

CONGRESSIONAL RECORD

November 18, 1970

A UNIVERSITY VIEW OF THE FOREST SERVICE

Mr. METCALF, Mr. President, in previous statements before the Senate, I have voiced concern over management practices in our national forests. This is a concern shared by other Senators who have also commented extensively on forest management in their respective States. We are increasingly brought to realize that this is an issue which is national in scope and it is an issue which directly involves the public, since what are at stake are public lands managed by public agencies.

I am pleased today to present an important new report on this problem. This is a report which was originated by concerned members of the public and produced by experts, at their own expense. Approximately a year ago I received a large number of letters from constituents in western Montana who were particularly worried about what they saw happening to their surroundings. Pictures, angry words, and news articles described logging practices which appeared to disregard every value of forest use except that of the cheapest removal of logs. In response to this, I expressed my concern to the Forest Service and, at the same time, requested Dean Bolle of the forestry school and the University of Montana to do an independent study of the problem.

The results have been most gratifying. The Forest Service itself selected a group of its own well-qualified professionals to conduct an in-house analysis of the problem as it existed in the Bitterroot Valley. Their report was released in May of this year and represents a sincere attempt to provide an objective evaluation of the dilemmas of forest management in the area under study. Copies of this study are available from the Forest Service, Division of Information and Education, Missoula, Mont.

In the meantime, however, the select committee convened by Dean Bolle has produced an independent, more pervasive analysis of the larger problems of forest management and has suggested some fundamental methods of cure. The select committee considers not only the most immediate problem of clear cutting and of multiple use. And they critically analyze – a rare and valuable asset in any committee report – the decision making procedures within the agency itself.

The possible dangers of clear cutting have been cited often before. These include soil disruption, ill effects on wildlife, scenic degradation, and water pollution, among others. The Federal Water Quality Administration, for example, warns that “logging operations all too frequently result in adverse impacts on many other multiple uses of Federal lands, as well as on the uses of the water of those streams far downstream from the logged areas – even to the estuaries where rivers enter the sea.”

The select committee’s report, however, goes further. It focuses upon what had been considered the primary defense of clear cutting: economic efficiency. The report disputes the common assumption that clear cutting, in the way it has been used in the past, is the most

profitable method of timber harvesting. And beyond this, the report suggests a new look at land classification in terms of what it designates as “timber mining.”

The report recognizes the difficult situation in which the Forest Service stands in regard to policy formulation. The Forest Service is constantly pressed by the administration for greater lumber output to meet national needs. Industry pressures for more cutting are enormous. But the agency may be too willing to accede to these pressures “from above.” The report sums up this dilemma in its statement of findings:

It appears inconceivable and incongruous to us that at this time, with the great emphasis upon a broad multiple-use approach to our natural resources—especially those remaining in public ownership—that any representative group or institution in our society would advocate a dominate-use philosophy with respect to our natural resources. Yet it is our judgment that this is precisely what is occurring through the federal appropriation process, via executive order and in the Public Land Law Review Commission’s Report. It would appear to us that at this time any approach to public land management which would de-emphasize a broad multiple-use philosophy, a broad environmental approach, a broad open-access approach, or which would reduce the production of our public lands resources in the long run is completely out of step with the interests and desires of the American people. What is needed is a fully funded program of action for quality management of all our public lands.

The conclusion is, then, that we are not just dealing with questions of natural beauty, wildlife, and pollution, however important these may be, but with the fundamental processes of forest economics. This is an important finding, and coming as it does from a committee composed of three professional foresters, a professor of wildlife, a political scientist, a sociologist, and an economist, it deserves to be heard.

I might add that this report embodies the finest example of public interest and involvement in an environmental issue. The people of Montana took the initiative in making their own concerns known; a local newspaper, the *Missoulian*, printed a series of outstanding articles on the problems; and the faculty members of the University of Montana devoted countless unpaid hours to the study, discussion, and analysis of the issue. On behalf of the other members of the Montana congressional delegation—Senator Mansfield, Representative Olsen, Representative Melcher, and myself—I want to thank the people of Montana who made this report possible. I ask unanimous consent that the select committee’s report be printed in the Record, and commend it especially to members of the Interior, Agriculture, and Appropriations Committees, to the resource management agencies, and to the Office of Management and Budget. I ask unanimous consent that biographical information on the select committee also be printed in the Record.

There being no objection, the items were ordered to be printed in the Record as follows:

December 2, 1969.

Dr. Arnold Bolle,
Dean, School of Forestry, University of Montana, Missoula, Mont.

Dear Dean Bolle: Enclosed are copies of letters I have received recently from constituents in the Bitterroot Valley.

These letters reflect the writers' and my growing concern over Forest Service management practices within the Bitterroot National Forest and elsewhere.

I am especially concerned, as are my constituents, over the long-range effects of clear-cutting, and dominant role of timber production in the Forest Service policy, to the detriment of other uses of these national resources.

I believe that a study of Forest Service policy in the Bitterroot by an outside professional group would be beneficial to the Montana Congressional delegation and to the entire Congress, especially the Senate and House Interior Committees. The Bitterroot is a typical mountain timbered valley and the results of such a study might well be extended to recommendations national in scope. I hope appropriate faculty members at the University of Montana will participate. If this is possible, I would welcome whatever policy recommendations such a committee would offer.

I look forward, as always, to receiving advice from the best School of Forestry in the nation.

kindest regards,
Very truly yours,

Lee Metcalf.

A Select Committee of the University of Montana Presents Its Report on the Bitterroot National Forest

STATEMENT OF FINDINGS

1. Multiple use management, in fact, does not exist as the governing principle on the Bitterroot National Forest.
2. Quality timber management and harvest practices are missing. Consideration of recreation, watershed, wildlife and grazing appear as afterthoughts.
3. The management sequence of clear-cutting-terracing-planting cannot be justified as an investment for producing timber on the BNF. We doubt that the Bitterroot National Forest can continue to produce timber at the present harvest level.
4. Clearcutting and planting is an expensive operation. Its use should bear some relationship to the capability of the site to return the cost invested.
5. The practice of terracing on the BNF should be stopped. Existing terraced areas should be dedicated for research.
6. A clear distinction must be made between timber *management* and timber *mining*. Timber *management*, i.e. continuous production of timber crops, is rational only on highly

productive sites, where an appropriate rate of return on invested capital can be expected. All other timber cutting activities must be considered as timber mining.

7. Where timber mining, i.e. removing residual old growth timber from sites uneconomical to manage, is to be practiced, all other onsite values must be retained. Hydrologic, habitat, and aesthetic values must be preserved by single-tree selection cutting, a minimum disturbances of all residual vegetation, and the use of a minimum standard, one-time, temporary road.

8. The research basis for management of the BNF is too weak to support the management practices used on the forest.

9. Unless the job to total quality management is recognized by the agency leadership, the necessary financing for the complete task will not be aggressively sought.

