The Ames Forester

IOWA STATE FORESTRY

AMES IOWA

1996
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A photomicrograph of oriented flakeboard made from 6-year-old silver maple. The flakeboard was manufactured by bonding aligned silver maple wood flakes with 5% phenol-formaldehyde resin under pressure at 350°F to a density of 0.65 g/cc. This photomicrograph was produced by incident fluorescence microscopy. A small flakeboard specimen was softened with 4% ethylenediamine, followed by preparation of a smooth surface with a razor blade and staining the surface with 0.5% Rhodamine-6G. Stained cell walls fluoresce strongly while regions containing cured phenol resin do not adsorb the stain and appear as dark areas under the fluorescence microscope. This photomicrograph allows one to study resin distribution and other glueline characteristics.
Patrons

A
ABBS, ARTHUR
ALLEN, THEODORE R.
ALLISON III, B.L.
ANDERSON, RAYMOND
ARGANBRIGHT, DONALD
ARNOLD, W.D.

EHLERS, LAWRENCE J.
ELLISON, COLONEL MARLON
ETHINGTON, ROBERT

F
FARRIS, WILLIAM
FICKE, JIM
FIRCH, GARY
FISH, JOHN A.
FRITCHER, EARL E.

G
GARMAN, ED
GINGRICH, EARL
GORDON, JOHN
GOTTSCHALK, KURT W.
GRIMES, PHIL D.

H
HALBROOK, QUINCY
HALL, RICHARD
HALVERSON, HOWARD G.
HANKS, LEE
HARTMAN, GEORGE B.
HATHAWAY, MICHAEL B.
HEACOX, E.F.
HERTZBERG, GROVER R.
HOLSOHER, CLARK
HOOVER, CLYDE C.
HOPKINS, FRED
HOPP, ERITH
HORTON, LOWELL E.
HUBBARD, JOHN W.
HUSMAN, DONALD

J
JACKSON, ROBB
JOHNSON, HOWARD
JONES, ROBERT
JONES, STEPHEN

K
KANEY, DAVID W.
KANSKY, GEORGE W.
KUHNS, PAUL JR.

L
LAMANSKY, WILLIAM H.
LANG, JERVIS
LEWISON, WAYNE
LINCH, JOHN

M
MCDERMOTT, R.E.
MCKENZIE, ROBERT
MCMILLAN, FRED
MEHLIN, A.F.
MERRIAM, ROBERT
MEYER, GENE
MEYER, DON
MILIUS, HANS C.
NELSON, DEWITT

O
OBYE, KEN
OLSON, BRENT
OLSON, RONALD

P
PETERSON, CHARLES J.
PIOEN, DEL
PROCTER, ROBERT E.

R
RASMUSON, DEAN A.
REHM, ROLAND S.
REID, PAUL
REYNOLDS, EUGENE E.
RICE, WILLIAM

RICHMAN, HUGO
RISE, CARL
ROUSEY, JAN E.
RUMMELL, ROBERT

S
SANDVIK, MARK
SAUNDERS, MIKE
SCHALLAU, CON H.
SCHOLTES, DR. WAYNE H.
SCHRAMM, D.L.
SKELLEY, JOEL
SMITH, DAVID W.
STRONG, DONALD L.

T
THOMSON, DONALD E.
THOMPSON, DOROTHY
TICE, CHARLES C.
TORRENS, DIRECTOR JOHN R.
TRACHSEL, TIM
TROCHUCK, RONALD
TYRREL, BOB

V
VAN DEUSEN, JAMES L.
VAN GILST, GERALD W.
VAN HELTEN, STEVE

W
WALLACE, ARTHUR L.
WEI TERESA HSU, KAO H. LU
WEST, DOUG
WICKS, WALLACE
WILSON, JOHN R.
WORSTER, JOHN

Y
YOUNKIN, MAX
YOUNG, DALE
Once again, this year has finally come to a close and along with it, another issue of the Ames Forester. We have both learned a lot about the publishing process and in doing so hopefully represented the ISU Forestry Department well. Sometimes (when we were trying to meet deadlines) we felt as if the whole production would never get finished, but with a little extra strength and determination from the article writers and Dr. Jungst, we got everything done.

This year's theme focuses on the products side of forestry. Thank you to Dr. Kuo and Dr. Rule for writing articles about their research in agroforestry products and fiber products.

We also would like to welcome Dr. Kelly, the new department chair, to Iowa State. We hope that his stay is enjoyable.

We would both like to use this chance to say thank you to the people who have helped make this issue of the Ames Forester all that it could be. Of course this includes all the people that wrote articles and the people that helped us proof read the draft copies. Last but not least, We would like to thank Dr. Jungst for helping us formulate ideas as well as answer questions that we had throughout the process.

All in all, this was a great experience for both of us. We really enjoyed putting this issue together so we hope that you have as much fun reading it. Enjoy the issue!

Chad Garrett and Tom Schultz
To Learn

I learn to fly,
Not knowing where the winds will take me.

I learn to work,
Knowing that I will need the skills.

I learn to create,
Knowing that these lines are in the clouds.

I learn to love,
As people show me how.

I'd like to learn to live,
But the future's just too different
Changing of the Guard
by J. Michael Kelly

October 1, 1995 was an eventful day for both Steve Jungst and myself. He was relieved of a mighty burden after ten years of yeoman service to the Forestry Department, and I attempted to shoulder that load on somewhat wobbly knees. From everything I have seen and heard, Steve has served both Iowa forestry and the ISU Forestry Department well during his term at the helm. I am sure we all wish him well as he returns to a full time role in teaching and research in the department.

