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Ames Forestry Club

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Forestry is Looking Into the Future
through the 1980 Ames Forester

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FROM THE EDITOR’S PEN

. . . I have no fear of tomorrow for I have today and I have seen yesterday. . . .

Last Year the ISU Forestry Department celebrated its 75th Anniversary. It was a fun year of reminiscing and reflecting on our past growth. However, it is important that we don’t dwell on our past. A new decade is here, inviting us to evaluate where we are now and plan for the future. The theme for the 1980 Ames Forester is “Forestry Is Looking into the Future.”

We feel honored to have the 1980 Ames Forester dedicated to the PLANT IOWA PROGRAM by the Honorable Governor Robert D. Ray. The A.F. staff invites you to celebrate the future by planting a tree today. Not only is this a special year for Iowa, but it is also the 75th anniversary of the United States Forest Service. According to R. Max Peterson, Chief of the Forest Service, “The goal is to plant 75 million more trees in 1980 than were planted in 1979. In this way, people can give themselves and their country a living, lasting present.”

The professional articles are exploring the future by looking at some of the issues and changes in the forestry field during the 1980’s. Many thanks to the authors who contributed time and effort to write these articles.

I am grateful for the patient help and support of my dedicated staff, the ISU Forestry faculty, and Robert Schwartz of the Iowa State University Press. The generous financial support of patrons and advertisers is also appreciated.

The growth of forestry in Iowa should be of interest to both alumni and students. The paths from the forestry department lead in many directions. In our diversified profession, graduates find challenge, satisfaction, a continuation of the learning process, and, hopefully, a job. The 1980 Ames Forester supports forestry in Iowa, close ties between students, faculty and alumni, and the success of the individual forester.

Because of the solid 75 years our forestry department has had and the healthy state of the department and students now, I feel safe in saying that we have our roots firmly planted in the future.
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FORESTRY IS LOOKING INTO THE FUTURE BY PLANTING TREES TODAY.

As we look into the '80's we see a state, and a country, that is healthy, living... greener than today.

For this to be so we must act today. It takes time for a tree to grow... So Plant today.
Foresters and Friends:

It is a pleasure for me to assist in dedicating this 1980 issue of the Ames Forester to the "Plant Iowa Program".

This project is designed to involve every county and thousands of people across the state in a voluntary effort to plant several million new trees and shrubs this year. Green plants and trees do so much to enhance Iowans' quality of life. In addition to their natural beauty, they help conserve the soil, break winds, provide sound barriers and assist us in saving energy. And, plantings made now will have benefits lasting well into the 21st Century.

The commitment of the Forestry Club to enhancing our environment is well known. The seventy-five years of forestry education at Iowa State University underscores the interest of students, faculty and alumni in improving our woodlands. Now we have another opportunity to further our common goal.

Your assistance and participation in the Plant Iowa Program as well as that of all Iowans will result in making our state an even better place to live and grow.

Sincerely,

Robert D. Ray
Governor

RDR:pw
Iowa Woodlands

by Gary Hightsorie

WHAT is now the state of Iowa was first surveyed between March 1832 and August 1859. Based upon this original United States Land Office Survey, it has been estimated that 29,412,550 acres (62 percent) of the total state land area was covered by tall prairie grass at that time with the remaining 6,680,926 acres (18 percent) in forest. Today, less than 2,942 acres or 1/10 of one percent of the Iowa landscape remains in prairie. The state forest resource has likewise decreased. A comparison of forest in Iowa at the time of settlement and at present illustrates a dramatic reduction in acreage. Our forest resources continue to be diluted and jeopardized by commercial, residential, recreational and agricultural development pressures. Projected demand threatens the health and survivability of our remaining forest resource.

The remnants of Iowa's forest persist at quarry spoils, along some fence rows, lining creek beds, in wooded pastures, in savanna-like landscapes, or in the complex woodlands of the river corridors. The forest areas of Iowa offer a multitude of values ranging from watershed erosion control and wildlife habitat to recreational, aesthetic and spiritual.

Permanent forest cover protects soils and water resources along our river corridors by decreasing soil erosion and water runoff. The removal or disturbance of forest areas greatly increases erosion potential. The effects of cutting, clearing and grazing practices on soil and water resources must be of a primary consideration to future forest planning and management.

In a state which so intensively uses every available acre for crop and livestock production, suitable habitat for wildlife is at a premium. Although some wildlife species have adapted to agricultural landscape, the majority of species depend on the remaining four percent of the states forest lands. The once continuous wooded river valleys which provided travel corridors for wildlife have been fragmented into scattered islands impeding wildlife movement. The vulnerability of these island habitats must play a critical role in future forest planning and management.

Our forest landscapes with their variety of wildlife, topography, geology, water, scenery and plant resources are popular settings for many of our recreational activities. Compatible uses include hiking, fishing, controlled hunting, wildlife observation and nature education, to name a few.

If the availability of gasoline and petroleum supplies become increasingly limited and consumer costs continue to rise, then leisure time recreation demand will shift from interstate to greatly increased "in" state visitation of natural areas. Peak weekend vacation use is projected to increase greatly resulting in a potential "crisis" in local recreation demand. It is not that existing parks and recreation areas cannot hold all who come, but that after a certain saturation point the health and survivability of the natural area becomes jeopardized.

It takes more than towns and railroads and cornfields to make the state of Iowa a pleasant place in which to live. It is the natural places of beauty which offer aesthetic, physical, educational and in the broad sense, religious values. As we gain an understanding of these environments we will come to respect the role that our natural forest communities play upon the landscape which enriches our daily lives.

It becomes obvious that a high planning and management priority must be assigned to our remnant forests. It is only this small proportion of the state that can provide suitable environment for our wildlife, recreation, aesthetic and spiritual needs. Unfortunately, the very attributes that make these areas suitable and attractive for these uses are the same attributes that attract nonconforming land uses such as residential, commercial and agricultural development. The principles of sound land use management based upon land capabilities dictates generally that residential, commercial and agricultural development locate outside of the immediate forest corridor area. We must learn to facilitate maximum use within the limits of the resource, in order to assure future generations that the resource will be available for their stewardship. In economic terms the value of one acre of Iowa forested land (Iowa ranks 41st in the nation in total forest area) must represent ten or twenty times the value of that same acre if it occurred in a state containing a large proportion of forest. In essence, Iowa's forest lands have a value under rated and misunderstood by most of her citizens. In a time of material and energy crisis, the erroneous concept that food, water, soil, lumber and fuel are inexhaustible and that local supplies are plentiful is still a dominant feature in the thinking of many Iowans.

Threatened with exhaustion of our natural forest heritage, it is imperative that the citizenry of this state at last awaken to the necessity of protecting what is left. In this time of energy and environmental crises, our incentive to protect all that we can has never been clearer, nor the opportunity to do so more favorable. We still maintain the advantage over more ancient cultures to protect as many remaining examples of our original forest communities as we can, but time is running out.

Not only must our remaining forest lands be protected, but replacement plantings could be encouraged in areas thinned or degraded by development. Much of our present woodland has a life expectancy of only one generation because the seedling habitat beneath the canopy has been significantly modified or eliminated due to grazing pressures by domestic animals and by the replacement of the forest floor with lawnscape in residential areas. In these areas only the parent canopy remains. The natural regeneration of these woodlands has largely been ignored. Is it possible for man to rebuild these disturbed harmonies from their nakedness and restore the ancient fertility, productivity, and healthfulness which took nature centuries to create?

The reestablishment of an acceptable balance between the two most broadly characteristic distinctions of Iowa's landscape, woodland and plow land, is admittedly a utopian goal. The following message presented by Harriett S. Kellogg in 1919 to the citizenry of Iowa embraces our contemporary challenge and aspirations for the future of our forested landscapes:

"A natural woodland carpeted with a mosaic of wild flowers appeals to each individual according to his inherent traits of character. One estimates it in terms of cord-wood and acres; another vanishes all utilitarian ideas, seeing it only as a most glorious heritage to be preserved that future generations may also enjoy its beauty, while the third correctly imagines a golden mean where in both the utilitarian and the man of sentiment may be satisfied."
Forestry is looking into the future through issues and changes in the 1980's.
Timber Supply

by Marion Clawson

"Supply" is a word widely used, hence one with several meanings. A meaningful and unambiguous exchange of ideas between us on the subject of timber supply requires some initial definitions of terms and concepts. At the minimum, we must distinguish between shortrun timber supply, or the ability to harvest timber from a presently available stock, and longrun supply, or the ability and willingness to grow timber for future harvests. I have preferred to call these "willingness to harvest" and "willingness to invest in growing" timber, to measure human reaction rather than biological potential. Some trees will grow without Man's help and indeed some will grow in spite of almost anything we may do to try to prevent them. But investment of capital, labor, and management capabilities will increase timber growth for potential future timber harvest. At any given moment, our timber supply is limited to that volume and those kinds of trees which have grown in the past and are now standing.

For each of these concepts of timber supply, there is (a) a physical or biological or ecological dimension, such as identification of timber species, measurement of timber volumes, descriptions of tree sizes, and measures of timber quality; (b) a technological factor, or the ability to use particular species, sizes, and qualities for end products which we want; and (c) an economic factor, or a demand for particular kinds of wood which give the physical volumes some value. The latter clearly depends on the kind of uses we seek to make of the timber—some will be usable, some will not be for any particular use. The economic dimension also includes a locational factor, since timber in remote locations have little or no usability for a particular purpose in a particular place.

AMEs FORESTER

The domestic demand for industrial wood will continue to increase. Also competing demands on forests for other purposes will increase. However, the U.S. has a substantial capacity to grow more timber than we are now growing. This challenge will continue to make forestry an exciting profession.

Jamestown, 1607

When the first permanent settlement in the eastern United States was established at Jamestown in 1607, almost exactly half of the area now contained in the 48 contiguous States was in what the Forest Service today defines as "commercial forest," meaning forest land that can grow 25 or more cubic feet of industrial wood annually in a fully stocked natural stand at about the age of maximum mean annual increment of growth. The term "commercial" does not mean that timber can be grown profitably. These natural forests were vast in area; given the slow travel on foot or by canoe, which were the only possible means of travelling through the forested regions in those days, they were indeed "endless," as they were often described. They contained many species of trees, individual trees were often very large, and the volume of standing wood per acre was very high. In purely physical terms, the shortrun supply of timber was very large. In economic terms, much of this timber had no value—in fact, much of it was worth less than zero, in the sense that the land cleared of forest was more valuable than the same land with a forest stand.

These forests were generally at the maximum stand volumes which the species, the climate, and the site generally would support. There was little or not net growth of timber; growth did occur but it was largely or wholly offset by timber loss from decay, storm, insects, and fire. There was a great longrun supply possibility, yet no actual longrun "supply" because there was no net growth.

1800 to 1920

This original forest situation had changed but little by 1800. There had been local use of logs for building houses, local sawing of timber, local use of wood for fuel, and even some export of pine logs for masts in sailing ships, and some other limited use of wood. But most of the originally forested area was undisturbed as late as 1800.

The 19th century was the period of the greatest westward expansion in American history. "Westward the course of empire takes its way." By 1920 approximately half of the original "commercial" forest had been cleared; much of the cleared land had gone into farms, or towns and cities, or used for rights of way for roads and railroads. On the land remaining in forest, or where the timber had been cut but the land was in the process of going back to forest, the volume of standing timber had been reduced by about half also. The forest harvest methods and practices of this long period were brutal even by standards of the day and would be considered extremely so today. Fires were encouraged or set and forest regeneration was not desired. There was a general belief that the land would go into farming and that it would be more valuable without the trees than with them. Given this assumption about future land use, many of the actions taken were sound and sensible. The major mistake was in misjudging the farming potential of many areas; much land that could grow trees was prevented, at least for a time, from doing so. At the then low prices for timber, there was little or no economic incentive to invest in timber growing.

During these decades, the shortrun timber supply increased in economic terms while at the same time it was shrinking in physical terms. It was also increasing in technological terms, as lumbermen learned how to use increasing varieties, sizes, and qualities of logs. Because tree growth was so delayed on the lands cut for timber, the longrun supply of timber increased very slowly through these several
decades. From a net growth of essentially zero in 1800, the volume of wood growth increased to 1920 at about six billion cubic feet of industrial wood annually. During the long period 1800 to 1920, timber harvest exceeded net growth of timber every year. Standing volume of timber was being reduced. The latter years of this period, the cry of "timber famine" rose. Much of the prevailing foresters' concerns over impending timber shortages arose because of this 1800-1920 experience.

1920-1977

History, especially forest history, rarely shows sharp breaks from one period to another; rather, there are gradual changes in trends which become apparent and importantly large only after some years. Nevertheless, 1920 marks a significant turning point in forest history, in part because vastly better data about American forests began to be accumulated at or after this date.

Since 1920, the area of land in "commercial forest" has been approximately stable, especially as measured against the extensive net clearings of the earlier decades. Some forested land continues to be cleared for farming or other purposes and some commercial forest is set aside in national parks, wilderness areas, or other designations which prevent timber harvest. But some previously farmed land has reverted to trees. The movement of land into and out of forests has left the area of commercial forest at about 500 million acres for the past sixty years.

The volume of standing timber continued to decrease after 1920 for perhaps another 25 years, but in the past 35 years the volume of standing timber (all species, all grades) has risen by about 50 percent. The data are not available for every year and there are some differences in definition from one date to another, so one must be a little tentative about just when these changes occurred or about just how large they were. At every date through this period, the shortrun supply of timber was fully adequate for the harvests taking place; because volume of timber stand rose, the shortrun supply of timber was also rising during this whole period.

The most significant change since 1920 has been the great increase in annual growth of wood, from about 6 billion cubic feet in 1920 to nearly 22 million in 1977 (the latest year for which data are available). This was the increase in longrun timber supply which we described at the beginning of this article—the willingness of timber owners/managers to grow more timber for future harvests. This greatly increased annual growth of timber was made possible only by the large scale timber harvest of the 1800-1920 period. That is, until the old growth stands which dominated the picture in 1800 had been cut, net growth of timber was necessarily low or zero. Everyone at all informed about forests knows that we cannot indefinitely cut more timber than we grow, because doing so reduces timber inventory, ultimately to zero; but fewer people seem to realize that one cannot indefinitely continue to have net growth of timber in excess of harvest, for this leads to an inventory accumulation to the maximum the species and the site will support. The harvest of timber 1900 to 1920 was a necessary prelude to the increased growth of timber 1920 to 1977, but this does not make sensible all the timber harvest practices of the earlier day. With just a little more care, and without significantly more investment, subsequent timber growth could have risen much earlier and probably faster than it did.

Throughout the long period from 1800 to date, foresters as a profession have seriously and repeatedly underestimated future growth potential of American forests. In 1933, in the "Copeland Report" the Forest Service made the most careful analysis of the forest situation that had ever been made to that time; it estimated the ultimate biological capacity of all American forests under intensive forest management to be the growth of 17 billion cubic feet of wood annually. By 1970 that growth had been exceeded and by 1977 it has been exceeded by nearly 30 percent. Other estimates of future timber growth have been equally too low. While the specific estimates have been made by the Forest Service, foresters as a profession have only infrequently protested the inaccuracy of these projections. Men whose forestry training and experience was dominated by the long period of forest depletion have found it difficult to visualize the future possibilities of timber growth.

Present Forest Situation in the United States

The United States today possesses a great wealth of timber, in substantial stands which vary in different parts of the country, among ownership classes, and by types of timber. A detailed account of this timber wealth is beyond the scope of a single short article, but the shortrun availability of timber—the shortrun supply, if you prefer that term—is high. The timber owners of the country vary also in their willingness to sell timber from inventory and in their willingness to invest to grow more timber for some future harvest. Again, a detailed account of the numerous and varied situations is beyond the scope of a single short article.

But it is highly significant that timber growth for all species for the United States as a whole exceeded timber harvest in 1977 by about 50 percent. The growth/removal relationship varied considerably between softwoods and hardwoods, by regions of the country, and among the different forest ownership groups. This favorable overall situation masks the many less favorable trends by timber size and continued on page 29

Marion Clawson received his B.S. and M.S. in Agriculture in 1926 and 1929, respectively, from the University of Nevada, his Ph.D. in economics from Harvard University, 1943. Clawson has been employed by the Agricultural Experiment Station, University of Nevada, Reno, Bureau of Agricultural Economics USDA, Bureau of Land Management, Economic Advisory Staff, Jerusalem, Israel and at the present is a consultant for Resources for the Future, a nonprofit, private research institution. Clawson has also contributed about 40 chapters to books edited by others, plus numerous professional journals.
Management of commercial forest resources in North America has undergone two transitions and is about to undergo a third. First is the transition from old growth to second growth which is akin to moving from a "coal mining ethic" to a "hunt and gather society." Second is the transition from second growth to managed forests. While some old growth still exists, commercial forestry is essentially at the forest management stage. The next transition will be designed forests.

by William R. Bentley

The highest economic payoffs to forestry research in the next decade or two will be the design of future forests. I make this prediction for two reasons. First, research always pays more for solving tomorrow's problems rather than today's or yesterday's. Second, North American forestry is entering a key period of transition.

Transition

When Europeans first colonized the New World, forests were a barrier to settlement. Clearing the land was laborious and often discouraging. Wood was a basic construction material, but frequently trees were not considered a resource. By Revolutionary times, some American forests had become resources. The Broad Arrow policy, which reserved tall, straight white pine for masts in the Royal Navy and similar policies for southern white oak to make hulls, were among the many factors which precipitated a break with England.

Over the next century, old-growth forests were exploited to develop the agricultural and industrial wealth of America. Forests were a cheap, green coal mine which were believed inexhaustible. Only after the Civil War did some eastern leaders perceive that timber famine was both possible and avoidable. Discussions began about the strategic tradeoffs between today and tomorrow.

Then began the transition from old-growth exploitation to second-growth management. Protection from fire and trespass was management's primary function. The economy of second-growth management is like a "hunt and gather society:" trees are harvested with little thought of future needs, and equilibrium exists only when, by chance, growth and harvest are equal. About 1950, the effect of the remaining old-growth on stumpage values abated and second-growth values rose rapidly in anticipation of future supply/demand relationships. By 1970, precommercial spacing, fertilization, and reforestation were common practices.

In the South, the Third Forest was recognized as a resource which was fundamentally different than the old-growth and old-field second-growth forests. The forest could be managed from regeneration to harvest! Recognition of this management potential in the South, Pacific Northwest and East signaled the opportunity to design future forests.

Forest Design

A creative profession is distinguished from less mature endeavors by the design activities of its practitioners. Diagnosis and prescription writing, as well as competent implementation of prescriptions are the core of forestry and other professions. Design, however, enables the profession to both respond to changes and cause changes. Design leads to new alternatives. Some new alternatives yield more desirable results in changed social or ecological environments. Over time, the social and ecological environments also respond to new forestry designs. Design efforts will be more productive if they anticipate possible dynamic interactions over time.

Modern agriculture, especially agronomy, is most unlike "hunt and gather" systems in its basic precept—cooperation. Early cultural systems adapt to what is perceived as nature's competitive model. Survival of the fittest is used as a crude explanatory model for what nature has selected. Man speeds up the selection and breeding processes, simplifies the ecosystems, and eliminates as many pathogens and pests as possible.

A modern cornfield represents a major step beyond a competitive model. Space in the physical sense of area plus light, water and nutrients is fixed. Breeding and other cultural practices optimize the individual plant's use of space in terms of corn produced. The plant does not produce more corn, however, by "invading" the space of its neighbor, so the whole cornfield produces maximum possible yields.

Foresters are applying this kind of thinking to the design of future forests. There are interesting and conflicting thrusts in the possible designs.

One obvious theme is uniformity. As is true in agriculture, uniformity leads to more rational harvesting and processing stages. Highly mechanized harvesting systems, automated sawmills, and other future images created by engineers usually require more uniform raw materials. The agronomic model of an Iowa cornfield, while not easily duplicated in forestry, is a possible and appealing design. Straightness and roundness continued on page 29

Bill Bentley has been Manager of the Forestry Research Division, Crown Zellerbach Corporation since 1976. Prior to his appointment he was Bullard Fellow in Forestry at Harvard University. He served on the forestry faculties at Michigan and Wisconsin and was on the Iowa State faculty from 1963 to 1966. Bentley earned his B.S. and Ph.D. at California and MF at Michigan.

1. Much of the original thinking presented along this line was done by Dr. John C. Grodon, who was professor of Forestry at Iowa State from 1970 to 1977. See the two Iowa State Journal of Science collections he edited in 1974 and 1975 on intensive culture of forest crops.
Small Private Woodlands; The Hope of the Future

by Leon S. Minckler

There are more than four million private nonindustrial woodland owners in the lower 48 states of the United States. They own 300 million acres or 59 percent of the potentially productive forest land. In the eastern part of the country the proportion of forest land in small private holdings is 73 percent. In the Northeast and the Lake states 56 percent of these holdings are owned by non-farmers such as teachers, doctors, lawyers, businessmen, hunting clubs, and just plain citizens who love the outdoors. Most of the remainder is owned by farmers. The average holding is small but in all they contain 38 percent of the commercial timber volume. Thus, the small woodland owner controls a major portion of both timber supply and the environmental values such as wildlife habitat, recreation, pure water, and aesthetics. It is time that we realized these facts and promoted an effective partnership between the woodland owners and the public to attain both the timber and the environmental values, while at the same time preserving the forest-soil-site-water ecosystem.

What do most woodland owners want from their forest? Most of all they want a forest environment, or they want an investment. Most also would like money from selling timber if this can be harmonized with the environmental values. But, in general, modern owners will not destroy or unduly mutilate their woodland merely to obtain quick timber dollars. Consequently, many refrain from cutting trees because they do not understand that timber values and environmental values can go hand in hand. Indeed, proper silvicultural practices can usually enhance the diversity and health of a forest, can improve wildlife habitat, and provide a more attractive forest environment. This is why some of us have used terms like “environmental forestry” and “ecological forestry” to stress the fact that integrated multiple uses from forests are possible and practical. It has been a professional failing that so far we have been unable to accomplish much in this regard.

Along with a better understanding and regard for “environmental forestry,” woodland owners may need government assistance such as tax incentives, management plans, marketing information, cost-sharing programs, and long-term loans. In the long run the vast areas of privately owned forests will be managed for the benefit of the owners and the people. The small private woodlands are indeed the hope of the future. They should be the top priority for the forestry profession.

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In the past most small woodlands have hardly been managed at all. The better merchantable trees of all sizes have been cut, the poor and cull trees have been left, and no positive measures taken to encourage regeneration. It is a tribute to the recuperative powers of eastern forests (especially hardwoods) that they have recovered so well. For the most part the woodlands now contain an adequate base of “good growing stock” trees from which to start management. This is the crux of our aim of good management without big outlays of money for artificial regeneration, including site preparation and planting.

There are three basic activities in silviculture; modification of existing stands, providing space for new regeneration in existing stands, and establishing new stands by artificially seeding and planting (reforestation). I will not cover reforestation in this report. I will cover management of existing woodlands.

Modifications of existing stands includes thinning to reduce density and stand improvement to eliminate cull and other low quality or undesirable trees (for the objectives of management). Foresters call this intermediate cutting. Other types of modifications include conscious efforts to enhance diversity, wildlife habitat, scenic quality, watershed protection, and sanitation. All these
operations require a high degree of professional skill.

Providing space and suitable conditions for new regeneration are regeneration cuts; the silvicultural systems are named according to these methods, for example, group selection and shelterwood. To do this job correctly requires a knowledge of the forest and the trees that constitute the forest. This means the density, diameter distribution, and species composition of particular management units (same ground action and record keeping). Management also requires a knowledge of the quality of the individual trees. This can best be judged by use of tree classes. I have used six tree classes as follows: (1) good growing stock, (2) mature crop trees, (3) low quality but sound trees, (4) high risk trees, (5) cull trees, and (6) wildlife or other special purpose trees. In small woodlands with multiple purpose objectives the owner will want to preserve the woodland as an existing and standing forest while at the same time improving the quality for timber and the diversity for wildlife and aesthetics.

The use of tree classes allows a combined operation to improve the woodland and provides space for regeneration at the same time. For example, mature trees, low quality trees, high risk trees (includes thinning), and most cull trees would be cut for wood products. The growing stock trees and the special trees would be left to grow or to provide habitat. Such combined operations allow maximum opportunity for increasing stand quality and providing space for regeneration. This would usually be some form of group selection with opening diameters at least one to two times the height of surrounding trees. Openings can be larger, or patch clearcuts used, if trees in the “cut” classes indicate this by their number and distribution on the ground. There should be a conscious effort to make openings for regeneration large enough. If enough good growers are present to stock a particular place, do not worry about regeneration on that spot. Professional help is required for these rather complex silvicultural operations.

It is obvious that an inventory of each management unit (the whole woodland or a logical part) will be required before each marking of trees to cut, or to determine whether a cut is needed. The inventory should include the following information:

- species, diameter breast height and tree class. Species may sometimes be grouped as, for example, “black and red oaks.” If tree volume is desired each merchantable tree should be tallied by log lengths to the nearest one-half log. A log length is 16 feet. Volume is then computed from volume tables; for example, a 22-inch tree with 2½ logs contains 434 board feet International scale.

- Inventories can be made by a forester using point sampling. A layman can inventory a small woodland by estimating diameter to the nearest 3 inches; i.e., 5-7, 8-10, 11-13, 14-16, 17-19, etc., and tallying all the trees. This will eliminate sampling error and give the species composition, diameter distribution, and tree quality (tree classes) of the woodland. Use a lime sack to mark trees tallied. Two men can inventory 30 acres in a day to a day and a half. This inventory will tell you whether to cut now, what trees to cut, and how much. You will also have a knowledge of wildlife and other special trees on the woodland.