10. Manpower and budget limitations of public resource agencies do not at present allow for essential staffing and for integrated multiple-use planning.

11. Present manpower ceilings prevent adequate staffing on the BNF. Adequate staffing requires people professionally trained and qualified through experience.

12. The *quantitative* shortage of staff specialists will never be resolved unless the *qualitative* issue with respect to such specialists is first resolved.

13. We find the bureaucratic line structure as it operates, archaic, undesirable and subject to change. The manager on the ground should be much nearer the top of the career ladder.

14. The Forest Service as an effective and efficient bureaucracy needs to be reconstructed so that substantial, responsible, local public participation in the processes of policy-formation and decision-making can *naturally* take place.

15. It appears inconceivable and incongruous to us that at this time, with the great emphasis upon a broad multiple-use approach to our natural resources—especially those remaining in public ownership—that any representative group or institution in our society would advocate a dominant-use philosophy with respect to our natural resources. Yet it is our judgment that this is precisely what is occurring through the federal appropriation process, via executive order and in the Public Land Law Review Commission's Report. It would appear to us that at this time any approach to public land management which would de-emphasize a broad multiple-use philosophy, a broad environmental approach, a broad open-access approach, or which would reduce the production of our public land resources in the long run is completely out of step with the interests and desires of the American people. What is needed is a fully funded program of action for quality management of all our public lands.

THE PROBLEM

The problem arises from public dissatisfaction with the Bitterroot National Forest's overriding concern for sawtimber production. It is compounded by an apparent insensitivity to the related forest uses and to the local public's interest in environmental values.

In a federal agency which measures success primarily by the quantity of timber produced weekly, monthly and annually, the staff of the Bitterroot National Forest finds itself unable to change its course, to give anything but token recognition to related values, or to involve most of the local public in any way but as antagonists.

The heavy timber orientation is built in by legislative action and control, by executive direction and by budgetary restriction. It is further reinforced by the agency's own hiring and promotion policies and it is rationalized in the doctrines of its professional expertise.

This rigid system developed during the expanded effort to meet national housing needs during the post-war boom. It continues to exist in the face of a considerable change in our value system—a rising public concern with environmental quality. While the national demand for timber has abated considerably, the major emphasis on timber production continues.

The post-war production boom may have justified the single-minded emphasis on timber production. But the continued emphasis largely ignores the economics of regeneration; it ignores related forest values; it ignores local social concerns; and it is simply out of step with changes in our society since the post-war years. The needs of the post-war boom were met at considerable social as well as economic cost. While the rate and methods of cutting and regeneration can be defended on a purely technical basis, they are difficult to defend on either environmental or long-run economic grounds.

Many local people regard the timber production emphasis as a alien orientation, exploiting the local resource for non-local benefit. It is difficult for them to distinguish what they see from the older forest exploitation which we deplored in other regions. They feel left out of any policy formation or decision-making and so resort to protest as the only available means of being heard.

Many of the employees of the Forest Service are aware of the problems and are dissatisfied with the position of the agency. They recognize the agency is in trouble, but they find it impossible to change, or, at least, to change fast enough.

Multiple-use is stated as the guiding principle of the Forest Service. Given wide lipservice, it cannot be said to be operational on the Bitterroot National Forest at this time.

A change in funding to increase considerably the activities in nontimber uses would help, but could not be effective until legislative and executive emphasis changed.

But even with this modification the internal bureaucracy of the agency and the lack of public involvement in decision-making make real change unlikely.

As long as short-run emphasis on timber production overrides long-run (and short-run) concern for related uses and local environmental quality, real change is impossible and the outlook is for continued conflict and discontent.

PROBLEM ELEMENTS

The committee found that the controversy surrounding the Bitterroot is both substantial and legitimate. While it is true that in a good many areas the conflict has been expressed in highly emotional and charged terms with many inaccuracies, still it is the opinion of the committee that the Bitterroot Controversy is a very real problem situation. It is a very serious local problem of the Bitterroot Valley and Western Montana, and for the United States as a society in general. The controversy contains many elements. A partial listing of these elements will help to elucidate the complexity of the controversy.

1. Over the past few years management decisions and policies have frequently resulted in situations that have disappointed virtually all the publics that make use of the Bitterroot National Forest. Frequently this has led to situations in which the land managers have found themselves isolated from these publics, and to situations in which their word with respect to land management policies was substantially discounted. This situation results, in our opinion, not necessarily because of poor local management or local inefficiencies, but because of policies laid down in Washington, in legislation and through the appropriations process as it is then implemented by the executive branch at its higher levels. This is especially true with respect to Congressional funding of the various program activities that would make the language of the Multiple-Use Act a set of realities instead of slogans.

2. Until relatively recently, timber management of the Bitterroot National Forest was handled entirely by nature, primarily through wild forest fires. Such management (accidentally) led to "even-aged" stands of timber particularly in the back country. Quite logically, Forest Service policy has been developed to continue deliberately such even-aged timber management are essential elements in the controversy (i.e., clear-cutting, regeneration practices, road construction for such sales, clean-up methods, and logging practices).

3. Much of the Bitterroot National Forest is fairly steep to rugged terrain. As a consequence, results of timber management practices are clearly visible from areas prized for recreational and aesthetic values and more recently by real estate development interests within the Bitterroot Valley.

4. An error in the calculations of the allowable cut for ponderosa pine occurred in the Bitterroot National Forest. As a result an over-cut of pine has taken place in recent years. Mills within the area attempted expansion on the basis of the anticipated cut and the change in sales patterns lead to public controversy and major skepticism over Bitterroot National Forest management in general.

5. As a result of change technology and changing markets, species not formerly salable from public lands have had markets develop. Consequently species not formerly cut, e.g., lodgepole pine, have been sold and cut. Harvesting lodgepole pine involves clear-cutting

and to promote regeneration severe slash burning of the entire cut and exposure of the mineral soil. The severe land treatment involved in such harvest comes under increasing public condemnation not only in the Bitterroot, but quite generally throughout the United States.

6. A decision to stop clear-cutting as a cutting practice may be a decision not to cut most mature lodgepole pine on the Bitterroot National Forest. The lumber industry, together with some members of the Congress and elements of the executive branch oppose reducing the amount of merchantable timber harvested.

7. Throughout our society major changes are taking place with respect to public involvement in the decision, formulation and policy-making processes in all areas. The various groups involved locally (and across the country) in the Bitterroot Controversy are a reflection of the nature of these changes. Traditional complex bureaucratic structures such as the Forest Service are only beginning to feel the tactics and devices employed by this new spirit of public involvement.

8. Local residents who are familiar with the system of cutting used earlier are disturbed with the change, do not understand the reasons for the difference and doubt that the forest can continue to produce at the present level continuously.

9. There is a great deal of waste material left on the ground after clear-cutting. People see many logs that they consider merchantable. Brush is scattered throughout the area. The soil has been scarified by bulldozers, there are great windrows of material piled up. They protest both the ugliness of the area and the considerable waste they see in unused materials.