This is my initial venture into Iowa, having spent the bulk of my professional career in Tennessee and Alabama working for the Tennessee Valley Authority. I am not a total stranger to the Midwest having spent time in Indiana first as a post-doc with the Department of Forestry and Natural Resources at Purdue and later as a Visiting Professor of Forest Soils in the Agronomy Department. During my tenure with TVA I worked largely as a researcher and later as a research manager in programs that were focused on evaluating impacts of air pollutants on forest ecosystems. These efforts ranged from calibrated watershed studies of nutrient cycling to controlled exposure studies of tree response to acid rain, sulfur dioxide, and most recently biosphere ozone. I have tended to focus much of my personal research efforts in recent years in the area of forest soils and the interactions between air pollutants and plant nutrition; as well as having a hand in developing mechanistic modeling approaches to describing nutrient uptake and carbon allocation in trees. I hope to continue at least some of the tree nutrition work as I find my research niche in the department.

While my twenty one years of service with TVA were most satisfying and rewarding, I was ready to explore new ground and take a shot at teaching on a regular basis. I had previously taught a forest watershed management course at the University of Tennessee on an adjunct basis and later undergraduate basic soil science at Purdue. The teaching opportunities and the very exciting research program in agroforestry were two big determinants in my decision to move to Iowa. One of my goals is to help the research program refine its focus and become the premier agroforestry research institution in the country.

Outside of the work place I have a number of personal interests that I pursue with varying regularity. Aviation has been a lifelong interest. I am an active pilot, a former aircraft part-owner (that had to be left behind in Tennessee with my former partners), and a member of the Experimental Aircraft Association. I also enjoy scuba diving and am a licensed amateur radio operator. For the last five years I have particularly enjoyed working as a stone mason at a local heritage museum near my former home.

I look forward to having a role in the future of forestry in Iowa and a part of the excellent group of individuals that constitute Forestry at ISU. I am sure that with your support and input we can continue to build on the strong framework that Steve has provided.

We all live with the objective of being happy; our lives are all different yet the same.

- Anne Frank
Agroforestry in the Midwest
Lita C. Rule
Department of Forestry, Iowa
State University
Ames, Iowa 50011-1021

Introduction

Agroforestry is a land use option that has been increasingly accepted as environmentally sound and potentially sustainable. It is a production system that attempts to link agriculture with the longer-term protective, productive, and social functions of trees and other woody and herbaceous vegetation. Economically beneficial perennials like fruit trees, fuel wood, and leguminous vegetation are incorporated in a farm to produce food, fuelwood, fodder, and fiber; to perform functions like soil improvement, erosion control, windbreaks, and as nurse crops to other plants on the farm; to provide shade to animals and serve as living fences; and as a source of cash revenue. It is adaptable to suit individual needs of farmers and the climatic conditions of an area.

Agroforestry is a system of producing diverse agronomic and forestry (hence "agro-forestry") outputs, a feature that may be very practical in trying to diversify the primarily agricultural economy of Iowa. While agroforestry is still an emerging food, fiber, and industrial material production system in the Midwest, it has been proven to be a sustainable system of land use in many parts of the world. For 10,000 years, farmers have relied on their own resources and knowledge and have demonstrated keen understanding of the principles of sustainability by having sustained agricultural systems (some of which are now called agroforestry) in China, Indonesia, Nepal, Philippines, Peru, and other parts of the world [Gonzalez, 1991]. In the United States, the notion of greater production through mixing forestry and agricultural practices was advocated as early as 1914 [Smith, 1914]. Agroforestry ideas may seem to have been emphasized earlier in the tropics than in temperate regions. Today, these practices can be found around the globe, addressing problems related to energy, environment, resource conservation, and food.

A review of agroforestry systems in the U.S. indicated such practice as grazing and intercropping with managed conifers in northwestern and southern U.S., and multi-cropping agronomic crops with hardwoods in the southeast and parts of the Midwest [Gold and Hanover, 1987]. The latter system usually involves northern hardwoods as black walnut and oaks and agronomic crops such as corn, soybeans, and wheat and fodder for grazing. Although there have been reports of agroforestry surveys for other sections of the U.S. [Lawrence et al., 1992; Henderson and Maurer, 1993; Zinkhan, 1993], no survey of these systems was yet conducted for the midwestern region of the United States before 1990.

Survey of Agroforestry Systems in Eight Midwestern States

In 1990-1991, a survey was conducted by researchers at the Department of Forestry at Iowa State to explore the different kinds of agroforestry activities and forestry-related systems being practiced in the midwestern U.S. It covered eight states: Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin.

The systems explored were classified into three general groups: traditional agroforestry, nontraditional agroforestry,
and other specialized systems. Traditional agroforestry included agrisilviculture, silvipasture, and agrisilvipasture. The nontraditional agroforestry systems included windbreaks or shelterbelts, intercropping of trees and other shrubs or perennials, and boundary plantings. The specialized systems included those that involve trees and the production of other nonwood products, such as maple syrup, ginseng tea, mushrooms, honey, and other nontimber products. These products, though grown in a forestry setting, are typical of the diversity of products one would get from an agroforestry system. Table 1 lists, describes, and gives examples for these various systems, with examples.

There was a total of 155 respondents to the survey. An indirect method of respondent selection was used because of the unknown population of farm and forest landowners doing agroforestry in the region and the large area coverage. First, identification of the respondents was done through district/area/extension foresters and other resource managers who were requested to provide names and addresses of people known to be doing agroforestry and forestry-related systems. Then a follow-up letter of verification with an invitation for their voluntary participation was extended to those who were identified. All who were contacted related to this survey were given information about agroforestry systems and a list of examples of these systems (Table 1).