- There should also be an appraisal of seedlings and saplings in openings which are free to grow; not overtopped. These will quickly grow into pole sizes (starting at 4-6 inches) and be inventoried.

- The size of an operable harvest depends on local market conditions. Usually logging operators like to cut at least 1000 bd. ft. per acre. A well managed forest on average sites will grow 150-200 bd. ft. per acre annually. Thus, a 10-year cutting cycle would be easily possible.

- All these measures will lead to sustained yield as it should be understood. This means a continuous yield from the woodland of timber, wildlife, pure water and recreation. But timber yield will not be annual and it may not be exactly the same from cut to cut. The concept is not one of rigidity but rather of a continuous flow of the woodland values, usually of increasing values. Let none tell you that sustained yield is not possible on small private woodlands.

Following are the essential management steps required to properly manage a woodland:

1. Determine in your own mind or in consultation with a forester the objectives of management.

2. If indicated, divide the woodland area into management units based on the character of the forest and site quality. For example, an area recently cut over and occupied by saplings and poles would be separated from an area of old growth. You will need at least a rough sketch map. Obtain the approximate area of each unit.

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A typical unmanaged upland hardwood forest in the midwest. The forest is uneven-aged and contains many species and classes of trees. Good growing stock trees should be left, but mature, low quality, high risk, and cull trees should be cut to benefit the existing stand and, if enough non-growing stock trees are present, provide group selection openings for new regeneration.
The Ghosts on my Tree Farm

by Lawrence M. Gibson

Back in the ages birchbark canoes slid up and down the South Fork of the Flambeau River. They came to a little meeting of a small spring fed creek. On both sides of the creek stood towering white pine. On the south side was a narrow high point up a steep twenty foot bank. The other side dropped as steeply to the swamp. On this point, one hundred by two hundred feet, stood at least forty huge pines. Canoes were parked on the shore and moccassin clad feet padded up the short trail to the fire spot. Oh, if only pine stumps could talk! Wood was gathered and a fire was built on the old fire spot. The soil is black with charcoal three inches deep on a fifty foot circle. The ground was bare under most of those huge pines except for a pine needle bed outside the fire spot. There was venison jerkie, wild rice and dried berries to eat.

A raven flew over the tree tops. An eagle soared down the river looking for fish. Wild ducks quacked up the creek in the swamp. Perhaps a deer came to drink. It may have been a hunting party, a food gathering group or a group going visiting. They all used this convenient and beautiful, sheltered spot to rest. In those times there was not a very large population of people in this area. There were not many deer in the virgin forest and food was scattered, and took a lot of time to collect.

We see our ghost party load their canoes and depart. Now all is quiet and the birds, gray jays, blue jays, chickadees come to pick the bones, and a skunk wanders past. A family of otters comes down the river and stops to investigate the creek. A muskrat carries a cattail stock down the creek from the swamp to his home on the river bank, then a fish jumps in the river. I look up through the branches of the one huge pine now standing and think how all things change for better or worse.

For how long those ghosts used the camp on my Tree Farm will never be known. How many times in history had those huge pines lived their two hundred years, disappeared, and new ones taken their place?

Before 1700 A.D. white man had penetrated this area, so late one afternoon a large canoe floats to a landing and two white men come up the trail. They were dressed in buckskin like the other party. The main difference was that most of their white skin was covered. I assume they spoke French. It would be hard to tell because they were as quiet as the previous visitors. They did have a different smell.

Their canoe was much more heavily loaded and they brought much more to the camp site. Maybe they intend to stay a few days. They had guns and traps. They cooked supper including a pot of tea, then rolled up in blankets under the pines. At daylight they were up, had a pot of tea, then went off on a faint trail around the swamp. Furs were their objective. They were gone till late afternoon then returned tired and spent, and empty handed. A storm brewed and they sat close to a pine tree as shelter from the rain. Sunrise was bright and clear. The trappers left early with their wet blankets spread out to dry on the canoe. Nature then returned to normal. So it went at the camp site for another one hundred and fifty years.

By 1840 there was more traffic on the river. The sound of the saw and the axe were forever creeping closer. A large party of white men came up the river one summer day. They were timber scouts and surveyors. They walked the shallow rapids at the bend of the river a quarter mile south of the old campground. It was late afternoon and they were tired so they pulled into the bank and camped just past the river's curve. There I found a pre 1860 bitters bottle that they left. There was another but it had been broken. The original people very seldom paid a visit now but the stillness was more often disturbed.

Then one day there was the sound of axes and saws and a crew snaked a wagon road up from the south. The impression is still there across the field. Travel by the new people changed from the river to the land. The creaking of wagons and the shouting of drivers were frequent new sounds.

One spring as the river ice rose and broke there was an unusual roar that came closer and closer. Soon a wall of ice, water and huge logs swept past the old campground for hours. The new citizens rode the logs and some used the camp site. When it was over the river was swept clean except for a log hung up here and there.

Now there are new construction sounds coming closer each day until from southeast could be heard a steam train whistle. Up through the timber came a new railroad track. Now the inhabitants of the woods had a new sound to get used to. In a few short years the entire sound picture was changed as the new inhabitant's villages and sawmills appeared along the new tracks.

It was about 1890 when the timber cutter appeared on this land. Rapidly the huge pine and hemlock were cut and hauled out by sled in the winter. The camp ground was bare and unused. Slash lay thick across the land and a fire ran through. Sprout growth of brush and pine cherry, choke cherry, poplar and birch sprang up. The deer herd ballooned on the new fresh shoots. In time the loggers appeared again to cut the swamp cedar and tamarack and then the maple and birch. Now the land stood naked and fires ran again taking nature's new seeding for a new forest.

The trains roared. The wagon road had been moved a hundred feet east to the section line. A man appeared on the hill north across the creek from the old campground. He built a
wagon road in from the main road then built a house on the hill. A trail led to the creek where he got water. He labored hard. He was neat I guess because he left at least three garbage and trash pits that were deep. He must have had chickens, at least rusty chicken wire remains in the pits. He must have had a car, at least there is a rusty Model T fender half buried. Back in the years the little house burned. Now there is a small grass covered flat spot, some brick and part of a concrete step, the trail and three old garbage pits. He did not clear any land. His steep trail is now a snowmobile chute.

Back on the roadside one day a crew appeared and built a four room house, two rooms down and two rooms up. Later some outbuilding of board and logs were built. To the south of the house the slave labor job of clearing the huge pine stumps began. Digging in the sandy, rocky soil with a shovel, hand sawing and pulling with a block and tackle with a four horse team, one by one, some this year and some next, the stumps were pulled and piled in a row around two sides of the field to make a fence. They are still there now, rotted and covered with beautiful moss under the brush. Breaking plows cut through the roots and brush fires burned almost constantly. From fire scars in the timber the fire also ran through the timber. Fences and stock appeared.

The timber was pastured, but still Mother Nature reproduced the timber. Here and there white pine made it through and now stand 75 to 100 years old, and up to 30 inches in diameter. There must have been a period some forty years ago when there were not many deer because there are scattered cedar and hemlock that made it through. The spruce, balsam, poplar and birch were persistent and have replaced themselves many times.

So now a family made most of their living from the cleared field and woodland pasture. Cow trails and horse logging trails appeared where once only deer trails were. Firewood off this place kept the people warm for 80 years and still does. The big barn is gone and a new home stands in it’s place. The last of the old buildings, some twelve in number, was removed last year. It stood for 80 years, built on eight by eight timbers set on rocks around a hole in the ground, the old house sheltered many families, and had been a recreational shelter for the last ten years. It showed it’s age, sitting there snuggled under four huge pines and one spruce, and almost invisible from the air. It’s weathered siding was gray and made of basswood. The eight by eights were completely decomposed, the old wood shingles were deep in moss and pine needles. The pine squirrels and flying squirrels with which it was infested, had practically insulated it with pine cones. They protested greatly as their house came down board by board. Did the ghosts of time protest? I don’t know but many friends who had enjoyed many happy hours in that old house did. I expect the ghosts have both happy and sad memories. Life was not easy in their time.

Now the twenty acre field is still cleared grassland kept that way because the animals of the forest need some openings. The barb wire fences are gone. Some of the old pine stump fence now borders the lawn. Roads lead down into a beautifully regenerated forest and to the old campground which is still used as a camp site. There are two spring fed trout ponds and a wild pond in the creek by the campground. Trails and roads lead into every corner of the 250 acre Tree Farm. Our home now stands on the site of the old basement barn. Our basement door leads out onto the lawn where years ago cows and horses went in and out of the barn. The land is beautiful, conveniently useful and productive.

As I read the history from the charcoal covered camp, the bitters bottle, the stumps of various ages, the fire scarred trees and stumps, the old fence lines, the old roads, the old home site by the river, I find myself living with the ghosts of 150 years and more. I have added a five acre spruce plantation on one side of the field, six and one half miles of car roads, seven miles of trails, improved the campground and built a new home. Wherever I make an improvement I find ghosts and memories of the past. A two or three foot moss, grown pine log, stumps of all kinds and ages from past logging, old upturned stumps in the forest from storms in the yesterdays. The forest floor is spotted with hummocks that are hard to walk over that were caused by upturned stumps through the ages. The old horse drawn farm equipment stands at the edge of the lawn to remind me of the hard work to make a living in the yesterdays, and also progress. A rotted out logging sleigh stands down in the brush. If I move it, it will fall apart.

I purchased this land and it’s ghosts in 1963. At that time I logged out 15,000 board feet of pine saw logs and all the merchantable spruce, balsam, poplar and birch pulp wood. Out of the pine tops we got two carloads of pine pulpwood. Mother nature has fully restocked the stand. There is still 30,000 board feet of pine. I left many for the aesthetic value. Here and there blister rust takes the top out of one and it should be logged out. Little by little a few pine got by the rabbits, spruce bud worm and blister rust. By logging I am gradually changing the stand toward all evergreen. The next selective logging will be in 1981. I estimate this will be the eighth time that logging has been done since 1900.

The above may sound like a profitable operation. The sorry fact is that it isn’t because of the tax situation. The average gain in stumpage value will hardly pay the taxes. Land valuations are set, not by what the forest land will produce but by the value somebody paid for a forest home, a hunting camp or recreation area. Huge areas in our township are County, State or Federally owned and not on the tax rolls. Other large areas are company owned and under the Forest Crop Law. The remaining 18,000 acres pays the taxes. The Forest Crop Law does not suit the small land owner because it complicates land sale or transfer.

So the pretty picture of the Ghosts boils down to aesthetic value or the plain desire to own some forest land. Dollar wise the compound interest and taxes eat more than the timber can produce. This is a registered Tree Farm and also a registered ASCS farm. Under the many government programs available, field regeneration, wild life planting, tree

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Lawrence M. Gibson was born in March 1909. He obtained his B.S. in forestry in 1933. He then became employed by the U.S. Forest Service for the next eight years. Gibson then worked for The Flambeau Paper Company as a forester and became a chemist in charge of the chemical laboratory. He served in WW II and then went back to the Flambeau Paper Company. Gibson retired in 1974 and now manages his own small woodlot.
Is integrated forest pest management a new term for an activity already understood and practiced since the beginning of forest management? Although foresters have understood the management aspects associated with pests, the integrated systems approach in pest decision-making is new. The forest manager of today has the opportunity to develop a complete forest management plan that integrates all aspects of management, including pest management.

Forestry and IPM

by Harold S. McNabb, Jr. and Elwood R. Hart

The acronym IPM (Integrated Pest Management) is encountered by the highest circles of national and international institutions as well as by individual growers and land users. To the forester, integrated forest pest management may appear to be a new term for an activity already understood and practiced since the beginning of forest management. This is both true and false! The long-term nature of forestry that defers financial return and causes the compounding of costs during the rotation age necessitates the management of pathogens and insects at economically tolerable levels. But, the concept of IPM goes much further than this understanding and practice of the term management. IPM also involves a systematic approach in making decisions in the development of pest management schemes. This approach not only facilitates the practical application of pathology and entomology research results but directs new research into areas of need for future improved pest management systems (Figure 1).

In addition, IPM involves the realization by the forest manager that potential pests need to be considered and their management integrated into the plan at the beginning of the development of a forest management plan for an existing stand or new plantation (Waters and Cowling, 1976). The current "crisis" management of pests wastes time, resources, and potential forest products and services. Too often, a slight change in earlier management practices would have managed the pest problems. For example, when planting red pine in Michigan, the site should be risk-rated for future Saratoga spittlebug injury (Heyd et al., 1979). A moderate to high rating would present four options to the landowner: 1) accept risk and plant; 2) plant and monitor insect populations, spraying when needed; 3) plant and reduce insect alternate hosts, i.e., sweetfern; and 4) do not plant. Depending upon the risk-rating, monitoring and spraying may produce higher returns on the first rotation of red pine but reduction of alternate hosts also would benefit future rotations. Thus, if the potential for the pest is recognized at the time of stand establishment and the forest management plan developed accordingly, the problems may not arise or at least could be projected and thus minimized.

An IPM system has for its foundation an understanding of the host, the pest, and their interactions within variable, but to a degree, predictable biological, physical, and socioeconomic environments (Schmidt, 1978). Although past research has produced much information on insect and pathogen relationships, one critical area of research normally was neglected; the establishment of impact figures on host or host-stand values for different pest levels. Such information is necessary for the development of economically sound pest management schemes. Once an economic disease (pathogen) or injury (insect or mite) level is determined, the role of the pest in the specific forest ecosystem is better understood (Figure 2).

How is all this research information that is needed for pest management decisions assembled and evaluated? Present computer technology has been invaluable in making true IPM possible. For example, the Expanded Douglas-fir Tussock Moth Research and Development Program recently completed by the United States Department of Agriculture developed a series of models that integrated such information (Brookes et al., 1978). These models, in turn, were integrated, allowing the forest manager to visualize the effects of different management alternatives over a period of 160 years. This final integration of the "Probability of Outbreak Occurrence and Stand Involvement Model" (Outbreak Model), the "Model of Growth of Host Stands" (Stand-Prognosis Model), and the Socioeconomic Model illustrates the power of modeling in decision making using management systems. A caution should be noted, however; models are dynamic, not static, systems. Continuous updating as new data become available is a necessity. Not only is information becoming more refined but changes in the environments, especially the socioeconomic environment, can be expected over time. The complexity of the information needed for a pest management system and how models are developed with this information are best illustrated in the final report of the Douglas-fir tussock moth program (Brookes et al., 1978). This synthesis of the Douglas-fir tussock moth injury problem presents the "anatomy" of an Integrated Forest Pest Management system better than ever before. Although this specific "anatomy" appears complex, in reality this problem is relatively simple when compared with other present major forest pest problems, i.e., Gypsy moth, southern pine beetle,

Harold S. McNabb and Elwood R. Hart have joined together in developing and teaching a two-quarter sequence in Forest Pest Management. The 1979-80 academic year is the fourth time they have offered this jointly taught endeavor. With their similar teaching philosophies, the interest and help of the students, and a supportive faculty, this cooperative teaching experience has been a career highlight for these two teachers. A two-volume work—a workbook on causal agents, symptoms and signs, and a book of pest management readings and simulation games—is being used and improved for possible wider publication and distribution.
Scleroderris canker, dwarf mistletoe, and spruce budworm.

This article has attempted to present a brief overview of the place Integrated Pest Management has in forestry. Although foresters have understood the management aspects associated with pests, the integrated systems approach in pest decision-making is new. The forest manager of today has the opportunity to develop a complete forest management plan that integrates all aspects of management, including pest management. Unless or until complete management integration becomes a reality in forestry, the great potential that the IPM system has to offer will not be realized.

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Mycorrhizal Manipulation for Improved Reforestation of Adverse Sites

by Richard C. Schultz

Reforestation of cutover lands and disturbed sites such as mine spoils promises to be one of the major challenges facing the professional forester in the 1980's. Forest management practices will continue to become more intensive as the demand for timber products increases while the base of forest land decreases. Forest rotations will become shorter, more material on the site will be utilized at harvest time and more genetically improved stock will be used to reforest the harvested sites. These practices have the twofold impact of potentially decreasing the natural fertility of the site while at the same time demanding more from the site by the use of high quality planting stock. Any management scheme will, therefore, be faced with the problem of increasing yields on sites that are becoming more adverse to high yield forestry.

Conifers and intolerant pioneer hardwood species will continue to be the major species of high yield forestry in the 1980's. Clearcutting is the most efficient regeneration technique for many of these species. But clearcutting on any site generally produces adverse microclimatic conditions which add to the challenge of reforestation. Removal of the vegetation and surface organic matter during harvesting and site preparation raises soil temperatures providing more energy for increased evaporation of surface soil moisture. The increased temperature also tends to increase soil organic matter decomposition by accelerating microorganism activity. Under these conditions of extreme heat, severe surface soil moisture deficits and accelerated losses of readily available nutrients, even the most productive site is adverse to the newly planted seedling.

Aside from the radiant energy from the sun and the carbon dioxide from the atmosphere, the soil provides most of the raw materials and the anchorage needed by the newly planted seedling. Soil can be considered as unconsolidated mineral material serving as a natural medium for plant growth and covering most of the non-water surface of the earth. This conceptual model, however, frequently results in the misunderstanding and mismanagement of the soil complex. The soil is a dynamic body with a multitude of floral and faunal organisms that are involved in a complex of organic and inorganic transformations. The flux of energy, water, and organic matter in the soil profile is constantly changing in response to the seasons, the growth and development of the plant and animal community, and the manipulation of that community by man.

The regeneration phase of forest management provides the greatest opportunities for man's positive or negative impacts on the soil complex. The high heat energy at the soil surface can be reduced by minimizing the disturbance of the forest floor during the harvest operation. This reduced disturbance also will also minimize evaporational loss of surface soil moisture and the accelerated decomposition of soil organic matter. On sites where surface disturbance is widespread, decreasing surface soil moisture and available nutrients will result in an adverse site which limits seedling growth.

Fertilization may provide a method for increasing the quantity of readily available nutrients, but the increasing cost of and competition for available fertilizer is making this alternative less feasible. We must, therefore, find ways to increase the efficiency of tree nutrient uptake.

The forest community efficiently and conservatively cycles nutrients through the ecosystem. However, the increased use of shorter rotations and more efficient harvest of all the plant parts reduces the conservative nature of the forest nutrient cycle and demands more efficient nutrient uptake or more artificial fertilization. The forest community is efficient at nutrient uptake because of the dynamic interactions between the root system, the mineral soil and the soil microorganisms. Microorganisms are present in great numbers, especially in the rhizosphere, and are involved in numerous ways in the physiological processes of the plant. Probably the most universal of the plant-microorganism associations is the symbiosis of mycorrhizal fungi with the feeder roots of trees. With few exceptions all plants in nature develop mycorrhizae (fungus roots) to varying degrees. Under the optimum moisture and high nutrient conditions of many agricultural crops, the inoculation rate of roots by mycorrhhizal fungi may be low or nonexistent, however, few forest trees grow under such conditions.

The significance of the mycorrhizal relationship in forest trees has been recognized for some time. The potential for manipulation of that relationship for reforestation practices has recently become a possible management alternative. It is likely that manipulation of the mycorrhizal fungi in the field is not feasible, nor warranted, but the introduction of seedlings on adverse sites that have a mycorrhizal root system tailored to the stress conditions of the site should provide more rapid and more complete reestablishment of the forest cover. A brief review of the major types of mycorrhizal fungi and their function in the growth of the host should be enough to indicate their role in forest tree growth and their management potential.

Ectomycorrhizae

There are three kinds of mycorrhizae. The ectomycorrhizae develop on all members of the gymnosperm family Pinaceae as well as Salix (willow), Populus (aspen), Carya (hickory), Quercus (oak), Fagus (beech), and others. Several of these species can be either
ecotomyorrhizal or endomycorrhizal depending on soil conditions. Ec-
tomyorrhizal infection of the feeder roots is initiated from spores or
hyphae (collectively called 'propagules') of fungi belonging to the
higher Basidiomycetes (mushrooms and puffballs) and Ascomycetes (cup fungi and truffles). These propagules are stimulated by
root exudates; they grow vegetatively over the feeder root surface forming a dense fungal mantle. Following mantle development hyphae develop intercellularly in the root cortex, forming the Hartig-net which may completely replace the middle lamellae between cortical cells. This Hartig-net is the major distinguishing feature of ectomycorrhizae. Ec-
tomyorrhizae may appear as simple unforked roots, multi-forked roots or node-like roots that are readily visible to the naked eye. These visible structures are referred to as "short roots", each individual one, regardless of branching pattern, being an ectomycorrhizoid. Individual hyphae, numerous hyphae or rhizomorphs may radiate from the fungus mantles on short roots into the soil and eventually unite with the base of fruiting bodies of the fungus.

Over 2,100 species of ectomycorrhizal fungi have been estimated to exist on trees in North America. The fruiting bodies of these fungi are produced above ground and yield millions of spores that are readily and widely disseminated by wind and water. Ectomycorrhizal fungal spores are therefore present in large numbers in most forest soils. Nur-
series producing bare-root stock often have sufficient natural inoculum in the soil to produce mycorrhizal development even if the nursery beds are fumigated to control pathogens because of the rapid re-colonization of the soil by the wind borne spores. However, the fungal species that naturally re-colonize the highly fertile and moist nursery soils are not necessarily those that function well on adverse sites. Artificial inoculation of nursery beds with fungal species that are competitive on adverse sites provides a means of increasing survival and growth of seedlings in the field. Methods are presently being developed that will make artificial inoculation with specific ectomycorrhizal fungi a viable nursery practice.

VA Endomycorrhizae

The second major type of mycorrhizae are caused by the endomycorrhizal fungi, commonly referred to as the "vesicular-arbuscular" (VA) type. They are the most widespread and important of the root symbionts. They are not restricted to specific groups of plants, but occur in practically all families of angiosperms, gym-

nospers, and many pteridophytes and bryophytes. Most of the economically important forest trees, such as Liquidambar (sweetgum), Platanus (sycamore), Ulmus (elm), Juglans (walnut), Fraxinus (ash), and Liriodendron (tulip-poplar) normally form endomycorrhizae. Endomycorrhizal fungi form large, conspicuous, thick-walled spores on the root surfaces, in the rhizosphere, and sometimes in feeder root tissues. Endomycorrhizal fungal hyphae penetrate the cell walls of the epidermis and then grow into the cortical cells of the root. The in-
fective hyphae may develop specialized absorbing or nutrient-exchanging structures called "ar-
buscules" in the cortical cells. Ar-
buscules consist of dense clusters of very fine, dichotomously-branched filaments which may occupy the entire lumen of the cell. Vesicles are developed later, generally in the middle and outer cortex and appear as terminal swellings either within or between cells. Vesicles are currently thought to function as temporary storage organs. No external mor-
phological changes occur in roots infected with endomycorrhizal fungi, although with some hosts a yellow or brown pigmentation has been reported. Endomycorrhizae have been largely ignored by plant scientists because of the difficulty in identifying them.

The fungi which form en-
domycorrhizae are mainly Phycy-
cetes. They do not produce large, above-ground fruiting bodies or wind-
disseminated spores but do most ectomycorrhizal fungi. Spread of these fungi in soil is by root contact, moving water, insects or mammals. In the absence of a host, the spores of these fungi are able to survive for many years in the soil. As with ec-
tomycorrhizal fungus spores, these spores are apparently stimulated to germinate by root exudates in the rhizosphere.

Endomycorrhizal fungi have not been grown in pure culture as have the ectomycorrhizal fungi. This makes it more difficult to produce specific inoculum for artificial inoculation of nursery beds. Inoculated roots on infected soils can be used as inoculum. The

inoculum can be added in small quantities to containerized seedlings or to nursery beds where a host crop plant such as sorghum can be grown to increase the inoculum density. Techniques are presently being developed to increase the efficiency of inoculum introduction into various growth media.

The third group of mycorrhizal fungi are the ectendomycorrhizae. This type of mycorrhizae has the features of both ecto- and endomycorrhizae. Ectendomycorrhizae have a limited occurrence and, with regard to forest trees, are found primarily on roots of normally ec-
tomycorrhizal trees. Very little is known about the species of fungi involved or their importance to growth of trees because little research has been done on them.

Mycorrhizae Host Interactions

It has been well established that mycorrhizal fungi can increase the growth of trees. This growth increase is generally considered to be the result of increased nutrient and water absorption, as well as increased disease resistance of the host, in-
creased growth regulator production by the root system and the fungi, and increased tolerance to high soil temperatures, soil toxins, and ex-
tremes in pH. Probably the most important of these is the role of the mycorrhizae in nutrient uptake, especially of immobile soil ions such as phosphate, zinc, copper, molybdenum and even ammonium.

Mycorrhizal plants absorb and accumulate more of these ions than non-mycorrhizal plants, especially when grown in soils low in concent-
ration. The rate of uptake is limited by the movement of the immobile ions to the roots. Some tree species produce few fine feeder roots hairs and are unable to exploit large soil volumes. These species, especially, benefit from the presence of mycorrhizae whose radiating hyphae greatly expand the absorbing volume of the soil. It has been shown that the normal phosphorus depletion zone of 1-2 mm around non-mycorrhizal roots can be in-
creased to at least 7 cm with an endomycorrhizal root symbiont. An endomycorrhizal root system can therefore absorb larger quantities of phosphorus than a non-mycorrhizal root system, especially in species with fewer fine roots.

Results from studies on increased uptake of the other more mobile elements by mycorrhizal plants have
been variable. Sometimes the elements N, K, Ca, Fe, Mn, Na, Si, Al and B are present in greater concentrations in mycorrhizal plants than in nonmycorrhizal plants. In other cases, the concentrations of these same elements are higher in nonmycorrhizal plants, and sometimes no significant difference in concentration between the two groups of plants is observed. This differential uptake may reflect the relative concentrations of elements in soil. If an element is deficient and limiting plant growth, it will likely appear in higher concentrations in the mycorrhizal plants. Characteristically, if mycorrhizal infection causes striking growth increases, the total amounts of all elements will be greater in the mycorrhizal plants, but the elements whose concentrations are affected most by mycorrhizal infection are very likely to be those limiting growth in the soil.