10. Bitterroot residents have a deep seated love for their valley. Their view of the landscape is precious to them.

11. The population has and is being rapidly augmented by new residents who are attracted by the beauty of the valley. Many of these new residents are intelligent, vocal and well-informed in ramifications of the environmental movement. They feel strongly that the social and aesthetic values of the forest community are being given short shrift.

12. There is concern among some people in the logging industry and woods workers as well as other local people that the present rate of cut on the Bitterroot National Forest is too heavy and that future employment and income are threatened.

THE FOREST SERVICE TASK FORCE REPORT

As part of our study the committee carefully examined the report "Management Practices on the Bitterroot National Forest, A Task Force Appraisal May 1969—April 1970." In order to appraise fairly or to fairly understand our evaluation of that report the following background information is essential. Prior to May of 1969 the Bitterroot National Forest controversy began to receive substantial public and media attention, and developed into a major management problem for the Forest Service. In an effort to document the problems, to investigate them and to make recommendations with respect to the problems for management of the Bitterroot National

Forest, Neal M. Rahm, Regional Forester, and Joseph F. Pechanec, Director of the Intermountain Forest and Range Experiment Station, appointed an “in-house” task force to provide them with a study and a report. The Task Force was instructed “to make a complete, impartial appraisal of (the) management practices.” As a format for their study and report they chose letters to Mr. Rahm from two groups within the Bitterroot (pp. 3-7 of the Report).

The Task Force Report is basically an answer to the specific questions posed in those two letters.

Our evaluation of the Task Force Report will be broken into two parts. First we wish to comment on pp. i-v, 1-69. Second we will comment separately on the final section, “What Challenges Do Wildlife, Aesthetics, Recreation, and Livestock Pose for Timber Management.” pp. 70-76.

Comments with respect to pp. i-v, 1-69: The Task Force, in our considered judgment did a commendable job in analyzing and publicizing the results of its investigation of the charges relative to timber management. These pages of the Report are addressed to major issues raised by the two letters and the Report used as a framework.

There are several minor errors in the Report. These errors were virtually unavoidable given the methodology pursued by the Task Force in its examination. While it is an “in-house” report it was not subjected to agency editing and evaluation prior to publication or other protective devices that could have been employed by the Forest Service and that could have resulted in quibbling away its essential clarity and relevancy. We wish to state, however, our belief that it is a psychological impossibility to evaluate one’s own efforts objectively.

With respect to the specific recommendations of the Report our committee offers the following comments:

On page 9 the Task Force observes: “There is an implicit attitude among many people on the staff of the Bitterroot National Forest that resource production goals come first and that land management considerations take second place.” We believe that this is so not merely with respect to the Bitterroot National Forest. It is widespread throughout the Forest Service, especially with respect to timber production in a sense that getting the logs out comes first. High quality, professional management of the timber resources is all too rare—growing the best possible trees, on the highest quality sites, and allocating the production dollar toward growing commercial stands of timber only on those sites. The pressures upon the Forest Service to get the logs out cannot be surmounted without the express assistance of the Congress. The pressures come not merely from private industry and from local communities dependent upon logs from public lands for their mills, *more importantly* the pressures come from (1) efforts to produce timber faster by legislative fiat; (2) efforts to produce timber faster by Presidential proclamation without corresponding increases in funds allocated to the Forest Service for reforestation and timber stand improvement; and (3) efforts to produce timber faster or at least remove it faster in terms of the recommendations of the Public Land Law Review Commission. To our committee many of the recommendations of the Public Land and Law Review Commission appear totally insensitive to the general mood of the group within American society expressing their desires

with respect to the disposition and use of our national forests and other public lands. The efforts of the Public Land Law Review Commission to erode the meaning and spirit of the Multiple-Use Act by making timber production the dominant use on suitable public lands can be found in many places within their report. (See specifically pp. 28, 98, 95-100.)

It appears inconceivable and incongruous to our committee that at this time, with the great emphasis upon a broad multiple-use approach to our natural resources—especially those remaining in public ownership—that any representative group or institution in our society would advocate a dominant—use philosophy with respect to our natural resources. Yet it is our judgment that this is precisely what is occurring through the federal appropriation process, via executive order and in the Public Land Law Review Commission’s report. It would appear to us that at this time any approach to public land management which would de-emphasize a broad multiple-use philosophy, a broad environmental approach, a broad open-access approach, or which would reduce the production of our public land resources in the long run is completely out of step with the interests and desires of the American people. What is needed is a fully funded program of action for quality management of all our public lands.

The Task Force observes on page 14: “Increased funds along will not solve present problems.” We concur. In order to provide quality management of our public lands—with due emphasis to considerations of environmental quality—the public agencies providing the direction and management must be adequately staffed to do the task. Present manpower ceilings prevent adequate staffing. Additional staff is required in many areas, e.g. soils, landscape architecture, integrated management planning, wildlife, recreation, to mention only a few. In many, if not most of these areas the staff must be in a position to provide management direction, not merely advice.

A re-evaluation of lines of authority and career ladders of the Forest Service is essential. Today the land manager making basic management decisions on the ground is near the bottom of the career ladder. We find this situation archaic, undesirable, and subject to change. The position of the on the ground manager, the district ranger, should be substantially upgraded and be much nearer the top of the career ladder than at present.

In general terms our committee also concurs in the other major observations and recommendations up through page 69 of the Report. In places we would change the emphasis somewhat: in other instances we concur, upon the assumption that the technical information behind the recommendations is correct.

In one additional instance we wish to concur specifically in a recommendation of the Task Force and then amplify the recommendation. On page 15 the Task Force recommends: “Multiple-use plans on the Bitterroot National Forest must become the controlling documents *in fact as well as in principle*. This will require strengthening these multiple-use plans so they clearly establish goals and direction of management on individual areas.” (Emphasis added.)

Multiple-use planning must precede management commitment of land to known or expected production goals. Multiple-use planning of public lands is a very special kind of planning, which must include effective public participation. Such special planning requires the

availability and direct participation in the planning of well-qualified specialists in all relevant resource fields. Unless such specialists are a part of the planning process they are not in a position to influence the management decisions that must be made. It is not enough to bring the specialists in to review and notify the plan when initially completed. Such a process is at best a poor compromise within a poor process. *Manpower and budget limitations of public resource agencies, in our opinion, do not at the present time allow for this essential staffing and for this process of integrating multiple-use planning.* Needless to say specialists of all kinds that are required for such a planning process cannot be expected to arise as the result of in-line promotion within the present career ladders of public land-use agencies.

Comments on pp. 70-76 of the Bitterroot Report: The weakest section of the Bitterroot Report is the chapter entitled: "What Challenges do Wildlife, Aesthetics, Recreation, and Livestock Pose for Timber Management." Perhaps it should have been left out completely, for in its present form it merely draws attention to its inadequacies and reinforces the public charge that the Forest Service is primarily oriented toward timber harvest as the dominant use of national forests.