Survey Results

Table 2 presents the results of the survey: 46 traditional agroforestry systems, 61 nontraditional systems, and 97 other specialized systems involving trees and nonwood products. The area of these systems ranged from less than an acre to hundreds of acres. These systems included hobbies, secondary sources of income (mostly for specialized systems), research-related or demonstration plots, and commercial operations such as for maple syrup production, tree-crop farms, and hunting area leases involving hundreds of acres. Some respondents indicated many other individuals are involved with certain practices, e.g., Christmas tree farming, windbreak programs and specialized systems. Thus, the numbers from the survey may not represent the total population of those doing these systems in the region but could indicate where systems could be more commonly practiced.

A. Traditional systems

Of the 46 systems reported, the most common was agrisilviculture (28 cases reported), followed by silvipasture (12) and agrisilvipasture (6). Almost 75% of these traditional systems were reported from the states of Minnesota, Iowa, Indiana, and Missouri.

The 28 agrisilvicultural systems were further categorized into three subsystems: alley cropping (16 cases) which included those that have agronomic crops intentionally grown between rows of trees or shrubs; any mixed cropping of trees and agronomic crops (8); and Christmas tree production with agronomic or horticultural crops planted between tree rows (4). Growing Christmas trees with crops in-between the rows, especially when the trees are still young, is an observed practice in the region. Often an alley cropping practice, this was considered a special case because Christmas trees have a much shorter production period compared with the usual timber and nut tree species used in other alley cropping systems. There are hundreds of Christmas tree growers in the region, and the number reached by the survey could just be a small portion of this
The crops often planted in the agrisilvicultural systems are corn, soybeans, wheat, and oats, and the trees are usually walnuts, pecans, other hardwood species such as oaks, ash, and poplars and evergreen (mostly pine) species for Christmas trees.

There was a total of 12 silvipastoral systems with two subsystems defined based on the animals involved: cattle (10) and sheep (2). The animals were allowed to graze for certain periods of time in mostly natural stands of oak, oak-hickory-maple, other northern hardwood species, and in black walnut plantations. Little information was available from respondents regarding their grazing practices despite a request for more detail.

Grazing woodlots is common in the Midwest as part of farm operations. From survey comments, there was a mixed response to grazing of forests in the Midwest. Strong sentiments against silvipastoral systems noted the incompatibility of livestock and timber production, while some practitioners reported grazing of cattle under the trees with no problem at all. Literature also yields the same mixed argument about woodland grazing [for example, see Cramer, 1991, Donohoe, 1982, Lewis et al., 1983, and Pearson, 1983 for the Pros, and DenUyl, 1945, Lentz and Wright, 1959, and Zinkhan, 1993 for the Cons]. Based on these comments and reports, silvipastoral systems still need a lot of research as far as the midwestern situation is concerned.

Only six agrisilvipastoral systems were reported. Two subsystems were represented, indicating the presence of animals (4 cases, all cattle) or having pasture/grass only in the area (2 cases). The trees were mostly black walnut and other northern hardwood species. Some of the grass species were timothy, buffalo grass, and hay. Since the survey, a new system has been established in 1992 in Iowa where the farmer had, in a very complex design, several animals (pigs, chickens, turkeys, cattle), row crops (corn, oats, red clover), and several tree species selected for nut production, for timber, and for animal shelter and windbreaks.

B. Nontraditional systems

Table 2 also shows 61 nontraditional systems reported as follows: field windbreaks or shelterbelts (29), intercropping of trees and shrubs (21), and boundary plantings (11). Shelterbelts or windbreaks are rows of trees planted in the field mainly to reduce the adverse effects of wind action. In the Central Great Plains, some of these have been in place several decades earlier mostly in response to the dust bowl crisis in the 1930s [Read, 1964]. However, a decline in interest in windbreaks in recent years and the removal of a considerable amount of those planted earlier have been observed [Byington, 1990]. Intercropping of trees and perennial shrubs included combination of two or more tree/shrub species, for various purposes, such as for nuts, timber, and fruits. Boundary plantings are rows of trees or shrubs planted to set up a barrier between two ownerships, or to delineate difference in land uses.

Nontraditional systems ranged from one or two or more rows of trees and/or shrubs. There have been a number of species used for these systems, including but not limited to: various oak species, pine species (red, scotch, white), ash, walnut, larch, maples, blue spruce, Norwegian spruce, eastern red cedar, Austrian pine, and poplars. Among the shrub species usually planted were osage orange, Russian olive, autumn olive, dogwood, lilac, cranberry, and ninebark. Promotion of
wildlife and its habitat was also cited by some respondents who are doing these systems.

C. Other specialized systems

Not normally considered as agroforestry, the specialized systems involve growing of trees and the production of nontimber outputs such as maple syrup (41 cases) and mushrooms (15, primarily Shiitake), and the promotion of wildlife for educational/recreational pursuits (30). A few other systems involved production of honey, ginseng tea, cones, ropings/wreaths, and other crafts. Trees, shrubs, grasses, and other herbaceous plants also have been grown as stream buffers and for energy production. A number of respondents reported more than a single system or practice, especially for these activities, most of which are either hobbies or are additional sources of income.

These specialized systems are important because they involve trees and the production of some nonwood benefit within a forest environment and thus enables those involved to relate to forestry more easily. Thus, these systems could be possible "transition" systems, as when one wishes to expand ginseng tea and thus start planting them in-between trees on a bigger scale, or when one wishes to increase honey production and starts putting in more boxes for "beehives" and increase pollination in the area. This could be true for most of the nonwood products that are produced within this category.