Soil temperature has been shown to influence the infection of specific mycorrhizal fungi. It has been suggested that soil temperature affects inoculation by influencing the rate of elongation and maturation of root cells. It has been shown that different species of fungus have different soil temperature requirements and, therefore, can be selectively used to stimulate the growth of seedlings on sites with known temperature regimes.

Specific species of mycorrhizal fungi have also been shown to increase seedling survival and growth under highly acid soil conditions. In several studies pH > 4, coal spoils, pine seedlings inoculated in the nursery with Pisolithus tinctorius outgrew seedlings inoculated with Thelephora terrestris. Both of these fungi form ectomycorrhizae but Thelephora is the species most commonly found in forest nurseries and appears to be more suited to the high moisture and fertility regimes found in them.

Mycorrhizal root systems are generally larger and physiologically more active than root systems with only a few or no mycorrhizae. This increased size and activity has already been shown to play a role in the increased uptake of immobile nutrients. It is also involved in the increased absorption of soil water. Mycorrhizal seedlings have been shown to grow better on drier soils. The increased growth may again be related to the large exploitation of soil by a mycorrhizal root system, especially in those plants with few roots hairs and feeder roots. This response suggests that plants could be tailored to compete better on droughty sites through mycorrhizal manipulation.

One final area where mycorrhizae may be involved in increasing tree growth is in plant hormone stimulation. Although little work has been done in this area, accumulated data on growth hormones produced by ectomycorrhizal fungi suggest that benefits to the host provided by the symbiotic fungus are not limited to supplying inorganic and organic nutrients from the soil. The fungal symbiont also provides the host plant with growth hormones, including auxins, cytokinins, gibberellins, and growth-regulating vitamins. These hormones are homologous to those formed endogenously by the host plant, but the fungus may be increasing the supply. These increased hormonal levels could significantly influence growth and development of the ectomycorrhizal host plant.

The manipulation of forest stands modifies site conditions including those which affect the mycorrhizal fungi population in the soil. Because of the widespread occurrence and the ubiquitous nature of most of these fungi, it is unlikely that mycorrhizal fungi populations can be manipulated in the field. This is not the case for all natural soils of the world, however. In many areas of the world, ectomycorrhizal trees and their symbiotic fungi do not occur naturally. In such areas the introduction of exotic ectomycorrhizal trees should be closely associated with the introduction of ectomycorrhizal fungi. On some severely disturbed sites such as mining spoils or borrow pits, similar deficiencies of either ecto or endomycorrhizal fungi exist. Introduction of mycorrhizal seedlings on such sites is imperative for good seedling growth if high levels of fertilizer are not used.

Under most other situations natural mycorrhizal fungi rapidly infect the root systems of introduced trees. However, since initial infection by the fungi means contact with a host root systems, introduced tree seedlings must have vigorously growing root systems. It is at this point that the potential for mycorrhizal manipulation becomes evident. As has been shown in the preceding discussion, species of fungi respond different to varying soil conditions. Thus, seedling mycorrhizal root systems can be "tailored" to adapt seedlings to adverse site conditions such as temporarily develop after clearcutting. The ability to plant seedlings that will survive and grow on almost any site will increase the efficiency and productivity of the forest industry.

**Summary**

Tree growth on adverse sites is mainly limited by low fertility and excess or deficient soil moisture. In natural stands that have reached an equilibrium in the nutrient cycle, changes in growth are seldom seen because the trees are producing the maximum growth allowed by the fertility and soil moisture of the site. This is not to say that growth could not be increased by the addition of fertilizer or through drainage or site irrigation. When sites are managed under shorter rotations using genetically improved stock, the loss of nutrients from the site with frequent harvesting may reduce site productivity. Heavy fertilization, soil drainage modification, proper selection of genotypes and modified harvesting practices can be used to maintain this productivity. However, present economics suggest that not all of these alternatives will be viable in the coming years.

Under intensive management, the most critical phase as far as tree growth and survival is concerned comes at the time of stand establishment. As a result of clearcutting, soil temperatures increase and surface soil moisture and organic matter content decrease. Such conditions are adverse to seedlings that have generally been grown under nursery conditions with high rates of fertilizer and moisture. The use of specific mycorrhizal inoculum in this phase of the forestry operation may be promising since individual species of mycorrhizal fungi can be selected that tolerate the stress conditions of clearcut sites, spoil banks, etc. and, thus, enhance seedling growth. These introduced fungi may not persist on the seedling root system in the field, but their presence during the first few years while the native fungi are infecting the root system can sufficiently increase survival and growth to make the method a feasible one. As the demand for wood increases and the land base to grow wood decreases, the forester will have to use every tool at his disposal to produce the fiber needed in the shortest time while maintaining long-term site productivity. 

Mechanized harvesting will be an important aspect of the total forestry approach to meet the increased demands for forest products. This paper presents some of the critical equipment needs that we see necessary to supply wood in the 1980's.

by Warren T. Doolittle and John R. Erickson

INTRODUCTION
Each of the past three decades has provided significant improvements in the equipment and methods used to harvest timber. We expect that the trend in mechanized timber harvesting will continue to increase to new levels in the 1980's. Some reasons for this projection and a few examples of new harvesting concepts will be described here. Before discussing these future needs, it is appropriate to review briefly the state-of-the-art of forestry mechanization.

IN THE PAST
A notable advancement of the 1950's was the beginning of improvements in chain saws. This process has continued to date. Improved small gasoline engines, light-weight metal and plastic molded frame components, improved cutter design, vibration isolators, and superior metallurgy for chains provided a large array of light, dependable chain saws for the industry.

Development work was also started on rubber-tired skidders during the 1950's. These rubber-tired skidders came of age after the introduction of the articulated frame steered models in the early 1960's. several small and a few large manufacturers began to market and improve the design features of rubber-tired skidders. They evolved into the major means of moving logs of gentle terrain. Their significance to the logging industry was their ability to travel about twice as fast as crawler tractors. This effectively decreased the density of logging roads, thus reducing the cost of access to timber stands and some of the adverse environmental impacts that occur with some road building activities. Other important developments in the 1960's were tree shears, mechanical limbing devices, hydraulic loads, and whole-tree harvesters.

The 1970's provided considerable sophistication of whole-tree harvesters. Several companies now manufacture machines that will convert the standing tree to either tree-length or short-length logs at the stump or at the landing. The most significant advance in shears was the development of accumulating arms that permit the cutting of several small stems prior to the carrier depositing them to form skidding bunches. In addition, whole-tree chipping at the woods landing became a commercial reality, and helicopter logging became a feasible alternative in many inaccessible timber stands.

These and other new technologies contributed to widespread international trade for logging equipment. In addition, mechanization improved forest management, as well as working conditions and pay for forest workers, and has had a favorable stabilizing effect on the cost of forest products.

FACTORS AFFECTING CHANGE
The rapidly growing and changing demands for wood-based products will result in even greater mechanization in the 1980's. These demands will pressure forest managers and the industry to utilize more of each tree cut and to intensify the management of forest lands to increase growth. Mechanization will provide the means to both meet the increased demands and to improve forest management.

On the demand side, several factors will influence timber harvesting methods. These are:
- increased demand for lumber and veneer products
- increased demand for residential and industrial fuelwood
- increased demand for reconstituted wood products that will substitute for lumber and plywood products
- increased demand for pulpwood

These last three items will create competing market demands for several types of materials. Excluding fuel wood, the demand projections for wood-based products indicate that twice as much wood must be harvested by the year 2000. Part of this increased demand will be met by harvesting wood currently left unused. Examples of this unused forest resource are:
- logging residues
- thinning from softwoods
- excess growth of hardwoods
- insect- and disease-killed timber stands
- residual small and rough trees left after harvesting that must be disposed of prior to regeneration
- cull trees
- short-rotation plantations developed from intensive culture

Excluding the unknown potential from short-rotation plantations, an estimated 485 million dry tons of unused forest resources could be made available annually.

NEW TECHNOLOGIES
The recovery of all these classes of unused material will require innovative approaches that will include cost and energy efficient equipment. Existing harvesting equipment and systems which evolved during the past few decades were designed primarily to harvest relatively straight and uniform logs. These recent developments permitted the harvesting of small sized trees, but are not economical for most of the harvesting situations that include the unused material described above. The economical harvest and utilization of those classes of material previously mentioned will

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present formidable challenges to researchers, equipment developers, and manufacturers.

These challenges will vary by geographic region, species, and terrain. However, based on the best predictions of where future wood supplies will come from and the need to manage forest stands more intensively, the following technical advances are expected in the 1980's:

- a new generation of small, long-reach cable yarders with intermediate supports
- systems to prebunch small timber on steep slopes to maximize the production of the cable yarders
- mechanized felling and bunching of trees on steep slopes
- whole-tree yarding on steep slopes
- swath-cut harvesters for gentle or flat terrain and intensive culture plantations
- systems for harvesting and transporting whole trees to the mill
- chipping at the stump
- mechanized felling and yarding of high quality timber from swamp lands

All of these technologies are focused on utilizing the timber or residues that cannot be harvested economically with current equipment and market situations. For the most part, they are aimed at recovering materials that will meet the growing demands for pulpwod, reconstituted wood products, and energy. The major exceptions to this rule are the new cable yarders and the mechanized felling of high quality timber from swamp lands where the major objective is to recover logs for solid wood products. Secondly, these technologies will supply residues for other uses, particularly cable yarders.

The rationale for proposing the technological advancements in mechanization needed for the 1980's can best be described in three separate discussions. These deal with the problems existing on (1) steep terrain, (2) gentle terrain, and (3) swamps.

Up to the present time, the majority of the timber on steep terrain in the West has been yarded with large highlead and slackline cable yarders. This is due to the large volumes of old growth timber being harvested. In the East where the size and value of timber on steep terrain are somewhat less than in the West, most timber has been harvested by building roads at close intervals (200 to 300 feet apart) along the slopes. Logs were then cable winched to the roads for skidding.

The need to change these practices is quite evident. In the West, there will be a continued but declining use of the large cable yarder as the old growth timber continues to be depleted. In the East, the adverse environmental impacts of high density road building are forcing a concentrated effort to find improved harvesting systems. The technical advances previously mentioned have applicability in both the East and the West. In the West, entry to vast acreages of second-growth stands will be needed to supply our timber needs and to provide improved growth on crop trees which will be harvested at intervals through partial cuts. In the East, we must find more economical ways of thinning stands, which have a preponderance of lower valued trees, with fewer roads. A first step to solve these problems is to develop an array of smaller and highly efficient cable yarders which can be moved and set up quickly. They must have relatively low capital investment costs and decreased crew size to provide economic yarding. Several new yarding systems are now under development. One example is the "Peewee Yarder" developed by the Forest Service in the Pacific Northwest, but much work remains to be accomplished.

Concurrent with the development of these new cable yarders, there is a need for other equipment and systems. The first is a suitable means for prebunching logs or trees on steep slopes. Currently, there are some efforts to build portable cable winch units that can be moved up and down the slope to laterally skid logs or trees to a cable road. These prebunching systems will permit optimum loading on the cable yarders and thus decrease yarding costs significantly. Efforts to date have been only partially successful, but they will become a reality in this decade. Another piece of equipment which will permit bunching is a carrier that can negotiate steep terrain and shear trees. This device would eliminate the man with a chain saw and could increase both timber cutting and yarding production. A prototype of this machine is in early testing phases by the Forest Service.

These improvements are also important for the harvesting residues on steep terrain. Small, more mobile, yarders can reduce the cost of moving residues; prebunchers can increase yarding loads; and mechanized whole-tree felling on steep terrain can lead to systems where the entire tree is brought to the landing, thus eliminating logging slash. Concepts for handling whole trees on roads or landings on steep terrain are now under study. All of these advanced methods for steep terrain logging should become a reality in the 1980's.

An important advance in technology that is needed on gentle terrain is the development of a "swath-cutter" concept. This concept can be broadly described as a machine traveling at a constant or near constant speed, collecting all woody material in its path. The wood is then converted to bunches of trees, chips, or other suitable packages ready for transport to the mill. This concept differs from present mechanized harvesting where the machine intermittently approaches a tree, cuts it, and then moves to the next tree. The advantage of "swath-cutting" is that the production cost of wood is dependent on volume per acre rather than volume per stem. With swath-cutting, it would be theoretically possible to harvest a stand of 4-inch diameter trees for the same cost as 10-inch diameter trees if the volumes per acre were the same. This concept would permit management of stands (such as sites that must be prepared for planting) at a profit rather than at

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Warren T. Doolittle was born and raised in Webster City, Iowa. He obtained his B.S. in forestry at Iowa State University in 1946, his MF from Duke University in 1950 and his Ph.D. from Yale University in 1955. He has been employed with the Forest Service since 1946, which includes the Southeastern Forest Experiment Station, Northern Forest Experiment Station and Washington, D.C. Doolittle is currently Associate Deputy Chief for Research in the Forest Service, Washington, D.C.
The Chief of the USDA's Forest Service considers fire equal to such perennial controversies as inflation, herbicides, log exports and timber management practices. The revised USFS fire policy calls for fire management; the previous policy specified fire control. The ultimate success or failure of fire management will most likely depend on how well fire managers master improved fire management techniques and how accurately they can predict fire's long-term effects on forest and rangeland resources.

The revised policy states that...

"The basic fire management policy on National Forest System lands is to provide well-planned and executed fire protection and fire use programs that are cost effective and responsive to land and resource management goals and objectives and supportive of RPA2 outputs" (USDA Forest Service 1978).

The first four words of the two policy statements are the essence of the change in fire policy. The revised policy calls for fire management; the previous policy specified fire control. The fire control policy required immediate and aggressive attack on all fires. Suppression action was guided by rigid standards. If a fire was not controlled by initial attack forces, efforts on each succeeding day were expanded as required to obtain control before the start of the next day's burning period (10 a.m.). Each fire had to be attacked and controlled, regardless of burning conditions or land and resource values. The primary goal of this policy was to minimize the acreage burned.

Forest Service policy allows the fire manager to permit certain wildfires to burn if they occur under preselected conditions in predetermined areas and are achieving desired results.

Fire Management Techniques for the 1980's

by William C. Fischer1

"One thing seems certain about the 1980's—natural resources will see sharply increasing demands which outstrip current supplies of all products and uses under current pricing relationships. At the same time, the 1980's promise to see continuing controversy over inflation, herbicides, log exports, use of lands deemed marginally suited for cost-effective timber production, and the role of fire in resource management.2"

Readers may be surprised to learn that the Chief of the USDA's Forest Service considers fire equal to such perennial controversies as inflation, herbicides, log exports, and timber management practices. Administrators and fire managers of several western National Forests are not surprised. They found themselves in the middle of the fire controversy during and immediately after the 1979 fire season.

The gist of this fire controversy is reflected in an excerpt from a "Los Angeles Times" news article (Nelson 1979):

"Forest Service Criticized for Letting Selected Fires Burn: Officials Defend Some Blazes as Beneficial for Environment but blackened Areas Draw Anger."

WASHINGTON— The U.S. Forest Service, which early last year adopted a policy of letting certain forest fires burn rather than immediately extinguishing them, has suffered some painful political blisters as a result.

And some state and local officials are furious about thousands and thousands of fire-blackened acres that the policy has produced.

The Forest Service decided to let selected fires burn because of growing conviction among forestry experts that fires are often beneficial, that they reduce the accumulation of brush and other flammable material on the forest floor, improve wildlife habitats, and increase plant and animal diversity.

Moreover, as the cost of fire-fighting mounted sharply in the 1970's, forestry officials began to question whether the resources saved justified the expense in some cases.

Finally, ecology-minded government officials argued that fire is a part of nature's process. . . .

Logical as those reasons seemed, heavy criticism has been leveled at the Forest Service, especially by some political leaders in the Pacific Northwest. These politicians, who grew up with Smokey the Bear's message that all forest fires are bad, have set off their own firestorm. From Fire Control To Fire Management

The "Los Angeles Times" identifies the underlying cause of the fire controversy: change, but it does not expose agency constraints nor the complex requirements for implementation. Since 1935, national forest fire policy has stated:

"The basic fire control policy on National Forests and National Grasslands is to provide well-planned and executed fire prevention and presuppression programs with aggressive suppression when fire occurs" (USDA Forest Service 1972).
The current fire management policy requires an appropriate suppression action be taken on each wildfire. Fast and aggressive initial attack is required on all wildfires that threaten life, property, or resources. If a wildfire escapes initial attack, subsequent action is carefully considered. The fire's potential for resource damage is weighed against potential benefits and costs for appropriate suppression alternatives. If, for example, the analysis indicates the escaped fire has a high potential for serious resource damage, an all-out suppression effort might be launched, using every tool and technique available to the fire manager. If, however, the potential for damage is low, the manager may elect to limit the suppression effort to the use of ground crews with hand tools; thereby trading-off acres burned against the cost of using more expensive fire control techniques.

The fire management policy allows the fire manager to permit certain wildfires to burn if they occur under preselected conditions in predetermined areas. Such areas are called fire management areas, and the preselected conditions are specified in a fire prescription for the fire management area. The use of traditional prescribed fire (planned burning) is retained and, in fact, encouraged in the fire management policy.

Forest Service Chief Peterson recently attempted to allay the fears of some fire management critics in a speech before the Western Forestry and Conservation Association (Peterson 1979). He summarized the fire management policy as follows:

"Two years ago we revised our fire suppression policy seeking to provide protection at a reasonable cost. Under this policy, each wildfire ignition requires an appropriate suppression action. In no case are wildfires simply left to burn. Our policy entertains no compromise with the protection of life, property, or resources needed to meet objectives. The policy does provide that when a wildfire is burning under prescribed conditions which meet management objectives approved for that particular area by the Regional Forester, the decision may be to confine the fire to a predetermined portion of the area. Contrary to some reports, we're not reluctant to fight fire aggressively inside a wilderness when the fire doesn't fit management objectives."

Fire Management In Practice

The practice of fire management is more difficult than the practice of fire control. The job of the fire manager has, consequently, become more difficult. The fire manager of the 1980's must command the considerable knowledge and skills of the traditional fire control and fire use specialist. The successful fire manager of the 1980's, must command the considerable knowledge and skills of the traditional fire control and fire use specialist. The successful fire manager of the 1980's must also possess the knowledge and skills required to evaluate alternative fire management strategies in relation to land and resource management objectives, to delineate fire management areas, to develop fire management prescriptions, and to analyze escaped fires.

Perhaps the best way to illustrate the substance of fire management and the knowledge and skill required of its practitioners is to describe how it has been implemented on the Troy Ranger District in the Northern Rockies. The Troy plan is, however, just one example of fire management practice on the national forests. Other plans specify different means to the same end: well-planned and executed fire protection and use programs that are cost-effective and responsive to land and resource management objectives. Techniques used in all existing plans will undoubtedly change as foresters gain fire management experience.

The Troy Fire Management Plan

The Troy Ranger District of the Kootenai National Forest straddles the Montana-Idaho line just below the Canadian border. The district encompasses an area of about 35,000 acres (131,500 ha) of Federal land and a little over 34,000 acres (13,800 ha) of intermingled State and private land. A fire management plan was developed for the district during 1978 and was approved by the regional forester early in 1979 (USDA Forest Service 1979a). (It is, at this writing, the only Forest Service fire management plan that has been approved for an entire non-wilderness ranger district.)

Fire Management Areas

The fire management area, the basic unit of fire management practice, is a parcel of land with specific boundaries for which fire management objectives are written in support of land and resource management objectives. Twenty-three such areas were identified on the Troy Ranger District. Fire management areas with similar fire management objectives were sorted into five categories for the purpose of developing fire management prescriptions. The fire management categories are described in terms of type of land, resource management and fire management objectives, and fire management prescriptions.

Protected fire management areas—all State and private land, as well as small isolated parcels of Federal land adjacent to or surrounded by State and private land, comprise the single fire management area assigned to this category. The fire management objective is to avoid
all damage to life, property, and resources. Unplanned fires that occur in this area are immediately and aggressively attacked. Wildfire prevention has high priority. During safe periods prescribed fire is permitted for reducing logging, thinning, and land clearing slash, managing vegetation in ditches, and disposing of debris. Less than 10 percent of the Troy district is classified protected fire management area.

Operational fire management areas—seven fire management areas comprising about 70 percent of the district are in this category. These are heavily forested lands managed primarily for timber and big game. Fire management objectives include: 1) minimizing fire-related timber damage, 2) reducing hazards associated with logging and thinning slash, and 3) using fire to prepare sites for tree regeneration and to rejuvenate spring and winter game range. Unplanned fires that threaten resources are immediately and aggressively attacked. When fire danger is low, attack may be modified to reduce costs or enhance crew safety. On big game spring and winter ranges, unplanned fires that occur under prescribed conditions may be allowed to burn as prescribed fires.

Observation fire management areas—six fire management areas in this category comprise about 20 percent of the Troy District. These are lands managed for primitive recreation, wildlife habitat, scenic beauty, and vegetative diversity. Such areas are characterized by high elevations, discontinuous forest cover, sparse fuels, and many natural barriers to fire spread. Fire management objectives include: 1) reducing suppression costs, 2) maintaining fire-related plant and animal diversity, 3) improving grizzly bear habitat, 4) reducing wildfire hazard, and 5) reducing adverse impacts of fire suppression actions. Unwanted fires are suppressed, but low impact suppression techniques are favored. Unplanned fires may be allowed to burn as prescribed fires to accomplish management objectives. Where fire management objectives are to allow fire to more nearly play its natural role. Secondary objectives are to use fire to create and maintain plant and animal diversity, to use fire to improve grizzly bear habitat, to reduce suppression costs, and to avoid excessive fuel buildups. Unwanted fires and all man-caused fires are suppressed. Preference is given to suppression techniques that protect the wilderness character of the land. Lightning fires may be allowed to burn as prescribed fires when they are in prescription and will achieve management objectives. Current national forest wilderness policy requires the suppression of man-caused fires and prohibits the use of conventional prescribed fires.

Special fire management area—eight special fire management areas totaling about 300 acres (120 ha) have been established on the Troy District. These are forested areas managed for recreation and education. Most are developed camp and picnic grounds. One area is the Ross Creek Cedar Grove, a stand of old-growth western redcedar, Thuja plicata. Fire management objectives are to protect visitors and their property, recreation improvements and overstory trees, and to reduce hazardous fuel accumulations. Unwanted fires are suppressed preferably with techniques that avoid excessive damage to the site. Unplanned fires may be allowed to burn as prescribed fires when achieving desired results such as fuel reduction. Prescribed fire will be used in spring and fall to reduce fuels.

Fire Management Prescriptions

An unplanned fire is attacked and suppressed unless it is allowed to burn as a prescribed fire. An unplanned fire can become a prescribed fire only if it occurs in a predetermined area, during a predetermined time, under predetermined burning conditions, and is behaving in a predetermined manner. All of these predetermined criteria, and others, are contained in one or more fire management prescriptions for each group of fire management areas on the Troy District. In the Troy Fire Management Plan, the fire management prescriptions are summarized in flow charts to assure that each prescription criterion is properly considered before a decision is made. The flow chart governing action on unplanned fires that occur on big game ranges in operational fire management areas is shown in figure 1. Notice that 11 conditions must be satisfied before a fire can be declared a prescribed fire. The terms, ERC and BI in figure 1 refer to the Energy Release Component and Burning Index, respectively, of the 1978 National Fire Danger Rating System (Deeming and others 1977). Figure 2 shows one of four flow charts summarizing the fire management prescriptions developed for observation fire management areas. Notice the addition of season and elevation as prescription criteria.

I will not discuss in detail the factors that are identified and evaluated in formulating a fire prescription. Fire weather and fire danger records, fire occurrence records, fuel inventories, fire history investigations, advanced knowledge of fire ecology and fire behavior, and practical experience in fire use and control shape the plan. The development of reliable fire management prescriptions is perhaps the most challenging task of modern fire management.

The Fire Management Committee

On the Troy Ranger District, treatment of an unplanned ignition is
decided by a committee made up of the district fire management officer, district silviculturist, and resource specialists (wildlife, watershed, etc.) appropriate for resource values on the management area. Duties of the committee are:

1. To decide if a fire fits the criteria for a prescribed fire,
2. To obtain forest supervisor approval for any deviation from established prescription criteria,
3. To review the prescribed fire daily and determine if it is still burning under prescription,
4. To document daily decisions regarding the fire,
5. To analyze probable behavior and effects of a prescribed fire that escapes prescription and burns as a wildfire,
6. To set the ultimate size of the prescribed fire and decide when the fire has accomplished its planned objectives, and
7. To order appropriate suppression action on the fire when needed.

The fire management committee lends flexibility to the fire plan. Even the best prescriptions fail to reflect the complex interactions between fire and the particular environment in which it burns. On the Troy District, the committee has proved to be effective. When fires occur well within prescription criteria, most decisions are made in minutes.

The Escaped Fire Analysis

Forest Service Policy calls for an analysis of all wildfires that escape initial attack, and for prescribed fires that escape prescription and burn as wildfires. Local fire behavior and resource specialists evaluate logical suppression alternatives on the basis of total cost-effectiveness and the effects of fire on the resources. The analysis is conducted each day the fire burns out of control.

