

Better resource-use is another possibility, and the Forest Service is working on that. For example, its research arm—in cooperation with HUD and the American Plywood Association—has developed a new construction material made of the ground-up particles from the inner part of a log; this process has the potential of doubling the usable wood products derived from a tree. Another Forest Service project, the Sawmill Improvement Program, has documented increases in production of 11 percent through improved sawing and milling techniques.

Finally, we should find out about those legendary four million citizens whose woodlots compose 59 percent of our forested land but account for only 30 percent of the wood fiber. How many of their lots are large enough to merit commercial management? How many of those owners are interested in commercial production? We simply do not know enough about these four million to make sensible proposal regarding timber production on their land—but that land is undoubtedly the sleeping giant of the timber industry. One private firm, of which I am aware, has initiated a program to help interested private owners make their holdings more productive. In return for its help, the company obtains the right to buy the timber at competitive prices.

Hence there are many ways of increasing timber production without increasing the allowable cut on public lands, or risking them on a high-yield management that concentrates on only one forest resource. We should not allow a projected wood shortage to panic us into reversing conservative policies on the forests that belong to all of us.

The Centennial of the American Forestry Association is in itself a reminder of the long public interest in forests, and an occasion for remembering how difficult it was for us to rescue some part of our national forest inheritance in the days when industry had no interest in replanting the lands it had cleared. But your centennial is also an

opportunity to look forward. A century from now, your successors will look back and render a judgment on the quality of the stewardship your policies reflect.

You look back with pride at the work of your own predecessors, who did so much to protect our forests in days when even the Government was wasteful with them. I hope, in the coming conflict over supply and demand, you will continue to support a policy of long-term conservation, and reject the counsels of short-term convenience. We can and should learn to manage our public lands for greater productivity—but we should not squander them, and we have no right to gamble them, for they are a trust we owe to the future.

RESEARCH AND EDUCATION

[By Dr. Edward E. Palmer, President, State University of New York, College of Environmental Science and Forestry, Syracuse, N.Y.]

It has often been said that most of the maladies of civilization, contemporary or older, have been due to one or a combination of two principal circumstances. One of these is the false classification of people into races, nationalities, religions, or some other exclusive classification. The other is the false classification of knowledge into rigid categories that become exclusive and impervious. While higher education in America has reacted positively to the breakdown in the classification of people through affirmative action, ecumenism, equal opportunity, senior citizen, and minority programs, we still have a long way to go in consummating such a breakdown or, paradoxically, we have fallen into such deeply rooted bad habits, that the breakdown of one set of "people" categories often leads to the construction of others that are equally false. A process of debate will continue for some time in the application of the idea of equality until we are, perhaps, able to determine more scientifically who are really unequal, who are inferior, and who are superior. False theories about inferiority and superiority continue to be tempting to most people, for each of us suffers from some slight or stronger aristocratic strain in his psyche.

The other circumstance, perhaps even more painful and costly, is the insistence upon rigid classifications of knowledge. Without elaborating upon the history of such systems of classifications, suffice it to say that in our efforts to resolve some of the principal public problems of the day, our failures are largely due to negligence in relating one area of knowledge to another.

In recent years, our awareness of the pressures of environmental problems has quickened. We have become increasingly cognizant of the degeneration of our surroundings, of the loss of aesthetic quality in our vistas, of the inevitable limits on our environmental resources, and the irreversibility of some of our actions when we throw the natural process of our universe into disorder. Indeed, efforts to increase such awareness permeate our entire educational system.

Recognizing with increasing intensity the relationship of our environment to our own welfare, we have devised excellent new goals—the proper management of resources that are renewable, conservation of those that are not; the control and reduction of pollution; and compensation for disaster, both natural and man-made. But because we have seen the universe primarily as compounded of chunks and pieces, and because we are impatient beings, we have demanded quick solutions to what we have seen as separate environmental problems. The effects of such narrow approaches to understanding of the biosphere, and of impatient attempts even with new technologies to solve

discrete environmental problems via short-term remedies, have not met with unqualified success. The very solution to a specific problem in one aspect of the environment has often meant the creation of another even more acute problem somewhere else.

Ironically enough, the theories of knowledge and the claimed structure and the relationship of science, technology, and ideology, which made possible man's earlier triumphs, now contribute to our contemporary frustration. Having segregated people, separated "types" of knowledge, and segmented the physical universe in order to explore, understand, and control more easily, we now find that our intervening disciplinary walls impede rather than enhance the progress of our understanding of the environment as a whole. And the disparate role of areas of knowledge devised to deliver benefits—originally undertaken in a desire for the benefits of social and political hierarchy, of divided labor, and the efficiency of specialization—now seriously hamper man's contemporary efforts to understand and cope effectively with his environment as a whole.

The environment in which we live is not an assortment of discrete objects and events, but a vast seamless web, a single entity, an integrated system of interacting synergistic phenomena. Though many great thinkers have presumed an orderly universe and attempted to build blueprints of civilization on such an assumption, only now are we beginning to develop the very special understanding and technology necessary to deal with the mutuality of environmental attributes.

To muster these critical capabilities, we need a new discipline that is also seamless in its design. The application of the new discipline will not be possible without the training of scientists in comprehending the ecological harmony, rhythm, and synthesis in the environment, though they may focus action on more specialized aspects of problem solution. The most promising recent approach to the overall problem has been of demand for a new "environmental science" which would conceive of the environment and its problems on a systems' basis. Such an approach would envision the cosmos as a synthesis, as a series of interrelating systems—air, land, water, all forms of life—and seek to understand them as aspects of a coherent whole.

We thus propose the education and training of a new kind of disciple. His understandings will be based on the systems' approach to environmental science. He will also be conversant with the broad range of technologies necessary to deliver that science to those attempting to modify the environment. And, he will be familiar with the behavioral, economic, political, and legal considerations involved in forming value judgments and decisions about the nature and conditions of that delivery.

Oddly enough, some people are still uncomfortable with both the term and the concept of environmental science. It may, therefore, be desirable to review the genesis of the current environmental concern in order to provide perspective, and to appreciate how environmental science should be perceived by the varying constituencies of research and education.

The current environmental thrust is a composite of three main historical developments. These are Environmental and Pollution Control to protect the public health; Conservation of Natural Resources to preserve the natural resources base; and Expansionist Pressure and Tech-

nological Development which have stressed both environmental and pollutional control, and conservation efforts, and have introduced new requirements in environmental design.

Environmental and pollution controls have clear and precise origins. Modern public health programs date from 1876 when Louis Pasteur demonstrated the role bacteria play in fermentation and disease. The conclusions became institutionalized in public health programs in the first and second decades of the twentieth century. Efforts focused on water supply, pollution control, vector control, food sanitation, solid waste management, and toxic materials. Colleges and universities played major roles in research and education in providing a firm technological base for effective action. As time advanced, programs in noise control, air pollution, housing, radiological health, and pesticides emerged.

A major focus of all of such programs was the impact on man, as measured by morbidity and mortality statistics. There was no particular emphasis on the impact on resource supply and quality. As time progressed, a more comprehensive approach developed, with a major thrust in the form of regulatory programs.

The conservation drive dates from the establishment of Yellowstone National Park in 1872, followed by the establishment of National Forests and other conservation efforts. These were also institutionalized in programs in the first two decades of the twentieth century. The establishment of the principle colleges of forestry was a direct result of that conservation movement. Interest matured into programs covering all renewable natural resources, water, soils, trees and forests, and fish and wildlife, based on proper management and use. The focus shifted to the resources; but the programs were mainly administrative and managerial, not regulatory.

Although somewhat separate from renewable natural resources, the discovery and effective development and maintenance of adequate reserves of nonrenewable natural resources of oil, coal, and minerals was part of the developing picture. Again, colleges and universities played major roles in advancing these efforts. The conservation effort divided into two major segments; the management-and-use group, and the preservation-and-nonuse group. The two segments of citizenry have been at loggerheads almost continuously.

Both conservationist and environmental control programs were stressed by expressionist pressure and technological development since their inception. However, these stresses reached full flower in the post World War II era, and continue to this day.

There was tremendous growth in population, coupled with a strong urbanizing trend. In addition, economic prosperity increased spendable income and leisure time. This resulted in accelerated land development for residential, commercial, and industrial use; in exponential increases in automobiles, snowmobiles, motor boats; and in overwhelming pressure on recreational facilities. A vast new network of environmental services, water supply, sewerage drainage, and solid waste disposal systems were required. An expanded new highway system was put under construction; airports were expanded; water resources development accelerated. The consumption of all natural resources rose dramatically, requiring new development on a continuous basis. Energy demands skyrocketed!

On the technical side was the wholesale use of new persistent pesticides, increasing use of artificial fertilizers, the replacement of soap by detergents, the development of nuclear energy, atmospheric bomb testing, medical, industrial, and research use of radioactive isotopes, the advent of the jet plane, the growth of the plastics industry, the use of one-way packaging, and the general growth and development of industry to meet expanding consumer demands.

The end result was environmental deterioration, air pollution, water pollution, rise in environmentally related diseases, destruction of resources, hit-and-miss development, mountains of solid waste, intolerable noise, imperviousness to aesthetic considerations, loss of unique natural areas, loss of valuable agricultural land, destruction of fish and wildlife, accelerated entrophication of waters, and spoilage of recreation and wilderness areas by overuse.

The combination of all these elements overwhelmed the old line governmental agencies and programs, and brought increasing demands for better scientific information, improved technology, better management, and regulation to cope with growth, consumption and technology.

The responses were new programs and reorganization at the federal, state, and local levels of government. At the federal level the Environmental Protection Agency was created, putting all environmental control programs into a single agency. A number of new laws were enacted to provide environmental impact assessment; water, air, and noise pollution controls; water resources planning; coastal zone management; multiple forest use; wild and scenic rivers designation; and proposed land-use planning.

States either led the way or followed suit. Some states took a number of actions, including the creation of new programs in water pollution, air pollution, solid waste, fish and wildlife, water supply, scenic and wild rivers, outdoor recreation, radiological control, unique area land acquisition, regional land-use control, local environmental management councils and commissions, and environmental impact analysis. A few states also consolidated environmental programs—including pollution control, resource management, and emerging growth and technological development programs—into a single department or agency of the state.

Local levels of government have followed suit with new programs and reorganization. International concerns, and in some instances global concerns, have been institutionalized through scientific cooperation, treaties, and agreements.

The separate development of environmental and pollution control, natural resource management, and control of emerging technology and expansion, that is, growth and consumption, have all now merged into a single unified continuum. It must be recognized that all of these things are, in fact, inseparable and should be amalgamated within environmental science. Although this concept is beginning to be accepted, it is not reflected in policy and programs and institutional arrangements. Rather it is conflict and competition that are rife in the area of environmental management.

The development of scientific understanding and control technology has lagged far behind the scientific and technological development that has generated many of the environmental problems facing

us. Policies are unclear and sometimes contradictory. Institutional arrangements make management and control difficult. A balance between public well-being, resource use, institutional interests, pollution control, economic concerns, and life style is difficult to achieve. Political, social, legal, economic, and technical issues must be formulated and resolved. This means that in addition to achievement of technical knowledge and competence, there is the challenge posed by political, social, legal, and economic aspects, which also requires a high degree of competence if we are to move to rational policy development and program implementation.

All of this is the framework that encompassed environmental science. Putting things in perspective, it has meant that the varying constituencies of educational institutions, existing and potential, must view environmental science as encompassing natural resource preservation and management, environmental pollution control, and the major technical and social growth issues. It is a tall order for any college or university to respond to adequately. However, the challenge can and must come.

The role of natural and social scientists in and beyond the colleges and universities is vital to the effort to advance scientific and technological knowledge of environmental science, and to assist in developing sound policy and programs through education and research. The proud record of our predecessors has attested to this and challenges us to emulate their fine work in a concerted fashion.

It seems to me as clear as anything can be that this country has to change its ways relative to our environment. These changes must include governmental policy, educational training and research, and economic and commercial consideration. Our nation has failed to formulate consensus policies in the resolution of almost any of its major physical problems. Thus, incongruencies abound. Here we are, a nation that has just completed the construction of the most elaborate and finest national highway system in the world, just at the time we run out of gas. It is a nation that has built the finest network of air transport with state-of-the-art equipment, and airports that are nothing short of magnificent, all just at the time we are running out of oil. And in our efforts to postpone or resolve the energy crisis, we are shifting emphasis to coal as a source of energy, just at the time, of course, that we have let the railroad beds and railroad equipment that haul it become obsolete, and have allowed our rail transport system to become completely bankrupt.

Our major shortcoming is the inability to integrate the skills and the superb scientific knowledge that we possess, whether in the professional specialty of forestry, in professional specialties of medicine, of business management, of government, or almost anything one can name. "Coordination" has been read out of our lexicon, and "cooperation" has come to mean "one-way street." We must return to those fine concepts and learn better, in our society, how to wed the efforts and the skills of industry, government, and education into a much more cooperative system, or this nation is likely to waste its fabulous resources, and like a meteor, have one brief brilliant moment in the sky of time, and then pass into decline and outer darkness.

PERSPECTIVES IN WORLD FORESTRY

[By K. F. S. King, Assistant Director-General, Food and Agriculture Organization of the United Nations]

The world has changed rapidly and significantly over the last three decades or so, indeed ever since the end of the Second World War. There has been, in this relatively short period, an unprecedented increase in the world's population. There has been developed an entirely new concern for human development and economic growth. There have been significant and pervasive advances in science and in technology. There has grown to be a predilection, some might say an obsession, with the environment.

Mr. Chairman, the world has always had to accommodate, or has had to resolve, to reconcile, conflicting emotions, conflicting objectives, conflicting ideals. These conflicts must exist, and will continue to exist, so long as man is allowed freedom of thought, freedom of choice, and freedom of action. Indeed, it might be argued that mankind's progress upon this earth depends upon peaceful conflict, upon the clash of views, upon the resolution of differences of opinion.

I venture to suggest, however, that at no time in the world's history has there been so intense a mixture of idealism and materialism, of nationalism and internationalism, of conservatism and liberalism, of hope and despair. These antithetic forces are to be found within nations, within groups which have in the past been noted for their uniformity of thought, within strata of societies which traditionally possessed common aims, common objectives, common desires.

I mention these internal problems, and I emphasize the changing circumstances we have experienced over the last thirty years, for one important reason. I wish to stress that although I am to discuss with you, today, the subject of "perspectives in world forestry", it cannot be considered in a vacuum. It cannot be examined in isolation. Today, the burning questions of forestry must be analysed within a global, inter-disciplinary context. "World forestry" cannot be regarded merely from a narrow, sectoral point of view. It must be looked at against a background of the international demand for forest products and the world's capacity to supply the wood raw material; it must be looked at within the context of general land-use policies, plans, and practices; it must be looked at with a full appreciation of existing and future patterns of world trade; it must be looked at with a knowledge of the scientific and technological advances which are being made, and which will probably be made, not only in the forestry and forest industries sector, but in all relevant aspects of economic activity. The gamut of economic, social, political, scientific and technological considerations must be taken into account.

I merely draw your attention to the necessity for a catholic approach to our subject. I hope that you will understand that I cannot, in the time at my disposal, adequately cover the desired range. I shall attempt to pose the main issues, to point to the strengths and weaknesses of our current approaches, to suggest fields of endeavour on which we might concentrate in the future, and to paint a picture, sketch the outlines, of what I consider world forestry would look like at the end of this century.

Since the end of the last World War¹ the world's population has grown by about 60 percent. As a result, there have been, almost literally, fantastic increases in the demand for food, for fuel, and for industrial wood and wood products. Unfortunately, tropical food supplies have, in general, failed to keep pace with or to outstrip population growth. In addition, because of the growing exposure of tropical communities to a money economy, arable land formerly devoted to food crops has been transferred to the seemingly more lucrative pursuit of the raising of perennial cash crops. However, productivity from the areas remaining to the food producers has often not increased enough to compensate for this loss of land. The result is, in so far as the developing countries are concerned, a combination of diminishing arable land and increasing population, which leads inevitably to human suffering.

In order to provide more and more land for food production, some tropical forests are indiscriminately razed to the ground. This is unfortunate not only because wood supplies are being thoughtlessly reduced, but also because in many cases the soil protection and water regulatory rôles of the forests are diminished. When it is remembered that the placing of more land under agriculture frequently leads to increased demands for water, and more particularly for controlled supplies of water, this ravaging of the forests takes on an additional dimension of horror.

Side by side with the increased rate of population growth has been a sustained expansion (except for the last year or two) of the world's economic activities. This is extremely significant for the forestry and forest industries sector. Even before the price of fuel was so drastically increased, the developing countries consumed vast amounts of fuel-wood. Indeed, by volume, this was the largest single entity of forest products utilized in these countries. Today, the bulk of the people in the poorer countries must rely, and in the foreseeable future must continue to rely, on wood as the main, if not the sole, source of energy for cooking and heating.

In addition to this growth in demand for a traditional wood product, there is a growing consumption, in the developing countries, of wood for use in the round, for sawn-wood, for wood-based panel products and for paper.

Moreover, the developing countries have come to understand the significant rôle which the forests, forestry and forest industries can play in the attack on economic underdevelopment. They now know that the sector can help them to save and earn foreign exchange; that it has high forward and backward linkage indices, and that therefore,

¹ This analysis of the effects of the changing world circumstances on forestry relies almost entirely on King, K. F. S. (1972) *A Summary of the Revised FAO Study on Forest Policy, Law and Administration*. Seventh World Forestry Congress, Buenos Aires, 1972.

the expansion of forestry and forest industries can act as a stimulating force for many other economic activities; that the practice of forestry and the establishment of forest industries can create significant employment opportunities, particularly in the depressed, often neglected, rural areas; and that there is certainly some type of forest industries suitable for establishment in almost any developing country.