Summary

The survey showed that three traditional and three nontraditional agroforestry systems are practiced in the region. The most common traditional system was agrisilviculture. The traditional systems often involved corn, soybeans, and hay planted with tree species for nut, timber, or Christmas tree production, and cattle. Nontraditional agroforestry systems included field windbreaks/shelterbelts, tree-shrub intercropping systems, and boundary plantings. These systems involved a variety of northern hardwood species, evergreens, and shrubs. The specialized systems are the most common practices in the region, producing outputs such as mushrooms, nuts, syrup, wildlife, and other nonwood products. Not normally considered as agroforestry, the significance of these specialized systems is that they offer varied ways of connecting forestry with other activities in a largely agricultural landscape, and that they may even be seen as opportunities for easier transition into agroforestry.

Although the results may not represent a complete count of people involved with agroforestry in the region, the numbers reported may indicate where a practice may be prevalent. The survey data provided some basis for further research on more suitable systems, and for identifying other researchable questions on agroforestry for the region. The survey also generated information for a directory to help foster the exchange of information on agroforestry and related systems. The results show that traditional agroforestry is indeed practiced in the Midwest, but that much work still needs to be done to "sell" the idea to many more landowners and resource managers.
Table 1. Agroforestry and related systems*

Agroforestry is generally defined as a land-use system that deliberately combines trees or shrubs with annual plants and/or animals on the same land area. This combination may occur in space (that is, grown at the same time) or in temporal (sequential) fashion. The three basic or traditional types of agroforestry systems are agrisilviculture, silvipasture, and agrisilvipasture. These three and other types of agroforestry systems with some specific cases are described below.

A. Traditional Agroforestry Systems

1. Agrisilviculture — combination of agronomic crops ("agri") and trees ("silvi").
   1A. Alley cropping — This is the most common example of agrisilvicultural systems, wherein the agronomic crops are grown between rows of trees or shrubs.
   1B. Mixed cropping of agronomic crops and trees
   1C. Christmas trees and agronomic/horticultural crops, either spatial or temporal mix

2. Silvipasture — combination of trees ("silvi") and pasture (animals, pasture, or both).
   2A. cattle under trees (black walnuts, pecans, pines, other tree species)
   2B. sheep under trees (black walnuts, pecans, pines, other tree species)

3. Agrisilvipasture — combination of agronomic crops, trees, and animals/pasture.
   3A. Alley cropping with shrubs/trees, crops, grass species, and with animals
   3B. Alley cropping with shrubs/trees, crops, grass species, and without animals
   3C. Any mix of crops, trees, grass, and animals
   3D. Any mix of crops, trees, grass, without animals

B. Nontraditional Agroforestry Systems

4. Shelterbelts/Windbreaks — plantings of rows of trees, mainly for purposes of reducing the adverse effects of wind action, such as erosion, loss of soil moisture, and drought stress on crops.

5. Intercropping of trees and shrubs (perennial species) — combination of two or more tree/shrub species. Most common examples are combinations of fruit-bearing shrubs and/or trees.

6. Boundary plantings — rows of trees or shrubs that are planted for purposes of setting up a barrier between two ownerships, or to delineate difference in land uses.

C. Other Specialized Systems
7. Wood-nonwood forest product combinations — combination of trees with nonwood outputs such as mushrooms, wildlife, pine cones, and similar nonwood forest items.
   4A. trees and mushroom production
   4B. trees and wildlife promotion — e.g., leased hunting
   4C. trees and pine cone production
   4D. trees and (ginseng) tea production
   4E. trees in combination with other nonwood forest products (e.g., maple syrup, honey, others)

*Partly based on a glossary developed by the Winrock International Institute for Agricultural Development in 1990.

Table 2. Traditional and nontraditional agroforestry and other specialized systems reported for the eight midwestern states in the United States*.

<table>
<thead>
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<th>System/State</th>
<th>IA</th>
<th>IL</th>
<th>IN</th>
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<th>MO</th>
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<td>35</td>
<td>18</td>
<td>18</td>
<td>41</td>
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</tbody>
</table>

*Although there were 155 respondents, the total number of systems reported was 204 because some respondents reported more than one system, especially for the specialized and nontraditional systems.*
References


Lawrence "Buster" Burkhart loved his tree farm, and the many people he met working with forestry. Buster's concern for the environment and the forest resource was well known in Appanoose county, as well as the rest of the state of Iowa. As one of southern Iowa's best and well known furniture and cabinet makers, Buster knew the true joys of working with wood. He shared this joy with people in the local community as well as with people far away with similar interest in the field.

Longtime residents of southern Iowa, Lawrence and Velma Burkhart lived in the city of Centerville since the 1940's. Their home was primarily built by Buster, with the exception of the brickwork on the exterior of the home. Fine furniture, oak floors, oak trim and doors adorned the simple one story brick home on south Main Street. For nearly forty years Buster worked in his cabinet shop making furniture, cabinets, and other beautiful woodwork for his customers in the area. As much as he enjoyed his woodworking, Buster loved the trees that provided the raw material for his craft.

With his love for trees, Buster started a small 15 acre tree farm on the outskirts of town in 1982. Planting many varieties of pines and mixed hardwoods, the tree farm slowly grew into a welcome relief to the weary eyes of the people in town and nearby communities. With many hours invested and a gentle touch, Buster kept a keen eye on his small plantation, making sure the trees were well maintained. He had no formal education in forestry, yet knew most of the basic science to keep the plantation healthy and vigorous. He also had the insight to make sure his tree farm continued, so he approached the Appanoose County Conservation Board with his concern for the acreage in the future. The board described the Gifts for Conservation program to Buster that assured the land will remain in its natural state as a park or preserve. Once presented with this program Buster donated his tree farm to the Appanoose County Conservation Board with agreements that the board would keep the land as a qualifying member of the American Tree Farm system and Iowa’s Forest Reserve program.