Our main reaction is that the questions raised in the chapter title are not answered: In less than seven pages, four major resource areas are disposed of in a casual and general manner. Despite all the rhetoric in the rest of the report regarding multiple-use planning, no real commitment or expertise was demonstrated.

Wildlife—One very disturbing aspect of the Task Force Report, especially since it was specifically singled out for special treatment by both the Ravalli County Resource Conservation and Development Committee (p.5) and the Bitterroot Multiple-Use Association (p. 7), was the attitude toward wildlife management. They did conclude that "much more information was needed concerning the relation of elk to other resource management activities" and suggested future cooperative efforts with the Montana Fish and Game Department.

There are other big game species besides elk however, and other game species besides big game, and other wildlife than those species sought by hunters. Again we find the emphasis being placed on the dominant species with little feeling for the equally important, if less exploitable, faunal members of the forest ecosystem.

Aesthetics—Scattered throughout the report are references to aesthetics with the suggestion that a landscape architect be assigned to every sale. It is not clear whether such a person would have veto power over the sale and sale specifications, or whether he would be called upon, after the fact, to apply his skills toward a cosmetic treatment of an existing, or an about to be produced, eyesore.

If effective multiple-use planning were a reality, management plans would not always start with a timber sale which would later be negated by adverse reports from watershed experts or landscape architects. Long range timber industry plans are rudely interrupted when "areas are withdrawn from cutting: (p. 39 #2) and the worst kind of public relations is experienced."

Recreation—The fastest growing use of national forest lands is reputed to be recreation but if so, it went almost undetected in the Task Force Report. One general recommendation (p. 76 #4) and a page more or less devoted to a discussion of recreation needs and planning is grossly inadequate. The recreationist may enter the forest via a logging road but this cannot be attributed to recreation planning. Perhaps recreation needs should be determined by the public, not for the public.

Range—The coverage of range management and livestock activities on the Forest was so superficial that it is difficult to evaluate objectively. We get the impression that the Task Force was defending Forest Service practices as being of no harm to livestock operators. What is not covered, however, is the fact that neither have then been aided, and no data seems to be available to assess possible harmful or conflicting situations between livestock and tree regeneration, or livestock and wildlife.

Perhaps many of the short-comings of the non-timber oriented activities of the national forests can be remedied by increasing appropriations and lifting the man-power ceilings, but there are other considerations: (a) inadequate staffing may be a *qualitative* matter. The personnel director within the agency cannot be the final judge of “expertise” or “qualified professionals.” This must be a matter of external evaluation. (b) The *quantitative* shortage is services of other disciplines (wildlife biologists, landscape architects, etc.) will never be resolved if the leadership does not recognize or is not sympathetic to the needs for other services than timber management.

The Task Force Report does recognize the latter possibility (p. 13) in part when it states that “The necessary funds for these services have not been included in the estimated costs.”

Why haven’t they been included? Perhaps in retrospect it can be said that unless the total management job is understood, the agency leadership will probably not “aggressively (seek) the necessary finances.”

ECONOMICS, CONVENTIONAL FORESTRY, AND A SUGGESTED CHANGE

In the preceding section we have examined the Task Force Report, and we accepted the assumptions and institutions of both the agency and the forestry profession. In this section we relax those constraints to take a broad look at the assumptions and institutions. First, a simple economic analysis of the timber management practices we observed is made. The devastating consequences of such analysis should have been apparent on the Bitterroot; we will explain why they were overlooked. Finally we will suggest an alternative management process.

While the problem in the Bitterroot Valley is complex and many-faceted, in the final analysis it resolved into disaffection on the part of some elements of the public with the practice of “clear-cutting, terracing, and planting.”

This problem has been examined, reviewed and debated from a dozen points of view—ecology, aesthetics, wildlife, water yield, timber production, and others. Curiously however, very little has been asked about the *economic aspect* of the practice. One might explain this

phenomenon on the grounds that economics is an inexact science and besides good input data doesn't exist—but these limitations apply equally or more so to the other facets of the entire controversy. The fact is that any consideration of the economic facts casts the problem in a whole new light. It helps to identify weak spots in past arguments. It points the way towards a more rational analysis of the problem. It helps to identify real issues in the controversy.

To make the maximum contribution, a whole series of sophisticated economic studies would be necessary. The industries in the Bitterroot Valley (timber, grazing, recreation) should be examined to determine their regional and national importance and to measure their interdependence and impact upon the resources of the Bitterroot National Forest. Social values and costs should be evaluated for alternative land uses in the area. And so on and on. These undertakings are beyond the scope of our report, but the utility of such economic studies can be demonstrated by taking a brief look at a narrow aspect of the problem: an example of economic analysis of clear-cutting and terracing in the Bitterroot Valley.

To demonstrate the economic irrationality of the practice of “clear-cutting, terracing, and planting,” we indulge in simple mathematics.

Assume the following:

Establishment costs (Regeneration), \$50 acre (this is conservative).

Other costs, none (an unrealistic, but simplifying assumption).

Rotation length, 120 years (close to the average reported for ponderosa pine, in the Task Force Report).

Yield at rotation age, 20 MBF* (optimistic for most sites on the Bitterroot).

Stumpage value, \$25/MBF* (in 1970 dollars).

Interest rate 5% (this approximates the rate being paid on longterm government bonds—a conservative figure. See Appendix B).

If we invest the \$50 in stand establishment *and charge no other costs* through the 120-year period, the stand at the harvest would have to be worth \$17,445 per acre, in order to return 5 percent on the initial public investment in regeneration. If the actual yield were 20 MBF per acre, the stumpage value would have to be \$872 per thousand board feet. If the stumpage value were actually \$25/MBF (in 1970 dollars) the yield would have to be 697,000 board feet per acre. It would obviously be impossible to achieve yields of these magnitudes.

It is enlightening to work the problem in reverse. In order to earn 6 percent on the investment, with yield and stumpage assumptions given, the stand would have to be established at a cost of \$1.43 per acre. If we relax the conservative assumptions used in this illustration, and

* MBF=thousand board feet.

set more realistic values for costs, yields, and interest rates—the results become ludicrous. The only way to justify the practice is to *ignore* economic analysis as a tool of decision-making.

The conclusions are clear and incontestable. *Clear-cutting and terracing cannot be justified as an investment for producing timber on the Bitterroot National Forest.* There are better and much more economical ways to provide for the nation's timber needs.

If we eliminate timber as a justification for terracing, what is left? Not water. Terracing may not impair water yield or quality, but nobody has yet shown that it improves water production. Not grazing. The purpose of terracing is to eliminate grass and other vegetative competition, which hardly enhances the grazing potential. Not recreation or aesthetics. There seems little doubt that the original forest or a naturally regenerated forest is more pleasing to look at or recreate in. There seems to be no possible way of justifying these practices.