We have therefore a situation, in the development economies, in which a resource—the forests—which is known to be capable of assisting greatly in economic development, is very frequently destroyed. It is destroyed to provide land for shifting or for permanent agriculture. It is destroyed to provide land for the production of food, without which many of the world's inhabitants would die or live a life of permanent under-nourishment. This, I submit, is one of the main problems of development in the developing world. This apparent conflict in the demand for land by the agriculturists, on the one hand, and by the foresters, on the other. This sacrifice of a developmental resource, of an industrial base, of an ecosystem which reduces the incidence of erosion, regulates water supplies, and tempers the micro-climate, for food which is the very basis of life, which provides the sustenance for man to work and for him to enjoy a modicum of physical and spiritual well-being.

In the developed regions per capita incomes have increased by more than 100 percent since 1945. This has led, not only to changing patterns of wood consumption, but also to a greater pressure on the forests for their services, for their non-wood values.

In the developed world, the demand for the less sophisticated types of wood products has declined. However, the increase in consumption of wood-based panels and of pulp and paper has been more than compensatory. Over all, it has been estimated that by 1985 world demand for wood for industrial processing would be more than twice as high as it was as recently as 1970, and that most of the additional volume will be consumed in the developed countries. (These calculations were made before the onslaught of the energy crisis.)

At this moment, the effect of the higher price of energy on the future consumption of wood and wood products in the developed countries cannot be accurately judged. This much can be said, however. It appears to be reasonably certain that wood products can be, and will be, more competitive with those substitutes for wood and wood products which utilise petroleum as the raw material base, and which appeared, say, five years ago, to be capable of absorbing a significant proportion of the wood market. It can also be said that if the levels of economic activity in the industrialised world are to be maintained (and there are already signs that they will be), the demand for wood and wood products will be sustained. Indeed, our work in the international agencies of the United Nations *suggests* that demand for wood will increase in the developed countries. The pressures on the forests of the developed world, for wood, will therefore be even greater than they have been in the past.

One consequence, in developed economies, of their rapid economic growth has been a growing awareness, by the general public, of the services which forests offer, and of the polluting effects of forest industries on the environment.

Rising incomes, better infrastructural facilities, improved mobility, more leisure time, and the severe emotional and mental stresses of

industrial societies have combined to create not only an interest in the non-wood values of the forests, but also to increase demands for their recreative use. In addition, the effluent which emanates from pulp and paper mills, the pollution of the atmosphere which sometimes results from the conversion of wood and wood products, the debris and waste which frequently accumulate from wood harvesting and wood conversion, and the impact of factories on the scenic beauty of the countryside, are all now fiercely condemned. As a result, in almost all of the developed countries, legislation has been enacted to control pollution, to conserve the aesthetic values of the forests, to zone the siting of factories, to prevent or control the felling of trees in certain areas, and so on.

There is little need to discuss the legislation in detail. In recent years, in the United States alone, the spate and range of conservation legislation has been remarkable. They are all certainly familiar to you, and a few examples will suffice; the Multiple Use-Sustained Yield Act of 1960, P.L. 86-517; the Wilderness Act of 1964 (78 Stat. 890); the National Environmental Policy Act of 1969, P.L. 91-90; and the Endangered Species Act of 1973, P.L. 93-205.

Almost all restrict the maximisation of the production of wood from specific types of forests. All can, in the long run, affect, the establishment and expansion of forest industries, the absorption of labour, the level of profits, the general growth of the economy, and the traditional systems of practising forestry.

Indeed, Mr. Chairman, as most people in this audience will know, at the end of August, this year, the United States Fourth Circuit Court of Appeals in Richmond, Virginia, ruled that trees in one of the National Forests in West Virginia cannot be harvested unless they are "dead, mature or of large growth", and unless they have been individually marked for cutting. As a result, the U.S. Department of Agriculture stated that it would not offer any more National Forest timber for sale in nine National Forests in Virginia, West Virginia, North Carolina and South Carolina until it decides its next step.

Therefore, it seems obvious that the problem of forest land-use in the developed countries is similar, in effect, to that of the developing world. In both cases, it seems inevitable that there will be a significant shrinkage, a significant reduction of the productive forest estate. In the developing countries efforts must be made to meet the just and rational demands of the agriculturist as well as the forester. In the developed countries means must be found of accommodating the just and rational demands of the conservationist, the environmentalist, as well as the production forester and the forest industrialist.

It used to be strongly argued (and there is still some validity in the argument for some places and for some types of combination) that multiple-use forestry¹ is the answer to the conflicting demands for forest land. It is now recognised, however, that although it is possible to optimise the production of various "packages" of forest goods and services, the maximisation of all the individual, single, goods and services which emanate from a forest cannot be attained. There has to be a trade-off. Use priorities have to be established. In the multiple-use package there has to be a dominant use.

¹ The conscious and deliberate use of forest land for the concurrent production of more than one good or services. Gregory, G. R. (1955). *Forest Science* 1 (1).

Moreover, in many countries, the consumers are demanding, and the legislators are supporting their demands, that more forests be reserved for single-use, non-wood forestry, usually for recreation, amenity, aesthetics. Indeed, these demands are not confined to the developed countries. In some parts of Latin America, for example, this is already a discernible trend. It is also not confined to recreation forestry. In the Guatope National Park, near Caracas in Venezuela, and in the Cantareira State Park near Sao Paulo in Brazil, the forests are managed solely for their water supplies.

Therefore, I repeat that if the non-wood services of the forests are to be supplied to the populace of the various countries, and if the need for more agricultural produce is to be met, then production forests will have to be confined to a smaller area than they now occupy. It follows from this, that if the increasing demands for wood and wood products are also to be fulfilled, there must be increased wood and wood fibre productivity. There must be more efficient wood harvesting and conversion methods, and a more rational utilisation of the forests and the wood resources which flow from them.

You will forgive me, I hope, if I say that the practice of forestry and forest industries in both the developed and developing countries is, in general, inefficient, though at varying levels of inefficiency. (This is also true of tropical agriculture, but this topic need not detain us here.)

Let us consider first, briefly the condition of forestry in the developing, tropical countries. We do not know exactly what species are in the moist tropical high forests, what quantities, what distribution, what growth rates. We do not know how the forests, as a whole, or the individual species in various types of forests, would react to different types of silvicultural and management systems. We do not know how best to regenerate naturally those species for which there is commercial demand. We do not know the utilisable qualities of many of those species we are aware exist in the forests. We cannot say with confidence whether mixed tropical hardwoods, from any region in the world, can be converted into pulp for paper. We do not know the effect of forest plantations on tropical soils, and whether those soils are capable of sustaining more than one rotation. We are certainly not utilising the best seed sources for tropical plantations, the best genotypes.

Our harvesting methods are primitive, costly and wasteful. So also are the systems we employ to convert the wood into primary products. In many countries, species that are known to be marketable, and that are in great supply, are either not utilised, or are burnt as weeds, because, for example, the silica content of the wood is high.

This list of the woes of tropical forestry is not exhaustive. However, it illustrates not merely our lack of knowledge, but our failure even to adapt what knowledge is available to the prevailing conditions.

The position with regard to forestry in developed countries varies only in degree. When I allege that forestry in the developed world is inefficient, I mean the allegation to be understood in relation to the advances made in comparable fields. Accordingly, rather than list the deficiencies that are inherent in the practice of forestry in the developed countries, examples will be given of the possibilities for research and for improving practices, in order to increase forest

yields. Much of what will be said, in this regard, will be applicable to both the developed and the developing countries.

Although much work has been done on tree improvement in recent years, more emphasis needs to be placed on the breeding of genotypes that will be suitable for growth on difficult sites. In addition, there is a considerable lack of knowledge, throughout the profession, concerning the predictable interactions of site, genotype and cultural treatment, and their combined effect on yield.

Another area of allied research which might prove profitable, is related to the possibility of breeding for different characteristics at different developmental stages of the crop. If I may be permitted to give tropical examples to illustrate a general point. A phenotype like *Maeseopsis eminii*, which possesses a high ratio of crown diameter to bole diameter, might be bred and utilised for rapid weed suppression and site domination during the early stages of the crop. This species may then be gradually replaced by a phenotype such as *Eucalyptus grandis* which possesses a low ratio of crown diameter to bole diameter, and thus will give a higher yield per unit area, and utilise the site more efficiently.

More research should also be pursued on the vegetative propagation of those species that are now normally propagated by seed. The point is easily appreciated if the advantages enjoyed by poplars in the easy rooting of cuttings are compared with the disadvantages of seed orchards. Indeed, there appears to be an inverse correlation between the seed production of individual genotypes and their potential for producing high quantities and high qualities of wood. The cheap and easy use of cuttings in establishing plantations would enable foresters to eschew the compromise between seed production and wood production, and use exclusively *sterile élites*.

We have not yet begun to examine the full potential of forest fertilisation, and the results of the influence of the faster growth which is attendant on fertilisation on spacing, and tending practices. The same is true of our knowledge of the optimum combination of cultural techniques in the nursery. In the last twenty years we have not succeeded (if the practice of forestry is taken as a whole and isolated examples ignored) in significantly reducing the period spent by seedlings in the nursery, and of improving, again significantly, the survival and early growth of plants in the field. We have not taken full advantage of the use of auxins, for example, as a means of increasing the efficiency of seedling production, although much progress has been made by the horticulturists, in this area. The application of greenhouse techniques to forest seedling production has also not been seriously and fully explored.

Although in the temperate countries the problems of seed storage may not be of great importance, they are of particular significance in the moist tropics. Because there is no winter, and in some cases no real dry season, there is no dormancy. As a consequence, the period of seed viability is short. Can dormancy be induced artificially? This question is of more than academic interest. The fact that the seeds of many tropical species have short periods of viability, imposes severe limitations on the use of such species as exotics, even though, like the *Araucarias*, they may possess a high production potential.

Our work on all aspects of improving wood productivity in the developed countries has been too diffuse. It is not the problems have not been appreciated. It is not even that the methodologies and techniques for solving them are unknown. It is that the approach has been haphazard and unplanned. Our activity in these areas of forest production has been extensive and desultory. Foresters in developing countries practise forestry as the early tribes gathered their food—as a nomadic, selective, slow, nit-picking exercise. Foresters in developed countries practise forestry as the very early agriculturists must have done just after they had ceased to be wanderers and hunters, as they must have operated in the early days of the domestication of crops and animals.

What I have said about wood production can be applied also to wood harvesting and wood conversion. In the developed countries, on average, about 40 per cent of the wood available in a cut-over forest remains unutilised. In the developing countries the proportion wasted is even higher. Much has been written about this. The subject is well documented. The technology and practises to reduce waste are known. The time is not too far distant, as I hope that I have demonstrated, when the knowledge which exists must be applied. The implementation of the environmental laws, and the pressures on the forests from other land-users, will permit nothing less. The conservations will force the production foresters and the forest industries experts to be as efficient as they are capable.

One last group of research activities, that is relevant to our times, is worthy of our consideration. Let us first consider the forests as a source of chemicals, polymers and liquid fuels, as a source of those supplies now obtainable mainly from fossils. It is said by some that we are at the beginning of the end of the petroleum era. Be that as it may, it is my conviction that the time is ripe for us to re-evaluate the possibilities of producing chemicals or even oils from wood residues. Research in this field was interrupted after the Second World War because it was difficult to compete with the petrochemical industry. However, the situation is now somewhat changed, and a great number of chemicals, now manufactured by the petro-chemical industry, might with profit be produced from wood through further development of the existing technology. The generation of energy from wood residues, either as such, or after pyrolysis to produce liquid fuel, is another possibility.

Other prospects exist in the utilisation of waste liquors from the pulp industry, especially from acid or neutral processes, for the manufacture of marketable products such as protein, lignosulphonic acids and glues for the particle board and plywood industries. Indeed, some of this is now being done, but on a small scale. Efforts should be made for the conversion of these small-scale operations to large-scale industries.

A few commercial plants for the utilisation of part of the carbohydrates in wood residues for the manufacture of wood sugar (xylitol) or furfural are in production. A further development could be the utilisation of the residue of these processes (which amounts to about 70 per cent of the wood material) to manufacture phenols and liquid fuel.

In the exploitation of the forest, the foliage is, almost always, completely neglected. However, the experimental evidence available sug-

gests that the leaves of forest trees may be converted into high-quality animal fodder, and to a wide range of chemicals with a potential use in medicine and in the cosmetic industry.

If I may be permitted to turn to another aspect of potential development in the use of wood. For a long time now, we have to some extent altered and improved the natural properties of wood—for example, in the plywood, fibreboard and particle board industries. Over the years, these generic types of products have been diversified to such an extent, that the boundaries of the various types of panels have become blurred, and the old definitions no longer fit the new realities. The predominant tendency, nowadays, is to produce materials with properties that are engineered to pre-determined end-use requirements. Indeed, the first boards with oriented particles have already entered the market. We seem to be at the beginning of a long road which teems with exciting possibilities. The engineering of wood now implies a synthesis of various wood components (particles, fibres, fibre bundles, strands, flakes) and non-wood components (plastics, metals, minerals) to produce entirely new types of product. The number of possibilities for new product combinations may be of the order of 3,000. If research and developmental activities are concentrated, and if our approach is truly innovative, a myriad of new products could be developed to meet the specifications we, or our customers, have established. Each such product would result in the saving of wood raw material.

An old, but still interesting, possibility is the production of board materials and mouldings from wood particles without glue additives. The main feature of such a process would, of course, be the activation of the lignin of broad-leaved wood particles in a sealed space. The lignin so activated would be used as a bonding material. It is reported that a new fibreboard mill using the dry method of production, without the addition of synthetic bonding materials, is in the final stages of construction in Czechoslovakia. In addition, research on a small scale is being conducted throughout the world. The research covers various aspects of different processes that are based on lignin activation.

Another long-standing problem of mechanical wood industries, namely, the reduction of residues, has been considerably alleviated by the development of residue-based technologies and products. Nevertheless, research aimed at reducing the residues of the mechanical wood conversion industries should be stepped up. The further refinement of our work on the Laser cutting of wood materials, the chemical modification of wood properties through, for example, the use of propylene oxide, butylen oxide, and epichlorohydrin, and the recycling of forest materials retrieved from urban waste, should be encouraged.

Mr. Chairman, these are but a few of the areas of research which appear to me to offer opportunities for increasing the biological productivity of our forests, for increasing the volume of the wood which we extract from those forests, and for utilising that wood in a most efficient way.

You will recall the central thesis of this paper. In the future, in both the developed and the developing countries, the pressures on forest land will be so great, that the areas to be devoted to productive

forestry will be reduced. The allocation of land to productive forestry, indeed to any form of land-use, should, of course, be based on land capacity surveys, and on an assessment of the social, economic and political effects of other competing uses. It is reasonable to assume, however, and no matter how rational the approach, the productive forest estate will diminish. In order to meet the growing demand for wood and wood products, we must therefore increase our productivity. We can do this, but much effort in research and development will have to be made.

It is, I think, inevitable that most of this research will be carried out in the developed countries, in which are to be found the knowledge, the facilities and the capital for such work. Much of the work done in the developed countries can possibly be transferred to the developing world. It is likely, however, that because of differing physical and socio-economic conditions, much of it, in the form in which it was conceived and executed, cannot be transposed willy-nilly.

If the developed countries wish to help the developing countries in these matters (and I would suggest that in forestry and forest industries there is an inherent inter-dependence), then the form of aid should be in the methodologies to be applied in research and development, in the approach to problem solving which has been so well developed in the United States, for example. Where technology per se is to be transferred, it should be adapted to the physical and social conditions of the recipient country.

If these things are done, I see in perspective, at the end of this century and in the early years of the twenty-first century, a pattern of forest deployment in the developed countries in which forest areas, particularly (but not exclusively) around the cities or within easy access of them, are set aside for single-use recreational forestry. Other areas, more remote, of the wilderness type will provide similar services. Yet others will be utilised for conservation, for their protective and recreational functions, e.g. areas on steep slopes. The greatly reduced productive forest areas will be mainly plantations and will be surrounded by landscaped, irremovable forests to maintain the scenic beauty, and to hide the scars of forest exploitation.

Within these productive forest activity will be intense, and yields will be achieved that bear no comparison with those obtained today. The industries based on these productive forests will be more varied in type, very much less wasteful, very much more efficient.

In the developing countries, the pressure for more environmental forestry will have just begun. More forests will be set aside specifically for the control of erosion and for the regulation of water supplies. Those soils now under forests which are capable of sustaining agricultural crops will be permanently dedicated to food production, and the forests now covering them will have been removed. In areas of intense population pressure, but where the forest soils are not inherently fertile, the system of agri-sylviculture, in which forest plantations are inter-cropped with food crops for short periods, will be practised. As in the developed countries, the productive forest area will be reduced, but more will be extracted from those areas than is now being taken out of the existing, all pervasive tropical forests. Forest plantations will be the predominant formation in productive forestry. Considerably more wood will be processed in these countries,

but the range and intensity of forest industrial activities will be considerably smaller than those in the developed countries.

I could not resist some crystal gazing. But the reason for looking into the future was not merely to engage in the futuristic pastimes that have become so much a part of the modern world. The reason was to convey to you my conviction that there is no real conflict between environmental and production forestry, no real clash of interests between agriculture and forestry. All can be accommodated, if we apply ourselves to the solution of the problems which now face us. We must understand that many aspects of land-use are complementary and not in antagonism. We must understand that there are many mansions in the firmament.

MEETING NEEDS FOR WATER, FORAGE, AND MINERALS

[By George R. Bagley, President, National Association of Conservation Districts]

Although water, forage, and minerals are certainly three of the basic natural resources of the nation, you do not ordinarily see them put together as the combined subject matter of a single paper. They have distinctive characteristics. Forage is a renewable resource. Minerals are non-renewable. And the supply of water is replenished annually in fairly consistent amounts, primarily by rains and snow.

Nevertheless, there are some common ties that provide good reason for grouping the three resources on this particular occasion.