In addition to the donated tree farm, Buster provided his time and expertise for many projects of the Appanoose County Conservation board. Volunteer time spent making signs, permit holders, bluebird and bat boxes, and other projects have allowed the board to accomplish a great deal while stretching their budget. Mr. Burkhart also established a trust fund for scholarships that now help college students in the field of forestry and other related fields. The first scholarship was awarded in 1992 to Joe Walker, who attended Simpson college in Indianola. Based on a genuine interest in a conservation related field and financial need, many more students were awarded the Burkhart Conservation Scholarships. Iowa State Forestry students have been the main recipients of the Burkhart Conservation Scholarships since 1993, and Buster was on hand to personally award the students at the ISU Forestry Wild Game Banquet. The combination of forest management and forest products at Iowa State appealed to Mr. Burkhart's idea of natural resource utilization. This combination of curriculum and the high stan-
standards represented by the students at ISU made it easy for Buster to give the scholarships to worthy students.

Personal note from the author...

As a recipient of one of Mr. Burkhart's scholarships and a resident of Appanoose county, I was honored to write an article about his contributions to ISU and to the forestry community. He returned much to the local community in southern Iowa and only recently became involved with ISU Forestry. I can only hope this helps everyone realize Buster's true love of the land and the resources gained from it. He was a simple man that tried to help others realize the potential for learning and understanding trees. I knew him only for a short time but his true passions became obvious to anyone who took the time to talk with Buster. The Appanoose County Conservation Board continues his legacy by awarding the Lawrence Burkhart Memorial Conservation Scholarships. I am sure Buster would be pleased to see students continue his ideals in the future by applying their knowledge with an education in a conservation related field.

The optimist proclaims that we live in the best of all possible worlds; and the pessimist fears this is true.

-James Branch Cabell
Utilization of Agriculture Fibers

Monlin Kuo and John L. Smith

Overview

To meet the enormous future demand for forest products due to anticipated global population growth, not only should we practice sustainable forestry and maximize raw material use and extend useful life of products by means of new technologies, we also need to maximize use of every available fiber resource.

The pulp and paper industry has been continuously searching for alternative fiber resources other than wood for pulp and paper production. The Institute of Paper Chemistry in 1976 published an annotated bibliography on "Pulping of bagasse and other paper-making fibers," listing 442 such worldwide studies. A more recent example is the successful development of newsprint production from kenaf in the Southwestern United States. Bagasse, a residue of cane sugar production, is an important fiber resource for pulp and paper production in the tropics. Because of lack of forest resources, China heavily depends on rice and wheat straw as the raw material for pulp and paper products.

In the United States, an immense public interest in cornstalk paper occurred in the late 1920's. The March 27, 1929 Daily Times of St. Cloud, Minnesota was printed entirely on cornstalk paper. The pulp and paper industry, however, only has been intermittently interested in cornstalks. The main obstacle of using cornstalk for pulp production is its low density and low fiber content. Paper made from the fibrous portion of cornstalk does have properties comparable to paper made from wood fibers, but chemical pulping four tons of cornstalk produces only one ton of fibrous pulp and one ton of pith cells compared to obtaining over two tons of pulp from four tons of wood chips. In the 1940's, chemical pulping of cornstalk was accomplished in two steps. After a brief pulping reaction, pith cells were separated and the fibrous portion was further pulped. The separated pith cells were used as filler for other types of paper or paperboard. Research before World War II concluded that although good paper could be made from cornstalk, it could not be done economically in competition with wood.

A 1994 literature review authored by Youngquist et. al. and published by the Forest Products Laboratory cited 1,165 worldwide research reports on the use of agriculture fibers for building materials and panel products during the period from 1913 to 1993. Over half of these studies were published after 1975, and again, bagasse and straw were the most studied materials with 235 and 269 studies cited, respectively. Because the United States has had the luxury of plentiful supplies of wood and wood fibers, we have not seriously considered agriculture residue as a raw material component for building and panel products. In other parts of the world that lack forest resources, agriculture-based building and panel products probably would not be developed in the near future because they need these raw materials for pulp and paper production. At the present time, they can substitute building materials and panel products with other materials, such as metals, concrete, and brick.
At Iowa State University, research on the utilization of cornstalk goes back to the 1920’s. For a period over twenty years, Professors Sweeney and Arnold of the Chemical Engineering Department led the research, producing numerous published results. During that time, there was a mill in Dubuque, Iowa, producing insulation fiberboard from cornstalk. The Dubuque fiberboard plant was closed and the ISU research results were shelved in libraries because corn fibers could not economically compete with abundant and superior quality wood fibers. The recent national environmental movement has greatly influenced the supply and price of wood and wood fiber. Harvest from national forests in the Pacific Northwest has been greatly reduced, forcing many sawmills in the region to close and many people to lose their jobs. Hardboard and medium-density fiberboard are normally produced from sawmill residues, but now some plants in the region have to supplement the shortage of wood fibers with wheat straw fibers. The lack of forest resources in Iowa provides an attractive opportunity for the under-utilized agriculture fibers. One of the promising ways to utilize agriculture fibers is to use them in mixture with wood fibers for the production of panel products. With ongoing research in short-rotation woody crop, agroforestry, riparian bufferstrip, and shelterbelt projects in the ISU Forestry Department, it is anticipated that certain amount of woody biomass would be available for such uses. With this future projection, in June 1995 an ISU biomass composite research group initiated a study of wood/agriculture fiber composites. The initial phase of this project is expected to be completed in June 1996. The selection of cornstalk as the agriculture fiber source in this study is quite obvious. Switchgrass also is selected because of its availability in southern Iowa where it is widely grown on the Conservation Reserve Program (CRP) land and because it is used as one of the vegetative components in the establishment of riparian buffer strips along streams. Some results of the pulping and agriculture/wood composite studies are reported as follows.