Thomas Nelson (1979) provides an excellent example of such analysis for a wildfire that occurred on the San Isabel National Forest in Colorado during 1978. The Maes Creek Fire escaped initial attack and burned in steep, inaccessible, broken, rocky terrain above 10,000 feet (3,048 m). The fire was not spreading very rapidly. Evaluation of potential effects on wildlife, timber, range, aesthetics, recreation, watershed, and soils, along with predictions of potential fire behavior yielded the fire control alternatives shown in table 1. The forest supervisor evaluated these alternatives in the light of crew safety, cost, and concern for life and property of local residents. Fire size was not a major concern because of natural barriers to fire spread. The forest supervisor selected alternative E (table 1), which represented a $500,000 savings over the cost of an all-out suppression effort. As Nelson (1979) points out:

"It was a common-sense approach to dealing with the fire cheaply but with adequate attention to the resource objectives and the public concern and safety."

Accomplishments and Prospects

Some skeptics of the revised fire management objectives...

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Figure 1. Flow chart for managing fires on big game spring and winter ranges on operational fire management areas (USDA Forest Service 1979a).
Fire Start

June 1—September 15?  No  Refer to flow chart for pre- or post season

Yes

Above 5,000 feet (1,525m)?  No  Suppress

Yes

Life/property endangered?  Yes  Suppress

No

≤ 53 ERC last four days?  No  Suppress

Yes

Smoke management conditions favorable?  No  Suppress

Yes

Fire weather acceptable?  No  Suppress

Yes

Fire behavior acceptable?  No  Suppress

Yes

Forecasted fire weather and behavior acceptable?  No  Suppress

Yes

Equipment and manpower available if needed?  No  Suppress

Yes

Boundary threatened?  No  Suppress (limited or total)

No

Allow to Burn

Continue to evaluate

Figure 2. Flow chart for managing fires occurring on observation fire management areas during the normal fire season (USDA Forest Service 1979a).

policy for the national forest see the policy as a foolish departure from strict fire control—a “let it burn policy.” Others agree with the policy’s intent but seriously question the capability of fire managers to develop and implement reliable fire management prescriptions. A recent Forest Service report of fire management activity in its Northern Region during the severe 1979 fire season tends to discount these fears (USDA Forest Service 1979b).

The Northern Region administers approximately 37,500,000 acres (15,176,250 ha) of National Forest land in northern Idaho, Montana, and the western Dakotas. About 8 percent of 3,000,012 acres (1,214,100 ha) are managed under approved fire management plans. Lands within classified wilderness areas account for 1,312,252 acres (531,274 ha) of this total. The remaining 1,687,252 acres (682,830 ha) is non-wilderness National Forest land.

The 1979 prescribed fire statistics for Northern Region lands managed according to approved fire management plans are shown in table 2. Of 101 fire starts, only 27 were allowed to burn a total of 32,011 acres (12,955 ha) as prescribed fires even though all the fires met prescribed fire criteria. Also note that all but 600 acres (243 ha) of the total burned area was in wilderness, but that 65 of 91 potential wilderness prescribed fires were suppressed. Elsewhere the same report shows that only 30 percent of the 32,011 acres (12,955 ha) burned in high intensity, stand destroying fires. Almost all of the acres burned in this manner were in the wilderness where the resulting biological diversity will support management objectives.

As illustrated by events in the Northern Region, early results of the Forest Service’s fire management policy are encouraging but by no means conclusive. The ultimate success or failure of fire management will most likely depend on how well fire managers master improved fire management techniques and how accurately they can predict fire’s long-term effects on forest and rangeland resources. Whatever the outcome, the 1980’s will be an exciting and challenging time for those who manage the Nation’s wildlands.

Publications Cited


USDA Forest Service. 1979b. Preliminary Fact Sheet: Prescription fires in the Northern Region. Northern Region, Missoula, Mont., 8 p.

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Table 1. Escaped fire analysis summary, Maes Creek Fire, San Isabel National Forest, July 5, 1978. (Nelson 1979)

<table>
<thead>
<tr>
<th>Remarks</th>
<th>A—Total suppression within 6 days with double present resources (18 crews and support)</th>
<th>B—Total suppression within 8 days with present resources (9 crews and support)</th>
<th>C—Partial suppression within 21 days with 3 crews, 1 helicopter plus support</th>
<th>D—No suppression: monitor status with one crew and 1 helicopter and support</th>
<th>E—No suppression: monitor status with 6 to 8 men and support</th>
<th>F—No suppression: no monitoring except daily air patrol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated control date</td>
<td>7/14/78</td>
<td>7/16/78</td>
<td>7/30/78</td>
<td>8/10/78</td>
<td>8/10/78</td>
<td>8/10/78</td>
</tr>
<tr>
<td>Size (acres)</td>
<td>2,300</td>
<td>2,300</td>
<td>2,400</td>
<td>2,400</td>
<td>2,400</td>
<td>2,400</td>
</tr>
<tr>
<td>Suppression cost</td>
<td>$694,000</td>
<td>$547,000</td>
<td>$210,000</td>
<td>$225,000</td>
<td>$22,000</td>
<td>$2,200</td>
</tr>
<tr>
<td>Rehabilitation cost</td>
<td>$14,000</td>
<td>$14,000</td>
<td>$14,500</td>
<td>$14,500</td>
<td>$14,500</td>
<td>$14,500</td>
</tr>
<tr>
<td>Estimated total cost</td>
<td>$708,000</td>
<td>$561,000</td>
<td>$224,500</td>
<td>$239,500</td>
<td>$36,500</td>
<td>$16,700</td>
</tr>
</tbody>
</table>

Table 2.—Summary of prescribed fire activity on National Forest lands covered by fire management plans in the Northern Region during 1979 (USDA Forest Service 1979b).

<table>
<thead>
<tr>
<th>Name of area</th>
<th>Fire starts</th>
<th>Fire suppressed</th>
<th>Allowed to burn</th>
<th>Acres within fire perimeter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaconda Pintler</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Beaverhead National Forest</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bitterroot National Forest</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cabinet</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>5-10</td>
</tr>
<tr>
<td>Kootenai National Forest</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>5-10</td>
</tr>
<tr>
<td>Scapegoat</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Lolo National Forest</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Selway-Bitterroot</td>
<td>12</td>
<td>7</td>
<td>5</td>
<td>200</td>
</tr>
<tr>
<td>Clearwater National Forest</td>
<td>16</td>
<td>7</td>
<td>9</td>
<td>14,900</td>
</tr>
<tr>
<td>Bitterroot National Forest</td>
<td>59</td>
<td>49</td>
<td>10</td>
<td>16,300</td>
</tr>
<tr>
<td>Nezperce National Forest</td>
<td>59</td>
<td>49</td>
<td>10</td>
<td>16,300</td>
</tr>
<tr>
<td>Wilderness subtotal</td>
<td>91</td>
<td>65</td>
<td>26</td>
<td>31,411</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of area</th>
<th>Fire starts</th>
<th>Fire suppressed</th>
<th>Allowed to burn</th>
<th>Acres within fire perimeter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Troy fire management plan</td>
<td>1</td>
<td>01</td>
<td>1</td>
<td>600</td>
</tr>
<tr>
<td>Lolo N. F. revised policy</td>
<td>5</td>
<td>52</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bitterroot fire mgmt. plan</td>
<td>4</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Non-wilderness subtotal</td>
<td>10</td>
<td>9</td>
<td>1</td>
<td>600</td>
</tr>
<tr>
<td>Total</td>
<td>101</td>
<td>74</td>
<td>27</td>
<td>32,011</td>
</tr>
</tbody>
</table>

Footnotes

1. Eighteen fires suppressed, did not meet prescription; modified attack on five fires.
2. Of 302 ignitions on Lolo N. F., 297 were outside prescribed fire management areas and were suppressed. Of the latter, 5 were not attacked immediately but were put out the next morning to eliminate overtime payments and enhance crew safety.

William C. Fischer is a USDA, Forest Service, research forester assigned to the Intermountain Forest and Range Experiment Stations Fire Effects and Use Research and Development Program. He is located at the Northern Forest Fire Laboratory in Missoula, Montana. Fischer received his B.S. and B.S.F. in forestry from the School of Natural Resources, University of Michigan in 1956. Before moving to Missoula, he worked on the Boise National Forest in Idaho. Fischer was chairman of the Society of American Forester's Northern Rocky Mountain Section during 1977 and 1978.

Footnotes

1. Research Forester, USDA Forest Service, of Intermountain Forest and Range Experiment Station, Northern Forest Fire Laboratory, Missoula, Montana.

THE 1980
Quality. At every period in history, it has been the most valuable and the most accessible timber which has been cut. The cutting of 150 year old and older Douglas fir along the Pacific Coast is not matched by the growing of trees of the same age and species. In the Northeast, the growth of lower grade hardwoods is vastly greater than their harvest. And many other specific situations could be cited.

The big, overall, general conclusion is: the United States is not running out of timber, or of forest land. Quite the contrary, we are building up our forests while at the same time the harvest of timber has been increasing.

The discussion to this point has all been in terms of "industrial wood"; that is, wood expressly for fuel (as contrasted with scraps from industrial wood) has not been considered. Interestingly enough, the available data on forests include absolutely nothing about wood for fuel (except as scars of industrial wood are burned). The foresters have in the past generally ignored fuelwoods in their surveys and inventories, and the available statistics on growth, stand, and harvest do not include species used only for fuel.

**Future Possibilities**

The domestic demand for industrial wood (as lumber, plywood, and pulp) will continue to rise. There is real possibility that our exports of such wood will also rise, which would help us pay for the oil and other products we import. The demand for wood for fuel will likely continue to rise. Wood may come to be used increasingly as feedstock for chemical processes. Some foresters view these probably increases in demand with alarm. How in the world can we meet such increased demands? My reaction is very different: I view these probable future trends with approval and expectation of favorable developments. They will almost surely mean higher prices for timber and stumpage, and this will draw forth substantially increased supply over the longrun. My studies have convinced me that forest owners as a whole are responsive in the longrun to increased timber prices. One can hardly expect timber growth next year to respond much to timber prices this year, but timber growth 10 or 20 or more years in the future will be greatly influenced by timber prices this year.

The United States has a substantial capacity to grow more timber than we are now growing, even by the practiced. The growth trend of the past 60 years can be continued—more, I believe it will be continued, up to some considerably higher level than we have yet attained. The demands on forests for other purposes, such as recreation, wilderness, wildlife, watersheds, etc. will continue to increase too, but my optimism about future growth takes into account these competing demands for forests.

I have said repeatedly during the past five years that I think forestry should be an exciting and rewarding profession during the next generation. There is so much to be learned, so much to be done, such great opportunities for public service and for a rewarding personal career.

**Forest Design**

are more desirable than volume increases. Individual trees which optimize productivity in a given space are preferred over excellent competitors.

There are some major disadvantages in this model. High dependence on energy, fertilizer, and pesticides are particularly important. Over the long-term, however, nutrient cycling and productivity relationships may be more critical. Consequently, more sophisticated designs may be required.

Mixed-species models generally have not been favored in commercial forestry because of the complexity of silviculture, harvesting, processing and marketing. Mixed species, however, often can produce more biomass per acre because of better use of total light and nutrients. Nitrogen-fixing hardwoods, like alder, are of greater interest in a world where energy costs are significant. Such hardwoods will become more interesting as nutrient cycling and long-term productivity relationships are better understood.

Biological control systems will become more sophisticated and successful. Also, as population dynamics are better understood, the risks and ineffective uses of pesticides will be more obvious.

Similarly, the role and importance of herbicides will change. Dropping broad spectrum herbicides from aircraft is a crude tool. Whether or

**Comments**

Future forest design need not create all the problems of modern agriculture. It can, in fact, point the way toward more rational means of managing renewable resources.

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AMES FORESTER
Timber Harvesting in the 80’s
continued from page 22

an expense. Some initial attempts have been made to develop this concept. Commercial units should be available within the next 5 years. These same machines could be used for intensive culture, short-rotation plantations which silviculturists now have in experimental stages of development.

Whole-tree chipping at the landing has been in use for several years. Well over 500 whole-tree chippers have been sold. A possible advancement in the 1980’s will be highly mobile chippers that will produce chips at the stump. The major impediment which may delay the adoption of this concept is the materials handling required to economically collect chips at the stump for delivery to the mill.

One of the major problems in the South is the harvesting of timber in swamp areas. There are thousands of acres of swamps containing high quality trees in areas that should be harvested while preparing the sites for regeneration. The two major problems are (1) how to best cut these trees, and (2) how to yard them to roads where they can be converted to logs for transport to the mill. Rubber-tired or tracked skidders are unsuitable. A new type of vehicle which can operate in deep water is needed to fell these trees mechanically, and inexpensive cable yarding systems must be developed to yard.

A concentrated effort on new concepts to address this problem is expected in the early 1980’s.

CONCLUSIONS

Undoubtedly, there will be several advances made in the mechanization of timber harvesting in the 1980’s that are not included here. The concepts presented here are those on which some research or developmental activities are already underway. The 1980’s will present some difficult challenges in timber harvesting as the demand for all wood products, including fuelwood, increases. The opportunities to improve forest management are great with this increased market demand which can be supplied from wood we currently leave unused. The challenge will be to develop the necessary equipment and systems to do the job economically.

The ghosts have watched the land be denuded and the timber build houses out on the praire. But even of more interest they watched it recover. I am most happy to give it a helping hand. The same animals are here, the same trees are here as they were 150 years ago. The main difference is that the people who use it all are different. The land will always be here, will always produce for mankind, if we just remember to tread softly when we enter the world of nature.

The Ghosts on my Tree Farm
continued from page 15

planting, roadside improvement, timberstand improvement, for which the government will pay half the cost, I could do many things but go broke from no return, or at least no return in my life time.

In the last five years I have traveled 80,000 miles in these United States and have seen many millions of acres of junk timber. Sooner or later this country will have to come to grips with this huge problem. A start to a solution is to only tax an acre of forest on what it will produce regardless of how pretty it might be. If we didn’t use any more judgement or science in agriculture than we do in Forestry, the Texas longhorn would have had still bigger horns by now and smaller T-bones.
3. Inventory the management units.
4. Make a marking plan based on the inventory and objectives of management.
5. Mark the trees to be cut. Use separate marking for timber trees (logs) and trees for pulp or fuelwood, or perhaps to be killed if there are no markets.
6. Harvest the marked trees. This usually involves a timber operator. You should have a Sales Contract with him spelling out the conditions of the sale and penalty for damage to the trees remaining and to streams and roads. The harvesting operation should be regarded as a part of the whole management package. All previous care can be nullified by careless harvesting. The location and construction of roads and skid trails is very important and requires reliable advice.
7. After logging appraise the area for damages and access penalties according to the sales contract.

All the above discussion involves intensive but conservative silviculture usually for integrated multiple uses on the nonindustrial private woodlands. It is management of an existing resource for both private and public benefit. (Therefore the small private woodland owner is justified in asking for government help.) I consider the small private woodlands the hope of the future because they constitute such a large total area, because industrial forests are managed almost exclusively for timber, and because the Forest Service plans the dominant use of clearcutting and even-aged management, even for mixed hardwoods and northern hardwoods. Their "multiple use" tends to become a number of single uses.

The kind of silviculture and management advocated here and in "Woodland Ecology" provides for production of wood along with the environmental values, greater diversity, and sound long term economics which involve a fair appraisal of all values. At the same time wood is produced without forest-water-site damage, without spoiling aesthetics, without the use of monocultures, and without heavy out-of-pocket investments when dealing with an existing woodland.
Forestry is Looking into the Future

through the ISU Forestry Department
State of the Department Address
“From the Northwest Corner”

by George Thomson
Chairman, Department of Forestry

THANKS to planning put forth by department heads and architects 15 years gone, my desk looks out on a panorama from Old Botany to the southwest around to Lush auditorium and Animal Science to the northeast. In the arc in between I see views that have been familiar to me ever since 1939 when I first saw Iowa State College as a green farm boy from Pecatonica. Within view are Home Ec., where you can still buy cherry pies at VEISHEA and where the only girls we ever got to know had their classes; the big glacial erratic with the fine granite dikes in it that was brought onto campus in memory of Doc Gwynne because he always took students out horse paddock by the railroad tracks which, even now, isn't far from the old ROTC cavalry horse “bull pen” where we all learned to ride, Artillery style, and found that after a hot afternoon with the horses no civilian would sit near us.

Why the reminiscing? Well, the Forestry Department has finished 75 good years and has now started down the back slope of the century and it comforts me that the physical world still retains bench-marks that I can recognize and that forests and institutions are not so ephemeral that one is always losing one's way. In the years to come forestry students still will dislike mathematics, Sophomores will still be expecting more from teachers than they are ever going to get, Pamplin Court will house still another generation of students, and Charlie Gwynne's rock won't have changed a bit. But that is stability in the long run—how are we doing now?

Despite the fact that we did not and do not wish to change to the semester system, the groundwork for the transition is essentially complete. Without the shepherding of Dr. Hopkins and endless hours of thought and work by faculty and student committees the switch couldn't have been accomplished at all. Starting in the Fall of 1981, the new system will be in effect. Exactly what the early starting date in August will do to summer experience and what the reduced number of courses will do to professional preparation we cannot say. We only know that we will survive and continue to strive for excellence.

Faculty is at full strength with a search going on for additional staffing in the important and employment-rich arena of forest products. More dependence will be placed on sister departments for instruction in the recreation aspects of forestry—but with guidance and stimulation coming from our own faculty.

In April of 1979 we successfully passed intensive review of our research by a panel of forestry specialists under the auspices of CR/SEA (Cooperative Research/Science and Education Administration). In April of 1981 we will have an accreditation review conducted by the Society of American Foresters. As is the case of most events where one must put one's best foot forward, these reviews are somewhat nerve wracking but are helpful and stimulating and, not unlike any rite of initiation, tend to form a bond among the participants.

Extension has simply never been better. Drs. Prestemon and Wray are endlessly busy and continuously in demand. Fuel wood, forest management, energy-efficient housing, and urban forestry are just a few of the subjects that cry for undivided attention. With the hope that funding will be provided from Public Law 95-306, the Renewable Resources Extension Act, we look forward to adding another Extension Forester and broadening our services to the State.

With encouragement from the U.S. Forest Service Experiment Station we hope to expand our funding base through cooperative research centering on the management of the private non-industrial forest. Work in forest management and utilization could then expect to approach the emphasis that we have placed in the last ten years on intensive culture plantation work.

While this section focuses on faculty it is obvious that faculty would not exist without students. Although enrollments all over the United States are beginning to decline at forestry schools there is no lessening in the number of responsibilities demanding attention if good graduates are to be produced. Advising will be tremendously important for the next five years as the present Freshmen and Sophomores and the students coming this Fall are brought through the quarter to semester transition. Equally important will be the advice offered by faculty and judgement exhibited by students while course selections are made from fewer offerings. Placement, too, demands the effort of all faculty members and all students. The recent study of the last five years of graduates showed that three-quarters of our recent alumni are employed in forestry so the record is excellent. Nonetheless it takes imagination and energy and dedication to parlay an education into a life's work. The department stands ready to offer all assistance.

Over the horizon come the next year, the next decade, and the next quarter century. Time will provide the challenge; faculty and students will provide the response as successfully in years to come as in the good years past.
Instructional Methods at ISU—Tradition and Change

by Steven E. Jungst

If you are prone to thinking about instructional methods (though I realize such thought patterns are not common among most), the first things which typically come to mind are textbooks, lectures and laboratory sessions. If you are an I.S.U. forestry graduate, you may also include summer camp which is really only an extended lab session complete with picnics in the woods and dust baths in the back of the truck.

Those things are certainly a part of forestry instruction at I.S.U., and they probably won't change much in the future. There are instructional methods which have been changed, however, in hopes of finding methods which better prepare young foresters. Admittedly, I'm not old enough to trace through all the changes which have taken place in instruction here. (I do detect an occasional gray hair, but so far, they are infrequent enough that I can yank them out without fear of looking like a miniture clear cut.) In the past 15 years, however, I have experienced a number of instructional changes both as a student and an instructor.

Much of the change has been computer oriented. It wasn't long ago that a student wasn't one of the elite unless they had a 12" Post Versalog slide rule dangling from their belt. I hadn't been on campus very long before I joined the elite and then spent a whole quarter in a hot little room in Marston Hall learning how to use all those scales. I was quite proud of that slide rule until two years ago when I chanced on a clearance sale at the book store and found 12" Post Versalogs on sale for $5.98. Everyone, it seems, now has a pocket calculator, and the instructional trick is no longer one of giving problems short enough to solve during a three hour lab, but of being sure that students understand all the numbers that flash out of the calculators at them. It is interesting to note, though, that dead calculator batteries cause almost the same panic during an exam that a warped slide rule did 15 years ago.

The technology from which those calculators sprung, however, has also been responsible for our ability to allow the students to do things which would have been impossible a few years ago. Computer simulation allows students to "manage" hypothetical areas for many simulated years in the space of a lab period. They can realistically incorporate management constraints, and, depending on their ability, wind up a successful manager, or a temporary failure, without fear of losing their job. In addition to simulation, they can now do calculations which would have been very time consuming a few years ago. Many problems that we used to avoid, we can now do rather
painlessly, and the student who thinks while using the computer is bound to benefit.

The University has recently gone a long way in supporting this type of approach by providing computer systems free of charge to students and departments. We currently have several terminals in the building for student use with more planned for the future. Student acceptance has been very good, and the number of computer related problems is continually increasing.

With most everything except interest rates getting smaller these days, it seems natural that instructional methods should take advantage of the trend. The forest pathology course is making use of microfiche, 4” by 6” transparencies containing up to 84 color slides, to help teach pathology. A new set is currently being prepared which will deal with both pathology and entomology, and students in the courses can use microfiche readers in the department or in the library to study and review various aspects of forest pathology.

The whole concept of education is really one of exposing students to new ideas from different viewpoints. Seminars, which take place at irregular intervals, are a good way of providing this exposure to students and faculty. Speakers range from students reporting on special topics work or Honors Program projects, to faculty discussing research or travels, to outside speakers talking about either forestry or nonforestry topics. Such seminars are an enjoyable break from formal classroom activities, and give students the
chance to experience what will form the mainstay of continuing education once they graduate.

Even with continually improving instructional methods, experience is still the best teacher. The requirement of a forestry related job for students during the summer still exists, and although most students see it as a way to get away from books for the summer, it is an extremely valuable instructional tool. More and more, we are encouraging students to go beyond the minimum department requirements and get as much summer experience as possible.

Another form of experience comes in one of the last courses foresters take at I.S.U. It is designed to give outside experience while maintaining classroom ties. The course has evolved over a number of years, but in recent years, it has become a capstone course dealing with actual natural resource management problems, and requiring students to integrate things they have learned from other courses. Problems are solicited from a number of areas around the state, and teams of students are allowed to choose the problem on which they wish to work. Students are responsible for contacting the client to clarify the problem, developing management alternatives, and presenting findings to the client at the end of the quarter. Since they are involved in solving real problems rather than hypothetical ones, interest runs higher, and they begin to really understand the complexity of working within numerous constraints to obtain a workable solution. The course continues to be refined, and presents a very timely bridge between 4 years of college, and a career in resource management.

The future of instructional method is limited only by the instructor's creativity and the students' desire to learn in new and better ways. My dusty slide rule brings back some pleasant memories, but the real fascination is dreaming of where we are going, and playing a part in changing and improving instructional methods at I.S.U.
Dr. George W. Thomson

Dr. Harold S. McNabb received a Bachelor's of Science degree from the University of Nebraska in Chemistry and Botany. He received his Master's and Ph.D. in Forest Pathology from Yale University. Dr. McNabb has been teaching at Iowa State University for the past 27 years. Dr. McNabb worked as a Teaching Assistant at Yale and Nebraska and held summer jobs with the Forest Service. Dr. McNabb teaches Forest Pathology-Entomology/Forest Pest Management, and Advanced Forest Pathology-Pest Management. Currently his studies include cooperative research with the Forest Service on diseases of Populus used in intensive short-rotation cultures and also mycorrhizae in Poplar and Black Walnut. He is also part of the ISU group working to optimize both the symbiotic relationship in Alnus and the use of N-fixing species in international forestry.

Dr. Fred S. Hopkins

Dr. Fred S. Hopkins, Jr. earned a Bachelor of Science in Industrial Forestry, a Bachelor's in Business Administration, and a Master's degree in Forest Marketing from the University of Michigan. Dr. Hopkins earned a Ph.D. in Forest Economics at Syracuse. Dr. Hopkins worked for New England Forestry Foundation as a forester, the Clearing Construction Company as a manager, and the True Temper Corporation as a timber buyer. Dr. Hopkins also has a great deal of teaching experience to his credit. He served as an Assistant Professor at the University of Vermont, a Graduate Assistant and instructor at Suny College of Forestry, and as an Assistant Professor, Associate Professor and Professor here at Iowa State University. Dr. Hopkins has been teaching at Iowa State University for 20 years. This year he taught Forest Resource Management, Forest Resource Economics, Forest Resource Policy, and Economics of Forest Resource Management. Dr. Hopkins does much research on the international level.
Dr. Dean R. Prestemon received his Bachelor's degree from the University of Minnesota, and his Ph.D. from the University of California. Dr. Prestemon has been here at Iowa State for 15 years. In the past, Dr. Prestemon has been employed by Douglas Fir Plywood, the National Lumbermans’ Association, and the University of California in the Forest Products Lab. Dr. Prestemon is an extension forester who also teaches Mechanical Processing of Wood and Physical Properties of Wood. The research that Dr. Prestemon is conducting concerns the use of Cottonwood in wall framing and working with the urban forest user.

Dr. Richard B. Hall

Dr. Richard B. Hall received his Bachelor's degree from Iowa State University in Forest Management, and his Ph.D. from the University of Wisconsin. Dr. Hall has been teaching at Iowa State for six years. The courses that he teaches are Introduction to Forestry, Silviculture, Forest Tree Improvement and Genetics, and Advanced Silviculture. Dr. Hall is also very active in research. He is currently involved in studying the genetics and breeding of Alnus and Populus, field establishment and propagation techniques for Aspen hybrids, genetic influences on root grafting, interaction between nitrogen fixing organisms and host plants in Alder, and producing short rotation sawlogs from Poplar hybrids.