First, of course, they are all affected in major ways by the management of forests and their associated rangelands. The arithmetic of land use bears out the point. Forests occupy some 754 million acres, or approximately one-third of the 2.3 billion acres of land in the United States. The policies guiding the management of such a large segment of the nation's land are certain to have a profound effect on water supplies, forage quality, and mineral production.

Second, there can be no doubt about the need for water, forage, and minerals. Every responsible study of recent years has pointed to the increasing requirements of the next quarter-century—and beyond.

Third, we are not yet moving in any deliberate way, as a nation, to meet the oncoming needs.

Fourth, we are being crippled in our ability to prepare for the future by a widespread distortion of values; a lengthening shelf of new laws accompanied by excessive regulations; and the concentration of a majority of our population in urban centers where the people are preoccupied with urban problems such as housing, transportation, and employment.

To enlarge a bit on the previous point, I believe too many Americans have forgotten—or were never taught to realize—that natural resources are the original source of all our wealth. The commodities from our lands and waters, and the materials extracted from them, are the foundation on which all the rest of our service-oriented economy is built. When we neglect this foundation, or downgrade it, we eventually invite the most serious kind of trouble.

Further, since I have had the daring to put in a good word for resource development, production, and the wealth that can be derived from it, I want to emphasize another fact of the real world.

As Americans, we cherish our freedom above all else. We cherish our Bill of Rights. Yet there can be no freedom, political or otherwise, without economic independence. A family without a job, without income, without the money to buy food, clothing, and shelter, is not a free family. It is a dependent family—a family obligated either to charity or the state.

In some cases, of course, this cannot be avoided because, most unfortunately, there are always those among our neighbors who are blind, or ill, or otherwise incapacitated.

But my feeling is that most Americans want a job, want to earn a living on the merit of their own work and capabilities, and have the feeling of freedom that is possible only with a reasonable measure of economic security.

Directly or indirectly, jobs and economic security for the families of America depend on the production from natural resources. Unless we are producing corn and copper, lumber and beef, and all the other commodities and materials essential to a growing society, there is nothing to transport, process, manufacture, and sell. There is no commerce or industry. There is no wealth—no money—to pay for doctors or musicians, schools, pro football, or leisurely trips into the Wilderness.

The point of my digression is to express my concern about the trend in recent years to shift the emphasis in forest management away from timber, mineral, and livestock production. More and more attention is being given to recreation. More and more public forest land is being withdrawn from timber, mineral, and grazing use and reserved for wilderness, parks, and scenic areas.

There appear to be increasing commitments to single-purpose recreational uses and a retreat from former policies that stressed multiple uses and sustained yields.

It is not my purpose to minimize the importance of recreation to the American people, or to suggest that the public and private forest lands of the nation cannot accommodate a substantial expansion of recreational uses. Such an expansion is both practical and desirable. But recreation and production are not always mutually exclusive, and it is my hope that we can arrive at a forest policy that achieves a rational balance of these sometimes conflicting uses.

More intensive management of forests and their associated rangelands is clearly one of the essentials in meeting our oncoming needs, not only for timber and recreation, but for water, forage, and minerals. These latter needs are of very substantial proportions. It is inconceivable, in my view, that the United States can meet them without major contributions possible through intensive management of the forests and rangelands.

WATER

The facts and prospects pertaining to water are familiar, I am sure, to everyone here. Our annual replenishment of water by precipitation is fairly constant at about 30 inches as a nationwide average. This is not a particularly meaningful figure, however, because the distribution of rain and snow is so uneven. Many areas of the West get an average of about ten inches a year, while other localities receive up to 100 inches.

Moreover, we don't get to use all the precipitation that falls. Nearly a third of it is lost through evaporation. Somewhat more than another third is transpired back into the atmosphere through our crops and forests. The other nine inches, says USDA's Economic Research Service, is natural runoff and is considered the renewable supply each year. It amounts to about 1.2 trillion gallons a day which accumulates in our lakes, streams, and rivers.

In addition, we have groundwater reserves equal to about 30 years of runoff, but this is also unevenly distributed throughout the country and in some sections is being severely depleted by heavy pumping.

What about the future? In its 1968 National Water Assessment, the U.S. Water Resources Council projected that withdrawals from the annual renewable supply would rise to 37 percent by 1980 and to 67 percent in the year 2000. Back in 1965 they were estimated at 22 percent.

Withdrawal uses, says ERS, "include water for public supplies, irrigation, rural use, self-supplied industrial use, and water power."

Consumptive uses of water are also expected to rise. These are the uses which include water discharged into the atmosphere or used by growing plants, in food processing, or incidental to an industrial process.

Since the First National Water Assessment, the water outlook has been altered considerably by two new national programs: (1) the effort to move the U.S. closer to self-sufficiency in energy, and (2) the drive to clean up pollution, including a reduction in the annual sediment load, from America's waters.

President Ford has set out a goals program for the coming decade which includes the construction of 200 major nuclear plants, 250 major new coal mines, 150 major coal-fired plants, 30 major new oil refineries, and 20 major new synthetic fuel plants. Needless to say, the production of energy requires very large amounts of water.

All along the line, the requirements ahead for water appear to be rising. The situation means that all of us, as a nation, and in every walk of life, will find it necessary to give more attention to the supplies, quality, re-use, distribution, and the timing of the distribution of water—wherever we are.

One of the avenues to additional water yield and availability is in the improved management of forests and associated rangelands. I am not a forester, but it occurs to me immediately that this could result in greater insoak for groundwater recharge, as well as a reduction in wasteful and destructive flash runoff of storm waters. Greater attention to insect and disease control as well as more effective fire prevention would help. As I understand the possibilities, manipulation of the forest canopy and eradication of water-loving plants of low economic value would also make contributions. Another important value of more intensive management would be greater protection of reservoirs against destructive silting.

FORAGE

As in the case of water, there are a variety of reasons to expect a substantial rise in the national need for forage in the years immediately ahead. Also as in the case of water, I believe American forest policy should be framed to help accommodate this increased need.

It is pertinent here to quote rather extensively from the work of Dr. Harlow J. Hodgson, Principal Agronomist for the Cooperation State Research Service, and widely regarded as an outstanding authority in the field of forage.

In an address during the annual meeting of the Society for Range Management last year, Dr. Hodgson said:

"Numerous projections have been made regarding future increases in red meat consumption in the United States. These average around 2 pounds per capita per year until 1985, a total of about 24 pounds per capita above 1972 levels. A few projections call for much higher levels . . . Nearly all this increase is expected to be beef. Whether these projections are realized will depend mostly upon the supply of slaughter animals, the most important factor in determining price. Retail price will be the most important factor in determining demand. . . ."

Later, in the same address, Dr. Hodgson declared:

"It is instructive to translate projected per capita demand for beef into cattle numbers and total forage demand. Each 1 pound per capita increase in consumption requires about 400,000 cows to provide the slaughter animals for 210,000,000 pounds of beef. . . These cows and their calves require the forage from about 2 million acres of forage producing land, assuming a national average of 5 acres per cow/calf unit.

"To provide 24 pounds of additional beef per capita by 1985, 9.6 million more beef cows will be needed. Furthermore, an expected 10 percent increase in population by 1985 adds another 4 to 5 million cows for a total of about 14 million. This amounts to an increase of about 30 percent over present numbers. Using our average of 5 acres per cow/calf unit, the equivalent of 70 million acres of forage producing land will be required to feed this number of cows and calves. Or we could increase productivity by 50 percent on some 140 million acres. This is a fairly sizeable task."

In an article in *Science Review* in 1968, Dr. Hodgson underscored the critical importance of forage in the production of beef cattle. He said:

"Only about one-fourth of the beef cattle in the country in any one year are in feedlots and are consuming high-grain rations. About three-fourths are breeding animals, calves, etc., which receive about 92 percent of their feed units from forage. This ratio probably will decrease only slightly over time and could reverse with higher price feed grains. Therefore, for every additional animal in the feedlot we need about three more in breeding herds, etc. . . . Two things are clear. We will need vastly increased outputs of forage production in the next two decades. The greatest portion of this forage will be fed to beef cattle."

"Rangelands in top condition," Dr. Hodgson continued, "can support the greatest number of grazing animals consistent with resource conservation. The more animals that can be maintained on the land, the less is the problem of disposing of animal wastes. . . . If animals could be kept on range or other grazing land for even one extra month, our waste disposal problems would be substantially reduced.

Aside from the increased forage needs for beef production, as set forth by Dr. Hodgson, there are additional reasons why greater attention to forage will be vital in the years ahead. Whether we are thinking of grasslands in the East or rangelands in the West, improved cover and better management of these lands is going to be important in terms of watershed protection, recreation, wildlife habi-

tat, and the reduction of the sediment load flowing into our lakes, streams, and rivers.

These forage lands are enormously valuable to our society, our environment, and our economy. They deserve better treatment than they have been getting. While they have not been altogether neglected in the past, neither have they received the kind of sustained attention their present and potential contributions warrant.

As a general statement, referring to the state of forage lands as a whole, it would probably not be far wrong to say they have played second fiddle to croplands and to forests.

Insofar as these forage lands are associated with forests and with forest policy, they should be regarded as a major element in policy projections for the future.

There would be a sizeable body of public support for such an upgrading of attention to forage. I am thinking, for example, of my own organization, the National Association of Conservation Districts. I am thinking of the American National Cattlemen's Association, the several dairy organizations, the Society for Range Management, and the major farm organizations. I should think the consumers of the country, and their organizations, would applaud forage improvement that would lead to more stable supplies and better prices for the animal products coming from the nation's pastures and ranges.

There is a large array of treatments, technologies and management practices that are waiting to be applied. There are improved plant varieties that can be used to increase both the number of animals that can be grazed and the meat output per animal. There are grazing systems, developed by careful research. There are a host of management practices, such as brush and noxious weed control, water development, seeding, water spreading, timber thinning, fertilization, and insect and disease control.

The catalogue of constructive actions is large, if we would only choose to make greater use of it. The task of upgrading 665 million acres of pasture and rangeland is huge, but over a period of time it can only be reflected in gains for America, in terms of jobs, land use, health, production, pollution abatement, wildlife, water supply, and the beauty of the American countryside.

MINERALS

The best that can be said about our mineral position right now is that it is a supreme headache. We are nowhere near self-sufficient in a number of the most critical metals. We import 98 percent of the cobalt we use, 91 percent of the chromium, 88 percent of the aluminum ores and metal, 86 percent of the platinum and tin, and 82 percent of the mercury. We are also heavy importers of asbestos, nickel, gold, silver, and zinc.

For many years, the United States was the world's leading producer of steel, which is often considered a key commodity in measuring a nation's productive capacity. Last year we dropped behind Russia in steel production and barely managed to stay ahead of Japan.

Data from the U.S. Bureau of Mines show that in 1950 the U.S. produced 47 percent of the world's steel. Last year we produced 19 percent. In 1950 we produced 44 percent of the world's aluminum. By last year our output amounted to 35 percent of the world total.

Meanwhile, mineral consumption throughout the world is increasing more rapidly than in the United States, and experts are quick to point out that this is accentuating the competition for raw materials in the world markets.

The ore bodies of the earth are non-renewable. In other words, exhaustible. When we—the United States and the rest of the world—have consumed them to a point where supplies no longer meet the needs, then we are in trouble. Substitutes are not always readily available. Professor Charles Park, Dean of Mineral Sciences at Stanford University, points out that nothing now known can take the place of steel where strength is needed, as in skyscrapers, dams, or in the high-temperature alloys of a jet engine. Nothing now known will substitute for cobalt in the manufacture of the strong permanent magnets needed in all modern communications systems, he says, and no other metal will remain liquid like mercury.

In 1970 Congress passed the Mining and Mineral Policy Act designed to bring about the orderly development of the nation's mineral resources by private industry. Some mining experts, however, believe the Act is facing too many handicaps to be effective.

Dr. Thomas Falkie, Director of the Interior Department's Bureau for cobalt in the manufacture of the strong permanent magnets needed investment capital. He cites, "unrealistic environmental regulation, the withdrawal of land to mineral entry under such laws as the Wilderness Act, and the increasing involvement of Federal, State and local governments with private enterprises" as stumbling blocks to the improvement of our mineral position.

The mining industry is frequently represented as one of the chief villains in ravishing the American landscape. Yet the National Commission on Materials Policy reported in 1973 that the criticism may have been excessive. "Total land disturbed in the entire history of the Nation by all types of mining including coal, oil, gas, stone, sand, and gravel, cement rock, and metal and nonmetallic ores has been less than 0.3 percent," the Commission stated, and added that "one-third of that area has been reclaimed or restored by nature."

Our needs for minerals are obviously enormous and increasing. The world supplies of many of them are decreasing and rising in cost. They are non-renewable. For some of the critical minerals there are no known substitutes. As a general rule, mining is a localized enterprise, not prone to affect extensive areas of the landscape. In recent years, furthermore, state and federal governments have seen fit to forestall mining activities that appeared to threaten the environment.

Under the circumstances, do we want a National Forest policy that hamstring mineral exploration and inhibits production? More and more western land, where geologists say we have our best chances for finding new minerals deposits, are being declared off-limits to mineral prospectors and developers.

When the Wilderness Act of 1964 was passed it created 9.1 million acres of Wilderness areas. That total has since been enlarged to 31 million acres, largely in the western states and Alaska.

As a people and as a nation, we need metals and other minerals as well as timber, forage, and recreation. I, for one, believe forest management policy should recognize that fact.

In conclusion, based on the experience of viable conservation and development movements such as conservation districts, I believe America can meet its future needs for water, forage, and minerals by applying sound conservation and development principles. Our big task is to muster purposeful public support for this approach.

MEETING TIMBER PRODUCTION NEEDS

[By Charles W. Bingham, Senior Vice President, Weyerhaeuser Company]

During this century we have seen three major crises of public confidence in American forestry. Each has resulted in significant shifts in the direction of American forest management.

Today, we are in a fourth period of major concern. I believe this, too, presents an opportunity for a major turning point in the practice of forestry—if we can understand the dimensions of the opportunity, and have the will to translate it into action.

Nationwide concerns over forestry that began building in the late 1880s have dominated debate throughout this century. The major concerns for the last 75 years or more have been future timber supply, and timber harvest practices.

In 1911, those concerns led to passage of the Weeks Act.

In 1924, the culmination of another round of debate was the Clarke-McNary Act.

Then, in 1938, President Franklin Delano Roosevelt requested a Congressional study of the nation's forestlands. A Congressional Joint Committee on Forestry responded in a report issued in 1941. Two indirect results of that Committee's efforts stand out during the early 40s. One was amendment of the Internal Revenue Code. Capital gains treatment was given to timber converted in the owner's mills, as well as timber sold to third parties. For the first time, federal tax policy recognized the long-term nature of forestry investments. The other major result, which came from the forest industry and thousands of smaller landowners, was the founding of the American tree farm system.

The tree farm system began with a 130,000-acre tract of land in Grays Harbor County, Washington. About half of the tract was owned by Weyerhaeuser Timber Company. In June of 1941, the tract was formally and publicly dedicated to growing trees, and given the name Clemons Tree Farm.

The tree farm idea came at exactly the right time to excite the imagination of state foresters, forestry committees and private landowners. In only four years, there were 938 certified tree farms, covering more than 11 million acres.

Today, there are more than 31,000 tree farms with some 76 million acres, in all 50 states.

The primary emphasis of the first tree farm effort at Clemons was fire prevention. Parts of the Clemons tract had burned many times since logging had begun there in the 1880s. Much of the land had not gone beyond the first forest succession stage of wild grasses, brush and small hardwood trees.

Nearly half of the Clemons tract was unstocked or poorly stocked as a result of repeated burning. Thus, for successful tree farming, fire prevention was a significant economic requirement.

A major objective at Clemons was a city-like ability to put water directly on any acre in the tree farm, swiftly. That objective was met in 1941.

With fire control underway, the foresters could try out additional tree farming techniques such as:

Logging methods geared to providing suitable conditions for regrowth.

Artificial seeding to assure reforestation.

Hand-planting was tried in some small, experimental areas.

Efforts were made to protect the young trees from animal damage.

And a forestry research unit was set up to study fire control, tree growth and yields, and pest control.

The early concepts and techniques tried at Clemons were reflected in principles of the nationwide tree farm system. The system was managed on a state-by-state basis until the early 1950s. In 1954, certification principles were codified nationally by American Forest Products Industries, known today as the American Forest Institute, or AFI.

Three major criteria were developed:

The first was forest protection from fire, insects, disease and destructive grazing.

The second was permanent dedication of the land to growing and harvesting tree crops.

And the third called for cutting practices that would improve the growth of the timber stand.

With minor modifications, these are the same criteria used to certify tree farms today. Yet, over the past 35 years, our ability to grow trees as a crop has increased dramatically.

Let's look briefly at how the forest management techniques have changed on Weyerhaeuser's lands in the original Clemons boundary. (Today, the ownership totals 89,000 acres.)

With the ability to control fire came the ability to use it as a tool in logging cleanup. A helicopter techniques for directing flame onto slash significantly reduced the cost of disposal, and increased the number of acres that can be burned during our severely limited slash disposal season. The helicopters also work in controlling the flame spread.

Today at Clemons, natural regeneration is a thing of the past. By hand-planting within a year after harvest, we can get a five-to-seven-year jump on nature in starting a new forest growth cycle.

The seedlings are grown in nurseries—Weyerhaeuser has nine nurseries, which carry 270 million seedlings in inventory.

Over the last 35 years, we've emphasized logging techniques that increase wood utilization, protect the soil, and help prepare the harvest site for reforestation.

What I have been describing are basic elements of the tree farming system that Weyerhaeuser calls High Yield Forestry. In the ways I've mentioned, High Yield Forestry is a logical extension of original tree farming practices. But there's a good deal more—from the laboratory to the harvest.

The research effort is the key. Today, we have more than 75 scientists in many disciplines working full time on forest management. Thirty-eight of them have doctorates in their fields.