General Characteristics of Cornstalk and Switchgrass

The stem of corn and switchgrass consists of three tissue systems, the epidermal, the fundamental, and the vascular. The outer surface of epidermal cells are lined with a specialized layer called cuticle. The cuticle layer is rich in the fatty substance cutin which is relatively hydrophobic and therefore very difficult to be bonded with adhesives. The fundamental tissue, also called ground tissue or pith, is composed of thin-walled and isometric (as wide as long in dimension) parenchyma cells. Vascular bundles containing xylem and phloem scatter within the ground tissue. In cornstalk, vascular bundles are enclosed in a sheath of thick-walled fibrous cells called sclerenchyma (Fig. 1). In switchgrass, sclerenchyma cells form a continuous cylinder just beneath the epidermis, and sclerenchyma also occurs at the outer edge of vascular bundles and in the leaf sheath (Fig. 2). Fibrous sclerenchyma cells are the desirable elements for paper making and panel production. It is evident from Figures 1 and 2 that neither cornstalk nor switchgrass has a high fiber content.

Lignin content is about 15% in cornstalk and 10% in switchgrass, much lower than the average values of 22% for hardwoods and 29% for softwoods. Lignin is a substance in plants that provides the rigidity for mechanical support and helps to bond cells together. A low lignin content is a beneficial attribute if the material is to be used for chemical pulp production because it would take less effort to remove lignin to produce pulp. A high lignin content in the raw material, however, is desirable in the production of hardboard and fiberboard. Hardboard and fiberboard are produced by consolidating thermo-me-
chanical pulp (TMP) fibers at a high temperature with or without resin adhesives added. During thermo-mechanical pulping, the raw material is first exposed to a temperature over 375 °F to plasticize the lignin-rich middle lamella, followed by separation of fibers along the plasticized middle lamella with a mechanical force. Lignin on the surface of TMP fibers acts as an adhesive when fibers are compressed at temperatures over 375 °F.

**Cornstalk and Switchgrass Pulp Properties**

Cornstalk and switchgrass were chemically pulped by a sulfate (kraft) process. Comparison of pulping characteristics and pulp properties of cornstalk, switchgrass, a 5-year-old hybrid cottonwood (Crandon), and mature southern pine is shown in Table 1.

Cornstalk has the lowest pulp yield among the four materials studied. The low pulp yield of cornstalk is due to its high content of water-solubles, especially sugars and oligosaccharides. Pulp freeness shown in Table 1 is a measure of fiber coarseness; the finer the fibers, the more difficult it is for the fiber mat to drain water, resulting in a low value of pulp freeness. A high content of pith cells in cornstalk and switchgrass pulps is responsible for their low freeness.

The tensile and burst strength of cornstalk pulp are greater than those of juvenile cottonwood pulp and are comparable to those of southern pine pulp. Cornstalk pulp, however, has inferior tear strength as compared those of both juvenile cottonwood and southern pine pulps. The excellent tensile and burst strength of cornstalk pulp is attributed to good fiber to fiber bonding facilitated by thin-walled pith cells. Cornstalk pulp’s inferior tear strength can be attributed to its low fiber content. The switchgrass pulp, on the other hand, has poor tensile and burst strength but has a greater tear strength than those of cornstalk and juvenile cottonwood pulp. Long fibers in switchgrass are responsible for this superior strength property.

### Hardboard Properties

Wet-process hardboards containing different mixtures of wood and cornstalk or switchgrass fibers with a target density of 62.4 lbs/ft³(1 g/cc) were produced. These hardboards were made using 2% phenol-formaldehyde as the binder. The wood fiber furnish used in this study was obtained from Georgia Pacific Corporation’s hardboard production plant in Duluth, Minnesota. Cornstalks and switchgrass were collected from central and southern Iowa, respectively, and these materials were ground into fibers with a 12" Sprout Bauer disk refiner under ambient conditions.

Table 2 shows that hardboards made from wood fibers are superior to boards made from cornstalk fibers and that board properties decrease with increasing amount of cornstalk fibers in the board. Similar results are obtained for switchgrass fibers as shown in Table 3. Tables 2 and 3 also show that cornstalk is a better material than switchgrass for hardboard production. The difference between cornstalk and switchgrass fibers may be due to extremely long and tough fibers in corn husk and leaf sheath. As the fiber composition changes, internal bond strength (IB) is the most influenced property, followed by bending (MOR) and tensile strength. Modulus of Elasticity (MOE) or rigidity is not as sensitive to changes in fiber composition. Cornstalk fibers cause more thickness swell of hardboard
than switchgrass fibers do. Morphological characteristics of fibers and low lignin content of cornstalk and switchgrass are the main reasons that cause reduction in board properties. Nevertheless, hardboard produced with a mixture of equal parts of wood fibers and cornstalk or switchgrass fibers does not seriously compromise board properties.

A series of hardboards also were produced by using 2% Arpro 2100 soy protein (ADM Products, Inc.) as the adhesive. Results indicate that hardboards bonded with 2% Arpro 2100 have 69% MOR, 93% MOE, 63% IB, 71% tensile strength as compared to those boards bonded with 2% phenol-formaldehyde resin. Thickness swell of hardboards bonded with 2% Arpro 2100 is 20% greater than that of boards bonded with 2% phenol-formaldehyde resin.