Dr. David W. Countryman

Dr. David W. Countryman received his Bachelor's and Master's degrees from Iowa State University in Forest Management. He received his Ph.D. in Forest Management and Planning. Dr. Countryman has been with the faculty for five years. He teaches Forest Resource Case Studies, Graduate Seminar, Advanced Forest Resource Management, and Research Methods. Before coming to Iowa State, Dr. Countryman worked for the U.S. Forest Service. Dr. Countryman is currently doing research under a Rockefeller Foundation Grant. His projects include Guidelines for More Effective Resource Regulations and Development of Forest and Recreational Resources in the North Central United States.
Dr. Steven E. Jungst received his Bachelor's, Master's and Ph.D. from Iowa State University. Dr. Jungst began his teaching career five years ago as a Temporary Instructor and is now an Assistant Professor. During a summer of his college career, Dr. Jungst worked for Weyerhaeuser. Dr. Jungst teaches Forest Fire Protection and Management, General Photogrammetry and Photo-Interpretation, and Forest Resource Measurements. Dr. Jungst is currently conducting research in conjunction with the Conservation Commission on assessing public tree needs in Iowa communities with populations greater than 10,000.

Dr. Paul H. Wray has been at Iowa State University for 5 years. Dr. Wray earned his Bachelor's of Science and Ph.D. here at Iowa State. He was an Assistant Professor at Virginia Polytechnical and State University prior to coming to Iowa State. Dr. Wray is an Associate Professor involved in Forest Biology and Extension. Dr. Wray is currently conducting research on small woodlot management problems and is investigating street tree needs in Iowa towns with a population of less than 10,000.

Dr. Ted J. Born received a Bachelor's and Master's degree in History from Northwestern University. From the University of Arizona he received a Masters and Ph.D. in Watershed Management. Dr. Born has been teaching at Iowa State University for three years. Dr. Born teaches Forest Conservation and Forest Recreation Resource Management. From 1974–1975, Dr. Born served as a staff Sociologist for Dames and Moore, an environmental consulting firm. Dr. Born has also served as an Assistant Professor of Natural Resources at the George Williams College. A current research project of Dr. Born’s is Improvement of Public Forest Recreation in Iowa.
Dr. Carl W. Mize earned his Bachelor's in Mathematics and Chemistry from Brockport State in New York. Dr. Mize received his Masters in Forest Ecology from Humboldt State, and his Ph.D. from the College of Forestry in New York. Dr. Mize has been with Iowa State for two years. He teaches Dynamics of Forest Stands, Forest Resource Surveys, Forest Biometry, and Introduction to Forestry Labs. Before coming to Iowa State, Dr. Mize was a chemist at Humboldt State. Dr. Mize is currently doing research on fuel-wood volume tables and the growth of mixed Alder plantations.

Dr. Joe P. Colletti

Dr. Floyd G. Manwiller received a Bachelor's in Forest Management and a Ph.D. in Wood Science from Iowa State University. This is Dr. Manwiller's first year of teaching at Iowa State. He teaches Wood Technology, Wood Liquid Relations, Wood Chemistry, Wood Composite Products, Formation of Wood, Advanced Topics in Wood Science, and Wood Products Seminar. For 13 years prior to returning to Iowa State, Dr. Manwiller worked with the U.S. Forest Service at the Southern Forest Experimental Station. He is currently completing his research papers for the U.S. Forest Service and is assisting a graduate student in studies concerning the anatomical properties of hybrid Poplars.

Welcome to ISU, Dr. Manwiller.

Dr. Floyd G. Manwiller
Richard R. Faltonson earned his Bachelor's of Science Degree in Horticulture from Iowa State University. Mr. Faltonson has been working in the greenhouses for 13 years. Although Mr. Faltonson does not teach any courses, he is asked to guest-lecture from time to time. Mr. Faltonson has a wide variety of work experience. He worked two summers for the U.S. Forest Service, and has worked in Alaska for the Bureau of Land Management. Then he worked for the U.S. Forest Service in Arizona. Finally he returned to Ames to work in the U.S. Forest Service greenhouses, which later became part of Iowa State. Mr. Faltonson is mainly involved in research on vegetative reproduction of intensively grown forest tree species. However, he is also involved in all the research that is performed in the greenhouses.

Tom Hillson

Tom Hillson earned his Bachelor's and Master's degrees in Botany from Iowa State University. Mr. Hillson has been a Research Assistant at Iowa State for two years. He taught biology at Des Moines Area Community College for one year. As a research assistant, Mr. Hillson assists Dr. Hall and Dr. Schultz in their research, and graduate students in their projects. Mr. Hillson familiarizes the graduate students with the equipment that is available to them. Mr. Hillson's own interests lay in tissue culture, especially sterile cultures of Populus hybrids and Alnus.
Dr. Paul N. Hinz received his Bachelor's in Wood Utilization from Pennsylvania State, a Master's in Wood Technology from North Carolina State, and a Master's and Ph.D. in Statistics from Wisconsin. Dr. Hinz has been teaching at Iowa State for 12 years. Before coming to Iowa State, he worked for 9 years at the U.S. Forest Products Laboratory. Dr. Hinz has a double appointment in Statistics and Forestry and is currently teaching Methods of Multivariate Analysis, Experimental Design for Research Workers, and Statistical methods.

Dr. Wayne H. Scholtes

Dr. Wayne H. Scholtes received his Bachelor's in Forestry from Iowa State University, a Forestry Master's from Duke University, and a Ph.D. in Soils from ISU. Dr. Scholtes has been teaching at Iowa State for 30 years. Before coming to ISU, he worked for the U.S. Department of Agriculture, (USDA), for 10 years. While with the USDA, Dr. Scholtes worked with the Soil Conversation Service in soil classification. He teaches Introductory Soils, Forest Soils, and Soil Genesis and Survey. Dr. Scholtes has a double appointment in Agronomy and Forestry and is currently doing research in soil reclamation of Iowa coal mines.

Dr. Elwood R. Hart

Dr. Elwood R. Hart received his Bachelor's at Cornell College and his Ph.D. from Texas A&M. He has been teaching at ISU for six years. Dr. Hart teaches Elementary Entomology, Advanced Insect Morphology, Insects and Man, and Forest Pest Management. His major research projects concern the yellow-headed fireworm and kairome studies with the mimosa webworm. He has also begun bionomic studies of the Aspen root girdler as a part of the Forest Service cooperative studies on Populus.
Secretaries

First row: Deborah S. Dent, Department Head Secretary; Joyce A. Wray, Research Secretary. Second row: Rosalie A. Turner, Graduate Secretary, Receptionist; Beth Williams, Undergraduate Advising Secretary.

These men keep second floor Bessey spic and span.

Left: Glen Buseman
Right: Ron Davidson
IN THE DEPARTMENT . . .

by Dr. Dean R. Presteman

FORESTRY extension focuses its efforts on seven primary program areas: management of natural woodlands and plantations; community tree programs; forestry conservation education for youth; shade tree management for individuals; continuing education for professionals; conferences; for housing suppliers; and housing-energy meetings for individuals and families. Staffing consists of two professionals (1/4-time extension) and one graduate assistant (1/4-time).

During the most recent program year (October 1, 1978 to September 30, 1979), forestry extension was involved with a total of 80 educational meetings involving 5,222 clientele. In addition, 600 individual inquiries for information were handled, 8 radio programs were presented, 4 TV programs were generated, 8 news releases were written, 7 new extension publications were published, and 4 displays were constructed.

The most active forestry extension programs currently are: heating with wood, energy-efficient wood construction, and tree planting and maintenance. Extension workload has increased substantially in recent years; projections indicate continued upswing in interest in forestry related programs in the years to come.

by Carl Mize

DURING the summer of 1979 I took a leave of absence from the University and worked for Weyerhaeuser at their Southern Forestry Research Center in Hot Springs, Arkansas. My assignment was to examine the effect of forest fertilization on various stand parameters. I worked with data from four studies in loblolly pine in North Carolina. While I was there, I was exposed to the very applied nature of industrial research, met a number of people in forestry research, and learned a lot about southern forestry.

I very strongly support the idea of university faculty taking leave and working for the forest products industry or the Forest Service to get a first hand exposure to the orientation of research in other organizations and to gain an appreciation for the strengths and weaknesses of different institutions.

by Dr. Fred S. Hopkins, Jr.

IN the Fall of 1981, the transition from an academic year of three quarters to the semester system will be implemented at Iowa State. As with most major changes, both advantages and disadvantages are anticipated for the Forestry program. The semester system will mean building essentially the same structure (curriculum) with fewer and larger building blocks.

Among the gains which will be realized is the opportunity for more substantial development of individual courses.

There will be negative impacts on the Forestry curriculum. Some worthwhile courses will be deleted from the curriculum as others are expanded. There will be some loss in flexibility. An adverse effect on summer employment is possible as the Fall semester will begin late in August.

In general the semester system will require more careful planning on the part of students.

Performing Arts Lottery

by Dr. David W. Countryman

DAVID W. Countryman, Denise M. Sofranko, and several other authors are writing a book, Guiding Land Use Decisions, based on research carried out within a regional research effort, "Guidelines for More Effective Regional Development of Forestry and Recreation Resources in the North Central United States". The book is a capstone document that provides a synthesis of the research work conducted in the regional research effort by more than 50 scientists, lawyers and other experts. The book is planned for completion in 1981.

by Kim Coder

IN mid-February the forestry department displayed a photographic exhibit entitled "The Natural Forest Communities of Iowa: A Resource in Trouble."

Dr. Hightshoe of the ISU Landscape Architecture Department produced this display to show the variety and limitations of Iowa's forest communities.

The display was composed of ten large picture frames with a collage format that showed both the tree species of each forest type and the typical understory plants.

The large photographs, taken from planes in various parts of the state, were especially beautiful and showed the delicate nature of the forest resource.
Forestry is Looking into the Future through the ISU Forestry Club

Club advisors are Dr. Carl Mize and Dr. Joe Colletti

Executive Council: President, Gary Stephan, sophomore Rep., Anita Montag; Secretary, Nita Rauch; Sen. Ag Council Rep., Dawn Evans; Junior Ag Council Rep., Al Wimmer; Vice President, Reinee Eshelman; Treasurer, Mike Scanlon


Spring Forester's Day

by Al Wimmer

It hasn’t been done for a long time, but on Saturday, April 21, 1979, Spring Forester’s Day was held at the Holst Tract State Forest. The day was modeled after Fall Forester’s Day, having field events and a large meal at the end of the day. The day was set aside to increase enthusiasm, participation, and comradship among participants rather than the usual competitive atmosphere that is felt during Fall Forester’s Day, which is held just prior to the Midwest Conclave, in which ISU participates yearly.

Of the 16 events scheduled, there was only time and energy for 12 of them. In these 12 events, over 20 different people placed first or second, so individual participation was high in all events.

John Jennett was the overall first place winner and second place went to Mark Sandvik. After the long day of challenging events, it was almost unanimously agreed that honorable mention be awarded to John Crane for his enthusiasm throughout the day’s events. Here’s your “E” for effort, John.

The day must be considered a success because of the needed break away from classes and the camaraderie that was felt by many at the close of the day.
Is that how you learned to throw a chain, Curt?

"Whew, that was hard work."

"OOMPH"
Veishea '79

by Sharon Abrahamson

With the last minute dash to turn on the projectors and the frantic cries of "Here come the judges", the 75th Anniversary of the Forestry Department began its celebration in style with an extensive educational display titled "Forestry—Yesterday and Today, 75 Years at Iowa State University."

Plans began early—in fact, seven months earlier at the SAF convention in St. Louis. And with this early start, a new team of foresters chose their specialties and began sketching plans, writing letters, and finally starting construction.

Then, at last, the big day arrived and the 1979 VEISHEA display was unfolded. The stations were manned with over 40 enthusiastic foresters who presented the forestry story to over 200 visitors throughout the two day celebration. And, judging by the visitors comments in the guest book, the display was a terrific success.

First on the tour was a cross-section of a 75-year old elm tree which was dated to include both...
national and forestry events that had taken place throughout the tree’s life. This was followed by a room of nostalgia, which included everything from old photos depicting the early days of forestry at ISU to old tools including an adze and broad axe.

Also new this year was a woody wildlife display, forestry extension display, and a display showing the wrong way to build a campsite, complete with suds and cans floating in a stream.

The new crowd pleaser was a Tree Identification Quizboard where visitors tried their skills at identifying trees of Iowa. If they matched the pictured tree with the correct name, Smokey the Bear’s eyes lit up. This display is now on loan throughout the year to the 4-H Nature Center in Madrid.

And then, all too soon (and not soon enough for some!), it was over. The dismantling began, and all was placed into its special niche in the storage closet. It was a tired crew of foresters that headed home to bed.

But, their months of determination and dedication proved that the spirit of forestry is still alive and ready to successfully meet the challenges of the next 75 years of forestry at ISU.
Game Banquet

by Barry Graden

At 6:30 in the evening on March 20, 1979, while most Iowa State students were at home eating dorm or “make-do” meals and growing weary-eyed from staring at reading assignments, the Ames Foresters and their friends were enjoying an exotic feast of North American wild game, and laughing and learning from the night’s entertainment. If you are one who missed this annual event, you should never forgive yourself, for it was a night well worth remembering.

The evening began with the feast—venison, duck, rabbit, squirrel, donated by people who deserve much thanks, and accented with many kinds of vegetables, salads, and a delicious dessert. Many of the banquet attenders had never tasted some of the meals provided at the meal, which turned the evening into somewhat of a tasteful adventure.

Following the meal, several academic awards were presented, most of which are granted annually at the Game Banquet to the most deserving students. This year the following awards were given: Keith A. Bauer Award, Hoo-Hoo Award, Strom Award, F.P.R.S. Award, Cone Award, Northeastern Loggers Assn. Scholarship, Pack Essay Awards, Society of American Foresters Award, and one favorite—the Most Beloved Instructor of the Year Award, which was presented to this year’s lucky winner—“surprise, surprise, it’s Dr. Mize.”

The presentation of awards were followed by the recognition of forestry club officers. Each officer serving the club for the past year was deservedly recognized and thanked for the excellent service they gave the club during their time in office. New officers, elected just prior to the banquet, were then announced. The results of the elections are kept a total secret, up until this time.

The climax of this year’s banquet came with the oral presentation given by the guest speaker, Dr. Paul Risk. Dr. Risk, a professor at Michigan State University, gave a very entertaining and informative talk on environmental interpretation, a subject he is well involved in at M.S.U. Some I.S.U. forestry students first “discovered” Dr. Risk when he spoke at the 1979 Society of American Forester’s Convention in St. Louis, Missouri. The students were so impressed with his talent for speaking that they urged the banquet committee to contact him with hopes that he might oblige. We felt very fortunate to have him attend and gave him a standing ovation for his excellent performance. If he had been a singer the audience would have cheered for an encore.

The Game Banquet was a complete success, enjoyed and remembered by all who attended. It is definitely an event to be looked forward to each year.

Canoeing

by Richard T. Straight

On April 28th, eleven determined canoeists set out from Adel, Iowa on the North Raccoon River for a Saturday of relaxation. A leisurely pace was set in order to make the short trip to Van Meter as long as possible. The day was relatively uneventful until our crew stopped on a sandbar about one-hour north of Van Meter for a mass clam hunt.

Even on the early, cool days of spring, a few people were sunburned, notably Mike Scanlon, who was beet-red from belt-line to eyebrows. Once again a few hearty Forestry Club members had made their way down one of Iowa’s rivers for the unofficial “Annual Spring Canoe Trip”.

Freshman Welcome

by Kris Holt

The Freshman Welcome is a time set aside at the beginning of the academic year for the gathering of forestry students and professors, both old and new. It is a chance to greet those who are new to the department, swap stories with old friends, and escape from the first few days of classes.

This year’s welcome was fairly relaxed. Holst Tract State Forest, the site of the event, saw a lot of conversation between the fifty-or-so who attended. Many went off to hike the maze and ways of Holst.

Softball was a planned activity, but lack of space promoted volleyball. A team composed of faculty and graduate students appeared to be unbeatable until they were finally conquered by the undergrads. The threat of a rematch was called on account of food.
by Kris Holt

In keeping with established tradition, the Forestry Club celebrated its regathering at the annual Fall Forester’s Day. To those unfamiliar with our holiday, it is a day of festive competition; re-creating the events and methods of the old-time loggers and foresters.

Fall Forester’s Day is held at Holst Tract State Forest. It’s a day of tree-felling, match splitting, tobacco spitting, buck sawing, speed-chopping, - - to name a few - - and good eating in good company. If you could fight off the mosquitos, it was a chance to roll up your sleeves and show off your skills at traditional forestry in a laid-back atmosphere.

This year, the Fall Forester’s Day was marked by good times, close competition, and about a dozen freak eggs, (some of which bounced and rolled up to forty feet without breaking!)

As darkness closed in on Holst Tract, the partying mood took hold of us. The group slowly broke up, only to rejoin later at Reinee Eshelman’s apartment where we talked until the wee hours of the morning while trying to diminish the world supply of popcorn.

ONE-MAN BUCK
1. Al Wimmer
2. Mike Scanlon

TWO-MAN BUCK
1. Mike Scanlon & John Jennett
2. Kris Holt & Al Wimmer

TWO-LADY BUCK
1. Julie Thompson & Sue Mellerup
2. Michelle Shaw & Margaret Straub

LOG ROLL
1. Greg Miller & Dave Peters
2. John Jennett & Mike Scanlon

DENDROLOGY
1. Mark Sandvik
2. Koral Santman

TOBACCO SPIT
1. Mike Scanlon

BOLT THROW
1. Mark Sandvik
2. Dave Peters

TRVERSE
1. Dave Hallam

EGG TOSS
1. Kris Holt & Duane Stall

PULP TOSS
1. Tim Morrow & Bob Hogeboom
2. Carl Mize & Greg Miller

SPEED CHOP
1. Mike Scanlon
2. John Jennett

TREE FELLING
1. Bob Hogeboom
2. Mike Scanlon

NAIL POUND
1. Kelley Peters
2. Patty Feany

MATCH SPLIT
1. Greg Miller
2. Al Wimmer
3. Sandy Hallam
4. Duane Stall (for lighting the match)

WOOD TECH
1. John Jennett
DIZZY IZZY
1. Jeff Miles
Midwestern

by Kris Holt

The 28 Annual Midwestern Forester’s Conclave was hosted by the University of Minnesota at Camp Courage, 30 miles northeast of Minneapolis, on October 19-21, 1979.

The ISU team of 12 Forestry Club members scored a total of 5 points, once again avoiding the dreaded last place prize: The “Bear Skin”

Senior John Jennett brought in the first point with a fourth place standing in the speed-chopping event. The second point, again a fourth place, was earned by the special event team of junior Kris Holt, sophomore Al Wimmer, freshman Dave Peters and John Jennett.

The last three points were the result of a dramatic conclusion of this year’s Conclave. Minnesota and Missouri went into the last event, the two-man buck, tied for overall first...
Conclave

As the event proceeded, it appeared that Minnesota would take first place for five points, and Missouri taking second and third for an aggregate of five points. With three teams left, the competition looked like it would end in a deadlock. But LSU’s last team still had their chance at the event. Mike Scanlon, a junior, and John Jennett raced in a time just seconds better than the second ranked Missouri team, dropping Missouri’s rankings to third and fourth. With Missouri’s aggregate reduced to three points, Minnesota took overall first by two.

To the dozen who went to this year’s Conclave, it was a good chance to meet new people. For those who go to the University of Missouri at Columbia for next year’s Conclave, we send our best wishes and hopes for strong friendships.

AMES FORESTER
Christmas Tree Sales

by Andy Mitchell and Al Weber

THIS year's Christmas tree sales were an overwhelming success. Four hundred trees were sold in seven days, bringing in more than one thousand dollars profit.

The trees were grown in western Illinois and northeastern Iowa. They included scotch pine, white pine and spruce.

Club participation was enthusiastic, with nearly everyone turning out to help sell trees. We would like to thank everyone who helped this year.

Special thanks to Jerry Grebasch for his cooperation in letting us use the state nursery facilities and to Barry Graden for the use of his truck.

Firesides

by Connie Reints

FIRESIDES mean sitting around the hearth, and watching the flames dance, talking of things past, meeting an ISU Forester (a fellow classmate at that!) that you never really knew, and spending a friendly evening with a professor in his home.

This year eleven faculty members volunteered to host firesides. Three were scheduled during winter and the rest during spring quarter. Eight to fifteen students are invited for a Sunday evening visit during each fireside. Students and faculty become better acquainted as a result of the evening visit.

The fireside program is a student-faculty function that continues building the good rapport within the forestry department.

Annual Ski Party

by Clark Ott

Unlike last year when we were praying for good weather so that we could go skiing, this year we were hoping for snow. But we were unfortunate and had to postpone our Ski Party until February 8th. Then we had enough snow to make it worthwhile.

By about 7:00 p.m., twenty Forestry club members and guests had arrived at Winter World at Humbolt. We enjoyed an evening of skiing and lively conversation around the lodge fireplace. There was chili, bread, pop, and other refreshments for those who came in from the slopes. Aside from the dense fog that settled in late that evening we had wonderful weather.

When we left, the fog must have been disorienting, because some people proceeded to make turns that led them away from Ames, and others
ended up in wrong towns.

The drawing for door prizes was held at 11:30 p.m. The winners were as follows:

1st prize—Silva ranger compass—Mark Rediger
2nd prize—Buck knife—Bruce Erickson
3rd prize—LP gas stove—Les Miller
4th prize—Fluorescent lantern—Michelle Nummela

The evening was a great success. Everyone enjoyed the great weather and the snow that had finally fallen.

Christmas Caroling

by Anita Montag

In the continuation of a recently established tradition, various Forestry club members braved the winds and bitter cold on December 13 to serenade the Forestry Department staff with Christmas cheer.

Not only did we raise our voices in song but we also staged the opportunity for John Jennett to lock Dr. and Mrs. Hopkins out of their own home. Next, imagine standing in that same wind and bitter cold singing—to an empty house and an empty apartment, thrilling isn't it? Yet the most unexpected pleasure was a visit by the infamous reindeer, Karl Krech, (Hey, Karl! when did you grow the antlers?).