Thus High Yield Forestry can and does begin with detailed, scientific knowledge about forest soils. We have prepared extensive surveys of soil characteristics on each acre of our ownership. By knowing the productivity of the soil, we can target our forest management toward fulfilling the soil's true growth potential.

Brush control is extremely important. The helicopter techniques of the late 40s now are a regular part of our forest management.

Thinning and fertilization are also elements of intensive forest management at Clemons. Today, at about stand age 15, we plan to thin out weaker trees precommercially. After we have thinned, the stronger trees have room to grow. The thinnings are left to return to the soil. At about age 25, and every five years thereafter, we can take out the thinnings that are usable size—at least for pulping, and most often for dimension lumber as well.

When we do commercial thinning, we also plan to apply fertilizer to the stand. The fertilizer increases tree growth helping stands reach harvestable size more quickly.

The most advanced technique we are trying operationally today is planting genetically improved seedlings. At our seed orchards, we graft branches from fast-growing, well-formed trees onto sturdy root stock. When the grafts bear seed, we collect it to grow seedlings. These are planted in the field at the same elevation and soil type as the parent trees.

At Clemons, we have just about worked our way through the old-growth, and have a high proportion of vigorous young stands. Ninety percent of the acreage is stocked with timber, most of it at good to excellent levels.

Let's pause for a moment and take stock of where we are. We've briefly discussed three major crises of public concern about the nation's forests. We've seen how the debate of the 1930s led private forestry to increase the productivity of its timber holdings through tree farming.

And now, we face this century's fourth crisis of confidence in American forestry. The concerns are more complex, but they add up to much the same issues as in 1911, 1924, and 1941. They include protection of forest soils, air and water quality, wildlife habitat, and timber supply for current and future generations.

Five major studies in the early 1970s addressed these issues:

The Public Land Law Review Commission.

The Seaton Commission.

The National Commission on Materials Policy.

The U.S. Forest Service's *Outlook for Timber*.

And the report, *Five Years of Effort on the Third Forest*.

This year three additional reports have been published.

The Forest Service study of Pacific Coast timber supply.

The Wolf/Library of Congress Report.

And perhaps the most thorough study in recent years, the Washington State Department of Natural Resources study.

All these reports recognize the importance of economics to forestry. That is, world markets which guarantee a realistic return on the capi-

tal invested in tree farming. Today, these markets do exist, and can be expected to grow over the next several decades. The Forest Service predicts that annual demand on the U.S. wood supply will rise 58 percent by the year 2000.

Worldwide, the FAO predicts a *doubling* of wood demand by the end of the century. U.S. forests and mills are among the most productive, and the best situated geographically, for filling that world demand. But markets are of no value to the tree farmer unless they are accessible. Our laws and regulations *must* permit wood and fiber producers to seek out and fill world markets, if there is to be significant investment in forestry.

As Marion Clawson of Resources for the Future points out, "In the long run growth *cannot* exceed harvest, especially for trees. . . . If no trees are harvested, net growth is or will become zero." And I would add, if there are no markets, there is no reason to maintain the nation's *productive* forest potential.

Assuming, though, that world markets *will* be accessible during the latter part of this century, let's consider how American's commercial foresters—especially its tree farmers—might go about further enhancing the productivity of their lands.

First, I believe industrial tree farms must continue to take the lead in research, capital investment, and forest management intensity—as they have done during the past 35 years of tree farming.

Today, the industrial forest sector, with only 13% of America's commercial forest acreage, supplies 29% of the nation's wood supply.

One reason is simply size of individual ownership. The average size on non-industrial tree farms is about 75–100 acres. Obviously, they cannot take advantage of the economies of scale available on industrial management blocks that are often thousands of acres in size.

The industry is also a direct user of its own raw materials, to a large degree. It can obtain efficiencies and values that the owner of a 40-acre woodlot cannot achieve.

The same can be said at the other end of the manufacturing process. The forest products industry goes directly to the consumer market, and can seek out the highest return for each product. The tree farmer, of course, does have markets for his intermediate products, logs and timber.

The fourth characteristic of industry's leadership is access to capital. Whether directly from cash income, or indirectly through borrowed funds, industry *is* in a better position than the small private landowner to generate the money for forestry investments.

But with all that said—with the limitations of the private landowner recognized and understood—I believe this:

If American forestry is to meet the challenges before it, the highest standards of industrial forest management must become the target goals for all tree farmers—and the tree farm system must begin now to recognize that need.

Let me illustrate what I mean by "highest industrial standards," as practiced on state and industrial lands in the West, and on millions of commercial acres in the South. Earlier, I described in broad terms the current forestry approach to the Glemons Tree Farm. Now I'd like to demonstrate the impact of that approach compared to less intensive management levels.

For example, the annual sustainable harvest from our 89,000 acres in the original Clemons Tree Farm—with stocking levels as they were in 1941, natural regeneration, and a 90-year rotation—would give us 119,000 cunits per year.

If we plant each acre for full stocking, but still permit only natural growth, and maintain a 90-year rotation schedule, our tree farm will produce 203,000 cunits per year.

But if we employ all the management practices we know today—planting, precommercial thinning, commercial thinning and fertilization—our 89,000-acre tree farm will produce 305,000 cunits per year, *on a 50-year rotation!* This is an increase of 156% over 1941 levels, and it will be further increased through genetically selected seedlings.

What I'm talking about represents the highest current standards for industrial tree farming. Obviously, such management intensity cannot be translated into specific standards for all tree farms. Different geographies, species and soil characteristics combine into different forestry potentials. And for the smaller landowner especially, local market conditions and personal financial status directly affect what he can afford to do in forest management.

But I do believe that eventually, most tree farming will trend toward a much higher level of forestry effort than today's. The growth in world markets, and the increasing value of wood, will lead to higher log and timber markets for the tree farmer, and will pull the dedicated landowner in the direction of more intensive management levels.

That will happen eventually—but hearing what the public is saying today, and recognizing the time required for any change to occur in forestry, I do not believe “eventually” is soon enough.

We must begin *now* to strengthen the American tree farm system into a source of added support for the change in forest management that the forest industry has already begun to make. Today, the formal objective of the tree farm system speaks only of “management practices that will produce more and better forest products and services.”

Surely in 1976—the nation's bicentennial year—we need to adopt a *new* objective for America's tree farms. It should set forth the aim of maximizing forest growth, based on the biological and economic potential of each tree farm, under a range of management intensities. *In short, it should be an objective that rededicates tree farming to America's future needs.*

Today, the *criteria* for tree farm certification are not appreciably different from those of the 1940s. I believe that to those criteria, we should add *target goals* for stand establishment and survival, for growth enhancement, and for maximum utilization of all harvested wood. And finally, I believe the management structure of the tree farm system must be strengthened to assist tree farmers in *exceeding* the criteria, and *reaching* for the target goals.

What I am proposing, I believe, is not a wrenching change. By their entry into the system, tree farmers have shown that they are committed to managing their forest lands productively.

As we move toward the improved management levels I have described on an increasing percentage of private lands, we can avoid a *fifth* confrontation with the spectre of timber famine around the turn of the century.

UNITED STATES FORESTRY—A BICENTENNIAL REDECLARATION OF INDEPENDENCE

[By Robert L. Herbst, Commissioner, Minnesota Department of Natural Resources]

Mr. President, Dr. Turner, distinguished delegates and guests to this 100th annual meeting of the American Forestry Association . . .

We are gathered here for the Centennial sessions of this great organization on the eve of a Bicentennial observance for our United States.

From an historical perspective, we are a people that have known wars—from devastating world confrontations to a divisive internal struggle. We have known depression, recession and searing drought. But as a nation we have never been more preoccupied, more totally traumatized, than by current events which have brought us into confrontation with the all-encompassing energy dilemma.

Indeed, in our mode of living, in our life styles, we have permitted ourselves to become so totally dependent, such captives of a single energy source and the inter-related global web of supply, pricing and demand that our very self-reliance—our basic convictions that we are masters of our destiny—have been shaken and called into serious question.

In a real sense, our great traditions of Independence have been threatened by our dependence.

This Petroleum Syndrome—this specter—jeopardizes our capacity to heat our homes, to fuel and maintain our industries, to sustain our mobility and insure our national security.

And how could this come to be? How could a nation which has demonstrated the awesome ability to explore the far reaches of outer space, to expose and harness the infinite secrets of the atom, to master complex computer technology—how could we have arrived at this seeming impasse where government, industry and citizen seem paralyzed by a crippling reliance on a resource which is non-renewable, which is finite and which may well be exhausted—at least from the standpoint of mass consumption—within the life-spans of today's children?

Could it be that we are guilty of allowing ourselves to become captives of a national, in fact international orgy of single-minded consumption at any cost? How else could we have been subjected to a conspiracy of control and price fixing which, after all, could well be within the proper bounds of long-term self-interest by those that have—versus those that do not?

Can it be that we have made a mockery of the words of our own countrymen . . . That we quote, but we do not listen . . . That we memorize, but we do not heed? Listen to what they have said:

Henry David Thoreau: "The fate . . . of the country does not depend on what kind of paper you drop into the ballot box, but on what kind of man you drop from your chamber into the street every morning . . ."

Shades of a Nation shaken and Watergate redefined!

And Aldo Leopold admonished that "A thing is right when it tends to preserve the integrity, stability and beauty of the biotic community. It is wrong when it tends otherwise . . ."

And what of Leopold's warning that we must, at any cost, embrace a national land ethic? Leopold is gone—but does that land ethic live?

Is there not a real hazard that, in our compulsive rush to identify and develop new petroleum sources, to utilize our coal and our oil shale, to produce synthetic fuels, we shall pay too severe an ecological price . . . in water depletion . . . in enormous soil devastation . . . in the creation of boom-towns with all of the adverse social, scenic and esthetic consequences?

Gifford Pinchot defined it so: "Conservation is the wise use of the earth and its resources!"

At this moment in time, what is our commitment to Pinchot's wise use principle—of our forest resources, our lands and waters and mineral reserves. Is it a commitment to wisdom, or to the panic of expediency and exploitation of our resource heritage at any price?

I do not consider these remarks unrelated to our concerns as forest resource managers. On the contrary. I introduce them to underscore my great feeling of urgency that we must re-commit, yes, re-dedicate ourselves to conservation principles. We must not, repeat not, surrender to the panic of short-term profit considerations; to shotgun solutions at the expense of long-term conservation ethics and the future of this nation. You have children. I have children. We owe them a legacy—not a heritage lost to a few years of expediency.

And what is the record written by America's forest industries?

I believe you will agree that we have known a bit of controversy. I believe you will also agree that the American Forest Industries have been the most sensitive—the most responsive of any American industry to qualitative and quantitative environmental concerns: in conservation practices, in setting aside wilderness areas, in multiple use advocacy for recreationists, for wildlife, for hunters and fishermen.

At times, it would appear that our forest industries have gone too far in consideration of world wood fiber needs for tomorrow—especially in the area of diminishing commercial forest acreages. At times, we may have been too accommodating.

In this regard, I am reminded of the story of the young man who landed a job as a clerk for a local Super Market. On his first day at work, he was approached by a rather impatient, seedy looking customer.

"Young man," said the customer, "I would like a HALF a head of lettuce . . ."

"Sorry, Sir," our clerk replied. "I can't sell you half a head of lettuce."

"You can—and you will," said the demanding customer. "I'm a bachelor. I can't use a whole head of lettuce. It will just spoil and stink up my refrigerator."

"Well, Sir, I'll have to ask the boss," the youngster replied. And he headed for the front office, not knowing the customer was hot on his heels.

"Hey, Boss," the clerk said, "some knucklehead is trying to buy a half head of lettuce."—and the words were scarcely out when he spotted the customer at his elbow, and quickly added:

"This gentleman wants the other half!"

Well, as you can imagine, the boss was impressed. "You know, son," he said, "you're pretty quick-witted. In fact, I'm going to recommend you for our manager's school up there in Peyton, Minnesota."

"Oh my gosh," the young clerk responded. "Don't send me to Peyton. The only things that place ever produced are hockey players and prostitutes!"

"Hold on, Fella," the Boss said sternly: "My wife happens to have been born and raised in Peyton!"

"You don't say!" said the kid. "Which team did she play for?"

Yes, sometimes management can be too accommodating.

The foundation of my personal conservation career is rooted in forestry. From the major emphasis in my education, to field work, to administrative areas, forestry dominated the formative years of my work.

As Commissioner of Minnesota's Department of Natural Resources, I am now preoccupied by the administration of several disciplines. But I have never lost sight of my basic conviction: that our forests have a potential that is still untapped.

Historically, in Minnesota and nationally, we have gone through a period of timber surplusses, to timber scarcity, to today's temporary phase of wood fiber abundance. We have come full cycle—and in a matter of less than a quarter century, we shall know another cycle of want—want for the forests that we are not planting today.

The word "renewable" has become so commonplace, so over-worked, that we have all but lost sight of its implications and challenges. But it is a fact that not only is the living tree an inexhaustible resource, but a plant which still holds vast secrets. Inherent in our forests is the promise of providing for this nation real answers to that aforementioned single-energy source dilemma—if we will but apply our American genius to the research, the technology, the funding, the pooling of expertise necessary to capitalize on that latent promise.

On the national scene, the picture looks like this:

One-third of the United States is forested. Translated: Our total land area is 2.3 billion acres; 754 million acres are forested.

Of our 754 million forested acres, approximately two-thirds, or 500 million acres may be classified as commercial forest land. The remaining one-third, or 254 million acres, is non-commercial forest land; that is, land which is either incapable or unavailable for growing trees for harvest.

Now let's take a clinical look at that commercial forest acreage.

- Our 500 million commercial forest acres fall into three major ownership categories: public, industrial—and "other private" acreages.
- Largest single owner of these lands: the Federal government, with 21% of the total acreage. And remember this: national forests embrace 46% of the nation's total softwood growing stock.

Another six percent of total commercial acreages belongs to state and municipal governments.

- 60% of the total commercial acreage—in the second, or non-governmental ownership category, belongs to some 4½ million non-industrial private owners: farmers, rangers, absentee landlords and others. The average timber holding in this non-industrial classification is 70 acres.
- The final, or third ownership category, is industrial forests. 13% of our total forests acreage is in that classification.

That is the summary picture of fiber ownership in the United States today.

Permit me at this juncture to examine with you our state forest ownership picture in the United States.

- We have a total of 18,393,000 acres of forest resources owned by our state governments. Some of these forests grow on relatively flat terrain; others on hilly, or even precipitous lands. Some grow in temperate and even hot climates—others in rather brisk climates, such as we enjoy in good old Minnesota. Species and growth rates vary accordingly.
- Of the total of 18.3 million acres of state forests on the national scene, this is the regional breakdown:
 - In 11 eastern states, we have 3,661,000 acres in state ownership.
 - In 12 midwestern states; 7,792,000 acres.
 - In 14 southern states; 896,000 acres.
 - In 13 western states; 6,044,000 acres.

We also have, in nation-wide context, an estimated 51,767,000 acres of land classified as “idle, open land needing reforestation”—and I hasten to add that some of our wildlife managers would be delighted to debate that terminology.

That, in a walnut shell, is our state forest ownership picture. But let us return for a moment to that 60% commercial acreage ownership category—the one which involves some 300 million acres of so-called non-industrial lands. It is a category which is mind-boggling in its implications, not only because some 4½ million Americans own this land—but because this land has great commercial potential.

To distill that arresting figure a bit more, I shall point a finger right at my home state of Minnesota, where 7 million acres of potentially productive forest lands are owned by no less than 150,000 citizens!

The implications of wise forest management practices applied to these lands would make any respectable forester salivate. But I have a ready response for the grandstand managers who chide the seeming vacuum in expertise for these acreages.

BEFORE YOU CAN PRACTICE FORESTRY, YOU NEED THE FUNDS FOR FOREST PRACTICES

I do not say this by way of apology. Nor do I consider the remark out of context when it is related to my preface. I consider it just one example of the need to reorder this nation's system of priorities. I find it fascinating to engage in conjecture over the enormous amount of energy required to produce steel and aluminum for construction purposes—as opposed to the relatively insignificant amount of energy required to produce wood products for identical purposes.

Again, if you will indulge me, I shall turn to my home State where forestry represents Minnesota's third largest industry. The economic implication of a viable forest industry to Minnesota is obvious—more so than in our neighboring states where large basic industries generate dollar returns.

Thus, in relative terms, the fact that we do have sizeable acreages of non-productive Junk Forests in the private lands category is particularly frustrating. If we must provide this nation with twice as much wood by the year 2000 as we are now producing—and three separate national studies tell us so—we must find a means to make these small holdings produce up to their capacity. And that applies to Michigan, Maine, Minnesota—wherever those 4.5 million owners averaging 70 acres each are located.

In Minnesota, to help solve the dilemma, we are utilizing the federal Agricultural Stabilization and Conservation Service cooperative program. The federal government provides incentive payments for the landowner, our state foresters provide technical service. This program pays for a part of the cost of tree planting, site preparation, timber stand improvement—as well as offering free technical advice. Expense to the owner: 25% of the total cost involved. It is no cure-all, but it is a beginning.

I cite Minnesota's approaches, and problems, because in microcosm they are symbolic of Forestry's challenges in many states. I find incredulous—let alone depressing—the fact that Minnesota last year alone put to the plow over 800,000 acres in our agricultural region—acres which were formerly grass and forest lands. We are experiencing, according to our own observations and those of the Soil Conservation Service, enormous erosion problems and soil loss. The pattern is repeated in state after state throughout the Midwest. Wood lots, windbreaks, protective grass lands are being destroyed.

It would seem that we have learned nothing from the chapters of the 1930's; that the Lesson of the Dust Bowl has been lost—that we are determined to repeat the same tragic mistakes at the expense of our land because of our blind refusal to recognize the wisdom of conservation practices.

What matters if we feed the world, if in the process we lose our land, let alone our conservation souls?