Conclusions

Although cornstalk and switchgrass fibers are generally inferior to wood fibers for paper and panel products, these agriculture fibers do have many other potential uses, such as for paper towels, corrugating medium, and insulation board. Agriculture residues also can be the raw material base for energy and chemical feedstock. For energy use, it can either be directly used as a biomass fuel or be converted to ethanol and other gaseous or liquid fuels. Cellulose or dissolving pulp from agriculture residues would produce many useful cellulose derivative products, such as fabrics, photographic films, cellophane, lacquers, plastics, just to name a few. Of course, all these uses are not currently economical. However, the current concept of product life cycle analysis which takes into account the economical and environmental consequences of producing and using various products indicates economics soon will change due to global population growth. When that time comes, many consumer products will have to depend more heavily on renewable resources. Increased use of agriculture residues would be able to contribute to meeting the future raw material demand.

Table 1. Comparison of unbeaten kraft pulp properties of cornstalk, switchgrass, juvenile cottonwood, and mature southern pine

<table>
<thead>
<tr>
<th>Pulp Properties</th>
<th>Corn stalk</th>
<th>Switchgrass</th>
<th>Cottonwood</th>
<th>South Pine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulp Chip Density (g/c.c)</td>
<td>0.10</td>
<td>-</td>
<td>0.33</td>
<td>0.54</td>
</tr>
<tr>
<td>Fiber Length (mm)</td>
<td>1.90</td>
<td>2.43</td>
<td>1.01</td>
<td>4.00</td>
</tr>
<tr>
<td>Pulp Yield (%)</td>
<td>43.8</td>
<td>48.3</td>
<td>52.3</td>
<td>48.4</td>
</tr>
<tr>
<td>Freeness (ml)</td>
<td>440</td>
<td>420</td>
<td>575</td>
<td>720</td>
</tr>
<tr>
<td>Kappa Number</td>
<td>10</td>
<td>-</td>
<td>16</td>
<td>40</td>
</tr>
<tr>
<td>Residual lignin (%)</td>
<td>1.5</td>
<td>-</td>
<td>2.4</td>
<td>6</td>
</tr>
<tr>
<td>Tensile Index (kN.m/g)</td>
<td>53.5</td>
<td>31.7</td>
<td>47.3</td>
<td>55.2</td>
</tr>
<tr>
<td>Burst Index (kpa.m²/g)</td>
<td>3.20</td>
<td>2.16</td>
<td>2.71</td>
<td>3.89</td>
</tr>
<tr>
<td>Tear Index (mN.m²/g)</td>
<td>7.13</td>
<td>9.21</td>
<td>7.32</td>
<td>18.50</td>
</tr>
</tbody>
</table>
Table 2. Effect of fiber composition on physical properties of hardboards containing cornstalk and wood fibers bonded with 2% phenol-formaldehyde resin

<table>
<thead>
<tr>
<th>Percent Fiber Composition (Corn/Wood&lt;sup&gt;1&lt;/sup&gt;)</th>
<th>100/0</th>
<th>75/25</th>
<th>50/50</th>
<th>25/75</th>
<th>0/100</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOR (psi)</td>
<td>3991 (71)&lt;sup&gt;2&lt;/sup&gt;</td>
<td>4251 (75)</td>
<td>4604 (82)</td>
<td>4542 (80)</td>
<td>5644 (100)</td>
</tr>
<tr>
<td>MOE (1000 psi)</td>
<td>358 (92)</td>
<td>359 (92)</td>
<td>375 (96)</td>
<td>364 (95)</td>
<td>382 (100)</td>
</tr>
<tr>
<td>IB (psi)&lt;sup&gt;3&lt;/sup&gt;</td>
<td>76 (59)</td>
<td>91 (71)</td>
<td>124 (97)</td>
<td>117 (91)</td>
<td>128 (100)</td>
</tr>
<tr>
<td>Tensile (psi)&lt;sup&gt;4&lt;/sup&gt;</td>
<td>2528 (73)</td>
<td>2928 (85)</td>
<td>3301 (95)</td>
<td>3215 (93)</td>
<td>3464 (100)</td>
</tr>
<tr>
<td>TS (%)&lt;sup&gt;5&lt;/sup&gt;</td>
<td>31 (177)</td>
<td>28 (160)</td>
<td>22 (126)</td>
<td>19 (109)</td>
<td>17.5 (100)</td>
</tr>
</tbody>
</table>

<sup>1</sup> Commercial furnish containing 20% softwood and 80% mixed eastern hardwood fibers was obtained from Georgia Pacific Corp., Duluth, MN.

<sup>2</sup> Values in parenthesis are percentages relative to the properties of boards containing 100% wood fiber.

<sup>3</sup> Internal bond strength measured as tensile strength perpendicular to board surface.

<sup>4</sup> Tensile strength parallel to board surface.

<sup>5</sup> Thickness swell after 24 hours soaking in water at room temperature.