Then why have the practices been used? The core of forestry professionalism, the central tenet of professional dogma, is sustained yield timber management. This concept was introduced into American forestry by early Chief Foresters Bernhard Fernow and Gifford Pinchot in the late 1800's, but it was developed and rationalized in the mercantile economies of Germany and France a century before that. These economies were characterized by stability, certainty, and via the prohibition of imports, a self-imposed scarcity.

The scarcity of natural resources, though self-imposed, was no less real, and thus natural resources were “conserved.” Labor and capital, relatively more abundant, were applied to timberlands. The management objective became the maximum biologically sustainable quantity of the physical product, wood.

With its implicit assumptions of scarcity, this dogma became the central dictum of professional forestry. As dogma it remains virtually unchallenged in American forestry education. The graduates of that education staff the Forest Service. We found much evidence that a major element in the Bitterroot Controversy was just this professional dogma. “Productivity” we learned time and again, meant maximum physical production of sawlogs. Much timberland was being harvested ostensibly to “get it into production.” The idea that a scraggy stand of overmature timber could and does provide *other* values was alien and largely absent from the thinking of most of the professional foresters we encountered: this in spite of their lip service to “multiple-use.”

If “productivity” is held to mean simply sawlogs at any cost then much of what we observed was wholly rational. We question seriously such a constrained definition. If “productivity” includes recreation, watershed, wildlife, and aesthetic values then much of what we saw cannot be rationalized at all. For certainly the idea that clear-cutting a forest to “get it into production” is similar to military rationale of destroying a town to save it. Clear-cutting and terracing, the technical means of regenerating timber stands, effectively eliminate a large number of alternatives or managerial options.

The first option that is foregone is the basic choice—whether to cut at all. Having decided to cut, the second option foregone is the choice of how much to cut. By striving to meet

an allowable cut set at the level of maximum sustainable volume yield, an inappropriate cutting program is almost guaranteed. It is unrealistic to assume that all the volume produced is suitable or properly available for cutting, or that it is economical to cut. It has already been noted that it may be uneconomical to regenerate and grow new stands of timber after clear-cutting. If economic parameters were built into the allowable cut calculations, it is clear that the annual cut on the Bitterroot Forest would be substantially reduced below current levels.

Consideration of economic factors also suggests that a variety of alternatives to clear-cutting and terracing should be evaluated. A partial list follows:

1. Removal of large timber by highgrading, leaving a residual stand that could be re-cut on a long cutting cycle of perhaps 40 to 50 years.
2. Cut the overstory but retain the understory for advanced regeneration, even if this means a timber species conversion or the necessity of accepting a low quality or low vigor second growth stand.
3. Use an even-aged cutting system (clearcut, seed tree, or shelterwood) *but depend on natural regeneration*, even if this means long regeneration periods and irregular stocking.
4. Make a more drastic distinction between high quality and poor quality sites. On the most productive and assessable sites, manage as *intensively* as economic conditions allow (even clear-cutting and artificial regeneration). On low quality sites minimize capital investments or postpone all cutting to some indefinite future date.

These, are similar alternatives, have one thing in common. They would reduce timber yields somewhat in both volume and value, but they would greatly reduce dollar investments (costs) in timber management and increase the yield of non-timber benefits. The improvement in economic efficiency (i.e. the benefit/cost ratio) would be substantial. Termination of the practice of clear-cutting and terracing would mean the public funds would no longer be invested in an uneconomical and unpopular program in the Bitterroot Valley. It would be consistent with the highest traditions of wise land management, and though it might be traumatic in the short run it would certainly be a credit to the agency.

Our Committee concludes that the practices of terracing on the Bitterroot National Forest be stopped as a general management tool. Further, we recommend that the existing terraced areas be carefully studied over the course of the next decade and that these existing examples be considered as primarily a research tool. Last, we recommend that where the decision is made to cut mature timber on sites of low value that the Forest Service defend the cutting not as timber management for sustained yield but as “mining” an existing natural resource.

What we seek here is a clear distinction between cutting timber as a step in timber *management*, and cutting timber as a *mining* activity. We do not categorically oppose such *mining* for reasons to be explained shortly; but to equate any timber cutting consistently and blindly with timber management is a gross professional error.

We see a need to reclassify timberland on an economic basis instead of on a physical, cellulose-quantitative basis. Land which is economic to manage for timber crops will return a decent rate of interest on capital invested. On this land, timber harvesting as a step in timber *management* is rational. But land which supports timber that is economic *only to cut* is not capable of earning a satisfactory return, in which case the harvest is tantamount to a mining operation. In other words, if we cannot afford economically to initiate, grow, and harvest a second stand of timber, then we are simply mining the first stand. At times this can be defended. But we must stop confusing cutting with management. We found a great deal of such confusion on the Bitterroot.

One consequence of distinguishing between management and mining has been referred to above: we recommend “managing” only the highest quality sites, investing in regeneration and protection costs where satisfactory rates or return can be demonstrated.

Another consequence of making the distinction would be to induce a very careful and deliberate sequence of choices on low quality growing sites. The initial decision, whether to cut at all, simply could not be made on the basis of “getting the land into production.” By definition, there would be no intention whatsoever of investing in post-cutting regeneration costs. Thus, the initial choice of whether to cut at all would need to be an analytical, stand-by stand decision, not a doctrinaire decision.

Given the decision to mine the timber on a low quality growing site, the next choice would be one of cutting methods. Since there would be no systematic concern for a subsequent crop of commercial timber, all silvicultural necessities could be ignored. If by clear-cutting and terracing we unwittingly sacrifice aesthetic values, game habitat, natural hydrology, and recreational values, the mining technique should be deliberately designed to protect or enhance these values. We mean, specifically, that the cutting method should protect or enhance the other values *on the site*. We heard many times that clear-cutting and terracing enhanced such other values on the adjacent hillside, or downstream, or over the ridge, and this is specifically what we do *not* mean. We believe that on-site, co-existing, simultaneous values need not be sacrificed. Sensitive, careful timber mining would avoid doing so. We recommend cutting on a single-tree selection basis. We would minimize the permanent road system, building low-standard, single-lane, one-time roads that would be seeded to grass and closed at the end of the timber mining activities. We would not terrace. We would not strip. We would not plant.

Such activity would rest very lightly on the land. Aesthetic values, natural hydrology, game habitat, and recreational values would remain virtually intact. Yet the residual timber value could be captured.

We see no reason to sacrifice non-timber values to silvicultural methods that have no economic rationale. Hence we suggest that a sensitive but deliberate timber mining activity be considered a legitimate alternative.