On the national front, Minnesota included, forest practices have been on the defensive—from land use practices, to land use designation; from clear cutting to cutting *period*. Witness the letters I have received from little and large children alike, admonishing me for permitting the cutting of Christmas trees!

Some of the vocal ones are irrational. But some of our environmental voices have forced us to look at ourselves, to re-examine our policies and practices with end results which have been beneficial to all.

In Minnesota we are fortunate to have 3 million acres of state forests, and an additional 16 million acres of public and private forests.

In providing recreational outlets and wildlife habitat, our forests have complimented our tourist industries. In providing watershed protection, our forests have made enormous contributions to our liquid assets—the quality and purity of our lakes and streams, and to net returns from these waters.

Our commercial forest acreage, again, reflects a national pattern. We dropped from 14,378,600 acres in 1960, to 13,547,900 commercial

acres in 1972—a loss of 831,000 acres to other uses. Of the acres lost, 292,000 went from forest production into single-purpose recreational use.

Last year, Minnesota harvested 1.5 million cords of pulpwood; 180 million board feet of sawtimber; 300,000 plus cords of miscellaneous fuelwood poles. The value of this Minnesota timber after primary processing is over one-half billion dollars—a most formidable contribution to our economy.

We share a common concern with sister states regarding the Federal Water Quality Act of 1971, and the implications of this regulation where forest management activities are concerned. To date, Minnesota does not have a Forest Practices Act. But we have created a Timber Law Committee representing industry, counties, state, university and professional interests. We have developed a model for a Forest Practices Act, based primarily on Oregon law. We do not believe in reinventing the wheel, when another state's example makes good sense.

But still, as Viking Coach Bud Grant would say after losing a close one, "we've got to return to the basics on the practice field." In state after state, where our state and non-industrial lands are concerned, we encounter areas of benign neglect of fundamentals.

Here, as I hear them and as I view them, are the basic challenges we must meet if we are to put our forestry house in order—and whatever your interest area, may I suggest that if the wooden shoe fits, wear it.

Inventory Urgency.—No respectable business can function without this elementary must: an inventory of what it has—and where. Yet, at this moment in Bicentennial time, we blushingly confess that we do not have that inventory. Yes, the federal government has the responsibility to get a forest inventory in all states, in all categories. But the federal government does not have the funding necessary to bring this inventory down to county level—within a time framework which will not leave great credibility gaps. This inventory should also identify private lands and, yes, marginal farm lands suitable for forestry—let alone those 4½ million owners of 70 acre average parcels in the non-industrial category. This Top Priority prerequisite requires the active support for everyone—from the private sector to the public, in acquiring the funding to get the job done.

Intensive Management.—We need to view our forest crop—the species we plant—as we look at a portfolio of personal stock. We buy some stocks as good short term investments; others as long term. And we sell off our marginal stocks and concentrate on the proven Blue Chips. So it must be in our forest practices.

Competitive Efficiency.—We must accelerate our efforts to make our products competitive; intensify our efforts to advance our recycling technology—including the difficult challenge of separating household refuse. We must continue our programs to utilize fiber from all areas in the most economic and efficient way. And this charge applies to the operation of mills and plants.

Communications and Education.—In a cooperative way, involving the public and private sector, we must intensify our communications and education efforts—for how else do we reach 4½ million owners of small land parcels which could, in great part, be converted from junk forests to productive, profitable lands. We must identify, and

reach these citizens. And we must strive to promote government policies—especially in the area of tax incentives—which will stimulate industry and private owners alike to invest in the multiple values inherent in the living forest.

Research.—Here again, we must pool our resources to promote basic research which will provide more products—and more alternatives than our crippling alliance to that single-energy source. A ton of municipal waste, which contains a high percentage of paper, has about half the BTU value of a ton of coal. This can and will become a more significant energy source. In 1940, we did not dream of an aircraft without a propeller. We did not dream of an American actually setting foot on the moon. Nor did we dream in those days of chippers; of machines which would produce papermaking fiber from branches, stumps, roots, tops and even leaves of trees. We did not conceive of super-trees with high yield characteristics. We must redouble our efforts to unlock the secrets of the forest—and the promise it holds.

Free Market.—All of us are aware of events and circumstances which present grave threats to our free society—unemployment, energy problems, huge deficits, the financial plight of major cities, soaring interest rates, intense competition for capital.

We must and we can make our free markets function as they should. The laws of supply and demand must be allowed to operate in a manner which permits wholesome, unencumbered competition—and pricing of products at levels which promote expansion. Only in this way can the forest industries avail themselves of the technological advances in plants and equipment which are the backbone of a free economy.

Above all, we do not want it to be said that we turned deaf ears to the words of our conservation greats. Their principles, their major message is, if anything, clearer today than it was yesterday:

“IF OUR ENVIRONMENT IS POOR, WE SHALL BE POOR!”

We have the history, the rich traditions, the demonstrated capacity of our forest industries to make this land prosper—to make most significant contributions to our future. This Bicentennial period is a most appropriate time to renew our dedication to making this a have—not a have not nation!

I thank you for the privilege of sharing these thoughts with you. . . .

RESOURCES FOR 300 MILLION

[By Charles J. Hitch, President, Resources for the Future, Inc.]

Dr. Turner, Senator Hatfield, Chief McGuire, Commissioner Herbst, Mr. Nonnemacher, and delegates to this centennial congress: you have my warmest congratulations on this most important of institutional birthdays, and my deep appreciation for all that you and your predecessors have accomplished over these one hundred years. What today is a full-fledged movement had its beginnings in John Aston Warder and the American Forestry Association. In an almost literal sense you have invented conservation and been its stewards for a century, and all of us are in your debt.

So I should be honored in any event to be here with you on this special occasion, but as it happens I am particularly pleased to do so, for there are strong and warm ties between the American Forestry Association and Resources for the Future. Our former President, Joseph Fisher, is a member of your Board of Directors, and our Vice President, Marion Clawson, has given you writings, help, advice, and a good deal of warm affection. I may be new to RFF and an unknown quantity to you of AFA, but I am part of a substantial tradition of friendly cooperation between our organizations and I am delighted to be here.

The old Washington hands among you will be familiar with the big clock that used to hang in the main lobby of the Commerce Department. Unlike most clocks, this one did not have chronology as its major purpose, but rather a simplified demography: as the minutes and hours ticked away, the clock totaled the additions and subtractions of births and deaths, immigration and emigration, and indicate at a glance the current total population of the United States.

Well, the clock exhibit isn't there anymore: like so much else in this constructing, renovating, subway-building capital, it has been packed off for repair and refurbishing so it will be in good shape for the Bicentennial. Population growth continues anyway, however. According to that master clock-watcher, the Bureau of the Census, one new baby is born every ten seconds in this country. When all the factors are totaled, there is one more American every 21 seconds: one more mouth to feed, to clothe, to heat, cool, and fuel. Over 4,000 more people every day, nearly 30,000 every week. When the population clock goes back on the Commerce Department wall, it will point to about 215 million of us. By any reckoning, that is a big number.

Numbers, however, are relative, and the surprising significance of the population number is its relative smallness. The total is not nearly so large as it might have been, and projections based on it and its con-

tributory rates are much more conservative than would have been supposed only brief years ago.

When I was appointed President of the University of California in the fall of 1967, one of our biggest concerns—perhaps the major set of problems—was the demand of mushrooming growth. Each fall saw an avalanche of freshmen: we had doubled in size in a decade and there was no end in sight. Like Alice in Wonderland, we had to run—and swiftly—just to stay in the same place.

Of course, there was an end, and it came sooner and more suddenly than anyone thought possible. The 1970 census figures told the story, and by now its features are commonplace: sharply lower birth rates, a marked decline in future growth projections, a reverse image of the bursting-at-the-seams campus, Colleges and universities across the country long since have stopped bolting the doors against the expected flood. Recruiting has become a refound art.

My assignment today is to assay our chances of providing resources for 300 million. What are the time frames involved? Well, if the total fertility rate of the 1960's had continued—an average 2.5 children per woman for the decade—we would be a nation of 300 million just about at the turn of the century. That figure would leap to 350 million at the year 2020 and, since a rate of 2.5 would guarantee growth indefinitely, exponentially higher figures as the population base increased. I want to emphasize that this kind of numbers game is meaningless, for far too many factors are involved to permit a mechanical extrapolation, but the 2.5 rate applied to today's base would result in a U.S. population of 2 billion by the year 2200. I can assure you that that figure would result in a resource squeeze of gargantuan proportions.

All that is fantasy, however, not only because of likely future changes which would alter such a self-defeating trend, but also in light of present data. In fact, the 2.5 fertility rate no longer prevails, as my academic colleagues and I found out when we examined the 1970 census results. Indeed, the rate, dropping steadily throughout the sixties, approached the 2.1 replacement level and actually passed it on the down side. In 1972 and 1973, the rate was such that—if it continued—zero population growth was a prospective reality for the mid-21st century, not simply an ultimate goal. For this country—and I emphasize that—for this country, the population bomb had been defused and a new, curiously contradictory concept was being talked about—negative growth.

There is some feeling that we already may have bottomed out in the case of declining fertility rates. The most recent indication¹—though admittedly tentative for the country as a whole—is that the rate is nudging upward again. I do not expect that it will go too high, however. Indeed, I think that we in the developed countries may have passed a very significant turning point in human history, a point of permanent deflection of population growth rates. Of course, something in the future—perhaps a source of unlimited energy, or another revolutionary change in family attitudes—might turn things around again, but for as far as I can see, growth rates for the United States are going to be constrained by a powerful combination of socioeconomic factors, most particularly including a changed view of women

¹ Sklar, June, and Beth Berkov, "The American Birth Rate: Evidence of a Coming Rise." *Science*, Aug. 29, 1975, pp. 693ff.

and their role in the home and in the work force, and an awareness of the pivotal part played by population size in the consumption of resources. The picture in the rest of the world is much different—tragically different for some underdeveloped and overpopulated areas—but in the United States, we probably can look forward to slower population growth, tapering off in the middle of the next century to a stability affected more by immigration rates than birth rates.

So I am willing to crawl at least part way out on a limb and say that, give or take a fluctuation now and then, this country has shifted from an average of three children per family to two, and that this shift translates to a total population of 300 million somewhere around the year 2020. Forty-five years, an additional 85 million people, growth by 40 percent in population, and an economy probably over three times larger² than today's: can we handle this? Will we in fact have the resources for 300 million?

Most of us at Resources for the Future believe the answer is yes, that the resources can be made available, in the year 2020 and probably indefinitely. We realize that there is more news value in predicting the depletion of phosphorus in X years, or the exhaustion of continental coal reserves within a lifetime, or a fight for sleeping space by a wall-to-wall population, but we have resigned ourselves to the lack of headlines. Certainly there will be difficult resources problems—the short- and middle-range situation is especially intractable—but our research does not lead us to predictions of gloom and disaster. The resources are there, and they can be made available if we are willing to pay their true social cost.

Resources for the Future traces its intellectual heritage to the President's Materials Policy Commission of the early 1950's, established to evaluate the availability of natural resources for national needs. Its chairman was William S. Paley, chairman of the board of CBS and later to be chairman of the board of Resources for the Future. The Paley Commission demonstrated that absolute depletion is highly unlikely, and that in any case the elasticity of supply guarantees no sudden exhaustion, as long as additional costs are paid. We live in a finite world and many things will be necessary if we are to take a different approach or to come to different conclusions. We live in a finite world and many things will be necessary if we are to husband its resources—research and development at home and abroad, materials substitution, stockpiling, recycling, and changes in consumption habits among them—but as our name implies, we believe there will indeed be resources for the future, for the year 2020 and beyond.

Let's look at two major areas.

Food

Perhaps the most basic question to be asked about the future is, can we feed ourselves if there are 85 million more of us? When you consider how much food we currently are exporting, the answer is obvious. But there is no need to cut off exports. On the contrary, they probably can be increased, while the use of fertilizers and pesticides can be decreased, if genetic improvement can be continued and sufficient new land is brought into production. This will be expensive, for it will

² Ridker, Ronald G., editor, Volume III of Commission Research Reports, "Population, Resources, and the Environment," p. 21. Commission on Population Growth and the American Future, Washington, D.C.: Government Printing Office, 1972.

be poorer quality land, but it can be done without prohibitive price hikes. There are many uncertainties and trade-offs involved: for example, future populations can be higher or lower, restrictions on the use of fertilizers and pesticides can be strengthened or relaxed, and land under cultivation may be contracted or expanded. There may be research breakthroughs, such as in the biological fixation of nitrogen. Future agricultural scenarios are almost limitless, but one fact is clear: the United States can feed 300 million Americans at current levels of consumption and still be a major agricultural exporter.

But what if our population growth is much greater than we expect, or what if we decide to shoulder a heavier portion of the world food burden? Then agricultural research and development will have to produce a second-generation green revolution, this time in the developed countries as well. Perhaps the few commercial experiments with hydroponic farming can be expanded by some orders of magnitude. Or consider the possibility of a completely self-contained photosynthetic "factory."³ But if at some time we should have manipulated every factor of supply and still fall short, there are demand inputs to the equation which have a significant potential yield.

I refer to the heavy—some would say inordinately heavy—consumption of animal protein in this country. Especially in the case of feedlot beef, this involves a significant foodstuffs loss as several pounds of grain—vegetable protein—are converted to a single pound of animal protein. The recognition of this protein gap has given rise to some increased meatlessness, especially among young people, and vegetarian and quasi-vegetarian diets are finding their way into the popular media. As far as I know, this movement—if it can be called that—has not perceptibly affected national averages, but it may be a harbinger of trends in the future.

If so, it can come none too soon for many critics of U.S. levels of consumption. The following passages are from a report produced under the auspices of the Club of Rome.⁴

The reduction of population growth and changes in the consumption pattern are the two most powerful instruments for bringing about an appropriate balance between food production and food requirements in the long run. For countries of South Asia, for example, the slowing down of population growth is more important whereas for the affluent countries, changes in the consumption pattern are much more relevant.

Many nutritionists are of the opinion that in developed countries per capita consumption of meat very often exceeds the amount needed for a healthy diet. Excessive consumption absorbs part of the grains required by the poor for a minimum diet. For these reasons, taxes on meat consumption or on grains fed to cattle might benefit all concerned.

I would not give the meat and population questions anywhere near equal weight. The primary problem is the present inability of many poor countries to feed themselves, and agricultural demand obviously is much more closely linked to population levels in those countries than to consumption patterns here. Still, the United States is not an island—politically, culturally, or in any other way—and it is instructive to us to know that this criticism exists and that there is some basis for it. We may never have to reduce drastically our consumption

³ See p. 182, *To Live on Earth*, by Sterling Brubaker, for a fascinating glimpse of such a "factory." The Johns Hopkins University Press for Resources for the Future, Inc., Baltimore, 1972.

⁴ Reviewing the International Order: Interim Report. Project RIO, Rotterdam, 1975. Annex 4, pp. 1 and 2.

of meat—in any case that contingency would seem to be some decades ahead—but it is quite true that more protein could be produced on fewer acres. To that extent, there is both figurative and literal fat in our agricultural system.

Energy

If only because they are so much in the news, most of us would put the problems of energy number two on the worry list for the future. If we have imminent shortages now, if not an actual crisis, what are we going to do 45 years hence with a 40 percent greater population? Let me try to put the situation into perspective.

Despite the historical hoopla surrounding the Bicentennial, we are a young nation perhaps most noteworthy for our cultural diversity. Yet some distinctively American proverbs have developed: "You don't get something for nothing"; "You only really enjoy something if you have worked hard to get it"; "There is no such thing as a free lunch!" All these homespun aphorisms to the contrary, however, we have acted for three-quarters of a century or more exactly as if fossil fuels were free, a gift horse whose teeth nobody ever bothered to inspect. The stuff was taken out of the ground as if it were inexhaustible, as if there were no tomorrow, and its costs were hidden, distorted, and cheapened. We were not paying the full bill of fare. Now all at once our lavish growth, coupled with a drop in domestic oil and gas production and assisted by a push from the OPEC countries, have brought us fully aware that we are living beyond our energy means; we know now that there are limits, and they seem too close for comfort. Not for several decades, if then, will there be any free lunch where energy is concerned.

But to say that energy will cost more is not the same thing as saying that we are in imminent danger of running out. Its sources may change and it will cost more—because production costs are higher, because associated environmental costs are beginning to be paid, because of international political and trade consideration—but it won't disappear, at least not soon and certainly not suddenly. Even without technological breakthroughs, world fossil fuel reserves (including potential as well as proved) appear adequate for at least the next half century. This reckoning appears to be true even leaving out oil reserves in shale and tar sands, and uranium and thorium. Beyond these possibilities, if man learns to harness nuclear fusion—a reasonable possibility within the next 50 to 100 years—the limits of worldwide industrial expansion will be set by factors other than availability of energy.⁵

So there is no last great brown-out just around the corner, as long as the true costs of extracting energy are recognized and paid. Yet there are substantial short- and middle-range energy problems, as we all are aware, involving the sort of thing a democratic society finds most difficult to resolve: how to allocate supplies during shortages, how to assure that all segments of the population pay and benefit equally, how to protect the environment while increasing production while not interfering unduly with personal and corporate freedom. The energy situation is all thorns—no matter where and how you try to pick it up you will feel some pain—but it is not so much a problem of physical resources as it is of people in society. It is a social problem, an institu-

⁵ Ridker, *op. cit.*, p. 24.

tional problem, a legal, political, and economic problem, and it will require our best efforts if we are to make it through to the time when solar and fusion power may make the whole thing an unhappy memory.

Or perhaps we'll remember this period as the good old days, for higher prices and both real and perceived shortages will have some good effects as well as poor. I expect, for instance, that we will become much wiser custodians of our energy resources, more efficient and cleaner in their use and more conserving of their supply. Researchers and technologists will turn to the field with rekindled interest and vigor—and funding—and new inventions are a definite possibility. And necessity may well mother some social inventions as well: people tend not to act until a crisis is upon them, but once it is—and I think energy does have crisis implications to many—then social logjams are broken and new roads can be taken. I do expect that the energy situation will produce some constructive political approaches, in this country and internationally.