However, those who did brave the elements were well rewarded. Following our singing tour of Ames, the warmth and hospitality of Dr. Manwiller's home was enjoyed by all. The goodies, punch and especially the hot chocolate were consumed heartily. More caroling followed and we were joined by the golden voice of Dr. Thomson. For those of you who didn't participate, you missed a good time. We hope to hear you singing next Christmas.
Forestry is Looking into the Future through Students of the Past, Present and Future

In Memoriam
Lawrence Battey '29
William Brabham '50
Arthur Carhart '16
John Froehlich '39
Tom Saddoris '37
Ted Silker '40, '41
Seymour Somberg '41
Wendell Stone '33
Karl Theilking '31
George Willson '48
SAFIN, JOHN
EUGENE OR 97401
65-1971
SELF

SACK, IVAN
400 BOX 5061
RENO NV 89503
65-1939
RETIRED

SAFRAN, JOHN
TOMS CENTRE
623-7TH ST
DE WITT IA 52742
65-1949
USDA-GCS

SAMSON, GEORGE ROGER
2004 SING-HECK DR
WEAVER LA
PT COLLINS CO 80531
65-1950
FORESTRY SCI LAB

SANDE, DENNIS MICHAEL
BOX 132
LEONIA 07605
65-1976
SCS

SANCULELLI, JOSPEH PETER
44 TUCKAHOE AVE
EASY CHESTER NY 10707
65-1979

SARDOZOL, OLIVER
SAWYER ANTHONY
EAGLE LA 53086

SCHRADER, JOHN
300 BOX 490
CHESTERS CO 85020
65-1974
FOREST

SCHNEIDER, JAMES FREDERIC
449 TUCKAHOE AVE
EASY CHESTER NY 10707
65-1976
SELF

SCHEMANN, GEORGE
332 S CULVER DR
TUCSON AZ 85710
65-1939
RETIRED

SCHWARZ, ERIC
410 W 50TH ST
RENO NV 89512
65-1941
SELF

SCHRAMM, DAVID
121 MOORE ST
RIPON WI 54971
65-1939
RETIRED

SCHRAHM, DONALD LESLIE
2707 MERRIMONT DR
TROY NY 12180
65-1939
RETIRED

SCHREIBER, JOHN
STUDENT AT ISU

SCHWANK, ADAM
750 MACKENZIE AVE
ARDMOR PA 18003
65-1949
RETIRED

SCHREUDER, HANS JIPVER
240 W PROSPECT
ROSS KNIT WOOL FOREST
PT COLLINS CO 80531
PHO-1965
FOREST SCY LAB

SCHREUDER, JOHN
1010 MACKENZIE AVE
ARDMOR PA 18003
65-1972
FORESTER

SCHUMACHER, JAMES ROBERT
1301 MACKENZIE AVE
ARDMOR PA 18003
65-1939
RETIRED

SCHUMACHER, CHARLES
126-16TH BLVD
HUNTSVILLE AL 35805
65-1939

SCHWARTZ, PHILIP
1101 HOLLY
JACKSON MS 39346
65-1949
DIST CONSERVATIONIST
US DEPT OF SOIL CONSERV

SCHWARTZ, JOHN
300 BOX 490
CHESTERS CO 85020
65-1974
FOREST

SCHMIDT, DIANNE LYNN
GRACIOUS ESTATES
LOT 102
MASON CITY IA 50401
65-1976
PEACE CORP

SCHWINK, ALBERT
400 BOX 5061
RENO NV 89503
65-1950
RETIRED

SCHNEIDER, JAMES
800 BOX 5061
RENO NV 89503
65-1950
RETIRED

SCHRAMM, DAVID
1101 HOLLY
JACKSON MS 39346
65-1949
DIST CONSERVATIONIST
US DEPT OF SOIL CONSERV

SCHMIDT, DONALD LEE
JOHN
ARDMOR PA 18003
65-1972
FOREST

SCHRAMM, DONALD LESLIE
2707 MERRIMONT DR
TROY NY 12180
65-1939
RETIRED

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STUDENT AT ISU

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750 MACKENZIE AVE
ARDMOR PA 18003
65-1949
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FOREST SCY LAB

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JACKSON MS 39346
65-1949
DIST CONSERVATIONIST
US DEPT OF SOIL CONSERV

SCHMIDT, DONALD LEE
JOHN
ARDMOR PA 18003
65-1972
FOREST
Bader, Curt  
Bloomfield, IA
Bauer, James  
Iowa City, IA
Beall, Janet  
Ames, IA
Black, Gregg  
Dayton, OH
Carlson, Gary  
Storm Lake, IA
Curtis, Anne  
Williamsburg, VA
Davis, Carol  
Hamilton, IA

Morrow, Timothy  
Fort Dodge, IA
Munoz, Timothy  
West Des Moines, IA
Murphy, Kevin  
Oelwein, IA
Olsen, Jerry  
Des Moines, IA
Patton, Robert  
Council Bluffs, IA
Pluff, Matthew  
Omaha, IA
Prestemon, Jeffrey  
Ames, IA

Liljedahl, Curt  
Missouri Valley, IA
Lund, John  
Hawthorn, CT
Lynn, Thomas  
Waterloo, IA
Mahoney, Karen  
Mason City, IA
Meyer, Jodi  
Stuart, IA
Miller, Leslie  
Ames, IA
Mohr, Kurt  
Clinton, IA

Jasper, Steven  
Masonville, IA
Johnson, Eric  
Cedar Rapids, IA
Johnson, Erik  
Lombard, IL
Kendall, Julie  
Ankeny, IA
Knut, Clinton  
Waterloo, IA
Lang, David  
Urbandale, IA
Laverenz, Donald  
Davenport, IA

Dorman, Randy  
Perry, IA
Dowd, Peter  
Westport, CT
Dunsworth, Greg  
Davenport, IA
Fouts, Kenneth  
Dunlap, IA
Goodspeed, Julie  
Iowa City, IA
Hamblin, Janice  
Downers Grove, IL
Hendrickson, Mark  
Waterloo, IA

Wells, Ann  
Sioux City, IA
Young, Stephen  
East Amherst, NY

Micek, Jeffrey  
Omaha, NE
Montag, Anita  
West Bend, IA
Mueller, Frank  
Monticello, IA
Nadolsky, Pamela  
Burlington, IA
Nelson, Jody  
Manson, IA

Gray, Linda  
Des Moines, IA
Grosz, Donna  
Omaha, NE
Hall, John  
Winnebago, IA
Hall, William  
Decorah, IA
Hardy, Alan  
Iowa City, IA

Healey, James  
Toms River, NJ
Kaiser, John  
Ankeny, IA
Leacox, Eric  
Bettenorf, IA
Maley, Peter  
West Des Moines, IA
McIntyre, James  
Des Moines, IA

Shaw, Michele  
Cedar Rapids, IA
Silverted, William  
West Des Moines, IA
Steig, Debra  
Boone, IA
Straus, Margaret  
Avoca, IA
Vanderpool, Beth  
Washburn, MO

Accola, Lon  
Davenport, IA
Bahr, Gary  
Ames, IA
Blum, Robert  
Nashua, IA
Boyce, Wesley  
Fairfield, IA
Bridgeman, Barbara  
Ute, IA

Cambridge, William  
Glenwood, IA
Drilling, Pete  
West Des Moines, IA
Fenton, Annette  
Cedar Rapids, IA
Fitzpatrick, Shawn  
Lynnville, IA
Gardalen, Dennis  

Healey, James  
Toms River, NJ
Kaiser, John  
Ankeny, IA
Leacox, Eric  
Bettenorf, IA
Maley, Peter  
West Des Moines, IA
McIntyre, James  
Des Moines, IA

Shaw, Michele  
Cedar Rapids, IA
Silverted, William  
West Des Moines, IA
Steig, Debra  
Boone, IA
Straus, Margaret  
Avoca, IA
Vanderpool, Beth  
Washburn, MO

Nummela, Michelle  
Omaha, NE
Peters, Kelley  
Steamwood, IL
Reid, Paul  
Muscatine, IA
Reutzel, Randy  
Northwood, IA
Schneit, Chris  
LeMars, IA

AMES FORESTER
JUNIOR FORESTERS

Beckman, Dwayne
St. Charles, IL

Berger, Gary
Sioux City, IA

Boots, Steven
Atlantic, IA

Burger, Marie
Ames, IA

Erickson, Bruce
Galena, IA

Goerndt, Randolph
Des Moines, IA

Gruver, Daniel
Waterloo, IA

Harker, Daniel
Downers Grove, IL

Hollins, Thamarika
Linden, IL

Honeywell, Robert
Clinton, IA

Jennett, John
Nevada, IA

Keys, Stephen
Wichita, KS

Knutel, Mark
Vincennes, IN

Kuhle, Don
Dubuque, IA

Hastie, Thomas
Cedar Falls, IA

Helmberger, Jo
dexter, IA

Herzberg, Bruce
Creston, IA

Hildebrandt, William
West Simsbury, CT

Ho Chun-Hong
Taihong City, Taiwan

Di Carlo, Daniel
Pittsburgh, PA

Eversen, David
Springville, IA

Foster, Brent
Mt. Pleasant, IA

Gehrig, Jennifer
deerfield, IA

Gowan, Daniel
Roanoke, VA

Hastie, Thomas
Cedar Falls, IA

Helmberger, Jo
dexter, IA

Herzberg, Bruce
Creston, IA

Hildebrandt, William
West Simsbury, CT

Ho Chun-Hong
Taihong City, Taiwan

Di Carlo, Daniel
Pittsburgh, PA

Eversen, David
Springville, IA

Foster, Brent
Mt. Pleasant, IA

Gehrig, Jennifer
Deerfield, IA

Gowan, Daniel
Roanoke, VA

Reilly, Shaun
Algona, IA

Rothlauf, Michael
Burlington, IA

Salon, Scott
Merrick, NY

Scanlon, Mike
Marion, IA

Stall, Duane
Palmer, IA

Kujinga, Kumbirai
Africa

Laughton, Michael
Washington D.C.

Mallis, Rebecca
Perry, IA

Opperman, Phillip
Traer, IA

Parsons, John
Newton, IA

Stocks, Phillip
Mt. Pleasant, IA

VanCleve, Jerry
Des Moines, IA

Weber, Alan
Fairbank, IA

Wimmer, David
Council Bluffs, IA

Young, Karen
Indianola, IA

Kujinga, Kumbirai
Africa

Laughton, Michael
Washington D.C.

Mallis, Rebecca
Perry, IA

Opperman, Phillip
Traer, IA

Parsons, John
Newton, IA

Holt, Kris
St. Louis, MO

Hutsell, Michelle
Dubuque, IA

Johnson, Kiint
Mallard, IA

Kramer, Jen
Waterbury Point, IA

Licht, Priscilla
New Ulm, MN

Maule, James
Mondamin, IA

Nelson, C. Dana
Lake Mills, IA

Peters, David
Sioux City, IA

Pries, Kim
Chicago, IL

Rediger, Mark
Lexington, IL

THE 1980
Summer jobs of Rachel's included working as a Forestry Aide in Flathead National Forest at Spotted Bear Ranger Station in Montana and as a Range Aide in Bitterroot National Forest at Stevensville Ranger District which is also in Montana. Rachel attended summer camp in 1978 at Greenough. She was on the Executive Council in 1978-1979. Rachel has been a member of the Forestry Club, a basketball statistics for JV & Varsity Men's Basketball Teams in 1976-1978, and also a manager and statistics for the Women's Basketball Team in 1976-1980. Rachel hopes to work with the federal or state government in range, wildlife, or other related fields when she graduates this spring in Forest Resource Management with a Range Management minor.

Lillian Baker
Webster City, Iowa

Lillian hopes to work for the federal government, Forest Service, NPS or BLM after she graduates this summer in Forest Recreation and with a Forest Resource Management minor. She attended summer camp in 1978 at Greenough, Montana. Lillian participated in the Trees for Tomorrow Camp in the summer of 1975 and was also a member of the Forestry Club. She also took two trips to the Boundary Waters area. Lillian worked during her summers for the Forest Service at the Lewis and Clark National Forest in Montana and at Iowa Conservation Commission at Yellow River State Forest. She is a transfer from Iowa Central Community College which she attended one year.

Phil Blakley
Camberra, Australia

Phil attended summer camp in 1978 at Greenough, Montana. He has been the Photography Chairman for the Forestry Club, worked on the VEISHEA and Game Banquet committees, and has been the photographer for the Ames Forester. His summer jobs have consisted of working on fire suppression and abatement. He will graduate as a Forest Resource Manager with a Forest Biology minor. Phil hopes to work for a big business or government organization in forest management.

Pete Boedeker
West Branch, Iowa

Pete attended summer camp in 1976 at Cloquet, Minnesota. He transferred from the University of Iowa in 1976. Pete has been working with Dr. Joe Colletti in developing programs for forestry classes. This interaction with Dr. Colletti got him interested with computer science work, and Pete would like to continue on with the computer science curriculum. Pete is a member of Forestry Club, Society of American Foresters, Phi Gamma Delta, and has participated with VEISHEA. He also participated in intramural volleyball, softball and basketball. Pete will graduate this spring in Forest Resource Management with an Agronomy minor.
Elaine Caldbeck
Urbandale, Iowa

Elaine attended summer camp in 1976 at Cloquet, Minnesota. She worked six months on a COOP Education Program at both Wayne National Forest in Ironon, Ohio, and Northeastern Forest Experiment Station at Delaware, Ohio. Elaine has been in a variety of activities. She has been a member of Xi Sigma Pi, a Girl Scout Troop Leader in 1976-1977, a Campus Girl Scout in 1975-1978, and at St. Johns an Acolyte, Lay Reader, and has worked on "Student Resource," and a Land Use Committee. She has been the head resident of Episcopal Rental Housing in 1976-1979 and the Church Mouse-Guardian of St. Johns building and grounds in 1979-1980. Elaine was the 1976-1977 editor of the Ames Forester and the 1976-1977 Forestry Club's Historian. She won the 1976-1977 Keith A. Bauer Award—Outstanding Sophomore in Forestry and the 1978-1979 Senior Award-Faculty Women's Club. She will graduate in Forest Resource Management and on the Honors Program in Forest Biology, Elaine has accepted a research assistantship at Purdue in Forest Genetics.

John Crane
Ames, Iowa

John plans to graduate in the winter of 1980 in Forest Resource Management with a Forest Soils minor. He attended summer camp in 1976 at Cloquet, Minnesota. John has been a member of Forestry Club and he was also the co-chairman of the pig roast at the 1977 Fall Foresters' Day. He worked in silviculture for the United States Forest Service at Packwood, Washington in the summer of 1978. In the summer and fall of 1979 he worked at Packwood in timber presale. John enjoys traveling, photography, and working in the outdoors. His plans are to go back to Packwood this April and work seasonal in timber presale.

Reinee Eshelman
New Virginia, Iowa

Reinee worked during her summers as a nature staff at a 4-H Camp and a concession worker and house staff at the Hilton coliseum. She has been a member of the Forestry Club, the Student-Faculty Relations chairperson in Forestry Club and also is the club’s VEISHEA Display co-chairperson for 1980. Reinee was the winner of the 1978 Dance Marathon and she also participated in this event in 1979. She was a Recreation Leader for Campus 4-H and she also sang in the play 'Hello Dolly' for VEISHEA. She was the President and Intramural chairperson for Devitt House. Reinee will be graduating this summer with a double major in Forest Recreation and Ag Ed Extension. She hopes for a job as a Naturalist or as a 4-H Youth Director.

Dawn Evans
Des Moines, Iowa

Dawn transferred from the University of Northern Iowa in 1977. She attended summer camp in 1978 at Greenough, Montana. After camp she worked as a Range Technician at Flathead National Forest. In 1979 she worked at Clearwater National Forest in Idaho as a Forest Technician. She has been a member of the Forestry Club, a Xi Sigma Pi Honorary, the Seniors editor of the Ames Forester and was the Agriculture Council Representative from 1979 to 1980. She was an unaffiliated Senator of the Government of the Student Government from 1979 to 1980, and is on the All University Elections and Student Traffic Appeals Board this spring. Dawn will graduate this spring in Forest Resource Management and Range Management.
That familiar indefinable lump in the chest . . . the going-away lump, that had been there when I was a child and was as uncontrollable now as then. Leaving the seaside after the summer was over . . . leaving houses . . .—any place that you had made with difficulty and affection your home. In fact, simply going away.

Anne Morrow Lindbergh

Ken Fenton
Des Moines, Iowa

Ken attended summer camp in 1978 at Greenough, Montana. He has been a member of Phi Kappa Theta Social Fraternity, the Travel Hunting Fishing People, the Forest Products Research Society and of the Society of Wood Science and Technology. Ken will graduate this spring in Forest Products with Industrial Engineering and Industrial Administration as minors.

Carole Gillespie
Cedar Rapids, Iowa

Carole attended summer camp in 1976 at Cloquet, Minnesota. She worked in Packwood, Washington in 1977 on selecting trees and in 1978–1979 as a Hydrology Aide. Carole is a member of the Society of American Foresters and American Forestry Association. In 1977–1979, she was a Forestry Club representative to Ag Council, the Loquacious Loquat editor and the Christmas Party co-chairman. Carole attended conclave in the fall of 1978 at Michigan. She enjoys canoeing, hiking and Washington state. Carole will be graduating the fall of 1980 in Forest Resource Management and in Hydrology. She is now on the COOP program with Packwood and she hopes to get a permanent job in watershed with the Forest Service by the spring of 1981.

Barry Graden
Bettendorf, Iowa

After spring graduation in Forest Resource Management and a minor in Timber Products, Barry hopes to get a job in timber management with a private industry. He has gained experience by working last summer in Stage II Inventory for the United States Forest Service at Bighorn National Forest in Wyoming. He also worked the summer of 1978 doing land surveying for Shive-Hattery & Assoc. Barry attended summer camp in 1977 at Greenough, Montana. He is a member of the Forestry Club, the co-chairman of the 1979 Game banquet, and he is married.

Steven Hagman
Omaha, Nebraska

Steve attended summer camp in 1977 at Greenough, Montana. The summer of 1978, he worked as a thinner for the Bureau of Land Management in Salmon, Idaho. In 1979, he was a supervisor for the summer's thinning operation and he also spent two weeks during that summer on a timber marking crew in Salmon. Steve was the President of Peterson House his junior year. He enjoys water and snow skiing, horseback riding, backpacking, tennis, jogging and walking. Steve graduated in the fall in Forest Resource Management with a business minor. He hopes to get a job either with the government or private industry as a forest manager specializing in silvicultural practices.
Scott Heeren  
Red Oak, Iowa

Scott attended summer camp in 1977 at Greenough, Montana. He participated in Forestry Club and Intramurals. Scott will graduate this spring in Forest Resource Management with a Business minor. He hopes to work for a private industry or do private consultant work.

Kirsten Held  
Hinton, Iowa

Kirsten is the editor of the 1980 Ames Forester. She has been a member of the Forestry Club, Horticulture Club and Agricultural Council. She participated her freshman and sophomore years on the ISU Debate and Forensics squad. Also in her sophomore year, she was the President of the Beacons Service Organization and in her senior year she was an ISU Student Ambassador. In 1979 she participated in conclave at Minnesota. Kirsten attended summer camp in 1977 at Greenough, Montana. After camp she worked in Seeley Lake Rangers District at Lolo National Forest. In 1978 she worked as a Research Aide in the ISU Forest Pathology lab and in 1979 she did an internship with Weyerhaeuser in timber management. Kirsten will graduate this spring in Forest Resource Management with Communications and Public Relations as a minor. She would like to start her career in a basic timber management job to gain field experience.

David Herwig  
Fort Dodge, Iowa

David will graduate this spring with a double major in Pest Management and Forest Resource Management. He was a transfer from Iowa Central College in Fort Dodge in 1977. David attended summer camp in 1978 at Greenough, Montana and the summer of 1979 he worked for the State and Private Forest at St. Paul, Minnesota. After graduation David hopes to do research in Pest Management or a forestry related field.

Geoffrey Kaeberle  
Ames, Iowa

Geoffrey attended the Society of American Foresters National Convention in October 1979 at Boston, Mass. He worked at S. Hanson Lumber Co. and Brunswig Harvesters (custom wheat and barley harvester.) In 1978 he attended summer camp at Greenough, Montana. He enjoys golfing, both downhill and cross country skiing, building home furniture and working with wood. After graduating this spring in Forest Resource Management with a Multiple Purpose Forestry minor, Geoffrey hopes to work in forest management of the private industry sector.

Education is the apprenticeship of life.  
Robert Willmott

He is to be educated not because he is to make shoes, nails and pins, but because he is a man.  
William Channing
Perhaps the most valuable result of all education is the ability to make yourself do the thing you have to do, when it ought to be done, whether you like it or not... however early a man’s training begins, it is probably the last lesson that he learns thoroughly.

Thomas Henry Huxley

Grant me the serenity to accept the things I cannot change, courage to change the things I can and wisdom to know the difference.

Erie Knapp
Endicott, New York

Eric attended summer camp in 1978 at Greenough, Montana. He is a member of the Volleyball Club here at Iowa State. Eric will graduate in the fall of 1980 in Forest Resource Management with a Computer Science minor. He would then like to get a forestry job in New York or in the Northeast.

Karl Krech
Johnson, Iowa

Karl hopes to work as a Park Ranger for the U.S. Army Corps of Engineers. He gained experience working as a Park Ranger for the Corps at Saylorville Lake. Karl attended summer camp in 1978 at Greenough, Montana. He is a member of the Forestry Club and of Xi Sigma Pi. Karl transferred from the University of Iowa at Iowa City in 1977. He will graduate this spring in Forest Recreation with a Recreation Program Administration minor.

Salli Kurt
Cascade, Iowa

Salli attended summer camp in 1977 at Greenough, Montana. Last summer she worked as a recreation assistant in Houston, Missouri, with the title of Forest Technician. In 1978 she was the VEISHEA Curriculum Display Chairman, and in 1979 she was the editor for the Seniors section of the Ames Forester. She participated in forestry intramural sports and in the Horticulture Club. She enjoys horseback riding, sports, reading and crewel. Salli hopes to achieve a sales or production position in a large-scale nursery. She will graduate spring quarter in Forest Resource Management with a Nursery Management minor.

Steve Kurtz
Omaha, Nebraska

Steve attended the University of Nebraska in 1973-1977 in Omaha before coming to Iowa State. In 1978 he went to summer camp at Greenough, Montana and in the summer of 1979 he worked for the city of Ames doing tree surveying. Steve will graduate this spring in Forest Resource Management with an Industrial Administration minor. He will work the summer of 1980 at Gifford Pinchot National Forest in Washington and then return to Iowa State in the fall to attend graduate school.
Michael Laughton
Washington, D.C.

Michael attended summer camp in 1978 at Greenough, Montana. He was in the United States Marines before attending Iowa State. Michael will graduate in the fall of 1980 in Forest Resource Management with a soils minor.

Joyce McClure
St. Charles, Iowa

Joyce graduated the fall of 1979 with a double major in Forest Resource Management and Pest Management. She worked as a volunteer at Black Hills National Forest at Sundance, Wyoming in 1977, and in 1978 and 1979 she worked at Northeastern Area, State & Private Forestry, in St. Paul, Minnesota. She attended summer camp at Cloquet, Minnesota in 1976. Joyce is now attending graduate school and hopes to get her Master's in Forest Pathology.

Dale Megown
Bettendorf, Iowa

Dale transferred from the University of Iowa in the fall of 1976. He attended summer camp in 1977 at Greenough, Montana. In the summer of 1978 he worked as a camp counselor at Camp Abe Lincoln in Blue Grass, Iowa. The summer of 1979 he worked as a Conservation Aide at Ledges State Park. Dale was on the Advisory Committee in 1977 and 1978. He was also a member of Ames-ISU YMCA Outdoor Center. He enjoys backpacking, canoeing, spelunking, and reading. Dale will graduate this spring in Forest Recreation with a Communication Interpretation minor. He hopes to be employed by a public recreation agency.

Sue Mellerup
Urbandale, Iowa

Sue worked the summer of 1978 and 1979 at Stephens State Forest as a conservation worker. She attended summer camp at Greenough, Montana in 1977. She has been a member of Forestry Club and Xi Sigma Pi. Sue transferred from Des Moines Area Community College in Ankeny. She will graduate this spring in Forest Resource Management with a Forestry Business minor. She hopes to get a forestry related job in Iowa.

Few of us can hope to leave a work of art, or a poem, to posterity; but together—if we act before it is too late—we can set aside a few great parks, and round out our system of refuges for wildlife. Or, working at other levels, we can reserve a marsh or meadow, or an avenue of open space as a green legacy for other generations.

By a series of such acts of conservation we can do much to save what Thomas Jefferson called the “face and character” of our country.

If we do this, surely those who follow, whether or not our names survive, will remember and praise our vision and our works.

Stewart L. Udall
Marvin Mensching
Logan, Iowa

Marvin attended summer camp in 1979 at Greenough, Montana. He enjoys hunting, fishing, backpacking and canoeing. Other favorite sports of his are racquetball and tennis. Marvin will graduate in the fall of 1980 in Forest Resource Management with a Soils minor. He then hopes to work in forest management or a related field and travel as much as possible.

Andy Mitchell
Mason City, Iowa

Andy attended summer camp in 1978 at Greenough, Montana. He is a transfer from North Iowa Area Community College. Andy has been a member of the Forestry Club and has participated in selling Christmas trees. After graduation this spring in Forest Resource Management with a Forest Biology minor, Andy will work for the concession in Yellowstone Park.

John Natvig
New Hampton, Iowa

John attended summer camp in 1976 at Cloquet, Minnesota. He worked last year from May through November in Uncompahgre National Forest in Colorado. He also worked for the Iowa Conservation Commission at Yellow River Forest in the summers of 1977 and 1978. John was the Committee Chairman of Fall Foresters’ Day and of Holst State Forest. He attended conclave at Carbondale, Illinois in 1975 and at Moughton, Michigan in 1976. John graduated winter quarter in Forest Resource Management with a Managerial Science minor. He hopes to work in the state or private sector in forestry.

Clark Ott
Wheatland, Iowa


Bill Rashid
Bettendorf, Iowa

Bill attended summer camp in 1977 at Greenough, Montana. He has been a four-year member in the Forestry Club and the 1979 Game Banquet co-chairman. Bill worked two seasons, 1978 and 1979, on the Bighorn National Forest in Wyoming doing contract inspection and stage 11 inventory. He will be working in 1980 on a Weyerhaeuser summer intern program in Mt. Pine, Arkansas. Bill will graduate in the fall of 1980 in Forest Resource Management and Range Management.

For yesterday is but a dream and tomorrow is only a vision but today well lived makes yesterday a dream of happiness and every tomorrow a vision of hope.
Nita Rauch
Warner, South Dakota

Nita is a transfer from Northern State College at Aberdeen, South Dakota. She attended summer camp in 1977 at Greenough, Montana. Last summer Nita worked for the Iowa Army Ammunition Plant near Burlington. In the summer of 1978, she worked at Targhee National Forest at Swan Valley, Idaho. She also worked as a playground leader in 1975 at Aberdeen. Nita attended conclave at Michigan State in 1978. She held positions as a Social Committee Chairperson in 1979-1980 and Forestry Club Secretary in 1979-1980. She was involved in Forestry Club and on the Ames Forester Staff. Nita enjoys playing tennis, bicycling, jogging, softball, sewing, playing guitar and fishing. After graduating this spring in Forest Resource Management with Forest Recreation & Watershed Management as minors, Nita will be working the summer at the Army Ammunition Plant. She then hopes to find a job working at state forests or county parks in the West, specifically in the states of Washington, Oregon or Idaho.

Connie Reints
Genoa-Kingston, Illinois

Connie attended summer camp in 1977 in Greenough, Montana. She has been a member of the Forestry Club, of ISU women’s cross-country and the indoor & outdoor track teams. She was also the Student-Faculty Relations chairperson in 1979-1980 and the Forestry Club’s Historian in 1978-1979. Connie worked last summer as a backcountry guard at Packwood Lake on the Packwood Ranger District of the Gifford Pinchot National Forest in Washington. She also worked the summer of 1978 as a Forest Technician in the silviculture & logging departments of the Packwood Ranger District. Connie enjoys playing the flute, mountaineering, backpacking and calligraphy. She will graduate this spring in Forest Resource Management with a Multiple-Use minor. Her future plans are to work in a forestry position in the Packwood Ranger District. She also hopes to keep on running and to climb more peaks in the Cascades.

Koral Santman
Dysart, Iowa

Koral attended summer camp in 1977 at Greenough, Montana. Last summer she worked with a timber crew at Nez Perce National Forest at Elk City, Idaho. She worked as a YCC Crew Leader at a residential camp for the U.S. Forest Service in the summer of 1978 at Potosi, Missouri. The last three years she worked at the Iowa State Center as a concession stand worker and usher. Koral has been a four-year member in the Forestry Club, an Alpha Kappa Lambda little sister, and Xi Sigma Pi and Gamma Sigma Delta Honoraries. She was the Forestry Club’s Secretary her sophomore year, the Vice-President her junior year and the Seedling Sales Chairman her senior year. She also received the Keith A. Bauer, Hoo-Hoo, J. Milton Cone and SAF awards. Koral will graduate this spring in Forest Resource Management with a Multiple-Purpose Forestry minor. She plans to get a job in forest management.