We heard many times that clear-cutting and terracing were necessary to control certain diseases—notably dwarf mistletoe—and to lessen the hazard of wildfire. Timber mining would not achieve either goal. But we are unconcerned, for the argument is unconvincing in the first

place: existing, commercial timber has grown in the face of these environmental factors. We suspect subsequent, “unmanaged” stands can do the same. A stronger case can be made on the basis of “whole forest” management. We are becoming increasingly aware of the beneficial effects of fire, for example, on other, non-timber values in the forest. We do not yet, and may never, see a positive value in dwarf mistletoe; but in regard to wildlife, watershed, and aesthetic values, it is at least neutral. Timber mining, one aspect of “whole forest” management, can withstand the fire/disease criticism with relative ease.

We realize these suggestions are unorthodox. We realize they are clearly antithetical to professional dogma; but that dogma has contributed substantially to the Bitterroot problem. We realize that the ultimate adoption of these suggestions is a matter of professional reorientation and may involve statutory modifications as well. We realize these things. Yet we propose these changes, convinced that superficial shifts in management practices will not suffice.

THE PROBLEM OF PUBLIC SERVICE BUREAUCRACY

Earlier we listed some of the sources of the conflict over management practices in the Bitterroot National Forest. The last item we listed referred to the changes taking place within our society. We would, at this point, like to comment in more depth on that point.

At large part of the Bitterroot Controversy results from the great disparity in values and objectives among the various groups involved in the Bitterroot. We doubt that the most carefully developed arguments will ever convince opponents of the appropriateness of some of the now practiced land management practices, e.g. clear-cutting lodgepole pine, terracing, or high standard road construction. Regardless of any developed fund of knowledge, research results, or even conditions of pure and simple fact, some of the groups involved in the Bitterroot National Forest are opposed to these land management practices under any and all circumstances; and nothing that can be said is likely to change their views, their positions or their unconditional opposition. At this point we must note that the crucial issue then becomes one of examining the process through which unpopular decisions involving public policy must be made.

The Forest Service like other complex organizations has developed a highly systematic, rational, routinized approach to problem-solving and decision-making based upon a programmatic definition of problems and solutions. While pragmatically quite defensible (it gets the job done) this approach overlooks many highly significant factors affecting the ultimate impact of policy and decision on people and groups not involved in policy formulation. Those most directly affected, in this instance the interest groups in the Bitterroot, have little reason to accept practices imposed upon them through bureaucratic decisions made elsewhere. They insist on being a part of the decision-making process, and their participation must be more meaningful than invitations to public hearings and briefing sessions.

Institutions and agencies currently are undergoing major changes in relationship between practitioners and clients, between purveyors of services and constituents. Resource management agencies in common with educational, religious, medical, and other service-oriented institutions are caught between the conventional, essentially conservative, bureaucratic structure of the past and the modernist conception of service as a two-way process. The patient today is insisting on

being fully informed about the diagnosis and prognosis of his case by the physician. The recipient of social aid insists on being part of the decision that affects him. The modern parishioner demands a reciprocal interaction with his priest or his pastor. Clients no longer are willing to receive passively whatever good the dispensing person or agency chooses to dispense. We can expect to see the acceptors of services increasingly demanding a significant role in the processes that affect their interest. There is no reason to expect the Forest Service to be exempt from this trend toward a more democratic participation in policy formulation and decision-making. The Service must realize that all significant interests in the communities affected by its policies must be involved. Moreover, this involvement must comprehend more than formal, but frequently superficial, operation of an information and education apparatus. The Forest Service must develop techniques which will include the various publics in the policy, formulation, and decision-making processes as these processes evolve. Inevitably this must mean occasional if not frequent, modification of preconceived course of action.

Bureaucratic structures such as the Forest Service not only alienate public support, they also inhibit effective exploitation of key personnel. In order to maximize local community resources and to attract local community support these persons in the Service most intimately associated with local community interests must be free to act. They require a latitude and a flexibility of operation which is denied them within the conventional bureaucratic structure. The person most sensitively located to relate constructively to local people is the district ranger. He represents the Forest Service. He makes administrative decisions within limits imposed by agency policy. By and large, the image he projects is likely to determine the way in which those within his district perceive the total organization. Yet his authority is severely limited and all too frequently his decisions and answers are bureaucratically determined. Despite reservations or frustrations that he may feel, his ultimate action is likely to be taken within the context of his supervisor's office and eventually of the regional forester's office. He is therefore denied the flexibility to meet issues and problems on an ad hoc basis. It might almost be said that his decisions are always predetermined, at least with respect to major issues and problems.

Since successful performances of bureaucratic roles, and therefore recognition and advancement, depends on definitions of performance that are bureaucratically determined, personnel at the district and forest level can scarcely be blamed for keeping this firmly in mind. That it acts as an impedance to public understanding and community participation is in a sense irrelevant. A ranger's future professional success is much more likely to be determined by judgments made within his organization than by judgments about the Forest Service and its management policies made within the community.

If our contentions are correct, and we believe that they are, then one aspect of the controversy involving the Bitterroot National Forest can be said to apply to the Forest Service more generally. The Forest Service as an effective and efficient bureaucracy needs to be reconstructed so that substantial, responsible, local public participation in the processes of policy-formulation and decision-making can *naturally* take place.

Last, it is our opinion that our comments in this final section come as no surprise to the Forest Service. It is our belief and opinion that the Service is engage in a serious process of self-examination. In that process of self-examination we urge consideration for the point of view that

stresses the most efficiency in providing effective public decision-making, even if internal bureaucratic efficiency must in some ways be sacrificed.

NEED FOR RESEARCH

The Bitterroot Valley, while unique in some specific ways, is really representative of a large part of the Rocky Mountain West. It is characterized by vast open space, low population density, an economy based on wildland resources, and a culture that is in transition from the “frontier” type with emphasis on exploitation to a more mature kind in which stability and environmental amenities are held in higher regard. Commodity resources (timber, minerals, grass, etc.) are increasing in value as the national economy continues to grow; but non-commodity resources (wildlife, aesthetics, recreation opportunities, etc.) are increasing even more rapidly in value as the national stock of these items dwindles and our affluent population puts more emphasis on the quality of life.

Thus we see the Bitterroot Valley faced with the same dilemma as so many other areas in the Rocky Mountain West—the need for more economic growth and development, but a strong desire to maintain or preserve a high quality natural environment. We need more wood products, but we want clean air and beautiful vistas. Herein lie the seeds of discontent, conflict and controversy. But, here also is an opportunity of life.

There is no reason to assume that economic development and environmental quality are mutually exclusive or irreconcilable. History and experience indicate that the problem is a difficult one—and we do not have the solution at hand. But, an objective appraisal of the situation leads to optimism, not pessimism. Trees can be cut without leaving an unsightly mess, roads can be built so that they compliment the natural beauty of the countryside, disturbed areas can be rehabilitated, people can use the land for recreation without destroying it—and so on. We have failed in the past, not because the problem is unsolvable, but because we didn’t recognize the scope of the problem, we didn’t utilize enough ingenuity, and we just didn’t try hard enough. In particular, we didn’t invest sufficiently in research and we didn’t make optimum use of the limited research information that we available.