I don't mean to sound like a Pollyanna. I think there are good and hopeful signs for the longer-range future, but the immediate picture offers little to cheer about and I certainly do not mean to imply otherwise. We are in a period of transition and there won't be anything easy about it. Yet we are not without tools to affect the immediate future. In a new book⁶ released only last week, Joel Darmstadter of RFF points out that growth rates of energy consumption can be reduced significantly without major changes in lifestyles or standards of living. In a carefully-drawn estimate of the effects of conservation in the New York Region, he concludes that such measures as better building insulation—especially in older buildings—and a shift to smaller cars can reduce the level of energy consumption by 10–12 percent under what would be expected without conservation. At best this would shift the 1985 level to 1990 or so—postponing the problem, not solving it—but it does provide a kind of breathing space, an easing of pressure which will permit more research and development.

The industrial process offers another fruitful target for conservation efforts. Glenn Seaborg, my colleague from the University of California, has noted that "Recycled steel requires 75 percent less energy than steel made from iron ore; 70 percent less energy is used in recycling paper than in using virgin pulp; 12 times as much energy is needed to produce primary aluminum as to recover aluminum scrap."⁷ If only because we have been so profligate in the past, conservation, including recycling, offers substantial short-term results. There is slack in the system—I don't think anyone really knows the full extent of it—and it can and will be taken up.

Still another possibility is materials substitution, the use of a renewable resource, or a more efficient one or a more durable one, in place of one which is finite or wasteful of energy. In this, as you are well aware, forest resources will have an enhanced role, for wood is renewable, biodegradable, and energy-efficient in production, all qualities which will become ever more important. This shift will

⁶ Darmstadter, Joel, *Conserving Energy: Prospects and Opportunities in the New York Region*. The Johns Hopkins University Press for Resources for the Future, Inc., Baltimore, 1975.

⁷ Seaborg, Glenn T., "The Prospective Change in Life Style Signaled by the Energy Crunch." *Public Administration Review*, July/August 1975, p. 334.

have its share of controversy, as you can imagine, but I think it can be managed with due regard for all the interests involved.

There is only so much that can be addressed in a talk like this. I have not, for example, chosen to explore the portentous issues presented by nuclear fission power, despite the fact that the electric utility industry clearly intends to rely increasingly on this source,⁸ and despite the serious misgivings of many knowledgeable people about it. For example, Allen Kneese, formerly director of RFF's Quality of the Environment program, has written of the deeply ethical nature of the decision on nuclear fission power.

If so unforgiving a technology as large-scale nuclear fission energy production is adopted, it will impose a burden of continuous monitoring and sophisticated management of a dangerous material, essentially forever. The penalty of not bearing this burden may be unparalleled disaster. This irreversible burden would be imposed even if nuclear fission were to be used only for a few decades, a mere instant in the pertinent time scales.

One speaks of two hundred thousand years. Only a little more than one-hundredth of that time span has passed since the Parthenon was built. We know of no government whose life was more than an instant by comparison with the half-life of plutonium.⁹

Have we really thought through all the alternatives? Do the known benefits outweigh the unfathomable costs? Can we presume to mortgage indefinitely the future of the planet? And if we decide the risks are too great, can we prevail on others to come to the same conclusion? The French? The Soviets? The Indians? The dimensions of the problems are enormous, and I can no more than hint at them today. Their solution, if any, awaits much concentrated research and the most probing and inclusive public and scientific debate.

I also intend to detour around other potential energy sources, such as solar and geothermal—which may have only marginal relevance to whether we can provide for a population of 300 million—and, for reasons of time, such natural resources as water, air, the nonfuel minerals, and the oceans. About these I want to say only that none of our studies indicates that doomsday is near: the resources are there, for more than 300 million Americans and for the probable additional billions of the world population. Despite the hue and cry, there really is not much of an argument about this. Even the relatively dour prophets of the Club of Rome state in its latest report that “neither food, nor energy, nor mineral resources appear from a technological viewpoint to be seriously critical for the next 25 years.”¹⁰ The Club points out, however, that from a socio-political viewpoint, many areas already are critical, and I cannot but agree. The worldwide production of food is sufficient, for example, but its production in some regions and its distribution are anything but. Famines do occur, and they may become more frequent and severe as world population pressures mount. Again the issues are not so much resources problems as human problems.

This is ironic, for with the important exception of nuclear energy, most of the problems of natural resources differ only in degree from

⁸ See, for example, p. 11 and throughout of the executive summary of “Economic Growth in the Future,” Edison Electric Institute, New York, 1975.

⁹ Kneese, Allen V., “The Faustian Bargain.” *Resources*, September 1973, Resources for the Future, Inc., Washington, D.C.

¹⁰ Draft of the Third Report to the Club of Rome. Quoted by John A. Harris, IV, and Berrien Moore, III, in “Feasibility Study: Establishment of a U.S.A. Chapter of the Club of Rome,” August 1975, p. 5.

those people have confronted since the human race gathered round the campfires of prehistory: how is wealth—however construed—to be generated and divided? How is society—any society—to be organized so that its members are sustained and nourished? When a decision is made—political, social, economic—who gains and who loses? In some ways, the knowledge that absolute depletion of resources is a manageable threat is comforting, for we cannot reverse the irreversible and the lack of one or more vital resources might indeed herald disaster. On the other hand, if people have been unable for thousands of years to work out a more nearly ideal arrangement for living together, what bleak promise can there be in the recognition that most of our problems are social?

The answer is that conditions have changed: to past generations, energy was cheap, forests were limitless, water inexhaustible, the air and the oceans infinite reservoirs. I am an economist and not an anthropologist, but to me, the explanation for human pre-eminence on this planet—the case for speech and the opposable thumb notwithstanding—is our flexibility, our adaptability to vastly different climates, diets, and conditions of life. The fact of limits to the misuse of resources was perhaps slow to sink in, but sink in it has, and we have passed a historical milestone. Perceived conditions have changed, and we have changed in response.

Do you hear people say anymore that bigger is better? In Detroit building bigger and less efficient cars, or are we being blitzed by the media with EPA mileage figures, with mini-Fords and Chevrolets, even mini-Cadillacs? Do communities continue to measure progress in terms of population growth, or do we see instead signs from Fairfax, Virginia, to Petaluma, California, that enough is enough, or perhaps to much? I think growth for growth's sake is a dead idea, and I cannot foresee any circumstances in the future which will revive it.

We do have to concern ourselves with natural resources—some are finite, others can be irreparably damaged, and most will become increasingly expensive—but I am convinced we will have enough if we are wise stewards. But even if we were to be assured all the resources we need in perpetuity, we still would be left with human nature as a pivotal factor. Who we are, to what degree we can fashion true community, how we can more harmoniously live in this closed system called earth: these are the important and enduring questions, and knowledge and trained intelligence are the tools for their solution. Fortunately, there are no limits to the growth of knowledge, to the development of this distinctly human source of capital, and in its infinite expansion we invest all our hopes and dreams for the future.

FORESTS AND WILDLIFE—INSEPARABLE NATURAL ASSETS

[By Lynn A. Greenwalt, Director, U.S. Fish and Wildlife Service, Department of the Interior]

I am grateful for the opportunity to be here today. It is a high honor and distinct privilege to participate in this landmark conference, which is addressing itself at the highest levels not just to forest management but to wildlife and other related natural resources as well.

John Gottschalk, a former director of the Service, once noted that we biologists like to think that we are really brothers under the skin with foresters. Aldo Leopold, our adopted patron saint, was first of all a forester. Looking back through the roster of other men who have made their mark in wildlife conservation, it is quite evident that foresters and wildlife managers can be interchangeable.

Having thus established a certain ecumenical rapport, let me talk for a few moments about fish and wildlife and their absolute interdependence on forests and other natural resources. I beg your indulgence for flavoring this discussion with some of my own deeply felt personal philosophies.

When the English poet John Donne penned the following words several centuries ago he was not talking about conservation nor the interdependence of natural resources. He did, however, eloquently express the existence of a cosmic oneness which all living things share, and we would do well to keep his thoughts in mind.

In Donne's words: "No man is an island, entire of itself; every man is a piece of the continent, a part of the main; if a clod be washed away by the sea, Europe is the less, as well as if a promontory were, as well as if a manor of thy friends or of thine own were; any man's death diminishes me, because I am involved in mankind; and therefore never send to know for whom the bell tolls; it tolls for thee."

Paraphrased into simplicity, we may read into the poet's prose the inescapable fact that all of us in the conservation movement, as in life, are in it together—foresters, biologists, bird watchers, nature lovers, hunters, defenders of animals, and, yes, even that ubiquitous group Dick Pardo, AFA's Programs Director, has referred to as "little old ladies in combat boots." May the Lord bless them! For they have done much good.

From this point I want to move to more specific ramifications of forest-fish and wildlife relationships.

Forest management, whatever its objective—saw log cutting, pulp log harvest, reforestation, fire control—has a potential for profound impact on fish and wildlife habitat and is, therefore, rich in potential for benefit to fish and wildlife. Most forestry programs carried out in

the world today are designed to yield a multiplicity of benefits to the landowner. The enlightened forecasts now at work in the woods recognize the great opportunity they have to benefit from more than just the accumulation of forest products.

The opportunity to reap more than one benefit from forest management is one that is virtually limitless. It's easy to manage forests—or any land, for that matter—to maximize the output of timber, or grazing, or recreation, or fish and wildlife, or for any other single purpose. It's not so easy to manage lands to provide a mixture, an array, of benefits. Once the manager steps into the arena of multiple benefits production he becomes embroiled in the problem of how much of what should be produced and to what degree is one benefit to be given up so that another can be gained. This is a difficult problem at best, but particularly when public lands are involved—subject as they are to the often countervailing pressures of the hosts of interests represented by the public at large.

Fortunately for the United States, forestry in this Nation is almost universally based upon the idea that multiple values are to be derived from forest lands, public and private. The Nation is equally fortunate that among these values are fish and wildlife. There is a growing increase in the level of recognition given fish and wildlife and this should be comforting for all of us, because the opportunities for enhancing fish and wildlife on forest lands are great indeed. While this recognition has been late in coming it is increasing at an encouraging pace.

As Forest Service Chief John McGuire said in a recent speech: "Historically, wildlife was one of the last resources in this country to be placed under management. Even after the Nation had begun to manage agricultural crops and trees, we still believed that Mother Nature could take care of the animals. We didn't realize the extent to which man's presence changes both the variety and habitat of wildlife in our forest and rangelands. Even now, we are gaining new knowledge about certain species."

These opportunities can be exploited in a variety of ways, often without significant interference with other forest management objectives. The trick is to determine ahead of time what it is the forest should yield in terms of a variety of benefits and then set out to manage these lands accordingly. This means careful planning, of course, and a recognition that many benefits just don't accrue automatically as a result of doing the usual, traditional kinds of forest management. One must be prepared to work at securing the combination of benefits desired and this means accepting the idea that management modifications are in order.

The U.S. Fish and Wildlife Service manages approximately 32 million acres of refuge lands. Of this about 5.5 million acres are in timber and brushland on 65 National Wildlife Refuges where such terrain is managed primarily for the benefit of wildlife. While we may be a mini-landlord compared with some Federal agencies, we do harvest timber and in relatively impressive amounts—\$820,000 worth in 1974. Our timber management programs, particularly in the southeastern States, are fine examples of how timber can be managed to benefit wildlife. Our operations are studied by foresters from all over the world, and we're proud to put these programs on display.

We in the Fish and Wildlife Service do not say that all timber management should be patterned after ours; we say only that we can show the way to manage timber to benefit wildlife and suggest that when the forest manager wants to do that we have a model that can be helpful to him in gaining that objective. We are especially proud of our timber management programs on the Noxubee National Wildlife Refuge in Mississippi and the Piedmont Refuge in Georgia.

The kinds of things we do sometimes startle the tradition-bound forester—not to mention the environmental purist. For example, we show that wildlife often benefit to a remarkable degree from practices that are often thought to be inimical to sound forest management. Among other forest management practices, we sometimes utilize clear-cutting, for example. Not on a grand scale, perhaps, but we have found that opening up the forest can be particularly beneficial to some wildlife species. We often flood our forest lands: those of you who have seen waterfowl in the flooded hardwoods of Arkansas know that mallards and trees make an exciting combination. On the Kenai National Moose Range in Alaska the moose—and other wildlife—have been the beneficiaries of that nightmare of foresters: fire. Fire-induced disclimax vegetation has increased the moose population on that area substantially. Dead snags, often an affront to the sensibilities of the forest manager, are important to eagles, falcons, woodpeckers, and wood ducks, some species of which are threatened or endangered. Wind-downed timber is valuable cover for forest birds and small mammals.

Incidentally, I would be remiss if I did not salute the U.S. Forest Service's splendid cooperation in modifying some of its management plans to help assure the survival of certain endangered species. The Kirtland's warbler in Minnesota, the condor in California, and the eagle nests in Alaska and elsewhere are just a few examples.

I've pointed to these actions only to indicate that sometimes the management of forest lands to benefit wildlife means that the manager must be willing to break with tradition in order to achieve the kinds of benefits he is after. This means the consideration of alternatives—"trade-offs" in the lexicon of the bureaucrat. This is not easy, because when alternatives are available the manager is subject to the pressures of various groups who'd like him to do things their way. The striking of a proper balance in these circumstances is perhaps more of an art than a science, but it is something that more of us must become comfortable with as time goes on.

Suffice to say that the opportunity is there; it remains for all of us who have a responsibility for forest lands to determine where, to what degree, and how those opportunities are to be exploited.

Fish and wildlife—and their habitats—are a valuable commodity. They are valuable economically: one need only to contemplate the millions upon millions of dollars spent on fish and wildlife related activities of all kinds to be convinced that the economics of wildlife is a substantial part of this Nation's economic aggregate. They are valuable esthetically: imagine what the world would be like without wildlife species with which we are most familiar—ducks and geese, deer, bears, rabbits, butterflies, the whole spectrum of living things that make life interesting and appealing.

Fish and wildlife and the places they live are absolutely essential to man's well-being: whole segments of the world's population live largely on products of the sea; the estuaries of the world—those areas where rivers meet the ocean—are vital to the creatures that live in the sea, since most spend at least a part of their lives in these intertidal nurseries; the estuaries are dependent upon the quality of the water entering them from the rivers and streams and oceans; man has a profound impact on the quality of these waters. Without a properly functioning machine, as represented by the interrelationships between oceans, the estuaries, the rivers, and the lands that affect the rivers, man and all of his fellow creatures are collectively in jeopardy.

In a very real sense, then we cannot afford to be without wild creatures and their habitats. It is not unrealistic to say that man's very survival may depend on his ability to maintain an environment that will support his fellow creatures—large and small. Failures to do so could spell the end of more than one species, including that large, warm-blooded, car-driving, energy-consuming omnivore called *Homo sapiens*.

E. B. White, journalist and famous essayist and humorist for *New Yorker* magazine, gives us pause for thought with these words: "I am pessimistic about the human race because it is too ingenious for its own good. Our approach to nature is to beat it into submission. We would stand a better chance of survival if we accommodated ourselves to this planet and viewed it appreciatively instead of skeptically and dictatorially."

Nature is important. Fish and wildlife *are* important. These truths are, I think, widely recognized. What is not so generally understood is what it is that fish and wildlife need in order to survive, especially in today's world, where man can and does have so many major influences.

The critical need of fish and wildlife today, the ingredient that is vital and at the same time more vulnerable than ever before, is habitat—the places wild creatures live. Unless habitat of the proper kind, of a proper quality, and in sufficient quantity is available, fish and wildlife simply cannot survive. As I'm sure you all know, habitat is not just the nearly primitive and often remote forest, or the desert, or the mountain tops with which wildlife are so often associated in the minds of the general public. Habitat includes coastal wetlands, the ocean shelf, the grasslands and potholes, field borders, woodlands, and backyards that offer places for wildlife to live and reproduce. These kinds of habitats are disappearing at an alarming rate. Highways, parking lots, homesites on drained and filled marshes, industrial sites, mines, and urban sprawl are leaving precious little habitat for anything—except man. Eroded fields, polluted streams, lakes infused with poisonous chemicals or unnatural nutrients contribute only to the decline of wildlife and fish populations.

Clearly, the processes by which habitat is destroyed are accelerating in their effect. The factor common to all of this, of course, is man and his activity. Our desire to improve our collective lifestyle, to secure more of the things we have come to need, to power our society, to achieve the self-elevation and self-discovery all of us cherish, has been achieved at a monumental cost. And a significant part of that cost is in more than dollars. It has been, it is, and probably will be, at

a cost borne by fish and wildlife through loss of habitat. And this precious commodity, once gone, is gone forever. It's clear, too, that if we are to achieve these things associated with "progress" (whatever that is) we must continue to impose this burden in some way. Something has to give, simply because we cannot have all of everything.

Man began to make his choices in this matter some time ago. When non-native man came to North America, he began to intervene in the natural process occurring on the land—and of which the native peoples were a functional part—in ways that were at first subtle but which later grew to far more dramatic and far-reaching dimensions. Early Spanish visitors brought horses to North America—an event which changed a number of things, including the role native man played in the scheme of things. The pony ownership syndrome among certain western Indian tribes is a case in point. Early settlers also left their mark: they settled and cleared the land and began farming. Others moved across the country, living off the land and its wild inhabitants, and were themselves displaced by later arrivals, who cleared, farmed, fished, built towns, and did all the things that man has always done in his own behalf.

These activities were, at least in the beginning, a mixed blessing. Opening the eastern forests increased deer herds and helped other wildlife. The virtual elimination of bison in the West also is a ribbon of a less brilliant hue on man's banner. Whatever the moral or philosophical merits or demerits of man's efforts over the past four centuries, he has moved into and altered fish and wildlife habitat—and continues to do so at a frightening rate and in ways that eclipse his best efforts in the past.