Randall Soedt
Davenport, Iowa

Randy attended summer camp in 1977 at Greenough, Montana. He worked in 1978 at Payless Cashways in Davenport and in 1979 he worked as a meat cutter at the Iowa State Meat Lab. Randy was also a part-time employee at the Warehouse Market. He enjoys hunting and fishing. Randy graduated in the fall in Forest Products with a combination of Industrial Administration and Industrial Engineering as a minor. He hoped to get a job with a Forest Product Company in production management.
The greatest oak was once a little nut that held its ground.

A contented man is one who enjoys the scenery along the detours.

Jeff Stehm  
Ankeny, Iowa

Jeff attended summer camp in 1978 at Greenough, Montana. After camp he worked for the Forest Service at the Flathead National Forest in Montana. Jeff will graduate this spring in Forest Resource Management with a Business minor. He is undecided if he will continue on to graduate school.

Gary Stephan  
Barrington, Illinois

Gary attended summer camp in 1977 at Greenough, Montana. After summer camp, he worked on trail maintenance on the Kelley Cr. Ranger District at Clearwater National Forest in Idaho. In the summer of 1978, he worked in timber presale on the Tongue Ranger District in Bighorn National Forest in Wyoming, and in 1979 on the Bonners Ferry Ranger District in the Idaho Panhandle National Forest. Gary was the Forestry Club's President in 1979-1980 and he also participated in Christmas Tree Sales in 1979. A member of the Forest Product Research Society, Gary will graduate this summer in Forest Products with an Industrial Administration minor. He then hopes to find work in a wood products related job.

Doug Stokke  
Ames, Iowa

Doug attended summer camp in 1978 at Greenough, Montana. He worked for the Youth Conservation Corps in 1974 and in 1975-1977 he worked for the Iowa Conservation Commission State Forest Nursery. Doug is a member of Xi Sigma Pi and a student member of the Forest Products Research Society. Doug will graduate this spring in Forest Products with a minor in Industrial Engineering. He then plans to attend graduate college at the University of Minnesota.

Richard Straight  
Webster City, Iowa

Richard has participated in a wide variety of activities. He was the Secretary for Caine House in 1977-78 and was elected President of the same house in 1978-79. He was the Forestry Club Treasurer in 1978-79 and the President of Xi Sigma Pi. Richard was also an active participant in conclave in 1977 which was held in Purdue. Then in 1978 he was the chairman for conclave which was held in Michigan. Richard attended summer camp at Greenough, Montana in 1977. During the summer of 1978 he worked for the United States Forest Service at Gila National Forest in New Mexico. In 1979 he was employed by the Iowa Army Ammunition Plant at Middletown, Iowa. Richard will graduate in Forest Resource Management with a Soil Science minor. He plans to attend graduate school in Forest Management and would like to work at the State Forest level (District Forester) with the United States Forest Service.
Gary Swenson  
Mediapolis, Iowa
Gary transferred from Southeastern Community College in West Burlington, Iowa in the fall of 1976. He attended summer camp in 1976 at Greenough, Montana. Gary worked with a timber crew and in recreation during his summers at White River National Forest in Colorado. After graduation this spring, Gary hopes to get a job in Forest Resource Management with Pacific NW. He will also graduate with a Earth Science minor.

Julie Thompson  
Rockwell City, Iowa
Julie will be graduating this spring in Forest Resource Management with a Forest Recreation minor. She attended summer camp in 1977 at Greenough, Montana. Last summer she worked in Quinault, Washington for the United States Forest Service. She also worked for the Iowa Army Ammunition Plant in 1978 at Burlington. Julie is a member of the Forestry Club, Xi Sigma Pi and the 1979 committee chairperson of Fall Foresters' Day. She transferred from Des Moines Area Community College in the winter of 1976. Julie's future plans are to find a job either in forest management or forest recreation.

Lam Truong  
Saigon, Vietnam
Lam will graduate this spring in Forest Products with Forest Resource Management and Industrial Engineering as minors. He transferred from Polytechnic University at Saigon, Vietnam and also received credits for summer camp from the same university. He is a student member of the Society of Wood Science and Technology at Madison, Wisconsin. Lam plans to continue on to graduate school.

Mark Woolley  
Waunakee, Wisconsin
Mark attended summer camp at Greenough, Montana in 1977. He is a member of the Farm House Fraternity, Xi Sigma Pi, Alpha Zeta, Forestry Club, SAF, AFA, National Wildlife Federation, Student Union Board and the Student Alumni Association. Last October he attended SAF in Boston, Massachusetts, and in the fall of 1979 he was on the Fall Foresters' Day Committee. In addition, he has participated in intramural sports. Mark worked as a Land Management Aide at the Iowa Army Ammunition Plant near Burlington in the summer of 1978. In 1979 he worked for the Weyerhaeuser Company at Mt. Pine, Arkansas. Mark will graduate this spring in Forest Resource Management with a Forest Business minor. He hopes to work in a management position with a private forest company preferably in the South.

SENIOR GRADUATES  
(absent for picture)
Brosnham, John  
Clark, Scott  
Dewispelaere, Earl  
Henderson, Mark  
Libbey, Steven  
Saul, Neal  
Solem, David  
Tranmer, Mark  
Warford, George  
Wilt, Steve
Since September several grads have realized their ambitions and have begun or will soon begin careers in forestry. Chris Walker culminated his extensive work in mycorrhizal taxonomy with Dr. McNabb when he received his Ph.D. in November 1979 and returned to work for the British Forestry Commission. He is currently conducting mycorrhizal research at their Northern Research Station near Edinborough, Scotland. Phil Baird accepted a position with the University of Minnesota's Technical College in Crookston, Minnesota as an instructor in Natural Resources. Advised by Dr. Born, he will complete his Master's degree in Forest Administration and Management. Bill Haywood, who studied under Dr. Hall, left Iowa State in March to become County Forester for the Black Hawk County Conservation Board in Waterloo, Iowa. Chuck Maynard will finish his Ph.D. program this spring and will fill the position of research associate in Forest Genetics at the State University of New York at Syracuse. Dave Kelley is looking forward to a consulting or extension position with private woodland owners upon completion of his Master's this spring.

Three graduate students will fill temporary positions in industry and research, and return to Iowa State to begin or complete graduate study. Denise Fardelmann has been awarded an internship with the North Central Forest Experiment Station in St. Paul, Minnesota to work on Sclerotinia canker in red pine under Daryl Skilling. She will return in September to complete her Master's in Forest Pathology. Bruce Borders will be working as a biometrician for Weyerhauser Corporation in Hot Springs, Arkansas, and will return in November to begin a Ph.D. program. Rita Sonnletter received a fellowship to work with Hans Heybrock at the Forestry Research Institute in Wageningen, The Netherlands, and will return to finish her Ph.D. program in Forest Pathology.

Forestry grads have represented Iowa State at several conferences in the past year. These include the Forest Products Research Conference in Madison, Wisconsin; the Midwest Mensurationist's Conference at Atwood State Park, Ohio; Conference on the Management of Temperate Forests in Corvallis, Oregon; the North American Conference on Mycorrhizae at Fort Collins, Colorado; the Central International Forest Insect and Disease Conference at Devil's Lake, Wisconsin; the Cooperative Forest Management TriState Meeting in Yellow River State Park, N.E. Iowa, and the Black Walnut Conference in Madison, Wisconsin.

But grads are not all work and no play. The fall term started out with a bang for the Forestry grads with the "Old Foresters" taking the Grad-Staff division championship in intramural flag football. A few smiling faces have occasionally donned green AllStar shirts, signifying their participation. Attempts to counter with a title in intramural basketball were squelched when the team, renamed "Forpa" (Forestry-Pathology), was defeated in the second round of playoffs. Having returned to their former cognomen, the "Old Foresters" are currently preparing an attack on the intramural softball circuit. When asked what gave the team such a competitive spirit and determination to win, one player replied: "We need new shirts." And what better reason? We are looking forward to a good season and some good fish at FASIFE (Forestry Annual Southern Iowa Fishing Expedition)!

Bruce Borders
Harrisburg, Pennsylvania
In 1978 Bruce received a B.S. in Forest Science from Penn State and in 1980 a M.S. in Forest Biometry from Iowa State. He plans to work for Weyerhauser Corp., Southern Research Station, as a Forest Biometrist from June-1980 to December-1980. Bruce will then return to Iowa State to start a Ph.D. program in Forest Biometry.

by Rita Sonnletter

Y ou see them in the halls occasionally looking distant, (could be lost or contemplating the Hardy-Weinberg formula), or bent over microscopes hours on end trying to elucidate the structure of tangential sections or find the elusive arbuscule. They can be found assisting labs and classes, breaking the bank on "Old Dwarf", subjecting Alders, Poplars and Walnuts to various inhumane conditions and in general competently filling the unknown territory between undergraduates and faculty. Who are they? Forestry graduate students.

A wide array of backgrounds and interests in research and academics can be found among the 20 graduate students currently pursuing degrees in the Forestry department. Bruce Borders and Hugo Ramirez-Maldonado study and conduct research in biometrics under the direction of Dr. Mize; Kim Coder, forestry's answer to Mr. Extension, is studying allelopathic systems under Dr. Wanyo's direction. Dave Kelley, advised by Dr. Countryman, and Francis Nwonwu and Chinlong Zheng, advised by Dr. Hopkins and Dr. Colletti are working towards advanced degrees in forest economics and marketing. George Mortenson, Glenn Oren and Paul Winstorfer are pursuing studies in forest products with their major professor Dr. Manwiller. Sue Hatz is planning research on containerized seedlings during her master's program directed by Dr. Schultz. Dave Hallam, Chuck Maynard, Greg Miller, Steve Paarman, Terry Robison and Jerome Thomas are advised by Dr. Hall and are involved with the study of forest genetics and silviculture. Denise Fardelmann, Joyce McClure, Kathi Patton and Rita Sonnletter study and aid in research efforts in forest pathology and mycorrhizal studies under the direction of Dr. McNabb.

AMES FORESTER
Kim Coder
Ogden, Iowa
Kim achieved an A.A. from DMACC in Environment Science and a B.S. from ISU in Forest Management. His future plans are to graduate, job hunt, and pursue personal goals.

Denise Fardelmann
Livingston, New Jersey
Denise graduated from the University of Delaware with a B.A. in Biology. She is now working on a Master's in Forest Biology here at ISU.

Dave Kelley
Columbus, Ohio
Dave received a B.S. in Forest Management in 1978 at Ohio State University and a M.S. in Forest Economics & Marketing in 1980 at Iowa State. He hopes to work with private woodland owners in either an extension or consulting capacity.

Charles Maynard
Des Moines, Iowa
Chuck received a B.S. in Forest Management and Outdoor Recreation in 1974 at Iowa State, an M.S. in Forest Biology in 1977 at Iowa State and received his Ph.D. in May of 1980. He has accepted a position as a Forest Geneticist at the College of Environmental Science and Forestry in Syracuse, New York.
Gregory Miller  
*Canton, Ohio*
Greg got his B.S. and M.S. in Horticulture from Ohio State University. He plans to research and teach tree genetics and breeding.

Steve Paarmann  
*Davenport, Iowa*
Steve earned a Bachelor of Music Degree in 1972 from the University of Iowa. He then taught music for three years in public schools. He will receive a M.S. in Forest Biology in the summer of 1980. Steve would like to work in silviculture and pest management and would eventually like to start a consulting service.

Francis Nwonwu  
*Nigeria*
Francis received a B.S. in Horticultural Economics & Extension from the University of Ibadan in Nigeria, (1974). He plans to return to Nigeria and work on research.

Glenn Oren  
*Waterloo, Iowa*
In 1976 Glenn received a B.S. in Forestry at Iowa State and is currently undecided about his future plans.

Kathleen Patten  
*Catonsville, Maryland*
Kathy achieved a B.S. in Conservation & Resource Management and a M.S. in Soil Science at the University of Maryland. After she gets her Ph.D., she would like to teach Forest Soils at the university level.

Hugo Ramirez-Maldonado  
*Chapingo, Mexico*
In 1974, Hugo achieved a B.S. from the University of Chapingo, Mexico in Forestry where he also worked as an instructor. Hugo would like to return to Mexico for a while and then come back to Iowa State to work on his Ph.D.
Terry Robison  
State College, Pennsylvania  
Terry got a B.S. from Penn State in Forest Science. He plans to get his M.S. and Doctorate from Iowa State University and then get a job.

Rita Sonnelitter  
Buffalo, New York  
Rita earned her B.S. in Biology in 1973 and her M.S. in Horticulture in 1975. She plans to work as a Forest Pathologist and eventually move into administration.

Paul Winistorfer  
Marion, Iowa  
Paul acquired his B.S. in 1978 through the ISU Honors Program in Industrial Engineering. He plans to pursue a Ph.D. in forestry.

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<th>AWARD</th>
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<tr>
<td>SAF Award</td>
<td>Those seniors who are also a member of the SAF are eligible for this award. The SAF award is presented to the most outstanding senior on the basis of academic and professional activities and achievement.</td>
<td>Curt Krambeer</td>
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<tr>
<td>John Milton Cone Award</td>
<td>This award is presented to a top student, usually a junior, who exemplifies the scholarship and dedication of John Milton Cone.</td>
<td>Koral Santman</td>
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<tr>
<td>Iowa Hoo Hoo Club Award</td>
<td>This award honors top students at the sophomore or junior level.</td>
<td>Doug Stokke</td>
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<td>Randy Goerndt</td>
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<td>Xi Sigma Pi—Keith A. Bauer Award</td>
<td>The Keith A. Bauer Award is presented to the outstanding sophomore in forestry, on the basis of grade-point and participation in forestry activities.</td>
<td>Shelly Hutzell</td>
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<tr>
<td>Pack Essay Contest</td>
<td>Charles L. Pack, as a reflection of his own belief in communication skills, established funds at seventeen colleges, one of which is Iowa State University, to support annual awards for essays and articles on forestry. Those forestry students who excel in communications skills are honored by this award. There are two classifications of eligibility for this award.</td>
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<td>Freshman Division:</td>
<td>Awards are made to the top three term papers submitted in Forestry 101 by freshman forestry students.</td>
<td>Wesley Boyce</td>
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<td>Joseph Bornong</td>
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<td>Upperclass:</td>
<td>Any sophomore, junior, or senior forestry major can enter. Winners are selected on the basis of written forestry articles which are submitted to the Department Awards and Scholarship Committee.</td>
<td>Dennis Haugen</td>
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<td>Tracy Mack</td>
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<td>Nita Rauch</td>
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<td>Mark Woolley</td>
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<tr>
<td>Northeastern Loggers' Association Scholarship Competition</td>
<td>The Northeastern Loggers' Association sponsors this contest for all forestry schools in its territory. A first and second place award is presented to two juniors in a four year forestry program. Selection is based primarily on the quality of a submitted essay. Other considerations are the student's scholastic record and work experience.</td>
<td>Kirsten Held</td>
</tr>
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XI SIGMA PI

by Rich Straight

This society was set up in 1908 at the University of Washington to encourage and foster high standards of scholarship and personal performance in the forestry and natural resources profession. Here at Iowa State University we have a chapter, Alpha Gamma, which was established in 1965. Since then, juniors and above who show excellence in the field of natural resource management, and who show those character traits indicative of high performance potential, have been invited to become members.

There are four officers elected yearly. Currently, they are Chapter Forester—Rich Straight, Associate Forester—Kim Coder, Secretary/Fiscal Agent—Denise Fardelmann, and Ranger—Bruce Borders. Our faculty advisor is Dr. Fred Hopkins.


Some forestry basics cannot be bought.

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Student Articles

Writing is an important part of an ISU Forester's education. Students spend much time and effort on the papers they write as evidenced by the following examples. The first was written for a Pest Management class. The second was a Pack Essay winner.

One Fine Day in the Lumber Yard

by Doug Stokke

"Take a trip to the lumber yard and look for wood defects," instructed Dr. McNabb. The class looked less than thrilled, and I myself was no exception. Little did I know that I would soon be conducted on a guided tour highlighting the wood defects at Schoeneman's Lumber Yard.

I arrived at the yard on a clear, crisp morning, and after I had checked in with the yard boss, I wandered out into the yard. As I neared the first storage shed, a small voice called out.

"Psst, hey buddy, over here." I turned and looked but saw nothing. "Must be the wind," I mumbled to myself.

Again the voice called out. "Hey, bud, you're looking for wood defects, right?"

"Who said that?" I demanded. "I did, stupid. Over here by the steps." I looked, but still didn't see anyone, at least not at first. When I did spot him, I could hardly believe my eyes. There, peering out from beneath some wooden steps, was a little green man, only three inches tall.

"Who are you, anyway," I exclaimed, still in disbelief.

"Allow me to introduce myself," said the little man. "My business card."

With that, he held out a tiny card, which I took from him. I squinted hard to read the miniscule print.

The card looked something like this:

Lentinus D. Punctatum
Professional Wood Rotter Association
Local 632
"WE SPECIALIZE IN ALL TYPES OF WOOD DECAY"

"What is this, anyway," I said. "This has to be some sort of joke."

"Not at all, my boy," said Mr. Punctatum. "I'm really quite serious about my business."

"And just what is your business?"

"Just like the card says, I'm a professional wood rotter."

"Oh come on now, wood isn't decayed by little green men."

"No, you're right there, my boy, but it's my job to see that the industry progresses, so to speak. In other words, I made sure that rot occurs wherever it's justified. Now, why don't you just allow me to show you some of the work I've been involved with here."

"Well, alright," I said, still quite skeptical of this little man, who I now imagined must only be the result of something I ate.

"We'll start off by looking over the dimension stock over here. There's some good stuff in there. First off, look at all of the blue stain. We're rather proud of that because it affects the sapwood of almost all commercial species. You'll notice that it occurs in spots, patches, or streaks. You'll see it all over in this yard."

"Big deal," I said, "Blue stain doesn't hurt wood much as far as changing its mechanical properties."

"Well, at least it's prolific," responded Lentinus. "So, you want to see something destructive, eh. Look at that brown, cube-like, crumbly wood there. It's dry rot. And how about that pecky rot on those two-by-fours? That happened when the wood was still in the tree."

"What about this stack of inch boards?"

"Well, my boy, you'll notice a lot of sticker stain on these hardwoods, and some brown stain on these softwood boards. We get those in the dry kiln or during air drying by oxidizing certain substances in the wood."

"I'll bet you're not so successful over in this section," I said, motioning to the building where the treated lumber was stored.

"No," Lentinus sighed, "About all we've been able to do with that lumber so far is create a few seasoning checks and splits in the wood."

"And here's another place where you've been stopped," I said gleefully as I pointed to the cedar and redwood.

"You're right, boy, those natural extractives sure keep me from getting the job done," moaned the little gremlin.

"What about insect damage?" I asked.

"Once in a while you'll see lumber that was attacked by wood boring insects and the like. It shows up as grooves in otherwise smoothly machined wood."

"You mean like this," I said, picking up the end of an affected two-by-six.

"That's right."

"All in all, I'd say you're behind in your work around here, Mr. Punctatum. Looks like there aren't too many serious problems in this lumber yard."

"I guess you're right, boy. You know, they just don't give us much of a chance, what with keeping this lumber dry, off the ground, and stacked so that air can circulate around it. Under these conditions, it's mighty hard to decay wood."

"Well, if it's sympathy you want, you won't get any from me, Punctatum. If I know anything about you wood rotters at all, I know that you don't give up."

"You're right there, boy," grinned Mr. Punctatum as I turned to leave. "Ya'll come back and visit me again, okay? Maybe I'll have some really rotten wood for you the next time."

I didn't even stop to wave goodbye. I knew the little critter wasn't kidding.
Effect of Road Construction and Clearcutting on Soil Erosion
by Nita Rauch

Erosion was not considered a serious problem in the early 1950’s in the U.S. Logging operations were concentrated mainly in the better timber stands along beaches and in valley bottoms. In the mid-1950’s, large-scale clearcutting began to include steeper slopes. Now areas having a high erosion hazard are being logged. One apparent consequence of large-scale logging is an increase in soil movement (Bishop & Stevens, 1964).

Natural soil-mass-movements on forested slopes in the western United States can be divided into two major groups of closely related landslide types. These include, in order of decreasing importance and regional frequency of occurrence: (1) debris slides, debris avalanches, debris flows, and debris torrents; and (2) creep, slumps, and earth flows. Each type requires the presence of steep slopes, frequently in excess of the angle of soil stability. All characteristically occur under high soil moisture conditions and usually develop or are accelerated during periods of abnormally high rainfall. Further, all are encouraged or accelerated by destruction of the natural mechanical support on the slopes (Swanston, 1974).

Clearcutting, it should be pointed out, is a timber harvesting procedure in which all the vegetation (or mechanical support) is felled in a selected area. This is the usual logging practice in the redwoods of the north coast ranges of California and in vast tracts of Douglas fir in the Cascade Range of Oregon and Washington. Denudation is made more awesome and complete by burning the slash remaining after a logging or cutover operation. Controlled slash burning is justified by various arguments, the foremost being that it eliminates a potentially serious fire hazard later on (Gray, 1970). In a study by Croft & Adams (1950), they also concluded that the recent occurrences of landslides were largely due to loss of mechanical support by root systems of trees and plants, chiefly by timber cutting and burning and, to some extent, by excessive livestock grazing (Bishop & Stevens, 1964).

Clearcut logging and slash burning in a steep 237-acre watershed in western Oregon resulted in increased rates of soil movement, especially on slopes unprotected by organic derbis. During the first growing season after burning, soil movement, which largely occurred as dry gravel, was most pronounced on 8 percent slopes (versus 60 percent), on south aspects (versus north), and in areas having little plant cover (versus well-vegetated areas). By the second growing season after burning, rapid invasion by vegetation essentially halted soil movement on all slopes except extremely stony talus areas (Mersereau & Dynness, 1972).

It becomes apparent that vegetative cover is a major factor in soil stability. Kawaguchie (1956, 1959) and his co-workers in Japan placed great value on a well-rooted forest cover as a means of minimizing landslide activity. They noted that landslides were far more prevalent in shrublands and grasslands than in forested areas. They also observed that the effectiveness of the forest cover in preventing landslides increased with the age or maturity of the forest. Bernardini (1957) studied the occurrence of landslides in the mountains in northern Italy and recommended forestation as a principal control technique. In another article by Cappuccini and Bernardini (1957) on the causes, classification, and prevention of landslides, the authors stated that an insufficient cover of vegetation is one of the most important causes if landslides (Gray, 1970).

Without vegetative cover, surface erosion will undoubtedly occur. Surface erosion can be defined as the movement of individual soil particles along the surface of the ground. Three factors control the rate of surface erosion. They are detachability, forces applied and surface erosion. Estimated effects can be found in Table 1 for the period immediately after logging.

Detachability is the ease with which soil particles can be detached and transported; it is an inherent soil characteristic. Soil aggregation has been used by many as a detachability index. Cutting and skidding tend to disrupt the soil surface to some degree, and hence might have a small effect. Roads remove all surface soil, exposing material that possesses very little aggregation; we would expect a moderate-to-great effect.

Forces applied are simply the forces available for transport, including raindrops, wind, surface flow and gravity. Raindrops and wind will have a greater influence on the logged area than an unlogged area, but the biggest increase will be the surface flow on roads. A large increase in surface flow on roads is likely primarily because of reduced infiltrating, interception, and interruption of subsurface flows by the road cuts (Megahan, 1972).

Since logging and road cutting began in 1950 on the H. J. Andrews Experimental Forest in Oregon, only two small road-related failures have taken place in the designated stable zone, occurring at elevations above 900 to 1000 m. in terrain underlain by lava-flow bedrock. The unstable zone, located at elevations below 1000 m. and underlain by layered volcaniclastic rock, has been the site of 139 slides during the same period.

Slide erosion from clearcut areas in the unstable zone of H. J. Andrews Forest has totaled 6.0 m³/km², or 2.8 times the level of activity in forested areas of the unstable zone. Along road rights-of-way, slide erosion has been 30 times greater than on forested sites in the unstable zone; however, only about 8 percent of a typical area of deforested land in the unstable zone is in road right-of-way. At comparable levels of development (8 percent roads, 92 percent clearcut), road right-of-way and clear-cut areas contribute about equally to the total impact of management activity on erosion by land slides in the unstable zone. The combined management impacts in the unstable zone (assuming 6 percent road right-of-way and 92 percent clear-cut) appear to have increased slide activity on road-related sites by about 5 times relative to forested areas over a period of about 20 years (Swanson & Dynness, 1975).

Surface cover refers to the materials (e.g., natural litter, logging debris, mulches, surface rock) that protect the soil from erosion forces. Protection might actually increase on some cutover areas, but usually decreased protection is expected on roads owing to the absence of plant cover or litter. Considering all three factors, the overall erosion hazard ratings show a small increase for cutting plus skidding and a moderate to large increase for roads. Roads have a much greater effect per unit area of disturbance than do cutting and skidding (Megahan, 1972).

It has been shown that soil erosion is related to clearcutting and road
construction. Another disturbance caused by road construction is the soil water-holding capacity. Excessive slope gradient and pore-water stress in glacial till soils of Karta series are primary factors in debris avalanche and flow occurrence in recently logged areas of southeast Alaska. Initial field investigations have indicated that during months of low rainfall, lateral movement of seepage water in these soils is limited to a zone 2 to 6 inches thick, directly above an impermeable, unweathered till surface. Seepage occurs along interconnected soil voids and partings produced by downslope growth of rootlets above this surface (Bishop & Stevens, 1964).