The need for a more viable research program seems painfully obvious. For example, one can turn at random to almost any page in the Bitterroot Task Force Report and find either a statement of dubious validity, and admission of inadequate knowledge, or an overt plea for more reliable information. The writers of that report apparently feel that major improvements could be achieved by expanding the staff support available to decision-makers in the agency. But it is also clear that even staff experts would frequently be helpless because of the serious shortage of basic data concerning the resources and knowledge of the effects of man’s activities. A vastly expanded research effort is ultimately the only solution to the fundamental question—how can we use these wildland resources without having a deleterious effect on the natural environment?

It also follows, of course, that the research must be well directed, competently performed, and effectively disseminated. It should concentrate on areas of critical importance or where existing knowledge is weakest . . . e.g. watersheds, wildlife, and recreation (including esthetic considerations). It should also examine certain managerial matters, such as procedures for

formulating policy (e.g. how best to involve the public) and procedures for evaluating investment alternatives (e.g. economic analysis, systems analysis, etc.).

The Bitterroot Valley (and much of the Rocky Mountain West) is posing unprecedented problems, and we must have more and better knowledge if we expect to deal effectively with these new situations. This knowledge must come in large measure from organized research. Empirics, experience, and intuition will not suffice.

APPENDIX A—COMMITTEE ORIGIN AND ACTIVITIES

This report is addressed to the Montana Congressional delegation which requested a study of the Bitterroot conflict. Specifically, Senator Lee Metcalf asked the Dean of the University of Montana Forestry School to establish a study committee to examine the issues, the opinion, and the facts relative to the public controversy surrounding land management policies on the Bitterroot National Forest. To provide the basis for this report a number of things have been done during the past year.

1. A study committee was selected composed of the Dean of the School of Forestry, a wildlife research specialist, a quantitative sociologist with special interest in bureaucracy, a political scientist with a specialty in pressure groups, and a public policy economist. All members of the committee have substantial experience with the Forest Service and with most federal and state land management agencies, their past and current problems, and their personnel.
2. The committee made two major field trips to the Bitterroot National Forest and communities it encompasses, once accompanied by Bitterroot National Forest personnel and again by members of the Sleeping Child Water Users Association.
3. An aerial inspection of the Bitterroot National Forest was made by some members of the committee to examine the results of past and present management practices.
4. Individual visits to various portions of the Bitterroot National Forest were made by members of the committee.
5. The committee attended the Task Force presentation to the public and the Forest Service at Hamilton on May 11, 1970, and it attended the Task Force presentation to the supervisory personnel of the Bitterroot National Forest.
6. The committee met with major groups and principals in the controversy.
7. The committee considered carefully the documents relating to timber and other resource supply and use for the Bitterroot National Forest.
8. The committee examined in depth and in detail the Task Force presentation, "Management Practices on the Bitterroot National Forest April 15, 1970."

9. The committee studied the current accounts of similar conflicts in West Virginia, Colorado, Wyoming and other areas.
10. In a substantial number of meetings the committee met and argued at length all aspects of the controversy at all stages in its examination of the problems relating to the Bitterroot National Forest.
11. All members of the committee served without special compensation and at personal expense to each member of the committee.

APPENDIX B—ALTERNATIVE RATE CALCULATIONS

	Interest rate			
	3 percent	5 percent	6 percent	8 percent
Value at end of rotation (to earn indicated interest rate)	\$1,736	\$17,445	\$54,409	\$512,650
If yield were 20 MBF, stumpage would have to be (per MBF)	\$86.80	\$872	\$2,720	\$25,632
If stumpage were \$25/MBF, yield would have to be (MBF per acre)	69.4	697	2,176	20,506
To earn indicated interest rate, stand establishment would have to be accomplished with (per acre)	\$14.41	\$1.43	\$0.46	\$0.05

NOTES

- (1) Actual rate of return on regeneration investment under indicated assumptions—1.9 percent.
- (2) With modified but more realistic assumptions (establishment costs--\$75; annual cost for protection, administration, etc.--\$0.65 per acre per year; rotation—100 years; yield—15 MBF per acre; etc.): Rate of return—0.85 percent.
- (3) No matter how the assumptions are relaxed (e.g. assuming large yields, etc.) the rate of return cannot be made to rise above 2.3 percent (unless nonsense assumptions are used).

BIOGRAPHICAL INFORMATION ON THE SELECT COMMITTEE

The seven members of the Select Committee on the Bitterroot National Forest are members of the faculty of the University of Montana in Missoula. At the time the committee was established in December 1969 four members of the committee including the chairman were members of the School of Forestry and three members were from the College of Arts and Sciences. In July of 1970 one member of the committee, an economics professor, resigned from the College and accepted a position of Professor of Forestry in the School of Forestry.

1. ARNOLD W. BOLLE

Arnold W. Bolle has been Dean of the School of Forestry and Director of the Forest and Conservation Experiment Station at the University of Montana since 1962. He has served on the faculty since 1955. Research and publications have spanned the natural resources area including forestry, wildlife, watershed, outdoor recreation and product manufacturing. Primary area of interest has been in multiple use management and the development of plans and programs to meet changing future need.

He was awarded his doctorate in public administration from Harvard University in 1960 and also has a master's degree from Harvard in 1955, a B.S. in forestry from the University of Montana in 1937 and a B.A. in Liberal Arts from Northwestern College in 1934. He is acting Director of the Environment and Resources Analysis Center, serves on two committees for the

National Academy of Sciences, is past president of the National Council of Forestry School Executives, is a member of the Executive Board of the Association of State College and University Forest Research Organizations, is director and past president of several Montana resource organizations, and has served as advisor and consultant to several federal and state resource agencies. He is a member of many professional and scientific organizations: AAAS, Society of American Foresters, Wildlife Federation, American Forestry Association, Soil Conservation Society, Wilderness Society, Range Management Society, Phi Kappa Phi, Xi Sigma Phi, and others.

2. R. W. BEHAN

R. W. Behan, Associate Professor of natural resource policy and administration, joined the School of Forestry faculty in 1963. He had previously served six years with the U. S. Forest Service in the Alaska Region. At the time of his resignation, he was functional staff assistant to the Forest Supervisor of the Chugach National Forest, in charge of timber management, wildlife management, fire control, and multiple use planning.

Behan holds B.S.F. and M.S.F. degrees from the University of Montana, and has recently submitted his Ph.D. thesis to the University of California at Berkeley. It is entitled "Wilderness Decisions in Region I, U. S. Forest Service: A Case Study of Professional Bureau Policy Making.", and reflects Behan's interest in the processes of public policy making. He has published other research in journals of both the fields of natural resource management and of public administration.