This gloomy recitation sounds like a prediction that things are bad and will not get better. Not so, really. Please remember that *man*, the thinking, perceptive, rational animal, has done this. It is possible, then, that man can work to overcome and ameliorate his deleterious intervention in the natural processes. In short, things can be changed.

Two things are important to keep in mind. First of all, man, having once intervened in the processes, must continue to be a part of those same processes he has interrupted. It is *not* possible, now, for him merely to step aside and let nature take its course.

We intervene in the processes which govern living natural resources in many ways, all perhaps under the umbrella of the term "management." We manage land, water, forests, crops, soil, fish, and wildlife. Management—and hopefully in the most positive sense—must be continued. There is no alternative to this. This is a responsibility we cannot shirk; indeed, it is one to which we must address more of our skills, time, and money. We cannot, if we have one scintilla of recognition of our moral responsibility—let alone our own self-interest—avoid contributing our best intelligence and energies to this effort.

I trust we can all agree that man—and especially we, as managers and stewards of the resources entrusted to us by the public, or our stockholders—must continue to exert influence over the natural processes into which we long ago thrust ourselves. Given that premise, then I think I can be reassuring on the point that man need not stop his world, forswear progress and personal and societal improvement,

or sacrifice all he has gained in order to accomplish right and proper things for fish and wildlife.

It is possible to mix technology and wildlife; it is possible to improve our collective and individual lifestyles—worldwide—and still have fish and wildlife and their habitats. Again, I must emphasize that we cannot have all things in unlimited abundance. There must be an acceptance of the idea of the inevitability of “trade-offs”—to use that awful term—to accomplish the things we want and must do. We must accept the fact that some sacrifice in the form of added expense, restriction of use, limitation of opportunity, or freedom of action is necessary in order to have the best of all possible worlds we so fervently seek.

I’m convinced that we can have coal extraction and wildlife in wildlands habitat. I believe we can have Alaska oil and gas, and caribou and bear and waterfowl. I think we can enjoy controlled “progress” without sacrificing fish and wildlife. Let’s face it. Fish and wildlife and their habitats depend on us; they are at our mercy. A man pitted against a grizzly bear is likely to mean a period of extreme trauma for the man; a grizzly bear pitted against men and their works is no contest at all.

What is it we must do? There is a lengthy litany of “things to do,” like making sure we don’t drain and fill wetlands unnecessarily, or that we don’t dam and channel, and construct with prodigality. We can assure that the forests contain trees for eagles and bears as well as saw-timber. We can control the kinds and amounts of chemicals and nutrients that flush into the streams and lakes of the country, and we can pay attention to erosion problems, which, unlike those of the “dust bowl” days, tend to be derived from road construction, housing and industrial development. These activities contribute immensely to silting of streams and the clogging of lakes, marshes, and estuaries.

The ameliorative actions I have mentioned are effective, important, and necessary. But they do not really treat any more than the symptom. What we really need, in my view, is the development of a higher level of environmental consciousness, an understanding in each of us of the consequences of our collective actions. Let’s call it a need for an environmental ethic. This ethic must be born of an understanding of what’s at stake for all of us, a comprehension of how natural processes work, and how man and his actions are inextricably entwined in the whole. This is not to say that every citizen should become a competent ecologist; this is neither practical nor desirable. I do suggest that as a Nation we must become informed and energetic participants in our environmental affairs, aware, for example, that our decisions could result in the demise of a whole species of animal or plant life somewhere; or, finally, that we do, in fact, owe our children and their children an opportunity to enjoy the bounties of nature we ourselves have too long taken for granted. Like many ideas, this one is easier to talk about than it is to make happen, but I feel convinced that we must create a pervasive and basic environmental conscience that will lead the Nation, and especially stewards of its resources, down the proper paths. This must be the solid underpinning of our endeavors to harmonize man and nature. Otherwise all the lesser things we try to do will be to no avail.

In closing let me quote again from John Donne. Among his many pithy statements is this one: "I observe the physician with the same diligence as he the disease."

Let's hope that the care ministered to the resources entrusted to us as managers results in a long and healthy life for the environment—both for man and other living things of the earth.

If we can do this then perhaps posterity, in scrutinizing the "diligence" of our efforts after our passing, need not indict us for malpractice in the treatment of their heritage.

MEETING RECREATIONAL, PARK, AND WILDERNESS NEEDS

[By George D. Davis, Director of Planning, Adirondack Park Agency, New York]

Despite the title of this paper, I cannot force myself to spend fifteen or twenty minutes detailing to this distinguished group myraid statistics reflecting the importance of outdoor recreation to the American people. We have all heard those dozens of times. Rather, I will suggest there is a unifying theme that ties the recreational, park and wilderness needs of our people together. I suggest that this theme is a quality environment with particular emphasis on its visual qualities.

The seeker of recreational, park or wilderness experiences is most often an individual or a small group of individuals searching for a setting that is aesthetically more pleasing than, or contrasts pleasantly with, the setting in which they live most of their lives.

I often wonder if we, in natural resource management fields, are able to recognize what it is that the typical office employee, assembly line worker or inner-city dweller so desperately seeks when given an opportunity to visit open space areas. Too often the resource manager takes his natural environment for granted. He just does not fully appreciate it. Then, as he works his way up the echelons of a company or government agency, his decision making is based on what he saw of the land. Frequently what the natural resource manager saw is not what the recreational visitor sees. I am appalled at the number of us who claim to be professional resource managers and understand the inner-relationships of a biological community yet never stop to notice a chestnut-sided warbler. Or who take for granted the incredible experience—in today's polluted world—of stooping over a small stream and scooping out a drink of crystal clear water.

If we are to successfully manage land, whether public or private, we must learn not only biological and physical resource considerations; we must begin to appreciate what land means to others in our society as a scenic backdrop to their recreational experience.

It strikes me that, no matter what our individual role in land management may be, we must recognize land as a resource necessary to all the people of this world; regardless of fee title ownership at any given moment in time.

Land use planning and regulation in rural areas is unquestionably on the upswing. Such land use planning is based more and more on the entire land resource rather than specific, economically attractive, land use options. Less emphasis is being given to merely differentiating types of land uses to provide for neighborhood and business settings as has been the past history of much of our urban and suburban planning. As we make this transition from planning and regulating the

uses of land in predominantly developed areas to planning and regulating land use in sparsely developed areas we must base our decision making on the future land patterns we wish to evolve. The patterns of land use that we develop in rural areas—those natural open areas that remain to us—are going to influence the quality of life for generations to come. A quality setting cannot but enhance both our ability and our desire to tackle other problems that face us as a society.

Anyone with an ounce of sense would probably stop after the preceding generalities. One seldom gets in trouble when speaking in generalities. Nevertheless, I would like to describe how one section of our country took some very significant steps to protect the quality of natural rural environment while still providing for both use and preservation of the resources. Equally important to the use of the resources, steps were also taken to provide for human use and habitation in a quality environment. I hope this case book example will show that both human use and resource conservation of our natural resources do not have to be incompatible.

In northern New York State there is a six million acre landscape designated as the Adirondack Park. This park is composed primarily of rolling and mountainous forest-covered terrain interspersed with thousands of lakes, ponds, and wetlands. Although the area was designated as a Park in 1892, it is not a Park as most Americans understand the term. In many respects it more closely resembles some European Parks because 60% of the Adirondack Park is privately owned. The remaining 40% is owned by the State of New York. One hundred and twenty-three thousand people reside in this Park. Another one hundred thousand are seasonal camp owners in the Park. The transient visitors to the Park number in the millions each year. Still the Adirondack Park has been and continues to be known as a relatively unspoiled landscape. This is not to say that much of the land is not used. A million acres of the private land is owned by several large paper companies and forest management practices on much of this land are intensive. In contrast, the land owned by the State must be forever kept as wild forest with no timber sold, removed or destroyed. The apparent compatibility over the past eighty years of private lands interspersed with public lands never ceases to amaze land managers elsewhere in the country. It is inconceivable to many that strict preservationists and resource utilizing companies share an area in which both find their objectives compatible as neighbors and both defend each others motives and land uses within this Park. It is rather refreshing that such diverse interest groups in the Adirondacks recognize and accept such a variety of legitimate land uses.

Following an intensive State-sponsored study of the Adirondack region, the New York State Legislature, at the urging of then Governor Nelson A. Rockefeller, created the Adirondack Park Agency to plan and regulate the use of both public and private land within the Park. The basic purpose behind the creation of this Agency was to provide a mechanism by which the recreational needs of some 55 million people living within a day's drive of the Park could be met, while protecting the private property rights and enhancing the economic potential of this generally impoverished area. The legislation made it clear, however, that the basic goal of the Agency must be to protect and enhance the natural landscape of the Park. The Adiron-

dack Park has become a laboratory, a testing ground, to see if it is possible to preserve a quality environment and still use it. The size and diversity of the area made it possible to consider a wide range of uses and intensities of use.

The first step in the program was to evaluate the 2.3 million acres of State lands in the Park. There was little question that the people of New York State, living by and large in urban areas, wanted to preserve the "forever wild" State lands rather than adopt conservation programs allowing more utilitarian uses of their land. The Agency felt that in this East Coast setting this was a valid desire and strongly supported the forever wild philosophy on State lands. Thus, the plan for State lands suggested no change in the New York State Constitution provision that reads:

The lands of the state, now owned or hereafter acquired, constituting the forest preserve as now fixed by law, shall be forever kept as wild forest lands. They shall not be leased, sold or exchanged, or be taken by any corporation, public or private, nor shall the timber thereon be sold, removed or destroyed.

However, the Agency recognized that this provision did not necessarily equate with wilderness. The Agency felt that wilderness per se would be a valid use for those lands owned by the State where a psychological wilderness setting either existed or could be easily recreated. The Agency designated fifteen areas, totaling approximately one million acres, as "wilderness" where no motorized equipment, vehicles or aircraft would be used by either the general public or administrative agencies. Another few thousand acres were designated "primitive" where wilderness standards would be followed but where it would take some years to recreate wilderness. A third classification of "canoe area" was designated for an area of 54 lakes and ponds ideally suited for the canoeist who wants to get away from motorboat traffic. A small acreage was designated to encompass intensive use areas such as public campgrounds and two existing ski areas that had been provided for by a constitutional amendment. Finally, the remaining one million acres of State land was designated as wild forest. Here the constraints of the State Constitution would apply with emphasis on the less fragile land placed on interpretive trails, snowmobiling, group camping, group trail rides, and similar recreational pursuits.

The plan for the use of State lands was not particularly controversial. It was adopted by Governor Rockefeller as State policy in 1972.

At this time the Agency focused its attention on the 3.7 million acres of private lands within the Park. The Agency identified and classified the existing communities as "hamlets." Future development controls within these areas would be almost entirely at the discretion of the local units of government. Next the Agency identified existing "industrial use areas" and so classified them. As a third step, the Agency identified existing residential areas and areas adjacent to hamlets where future residential growth would logically occur. These areas were classified as "moderate intensity use." Here the Agency suggested that the land should be developed for residential uses at an average density of no more than one house per one and a quarter acres. A fourth classification identified "low intensity use" areas where the natural resources were amenable to housing development and other construc-

tion activities so long as its intensity did not exceed approximately one building for each three and a quarter acres of land.

The remaining 87% of the private land, well over 3 million acres, was land that the Agency felt could not withstand intensive development because of natural resource considerations or because this land was essential to maintain the open space character of the Park. This land was divided into two categories. The first category, "rural use", could withstand some limited development. In this category, the Agency suggested limiting development to a maximum of one principal building per eight and a half acres. This category occupied 34% of the private land in the Park. The final category developed was "resource management" covering 53%, or approximately two million acres, of the private land in the Park. This was the land the Agency felt was absolutely vital to the Park's open space character. On this land occasional buildings, not to exceed one for every forty-three acres, would be allowed. The primary uses of this land would have to be natural resource oriented, most often forest management although some agricultural land is also involved.

This plan developed by the Agency was adopted by the New York State Legislature and signed into Law by Governor Rockefeller.

Any of you familiar with traditional zoning probably find this idea, which boils down to forty-three acre zoning, somewhat revolutionary. Yet, if we stick to our traditional approach, that one or two acre zoning is about as far as we can go, I find little hope for protecting landscapes that our children will want to live or recreate in. Something revolutionary had to be done and New York, under the innovative and vigorous leadership of Nelson A. Rockefeller, did it. The program was developed after careful consideration of all physical, biological, and social resources and not arbitrarily. It provides for extensive development in the Adirondack Park but it channels such future development to those lands most amenable to development from resource, aesthetic, and social viewpoints.

The plan has been in effect for two years, and it has certainly not been an easy two years. There is a great deal of public education needed to further our program. Equally important we have a great deal to learn from the landowners and the local units of government involved. Needless to say, we have found ourselves in court a good deal of the time. Right now there are twenty cases pending, most of them aimed at constitutional issues such as whether forty-three acre zoning constitutes a taking of land.

We are very optimistic about the outcome of these cases. If we did our homework properly in developing our plan, the law adopting the Land Use and Development Plan will be upheld in the court. To date there have been two decisions handed down by the courts, both favorable. Perhaps the most important ruled that a decision of the Agency based entirely on aesthetics was a legitimate exercise of their police powers.

It will be at least ten years before the success or failure of the Adirondack program is known. I feel there are at least two elements missing in the program that should be corrected. First, some relatively minor land uses are presently not reviewable by the Agency if they meet the density guidelines. Still, a trailer here, a gas station there, a house here, or a barn there can eventually nickel and dime the

visual amenities of the Park to death. The second element that has to be faced is not unique to the Adirondack Park. It is equitable real property taxation. If we desire to promote development in certain areas and severely restrict development to protect visual and resource amenities elsewhere, we must squarely face the tax problem. We must amend our existing real property tax laws so they promote, rather than discourage, such land use policies.

Assuming we can remain flexible enough to correct inequities, I am confident that New York State will have provided in the Adirondack Park, a casebook example of how today's and tomorrow's pressures on the land can be addressed. The Adirondack example will prove that it is possible to provide a quality environment for all of us to live in or at least visit.

THE PRESENT FOREST RESOURCE SITUATION ON INDUSTRIAL LANDS

[By R. M. Nonnemacher, International Paper Company, Mobile, Alabama]

It is very appropriate, and significant, that the American Forestry Association is celebrating its centennial year during the period our nation is conducting its bicentennial celebration. Added emphasis is given to our meeting this year in that this is also the occasion for the concurrent Sixth American Forestry Congress.

The early recognition of the importance to our country of discussing and formulating sound forestry programs is a high tribute to the 100 years the American Forestry Association has been so active. Of added importance to the policies for which the Association stands is that it represents a broad cross section of *all* individuals and groups who have an interest in trees.

The program reflects this cross section of interests in our nation's forests. I think it is appropriate that this general session be devoted to taking a look at our present forest resource situation—where we stand from the standpoint of federal lands, state and private non-industrial lands and those lands owned by the various forest industries. These discussions will then be looked at in view of supplying the needs for a population of 300 million people.

Before getting into the specifics of my assigned subject, one of three reports you are to hear on land stewardship, I would like to relate a parable. The one who is generally regarded as a Master Teacher—the greatest who ever lived—found the use of parables an effective way of getting across his point. Therefore, I'm sure you will understand my use of a parable that goes something like this:

Once upon a time there was a football coach who had three players of great capability. The first was a running back with great potential; he was unusually strong and quick and had all the moves of an O. J. Simpson. One back of his ability could all but carry his team to a successful season. However, the coach had one problem with his great prospect: The player didn't realize how good he really could be and, therefore, he never bothered to train. Consequently, he was in such poor condition that his stamina and coordination were so poor the coach could use him only sparingly and with little success.

There was a second outstanding back on this same team. He was a quarterback who could pass like Joe Namath and scramble like Roger Staubach. He, too, could all but insure a successful season except for one problem: A well-meaning doctor would not permit him to run at full speed and insisted on his using a passing motion that gave his passes all the zip of a midget leaguer.

This same coach had another great running back. This third back, although light, had great speed and was to his coach what Mercury

Morris was to Larry Csonka and the great Glenn Davis was to Doc Blanchard on the powerful Army team of several decades ago. This back would give his coach all he had and, because the other two backs did not carry their share of the load, the coach put him in every game and kept him going as long as he could. Needless to say, his small stature and the frequent rushes through the line soon wore him down and he couldn't really do as well on wide runs and down-field pass receptions which should have been his specialties.

The coach realized that if he could get his first back inspired and the second back freed from his well-meaning doctor's restrictions, his would be a team with the greatest offensive capabilities in the history of football. Did the coach ever attain his team's great potential? No, because he was a college coach and time ran out on him.

Have you seen the parallel of this parable? If not, by taking some liberties for purposes of simplification, let me suggest that the college coach is the United States of America and his football team is the wood fiber requirements of our generation. The player who could not be used to his full potential is privately owned timberlands which are not being developed for various reasons, even though proper use would permit them to exceed industry-owned lands.

The player whose capabilities were not realized because of a good-intentioned but shortsighted doctor is, of course, National Forest timberlands. And, finally, the over-worked player is industry-owned lands which, for the most part, are reasonably productive but are being forced to carry more than their fair share of the fiber load.

As I discuss my assigned subject, perhaps this parable will help put in perspective the load our nation has placed on industry-owned forest lands.

It is a distinct pleasure for me to have been asked to discuss the current industrial forest resource situation. I will be talking about the total nationwide picture for all forest industries—pulp and paper, lumber, plywood, poles and piling, et cetera. Since my 30-year career with International Paper Company has been spent in our Southern Kraft Division, I hope you will forgive me if I occasionally seem to place undue emphasis on the Southern forest resource. Perhaps another reason for this is that our region has often been referred to as "the nation's wood basket." Dependence on the South to grow even greater tree crops is evidenced by the Third Forest report and recommended activities to boost timber production.