During high rainfall periods, the soil becomes saturated, and the seepage zone thickens with substantial increases in flow. The increasing volume of water, moving laterally through the soil as saturated flow, causes a rise in the piezometric surface, with two important consequences: (1) increasing shear stress along potential sliding surfaces caused by rising seepage pressures and increasing unit weight of soil materials, and (2) decreasing shear resistance resulting from increased pore-water pressure in the soil (Swanson, 1970).

Studies from three Oregon watersheds indicate that timber harvest operations involving high-load cable yarding to a system of logging roads may increase sediment in streams draining these areas by two to 150 times the amount from undisturbed watersheds in any other year. These increases may average more than 100 times the undisturbed condition over a period of years.

By far, the greatest soil loss was associated with landslides and the scouring action of high-velocity mudflows which often pass down the stream channels following a landslide. Landslides associated with forest roads move the largest volume of soil. These landslides occur most often where roads intersect stream channels (Fredriksen, 1970).

Current research on the effect of forest operations on soil stability is directed toward: (a) anticipation of hazardous sites, (b) avoidance of disturbances systematically damaging to slope stability and (c) reduction of landslide incidence after disturbance.

The ability to identify hazardous sites is probably the most useful and economical management tool available. In the northern California Coast Ranges, aerial photos are being used extensively to identify, delineate, measure, and interpret topographic features related to deep-seated creep and sliding. The interpretations are supplemented by geologic maps compiled from surface outcrops and drill cuttings which aid in the interpretation and extrapolation of observed creep patterns. Vertical color-infrared photographs are being used to identify slope areas of high soil moisture content.

Avoiding activities that are systematically damaging to slope stability will keep slope disturbance to a minimum during forest operations. These include restricting forest road construction on potentially unstable slopes and preventing damage to the slopes by timber harvesting equipment and methods. A number of promising new timber harvesting methods are also being investigated or are undergoing limited practical trials. These include balloon logging and helicopter transport, both of which have a tremendous potential for reducing ground damage, but are of extreme expense at the present time.

Most direct methods of stabilization and control of disturbed areas are expensive and difficult. There have been some limited attempts to stabilize disturbed areas by vegetation planting. This has been done with some success in the Western States with grass and legumes on road cut and sidecast slopes to reduce surface soil erosion (Wollum, 1962; Bethlahmy & Kidd, 1966; Dymness, 1967b; as cited in Swanston, 1974). The United States Forest Service is currently experimenting with hand seeding of debris avalanche tracks with older in southeast Alaska also (Swanson, 1974).

It is fair to conclude from an analysis of published literature on this subject that there exists a definite cause and effect relationship between forest clear-cutting and mass-soil movement. Studies carried out in many different parts of the world appear to support this conclusion.

A forest cover appears to affect the deep-seated stability of a slope in two principal ways, via, by modification of the hydrologic regime in the soil mantle and by mechanical reinforcement from the root system. The former is likely to be important only in the first year following clear-cutting and burning, i.e., before invading vegetation has had a chance to take hold. Evidence in the literature suggests that the effect of the root system is far more important and that gradual deterioration of a tree root system leads to progressively greater slope instability with time (Gray, 1970).

**BIBLIOGRAPHY**


**Student Prepare for the Future by Attending Conventions**

**TOWN Meeting Forestry—Issues for the 1980’s**

"TOWN Meeting Forestry—Issues for the 1980’s" was the theme of the 1979 SAF Convention in Boston, Massachusetts. Iowa State University representatives to the October 14-17 meeting were Dr. Thomson and four students—Jeff Kaeberle, Koral Santman, Mark Woolley, and Kirsten Held.

The students, all seniors, especially enjoyed the opportunity to meet professionals from all aspects of the forestry field and discuss career opportunities. A good place to meet practicing foresters, as well as other students, was in the student hospitality room. A place to rest sore feet, eat munchies and read company brochures was also available in this room. Another highlight of the student room was the quiz which was designed to show students they didn't know all the answers—yet. After working on this forestry quiz separately, Kirsten and Koral decided that two heads were better than one and filled out the answer sheet under the name Kirsten Held (or was it Kirsten Santman?).

Alumni had a chance to swap stories, renew old friendships, and meet the four students at the ISU reunion. Though ISU foresters are scattered over the entire U.S., the ties to the school remain strong. Students and alumni both enjoyed old summer camp movies that were shown at the reunion.

Even after attending meetings all day, the students still found enough energy to explore the city of Boston in the evenings. Jeff quickly became acquainted with the subway system and saw much of the city on the way to the convention from his hotel on the other side of the city. Kirsten and Koral toured the city with students from other schools and seemed to be working under the philosophy that they had to eat enough seafood in one week to last a year!

The convention ended pleasantly for the ISU foresters in attendance. Dr. Thomson was honored as an SAF Fellow at the closing banquet.

After replacing a misplaced airline ticket for Koral, taking a last glimpse of hiscric Boston and saying goodbye to old and new friends, the group from ISU headed back to the books. They unanimously agreed that the convention meetings, opportunities to meet professionals and make new friends was worth missing a week of school during fall quarter mid-terms.
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Rothschild, Wis. - Pulp and Paper
Schofield, Wis. - Region Headquarters

Weyerhaeuser
Summer Jobs
A Summer in the Backcountry

by Connie Reints

M't Rainier, the towering God of Washington, gave me a lasting impression of power and beauty when at age thirteen I first saw it...THE MOUNTAIN. I had seen other mountains, but nothing like this, and the lush-green forest of Douglas-fir, Western Hemlock, and Western Red-cedar within Mt. Rainier National Park complimented the mountain's beauty. After meeting THE MOUNTAIN and the park, I decided I would major in forestry in college and someday return here to work. We all have similar stories about love of the mountains and first interest in forestry, but in my case my dream came true.

To my excitement, in the summer of 1978, I was hired by the Packwood Ranger District of the Gifford Pinchot National Forest (just seven miles south of the entrance to Mt. Rainier National Park!). That summer I worked for the silviculture and timber departments, but "eyed" the backcountry guard position at Packwood Lake. Through contact with the right people and a little pushing, I was hired for the backcountry guard position during the summer of 1979.

Packwood Lake, elevation 2857; is accessible to the public via a six mile drive and then a four mile hike (or motorbike ride). Upon reaching the lake, backpackers may camp at undeveloped campsites, or may continue their hiking trip into the adjacent Goat Rocks Wilderness Area.

The cabin I stayed in at the lake was quite rustic, complete with electricity, flush toilet, stove, refrigerator, and trash compacter (of all things). My drinking water was pumped into the cabin directly from the lake, but I boiled it to be safe. The view from my cabin's picture window was spectacular, overlooking the 1½ mile by ½ mile lake, the ¼ acre island, and towering Johnson Peak beyond. The four room cabin was quite a cozy home!

As backcountry guard at the lake, I was responsible for the area in terms of general maintenance of bridges, buildings, and bulletin boards, cleaning outhouses (argh!), and litter collection, but my major area of duty was public relations. Uniformed in green, I greeted the campers and hikers, visited with them, answered their questions, and passed on useful regulatory information. Every other week I hiked to the adjacent wilderness area for three days making visitor contacts and collecting litter. Truthfully, my job was so enjoyable I felt as if I was on a vacation.

The sun shone cheerfully most of the summer, which is quite unusual for this part of the country, but when the rain did fall it lasted for days. During the wet periods not many campers were at the lake, but those who where there usually appreciated my donations of plastic for tarps and Woodside Owl garbage bags for raincoats.

Besides viewing Mt. Rainier everyday, I successfully completed its ascent in early July on my days off. The climb took two days and we left for the final climb to the summit at 2 a.m. the second day. The stars that morning were brilliant and so numerous that I know my eyes failed to take them all in. The sun rose when we were at 11,000 feet and it was glorious! Pinks, oranges, and reds painted the sky above the mountains on the horizon. At 8:30 we reached the summit greeted by a slight wind and a spectacular panorama view of the distant world below. The ascent of Mt. Rainier was definitely a highlight of my summer.

The days at Packwood Lake passed quickly and so did summer; reluctantly I entered the last entry in my summer journal:

September 3
Such stillness here at the lake, the clouds hang over us, envelope us in our own little world. An occasional breeze makes the Forest sing...the leaves move to and fro dancing in the breeze...abruptly as they started, they stop dancing and once again life is still, the lake is still.

Why have I been so lucky, as to be able to spend my summer at this beautiful place...this heaven...this haven from the busy cities?

Yet, I am tiring of the solitude, I feel prepared, ready to complete my last year at college. Give me blaring stereos, lots of homework, short nights, old friends, cross country meets...and stimulus...lots of it!(Am I sick?)

Iowa flatlands...college craziness and home...here I come!
A “Weyco” Experience

by Kirsten Held

EDUCATIONAL . . . thought-provoking . . . fun-filled . . . rewarding . . .

These are a few of the adjectives I would use to describe my 1979 summer work experience. I was an intern with Weyerhaeuser in Mountain Pine, Arkansas.

The program is designed to give interns a broad view of the company management policies and practices. I was shifted among various work assignments ranging from timber inventory to scaling logs in the mill. I was also given the opportunity to spend some time in the public affairs department of the Hot Springs office.

The final job of the summer was helping to collect data for a logging study. This research project was an evaluation of the tree harvester being used by Weyerhaeuser.

Weekends were generally spent recovering from a hard week of work, exploring the exciting town of Hot Springs, and relaxing at the “intern’s abode” by Lake Hamilton.

The work assignments, the chance to meet and talk with people in all ranks of the company and seminars about Weyco all helped make the summer of 1979 an educational experience which I’ll always remember.

In the Stream

by Carole Gillespie

WHILE most of the country was in a shortage of water this past summer, I saw an abundance of it everyday. My job kept me literally in the streams of Packwood Ranger District, in the Gifford Pinchot National Forest in Washington. Larry (my partner) and I carried out stream stability and fish population surveys. Larry took care of the fish, while I did the watershed aspect.

My job consisted of dividing the stream into reaches according to changing conditions and evaluating landform slopes adjacent to the channel, mass wasting hazards, debris jam potentials, vegetative bank protection, channel capacity, bank rock content, obstruction and flow deflectors, plus a few other problems such as under bank cutting, etc. These surveys were to aid in reclassifying streams, and also to designate areas that needed work, for example, debris jams that threatened downstream installations such as bridges.

The job also had many challenges: how to get over and around a 100 foot waterfall when the sidewalls were bedrock and you were wearing “lead” chestwaders two sizes too big; or how to tell if you are surveying the right stream when you had to walk a mile to get to it and it disappears into a swamp, or how deep a pool is when the water is so clear that the bottom looks only two feet away (and it’s really closer to five feet). The best part of stream surveying is seeing the part of the district that most people have not or ever will see, and that makes it very unique.
Summer Camp 1979

The Lubrecht Forestry Camp owned by the University of Montana was again home for 50 students for six weeks last summer. The camp, set on 8094 hectares of experimental forest and surrounded by gentle mountains proved to be very adequate. For most, the western Montana scenery was a welcome change of pace from the midwestern plains.

The camp, being somewhat set in a valley, experienced totally unpredictable weather conditions. When the weather reports on the radio said it was raining in Missoula, 30 miles away, the sky would be beautifully clear at camp. Rain was practically nonexistent except for a few quick late afternoon thunderstorms. Temperature fluctuations were very broad, sometimes varying 50°F from early morning to afternoon. These fluctuations were coupled with a lack of high humidity, which was appreciated by all.

Classroom time was kept to a minimum by holding most classes outdoors and by taking field trips. In forest measurements class, taught by Dr. Steve Jungst, everyone got a chance to romp around the woods and maybe get lost for a while. Dr. Jungst's class involved learning the basics of forest measurements and actually getting out in the field to apply what was learned.

A "Mr. Klint Oimeter" wanted the services of each cruising team, composed of five people, to gather data about a certain twenty acres and produce a map for the twenty acres. Each team ran a boundary traverse around the perimeter of the twenty acres, timber typed the area, and drew a map of it. Then, sample plots were laid out, measurements taken, volumes estimated, and total worth of useable wood material estimated. Needless to say, measurements was the most time consuming class, but also one of the most liked.

Multiple Use Operations taught by camp director Dr. David Countryman provided a broad overview of the operations of various agencies. All of the time in this class consisted of field trips to private, state, and two different federal agencies. In addition, trips were taken to the Forest and Range Experiment Station, Forest Sciences Laboratory, Fire Research Laboratory, and Smoke Jumper's School, all in Missoula. Because the field trips always involved quite a bit of traveling time,
There would usually be some resistance from the section of students that had to ride in the old, well-used truck on cold mornings. The other section which got to ride in the two brand new vans would just stand and smile.

On occasion, in the afternoon when the weather was nice, each section would want to ride in the truck with the canvas rolled back, and "catch some rays." However, with most of the roads being dirt and with the lack of rain, dust was a constant annoyance. Often, after a ride in the truck, clothes would be completely coated with dust, teeth would be gritty, and hair would be dirty. The ride in the vans behind the truck was not much better.

Dr. Joedy Colletti taught Wood Utilization for the first three weeks of camp. Many field trips were taken to plants that manufactured house logs, winow sashes, plywood, lumber, and particleboard. General class discussion and unforgettable mill reports followed each of the trips to bring out the finer details of each mill. Souvenir plywood plugs to replace knots were picked up by some students in memory of the trip to Champion International, the largest plywood plant in North America.

During the last three weeks of camp we experienced the world of Forest Ecology as taught by Dr. Paul Wray. The forest ecology class was unique in that it covered so many topics. Work in the field consisted of everything from making a plant collection and digging soil pits, to making site index curves and investigating forest pests. Data collecting was often laborious under the hot sun, and the writeups were no more pleasant, often having to be turned in by 6:00 P.M. the same day. Even so, much was learned by Dr. Wray's wisdom.

There were no complaints about the meals that Mrs. Laura Schilling prepared for us. When everyone returned from a day out in the field, we all could count on Mrs. Schilling to provide us with plenty of hearty food.

Each person in camp, except the vehicle drivers, had KP duty for one week and general camp cleanup for one week. Sunday morning and afternoon was Mrs. Schilling's well deserved time off. This gave the people on KP a chance to test their cooking skills. Much to everyone's surprise, the KP crews usually fared quite well.

Attending class five and a half days a week, and doing catch-up homework on weekends, left little time to enjoy the surrounding countryside. The extremely long days which lasted until 10:30 P.M. or so, helped somewhat, giving everyone an opportunity to play horseshoes, softball, or volleyball after dinner. Also, by procrastinating a little, everyone usually found time to enjoy themselves on the weekend.

Weekends were filled with such things as hiking, backpacking, washing clothes, fishing, and going to church. Such familiar names as Roundup, Clearwater, or Potomac bars were the site of some mighty good conversation and pool playing for those who did not opt for the long drive to Missoula at night. At these places such well known people as Mr. Flake, the owner of the house log operation we visited, could be found socializing. When people did go to Missoula on Saturday night, the best bet was that they would be found at either the Holding Company or the Trading Post Saloon.

Unusual things sometimes happened after the Missoula crew came back at night. A speed ditch in the camp driveway made to slow down traffic was mysteriously filled in one night. Occasionally, some people such as Dr. Jungst and those who dined and discoed with him, had an extremely hard time finding their way home.

The extremely dry summer, low humidity, and a sudden thunderstorm one night gave about fifteen people the chance to work on a fire crew. Fires, started by lightening, broke out all over the area and our camp was called upon by the state to help put out the fires. For those who worked the 26 straight hours it was a hot shower and plenty of sleep when they returned.

Fourth of July weekend gave everyone a chance to have an extended weekend of three days to explore the countryside. The folks who went to nearby Bob Marshall Wilderness were greeted with driving rain which later turned into snow. Others went to Glacier National Park where they were greeted by more snow. Still others went to Coloma, an abandoned mining town in the Garnet Range just a few miles from camp.

Another group went rafting on the nearby wild Blackfoot River the last day of the long weekend. The weather again did not quite cooperate, changing from warm and
sunny to cold and drizzly by the end of the day. The weather didn't spoil the fun though, especially when each raft went rampaging through the Round-Up rapids. Although there were a few close calls, with one person falling out into the rapids, no one was hurt, except for bumps, bruises, and a few sore muscles.

To top off the weekend, a special meal was arranged by those who had ordered steaks and set up a steak fry. Everyone got to cook their own steak over hot coals. The section A vs. B softball game that followed made some wish they would not have eaten so much.

Dr. Countryman also arranged an alumni day for alumni around the area to come to camp and visit with everyone. The alumni that showed up were greeted well, and had an enjoyable time as well as the students that visited with them.

Enough crazy and unique things happened at camp to inspire songs to be written which explicitly described what went on. One such song was named after what had become our camp motto, "It Could Only Happen at Lubrecht." Another song told of one of the instructors, Joe Colletti and was entitled "Colletti's Song".

After summer camp was completed, those who were lucky enough to find jobs stayed and worked. The rest left for home, with some wishing camp could have been longer, and others yearning to go back next summer to work.

For those of us who were out at camp last summer, we will always remember that it could only happen at Lubrecht.
"It could only happen at Lubrecht"

The crew from cabin 20.

Enough cookies for 60!

Dr. Colletti "on tour" at K&L Mill.

"I'm a lumberjack and I'm O.K. . . ."

"Lenny and Squiggy" at their best.

". . . I work all night and sleep all day."

"Look Inviting?"
Who Said Foresters Aren’t Creative?

Each club meeting, the Knothead Award is bestowed upon a forester who has demonstrated that to err is human.

Carl Ramm
April 19, ’79

1) freezing his foot bad enough to need plastic surgery
2) dropping his briefcase and busting a toe on the other foot
3) falling asleep before taking his date dancing and not waking up till 2:00 in the morning.

Dear Club Members:

Evidently you still haven’t learned that if you can’t say something nice about someone, don’t say anything at all. I can’t exactly say it’s nice to know the legend is continuing on; it is true that a prophet is never recognized in his home town.

As the missive was from the Forestry Club, it was not difficult to guess who would suggest such an immense honor be bestowed on this truly unworthy individual. The fetid stench of the Catfish Charley-coated hands of Doctors Jungst and Countryman is easily detected. Senility strikes different people at different ages, but it is sad to see two with such promise sinking at such an early age. Of course, the amount of time it takes Dr. Jungst’s blood to reach his brain—small though that brain may be and minimal its requirements—and the overdoses of pipe tobacco that Dr. Countryman indulges in must certainly have had some contributing effect.

Please inform the honorable (and if you believe that . . .) Jungst and Countryman that when they come up north for their fishing expedition, that after driving them through the night to reach a ‘hot’ fishing spot, they will be dropped in a quiet residential section of Detroit. Their reward will be certain when they need to ring doorbells at 2:00 a.m. to ask directions.

I am reminded of the story told about Dr. Jungst and Dr. Countryman, about a time in their not too distant but abysmal past. It seems they were recovering from a strenuous night of research, taking their ease and recovering their strength in the alley in back of the old Peanut Tree. They were being kept company by an alcoholic skunk with dysentary; why the skunk was there or where he went afterwards if he did in fact leave is not really major to the story—only a pfc. Anyway, Dr. Promnitz happened along (it was a crowded alley that night) in search of souls to redeem, and happened to chance upon the trio. With sadness in his eyes, Dr. Promnitz leaned over and said, “You are known by the company you keep”; the skunk got up and left.

Enough of these pleasantries, please give my worst (which is pretty bad) to everyone associated with the award. Nita, in particular, could use some help. The letter had only 23 misspellings, unless there exists some game called ‘solitaire’, and the crayon was nice and neat; especially for Nita.

I would not want this letter to fall into the wrong hands, so please read it, eat the letter, and then destroy yourselves.

Without all due respect and salubrious salutations,
Carl W. Ramm
Assistant Professor

Snow White and
the Twelve Dwarves

Once upon a midnight eve,
Our evil thoughts began to weave.
The night was silent, all others gone,
Our tests were in, our answers wrong.

Vengeance we sought on that fateful night,
Oh dopey us! We saw the light.
Since our mental achievements were so small,
From dwarfs we must have learned it all.

And so to give credit where credit’s due,
We thought we’d rename each of you.
Have no offense from us so rotten,
By tomorrow we hope all’s forgotten.
And so at last this verse is through,
Oh dopey us! Oh dopey you!

The Dwarves’ Revenge
(Not to be Confused with Montezuma’s Revenge)

Once upon a VEISHA day
Snow White and twelve have this to say
To Those who on that fateful night
Put pen to pad and showed their spite
Vengeance sought; we think in fun
But as for blame, we’re not the one
Mental midgets, (dwarfs you say),
Would just expound from day to day
And never notice anyway
That you are missing, sleeping, or content
To read the Daily—so repent
And if your mind has not expanded
The blame to you should then be handed
And so also our verse is through
From Snow White’s Bunch to dopey you.

Donna Grosz’s answer to the question, “What are tyloses?”

Do Bill and Barry really sleep together?
And We're Proud of It . . .

or

What to say when someone asks you
why there is a forestry school in Iowa!

T might have been that we sprang
full blown from the forehead of
Zeus or that some outside-of-the-
galaxy empire attempted to colonize
Earth in pre-glacial time when there
were spruce forests in Iowa. Actually,
of course, we got here because the
founders of the State Agricultural
College and Model Farm required
that forestry be taught and Section
1621 of the Code of Iowa for the
Ninth General Assembly formalized
that requirement back in 1880. That
still doesn't answer the "How
come"?

I suppose that it is enough to
remind ourselves that the men and
women who brought Iowa State into
being were, themselves, products of
the pioneer settlement period where
the scarcity of wood for fuel, con-
struction, variety, and protection
from the sun and wind still loomed
large in memory. It suffices that
dwellers of the prairie states were
and are more appreciative than most
of the comfort and rewards offered
by trees. This interest brought forth
the Forestry Department in 1904 as
one of only a tiny handful of the
original forestry schools still in
existence in America.

So much for our origins. What
accounts for the success of Iowa
Staters as they have taken their
places in American forestry? Or,
terrible thought, is our success
visible only to us and are the cries of
congratulation only our own? We had
better look to the nature of our
laurels before we explain how we
went about earning them.

There are no annual playoffs be-
tween Forestry Schools and, even
if there were, there are no set rules to
the game each forestry school elects
to play. Some schools are known for
research, some for service, some for
undergraduates, some for size, some
for diversity, some for the number of
graduates who become executive
officers or advisers to presidents.

It would be ill mannered and
presumptuous for one forestry faculty
to set itself above some other in-
stitution's faculty. Department
executive officers realize this so the
question of who is better simply
never comes up. Afterall, one
wouldn't wish to lose a faculty
member to another school that had
been ranked as inferior. Of course
the play is, if such an unfortunate
event takes place, to say, "Oh, yes,
so-and-so left here to go to
________________. It improved both in-
sstitutions."

The Society of American
Foresters, with the sometimes
reluctant support of the school and
university involved, accredits each
forestry program in the United States
on a periodic basis. Withholding or
withdrawing accreditation is not
fatal, but is is embarrassing. Contrary
to common assumption, however,
forestry schools are not ranked by
the Society of American Foresters or
by any other body. Iowa State is
proud to have retained its accredi-
tation from the very beginning of
the system.

If there is no official ranking and
forestry schools don't talk about it,
what basis does the alumnus of any
institution have for feeling his or her
school has done a recognizably
superior job in preparing its
graduates for the professional world?
Since this could get pretty lengthy
let's stick with those things that
apply directly to the undergraduate
program where the final product is
the Bachelor of Science. The
following are some questions that
one could ask.

What have past graduates ac-
complished?

What is the quality of the parent
institution that surrounds the
forestry school and what is its at-
titude to its foresters?

What is the record of students
presently enrolled in respect to work
experience, morale and enthusiasm,
grades, extra-curricular activity?

What is the raw material from
which the student body comes?

These questions are not in order of
importance, but do notice that they
descend through a sequence of the
alumni track record down through
demographic factors over which the
institution has almost no control.
We can look briefly at each of these
questions and take modest pride in
the answers.

The Graduates

Our alumni and alumnae are our
pride. Presently there are 2024 living
graduates of this department. The
majority have spent a considerable
part of their careers in forestry or
work that developed from forestry. A
of the Forest Service, was an Iowan from Iowa State, and that just last year we were recognized as third in the U.S. of Schools of Agriculture and Forestry.

The Student Body
Although winning the last-place bear skin in Midwestern Forestry Conclave may seem a burden sometimes too heavy to bear (no pun intended) it diminishes to nothing in relation to the recognition and reputation that ISU Forestry students have attained as they have become known through our far-flung summer camps, through excellence on summer jobs, through the long-standing reputation of the AMES FORESTER, and through the amazing excellence of VEISHEA.

The forestry student body is known for the cohesiveness, high morale, and effort of its individuals. Nothing should be allowed to dishonor that reputation.

Raw Material
A much revered Dean of a neighboring forestry school once said, "I don't actually know that Iowa State does any better job than the rest but it seems to be continually blessed with students who come from homes where the work ethic is important and the desire to succeed is ingrained." Some combination of Grant Wood's Midwestern Gothic and Meredith Wilson's Iowa Stubborn seems to pay off and even those of us too long in the vineyard who recognize the axiom, "If you can't help them at least don't hurt them," are aware of the potential that we inherit in every freshman or transfer that appears on campus.

Maybe you will have to suffer the slings and arrows of such outrageous statements as, "I didn't know there were any trees in Iowa" or "What do you do, cruise corn stalks?" but it may be of comfort to you to repeat the statement from a shrewd old professor from the West Coast who once said, "The quality of forestry education increases in direct proportion to the distance of the institution from the woods." And that was not an Iowa Stater who said that.

But regardless of the raspberries that you may have to receive and all of the self-plaudits that you can hear from Iowa Staters who have gone before, one paraphrased truth remains—the fault lies, not within our past, but within ourselves, if we be underlings. ■