He is a member of the American Association for the Advancement of Science, the American Forestry Association, the Forestry History Society, the American Society for Public Administration, the Society of American Foresters, and is a director and president of the Montana Conservation Council, Inc.

Behan, his wife Ann, and their three children live near the campus in Missoula.

3. W. LESLIE PENGELLY

W. Leslie "Les" Pengelly is Professor of Wildlife Management at the University of Montana. He was appointed to the University of Montana School of Forestry staff in 1963, after serving (1954-63) as University of Montana wildlife extension specialist. His time is divided between the School of Forestry where he teaches wildlife management courses and the School of Education where he teaches general conservation courses. He was recently appointed Coordinator of Environmental Studies Program for the University.

Prior to 1954, he was a research biologist for the Idaho Fish and Game Department, instructor at the University of Idaho, Moscow, instructor at Utah State University, and a high school teacher in Michigan. He also taught at the University of Alaska, Fairbanks (1968-69).

He earned his B.A. in biology from Northern Michigan College in 1939. He received his M.S. in wildlife management from the University of Michigan in 1948 and his Ph.D. from Utah State in 1961.

Dr. Pengelly has published several publications on ecology and wildlife. His research includes projects on fire ecology, wilderness ecology and the history of the Yellowstone elk herd. He has presented many papers on conservation issues at national conferences.

In 1967 he earned a national professional conservation award presented by the American Motors Company. He is a member of four national honor societies: Phi Sigma, Sigma Xi, Xi Sigma Pi and Phi Kappa Phi.

Active in public service, Dr. Pengelly gives many conservation talks at schools, service organizations, clubs and professional societies. He is nationally known for his ability as a speaker. He serves on many campus and forestry school committees.

His professional association memberships include the Wildlife Society, the Northwest section of the Wilderness Society and its Montana chapter, the Wilderness Society, Michigan Foresters' Association, the National Wildlife Federation, the Montana Wilderness Association and the American Association for the Advancement of Science.

Dr. Pengelly was born in Negaunee, Michigan in 1918. He and his wife Mary, have six children.

4. ROBERT F. WAMBACH

Dr. Robert F. Wambach, a 1957 graduate of the University of Montana School of Forestry, returned to his alma mater in 1967 as an associate professor of forest economics. He also serves as Associate Dean of the School of Forestry and Director of the Montana Forest and Conservation Experiment Station. Prior to his arrival at the University of Montana he was a Research Project Leader for the U.S. Forest Service (1959-67) in Minnesota and Michigan; and before that he spent five years in the U.S. Air Force as a Russian linguist.

Dr. Wambach studied forestry at the University of Michigan (1948-50). He attended Syracuse University (1952-53) and received a certificate in Russian Area Studies. Returning to forestry, he attended the University of Montana (1955-57) and received his B.S. in forestry. He received his M.F. in forest managements from the University of Michigan (1959) and his Ph.D. from the University of Minnesota (1966).

He is the author of numerous technical bulletins and articles which have appeared in scientific journals. He is considered an authority in the fields of forest economics and management science, and is called upon frequently to lecture on these topics at other universities and at regional and national meetings.

He belongs to several professional, honorary, and scientific societies, including the Society of American Foresters, American Economic Association, American Association for the

Advance of Science, Xi Sigma Pi, Gamma Sigma Delta, etc. Dr. Wambach serves on numerous professional academic, and civic committees, including the Montana Environmental Coordinating Council, the Montana Water Resources Research Council, the University Faculty Senate, and the Intermountain Fire Research Council.

Robert Wambach was born in 1930. He and his wife Carla, have three children. They make their home in Missoula's Rattlesnake Valley.

5. GORDON BROWDER

Gordon Browder is Professor of Sociology and Executive Director of the Institute for Social Science Research. He was the first chairman of the University's Department of Sociology serving from 1948 through 1967. During the past 22 years Professor Browder has served on virtually every significant University committee including being chairman of the faculty's governing body the Faculty Senate.

His education and experience prior to joining the University of Montana in 1948 include graduation from the public schools of Dinwiddle County, Virginia; receiving the B.A. in English from the University of Virginia in 1935, and the M.A. in Sociology from the University of North Carolina in 1941. Further graduate work in sociology led to his receiving the Ph.D. in Sociology from the University of North Carolina in 1943. He has served as Research Associate for the Bureau of Research in the Social Sciences at the University of Texas, instructor in sociology for the U.S. Army University at Shrivenham, England following his service during the war in the Infantry, and taught sociology at the University of Florida during 1946-48.

Browder has published regularly and widely during the past 30 years. His publications center around his interest in criminology, demography and conservation of human and natural resources. He is a member of the American Sociology Association of which he is a Fellow, the Pacific Sociological Association, the Rocky Mountain Social Science Association, the American Association for the Advancement of Science, and the Montana Academy of Sciences.

He is a member of the Region 1 Advisory Council, the Governor's Crime Control Commission, the Governor's Task Force on Indiana Problems, and serves on the Board of Directors of the United Givers of Missoula. He is also a member of Alpha Kappa Delta, the national sociology honorary, Pi Mu Alpha, the national social science honorary, is listed in *Who's Who in America*, *Who's Who in the West* and in *American Men of Science*.

Browder was born in Petersburg, Virginia in 194. He and his wife, Alice, have three sons.

6. THOMAS PAYNE

Thomas Payne joined the University of Montana faculty in 1951 as a member of the Political Science Department. He is a graduate of Westminster College in Fulton, Missouri (A.B. 1941), and received his graduate education in political sciences at the University of Chicago (A.M. 1948, Ph. D. 1951). In recent years he has been President of the Northwest

Political Science Association as well as Vice President. He is a member of the Executive Council of the Western Political Association and a member of the board of editors of *The Western Political Quarterly*.

At the present time Professor Payne is on a sabbatical leave in Washington, D.C. He is continuing his research in pressure groups and their impact on Montana. His research and publications during the past twenty years have centered upon the political processes in the West, especially within Montana.

Thomas Payne was born in 1920 in Fulton, Missouri. He and his wife, Katie, reside with their two sons in Missoula.

7. RICHARD E. SHANNON

Richard E. Shannon has been a professor of economics at the University of Montana for the past 14 years. On July 1, 1970 he became Professor of Forestry and Director of the School of Forestry's Master of Resource Administration program. He is the chairman of the School of Administrative Leadership which celebrated its Silver Anniversary during 1970.

Professor Shannon received his undergraduate degree in economics from William Jewell College in Liberty, Missouri. His graduate degrees were conferred by the Ohio State University in 1950 and 1955. Prior to joining the faculty of the University of Montana he taught at Ohio State, Michigan State and Kenyon College. He is a member of The American Economic Association, The Royal Economic Society, regional associations, and American Forestry Association.

He is the author of several economic monographs involving public finance, economic growth, state and local planning efforts and similar topics.

Shannon was born in Hardin, Montana in 1926. He has lived in various parts of Montana. He and his wife, Gerry, have three daughters.

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