In discussing the present industrial resource situation, I will be using data from the 1973 U.S. Forest Service publication, "The Outlook For Timber In The United States."

This publication, and earlier versions, are considered to be the "bible" of forest statistics, so I am sure all of us discussing the resource situation will be using the same basic data.

Since we have an audience today of such varied backgrounds, I hope to keep my discussion understandable and in perspective, avoiding technical terms professional foresters so often use. Also, I hope you will not get lost in numbers. They are only important to give a clear visual impression of the relativity of the three classes of land we are discussing.

One point I would like to emphasize is that while I will be reviewing the resource situation from the standpoint of timber production only,

I do recognize the many other resources our forests provide—wildlife, recreation, watershed protection, and others.

Now, let's look at the forest resource on lands owned by the wood-using industries. Of the 754 million acres of forest land in the United States, 500 million acres are classified as commercial forests. This is not "commercially owned" forest acres, but is defined as follows—"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." I will be discussing industry's part in the ownership and management of this 500 million acre "forest."

For convenience in collecting statistics, the forest regions in the United States are divided into four regions—North, South, Rocky Mountains and Pacific Coast. Here we see the amount of commercial forest land in each region.

Nearly three-fourths is in the eastern half of the United States, equally divided between the North and South. The remaining one-fourth is in the West, about equally distributed between the Rocky Mountains and the Pacific Coast section.

Four major types of ownership are recognized—National Forests, other public, forest industry and other private, which includes lands owned by farmers and other private owners. My discussion will pertain to the 14 per cent of the 500 million acres of commercial forest land owned by industry. This amounts to 67 $\frac{1}{3}$ million acres nationwide. This includes the nation's most productive timber growing areas.

About 52 per cent of these lands are in the South and 27 per cent in the North. Most of the balance is located on the Pacific Coast. Industrial ownership increased by 13 per cent, or about 8 million acres between 1952 and 1970, with much of this acreage being added in the South. A substantial portion was purchased from farmers and miscellaneous private owners.

It is interesting to note that industrial ownership in the North and South is by companies predominantly oriented towards the production of pulp and paper, whereas in the Rocky Mountain and West Coast areas the companies are predominantly lumber-oriented companies. However, in recent years the larger pulp and paper companies operating in the South have become more totally product-oriented.

International Paper Company, for example, has rapidly expanded in the last few years in production of lumber, plywood, and pressure treated wood products to become a totally integrated forest products company.

I would like to point out here that in addition to industry's management of their own lands, about nine million acres in non-industrial ownerships were managed by the forest industries through leasing and long term cutting contracts.

Now, let's see what kind of an inventory we have on the forest lands owned by the wood-using industries. Of a total growing stock of about 715 billion cubic feet of sound wood in 1970, about two-thirds was in softwoods (pine and other conifers) and about one-third in hardwoods. Forest industry lands accounted for 17 per cent of the softwood inventory and 12 per cent of the hardwood inventory. The greatest inventory of softwoods, by far, is on the National Forests, while other private ownerships account for the largest inventory of hardwoods (71 per cent).

It is interesting to note that although most of the Southern pine timber in 1970 was relatively small, the South nevertheless was the source of about a quarter of the softwood lumber and plywood, and three-fourths of the softwood pulpwood produced in 1970.

Another interesting point in this data is that the National Forests, with only 18 per cent of the commercial forest area, contain nearly half (46 per cent) of the softwood inventory.

I think this indicates that the National Forest cutting budgets have to be increased to meet the future timber needs of our nation. The alternative is higher and higher prices for the available private timber—ultimately pricing lumber beyond the reach of the average citizen.

Again, if we are going to have enough timber in the future, the other private ownerships, accounting for 59 per cent of our forest acres with only 26 per cent of the softwood inventory, must also increase their productivity.

Let's now take a closer look at the growing stock we have on industry-owned lands by regions. "Growing stock" is defined as merchantable trees five inches and larger, diameter measured at breast height. Here we see that about 17 per cent of the nation's softwood volume and about 12 per cent of the hardwood volume is on industrial ownerships. The largest softwood inventory, about one-half, is on the Pacific Coast, while the North and South contain 85 per cent of the hardwoods.

That's the total inventory, so let's see where we stand on total sawtimber volume. Industry accounts for 17 per cent of the softwood inventory, with about 61 per cent of this volume on the Pacific Coast and 25 per cent in the South.

A contrast in the softwood sawtimber volume on industrial versus other private holdings is that, while the volumes were nearly equal, there is nearly four times the acreage in other private ownerships.

Again, this indicates the need to increase the productivity on other private ownerships.

In the South, for example, we are making progress in increasing the forest productivity on private ownerships through management assistance programs available from many companies. At International Paper Company we call our landowner assistance program LAP. To date a total of 953 owners representing 387,000 acres of forest lands have entered into a management agreement in our nine-state Southern Kraft Division operating area. Our goal is to have a minimum of one million acres under these agreements by 1980.

Focusing the picture on industry sawtimber volume by regions, the Pacific Coast industrial lands contain 61 per cent of the total softwoods while one-half of the hardwood sawtimber is in the South.

Next, let's examine where industry stands on the cubic feet of growing stock per acre. We are about average with 1,480 cubic feet/acre—the National Forests having the highest volume and other private the lowest.

When we look at industry stocking by regions, we see that the Pacific Coast has the highest, while it is lowest in the South. This is not surprising when you consider the high rate of harvesting in the South. This does not mean these harvested areas are not growing trees. There is a considerable acreage stocked with pre-merchantable trees which *do not* show up in growing stock inventory at this time.

When we look at the average volume per acre in all ownerships, it is not surprising that the highest figure is on the National Forests, while the lowest is on Other Private. Volume on industry-owned lands is about average.

By regions, the volume per acre on industry lands is naturally highest on the Pacific Coast and Rocky Mountain areas, while the North and South have a much lower volume per acre.

I think this data is of key importance in considering the resource on industry lands. The net annual growth per acre of softwoods is highest by far than any other class of ownership. The primary reason for this is that the slower growing, older timber has been harvested and replaced by faster growing, vigorous young stands. In fact, with the timber requirements facing this nation, we need to emphasize rate of growth instead of inventory. We have long been unduly enamored with "inventory."

Here you can see the net annual growth per acre on industry lands by regions.

This data illustrates the urgent need for more intensive forest management on *all* ownerships which, taken collectively, are growing at about 50 per cent of the potential rate per acre.

When we examine this potential growth more closely, we find that on industry lands we have the potential to increase the net growth per acre by nearly 60 percent for the nation as a whole from the current average of 52 cubic feet per acre to 83 cubic feet per acre.

The North, which has the lowest current average, has the highest growth potential. The increase in the South is estimated to be moderate, since the current growth average is already high. On given acreage, it is estimated that industry can even exceed the estimated potential using modern forestry techniques.

Industry lands, in all regions in the country, have a higher current growth rate than any ownership category. Intensive work in genetics, cultivation, drainage and fertilization is bringing results unthought of 30 years ago.

We have looked at forest inventory, growing stock and potential growth. Now, let's see how growth versus cut compare. Here we see that the forest industry leads other ownerships both in the growth and cutting of trees per acre. However, the removals exceed the growth on industry lands.

When we look at the growth and cut by region on industry lands, we find the cutting exceeds growth by a considerable margin in the Pacific and Rocky Mountain regions, while we have a favorable balance of growth over cutting in the Northern and Southern regions.

For hardwoods, there is a favorable balance of growth versus drain, with Other Private having the most favorable ratio. Growth and removal is about average on industry lands.

By region, both growth and removal is highest in the North and South, with the industry ownership showing more hardwoods being grown than being cut.

I hope this mass of data hasn't confused you. While you won't remember the numbers, the visuals may have helped to bring into focus the resource situation on forest industry lands, which account for about 14 per cent of the commercial forests in the United States. These

industrial ownerships are particularly important in the South and the Pacific and Rocky Mountain regions.

From this discussion, there are several key points to remember:

1. The softwood timber stands on industry lands are about average in volume, but their growth rates per acre are the highest of any major ownership.

2. The harvest per acre in relation to the volume of standing timber, is by far the highest of any major ownership—more than double the average rate for all forests.

3. Industry lands include some of the most productive forest land, the most intensively managed, and the highest output per acre and per unit of standing timber, and probably per dollar investment, of the four ownership classes.

4. Slow growing, mature timber is being removed from industry lands and being replaced with vigorous, young timber.

I am proud of the contribution the forest products industry is making in supplying the many useful products we use every day. I am proud of the stewardship we are entrusted with in the management of our forest lands. I am also proud of the assistance we in industry are giving to private landowners in improving the productivity of their forest lands. We have a common platform in the American Forestry Association to develop sound, practical programs for all interests in forestry to assure adequate proper management of our forests for all uses.

Going back to the parable which I used earlier, I feel that all of us are the alumni who both want to and need to help the coach get full potential from all his players. However, like the coach, unless we really get together and get with it, our time may run out, forcing this country to reduce its use of fiber or resorting to imports which will have a highly undesirable effect on our balance of trade.

“MOVING AHEAD TOGETHER”

[By Ruth C. Clusen, President, League of Women Voters of the United States]

For some 24 hours, delegates to this Sixth American Forest Congress have been hearing from an imposing array of policy-makers, legislators, and professional conservationists about the present resource situation and the need to meet the requirements of a wide range of needs and uses. To address you with that extra word “together” added to the theme of “Moving Ahead” is indeed a substantial challenge. In my first contact with Bill Towell, I demurred somewhat saying that the League of Women Voters, while having an active program in land use planning, has not focused on forestry issues with great specificity. But perhaps this is an advantage bringing as we do a broad perspective and a concern for the public interest to this forum.

It would, however, be foolhardy of me to stand here and propose a detailed well-defined plan for reconciling differences—even if I could. It would also be redundant for me to spend time on the rhetoric of the need for coming together on a policy. Therefore, I have chosen to try to identify the blocks which separate forest-oriented people and suggest how to arrive at a reconciliation.

Because this is a centennial observance it is natural to look back with nostalgia to the little band of founding members who created the American Forestry Association. Moreover, nostalgia is the order of the day in the theater, in clothes, in historical perspective. Wherever we turn we are exposed to an atmosphere of wishful thinking which suggests that things were simpler, problems smaller, life better at another time in history. It is natural, on a centennial occasion to look back at that little band of founding members who, few in number though they were, launched this effort to preserve our national heritage by the creation and preservation of the national forests. What a satisfaction it must be to contemplate what a host they have become during the 100 years. Consider with pride how influential AFS has been in establishing national forests in the west and later in the east. AFS was a pioneer. The small charter membership had a clearly shared, well-defined goal.

In 1975 you are in a sense a victim of your own great success. Now you deal with an embarrassment of riches, a plethora of forest lovers. The problem is, as you all know, that the many members of the AFS do not think alike. And the many other organizations interested in the national forests have their own goals, which differ from one group to another. Some organizations are purely professional, some are made up entirely of nonprofessionals, some, like AFA, are mixed in membership. As the organizations embrace different views of what is good, desirable, possible, so within a single organization members also have disparate opinions.

Nostalgically, some people yearn for a return to the early days when the Forest Service activities seem centered on conservation and little of the nation's lumber came from the national forests, when professional foresters were in the forests more of the time, managing on the spot rather than at the desk. But since we can't turn back the clock, we can't go home again, what can we do to reconcile differences, to get moving ahead together? It seems to me that there is merit in trying to identify the blocks which prevent forest-oriented people from arriving at mutual solutions when they obviously support mutual goals. Sometimes in looking with clear eyes at the trees instead of the forest it is possible to arrive at a plan of attack. In the course of this I am going to raise a series of questions which are intended to set you to thinking about the possibility that the various interests involved have looked at these matters with tunnel vision and need a broader perspective.

Let's look at goals first. Are those who care about forests, be they individuals or organizations or institutions so divided over emphasis that reconciliation under the multiple use doctrine is no longer possible? Even a cursory overview of recent writings makes it clear to the public that there are some three different aims being pursued simultaneously. Each has its vociferous advocates. Timber, mining and forage yield supporters find themselves pitted against recreation backers who are themselves divided into developed area group recreation supporters plus hunting and fishing concerns. These in turn confront the wilderness preservation people who want dispersed recreation and are concerned about habitation for non-game animals, wildlife, endangered species, diversity, and watershed protection. In other words, there may be a limit to the number of different aims which can be accommodated under the multiple use doctrine.

Or, perhaps the question to ask, is—does money lie at the bottom of the separation in views? Everyone at least gives lip service to the idea that programs should be well-conceived, efficiently-managed, socially beneficent. Are the costs too high? Will the benefits in the long run outrun the costs? It may be that the competition for funds for undertakings which each interest sees as having the virtues of an ideal program undelies the divisiveness in forestry use views.

Or, it may be that it is a combination of the two—money and goals—which brings about conflict between immediate objectives and long range goals. This seems to me to be at least one of the very basic issues which must be resolved—and the public is, as usual, caught in the crunch. Those interested in maximizing income to the treasury from increased logging and those who want to maximize forest industry profits by production line logging seem oblivious to the effects on erosion and siltation, landslides and leaching, reforestation and recreation. Are they looking at quick benefits and forgetting the long term costs, forgetting that the reason for the formation of the national forests was to preserve their values for our descendants?

On the other hand, those who oppose increased production from the national forests seem unmindful of the fact that a country forced to use less lumber will require some substitute—probably metal or plastic—which will require more energy to produce and will cost more in environmental damage than would well-conducted cutting with lessened waste in harvesting and maximum recycling of forest products.

Another factor which seems a likely possibility in causing separation and distrust is the rearing up of that continuous incompatibility

between professionals and the public, with the usual inflexibility on both sides.

Is the underlying issue one of professional control: "We know what to do; we know what is good for you, and we are going to give it to you even if it isn't what you want!" And on the other hand the public's view: "We citizens are going to decide what we want: we are not going to have you technocrats decide for us. After we've made up our minds and expressed it through the political process, you professionals can use your skills to achieve the goals we, the public, have set."

One of the problems that arises in the development of public opinion is the question of who is the public? Who speaks for them? Frequently professionals in a discipline (who often are too busy with their professions to be what I might call practicing citizens) think that fellow professionals operating on the state and local levels are the spokesmen for citizens. It is important that public opinion (whose formation no one really understands or can direct) and the expressions of bureaucracy are clearly distinguished, one from the other.

The process by which the public makes the value judgments is not a tidy, systematic, analytical one, which can be computerized and subjected to mid-term correction. But the public right to make the value judgments is one that is basic to our political system, inefficient though it may be.

In thinking of the public's role in making the value judgments, the elected official's role in expressing those judgments in terms of policy through the political process, and the agency's role in implementing policy, it is important to understand where the line between goals and means lies. How far down the road does the political process extend? The United States has the multiple use doctrine, now reexpressed in the Forest and Rangeland Renewable Resources Act. Are these politically derived decisions to be followed, constraining both the agencies that are involved in their implementation and the industries that use the resources with which the acts deal? Of course, for this is the American system—a government of laws, the concept to which we all subscribe. What tends to happen is an upward creeping of the *means* until they begin to modify the *ends*. When that happens, when its happening becomes visible, tumultuous days have arrived.

Therefore we must find answers not so much to what separates as to how to get off dead center and accomplish some forward movement together. One prospect which offers some hope is for forestry people to work consciously to develop some measuring tools for decision-making. Perhaps the answer lies in renewed concentration on how to reach a rational decision rather than which views shall triumph.

A great part of the appeal of the past, the spring from which this nostalgia we mentioned earlier arises, comes from the feeling we have that decisions were easier then, that what should be done was more obvious, that the path from where we were to where we wanted to go was clearer. We all know that 20th century managers have many more tools at their disposal than did their predecessors. Can the sophisticated analytical tools be applied to forest issues in ways that will furnish information that will help us to move ahead together? Can we get, from a rigorous application of these tools, a better understanding of qualitative and quantitative costs/benefits—tangible and intangible—of different means of reaching the goal of national forest preservation?

I urge you to try, at least, to use modern methods of analysis and technology to seek a consensus to the problems you have been discussing during this Congress. A starting point might well be the thoughtful approach of Marion Clowson in his recent book, *Forests For Whom and For What*; which deals with the basis for analysis.

You will remember that he proposes five areas for analysis: physical and biological feasibility, economic efficiency, social and economic fairness, aesthetic and cultural sensibilities, and administrative practicality. And if I may simplify his conclusion beyond even his recognition, the application of rigorous analysis with modern tools to these five areas will probably show WHAT to do WHERE rather than provide a single middle of the road answer that will bring us together.

There is no single answer—no easy way—no middle road which can be applied to all forestry issues as they grow and change. If there were a simple formula, you would *be* together, and I would not be standing here saying these words. None of the issues that divide you is as simple as the protagonists on either side would have it seem. When *demand* and *need* are mentioned, for example, even the public knows that the response cannot be a simple one. Citizens have learned, in the ENERGY classroom, to ask, "Demand at what price? What price in dollars? What price in intangible costs?"

Whether the root cause of what separates those who care about the nation's forests is any or all of those I have suggested to you: Money, goals, immediate objectives as long range goals, and incompatibility between professionals and public.

A lack of measuring tools is really no answer to your problem of how to move ahead together. And so, nostalgia notwithstanding, back to work! Learn more! Ponder more! Stop pointing the finger at those who think differently. Stop making pious claims based on what may be long chains of fact, inference, assumption. MOVING AHEAD TOGETHER will be realized when the value judgments and the political processes of policy-setting are built from stronger materials, from a higher quality of information. . . . which is a renewable resource that those of you in this room are responsible for producing.

No single answer can ensure an ideal forest policy. Alternatives will always exist and each will have its advocates. The important consideration to the public is that a forest policy for the country be arrived at carefully, with the use of tools not available in 1875, more consciously, and by a wider range of interests than ever existed 100 years ago.