Table 3. Effect of fiber composition on physical properties of hardboards containing switchgrass and wood fibers bonded with 2% phenol-formaldehyde resin

<table>
<thead>
<tr>
<th>Percent Fiber Composition (Switchgrass/Wood)</th>
<th>100/0</th>
<th>75/25</th>
<th>50/50</th>
<th>25/75</th>
<th>0/100</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOR (psi)</td>
<td>3496 (62)</td>
<td>3911 (69)</td>
<td>4020 (71)</td>
<td>4935 (87)</td>
<td>5640 (100)</td>
</tr>
<tr>
<td>MOE (1000 psi)</td>
<td>307 (80)</td>
<td>323 (85)</td>
<td>318 (83)</td>
<td>353 (92)</td>
<td>382 (100)</td>
</tr>
<tr>
<td>IB (psi)</td>
<td>70 (55)</td>
<td>90 (70)</td>
<td>101 (79)</td>
<td>112 (88)</td>
<td>128 (100)</td>
</tr>
<tr>
<td>Tensile (psi)</td>
<td>1804 (52)</td>
<td>2593 (75)</td>
<td>2833 (82)</td>
<td>3188 (92)</td>
<td>3464 (100)</td>
</tr>
<tr>
<td>TS (%)</td>
<td>25 (143)</td>
<td>19 (109)</td>
<td>17 (97)</td>
<td>16 (91)</td>
<td>17.5 (100)</td>
</tr>
</tbody>
</table>
Figure 1. Transverse view of a cornstalk, showing distribution of vascular bundles (Vb) in ground tissue (Pi, pith). Vascular bundles are enclosed in a sheath of sclerenchyma (Sc). Scanning electron microscopy (SEM), 60X magnification.

Figure 2. Transverse view of a switchgrass stem, showing distribution of vascular bundles in stem and in leaf sheaths (Ls). Sclerenchyma (Sc) forms a continuous cylinder beneath the epidermis. SEM, 120X.
Fall Camp

By Christopher Janda

Three weeks in southern Alabama were exactly what the 1995 class of ISU Forestry students needed to gain excellent exposure to the world of forestry. The camp covered all areas of the field, from the management of land for wildlife to the manufacture of wood products for consumption.

This year’s fall camp was based in the beautiful and serene Conecuh National Forest at Auburn University’s Solon-Dixon Forestry Education Center. Solon-Dixon is a well-staffed and well-equipped retreat which promotes the education of students like ourselves in all aspects of forestry. At the Center we found a central square surrounded by the dormitories, the classrooms, the unforgettable cafeteria, and the recreation center. It was in that cafeteria where we were fed the most solid three meals each day which any student could hope for during the semester. Beginning with cheese grits for breakfast and ending with pork chops for dinner, each person was more than satisfied. Down the hill from the cafeteria, the cedar paneled recreation center housed ping pong tables, a television set, and brand new clothes washers and dryers. It takes little effort to say that Solon-Dixon definitely exceeded all of our expectations.

During the weekends, a couple of groups made the hour drive to the Florida coast where we were able to witness firsthand the damage done by hurricane Opal. It was eye-opening for us mid-westerners to see beach houses lifted off their pilings and set down again, though
not gently, fifty yards from their original construction site. A lot of the beach had been washed back out into the ocean, and much work was being done to restore the sand to the beach.

The most important part of the trip, however, was the education we received through plant tours and forest management trips. On the product side, we were able to visit such companies as Champion International, Neste Resins, T. R. Miller, Temple-Inland, and Georgia Pacific's plywood manufacturing facility. For exposure to management, presentations were given to us by Scott Paper, Bon Secour National Wildlife Refuge, and Blackwater River State Forest, and we performed several surveys within the Solon-Dixon property.

At Champion International we watched the pulp and paper making process. It was educational for many of us to see the actual process from roundwood to final product, whether it was newsprint, white paper, or pulp. Many of us were surprised to observe the sheer volume of paper which was produced at that plant alone each day, keeping in mind that it was only one of the many plants around the country.

An employee of the Blackwater River State Forest presented its management plan to the group, showing us how it meets the wide range of demands for its use. The population surrounding the area is able to freely use the State Forest for recreation, picnicking, and camping. There is also pressure for the forest to produce saleable timber to financially support its operations. In addition to those obligations, the management of the area for endangered species is necessary. Pine Baron's tree frog, the Gopher tortoise, the Eastern Diamondback rattlesnake, and a pair of bald eagles make their homes on the property. Finding a balance between all of these objectives presents a challenge.

Since we were in southern Alabama, we all became well acquainted with the plight of the red-cockaded woodpecker as well as the decline of the longleaf pine and wiregrass ecosystem. Years ago, pre-colonially, much of the southeast was dominated by longleaf pine and wiregrass. Fires periodically burned the area, causing a dynamic equilibrium to exist. Longleaf, which is heat resistant in its grass stage, needs fire to release water and nutrients for its growth, while
wiregrass relies on the fire to open the understory for its light requirements. Through fire suppression and conversion to other species of trees, however, this ecosystem is now much reduced and isolated in protected stands.

The red-cockaded woodpecker, likewise, has lost much of its habitat since it roosts only in old growth pine. The strain placed upon the region to supply much of the country’s wood products has caused a considerable amount of this bird’s habitat to be lost.

In all, the trip was as educational as it was enjoyable. The Solon-Dixon Forestry Education Center provided a superb academic atmosphere and an excellent base to work from. The forest management and plant tours informed the class about the current issues in forest administration and industry. Without any doubt, the experience in itself is one which will outlast any education.

Now I see the secret of making the best persons, it is to grow in the open air and to eat and sleep with the earth.

-Walt Whitman
Wilderness

A streak across a plate of shimmering crystal,
The sun rises over the ridge.
As life grows from the night,
The water begins to turn turquoise before me.
The heavy scent of smoke,
A warm crackling blaze shows how to share.
We both sit around the fire,
She leans to my shoulder.
I feel the beauty in her that I see before me,
She feels the solid mountains which are burly yet majestic.
Together, we equal the wilderness
Which is wild, yet has a defined rhythm.
We shall last like the mountains
Yet make the beauty that covers them.
Even though storms may strike periodically,
The wilderness and the mountains are still there,
Just as intertwined as before
Yet stronger for lasting the bitterness of biting winds.
Only together are we whole,
One part without the other can’t function.
There would be no purpose
It could never happen.
Yet even mountains get weathered
and wilderness becomes tamed
What we make is stronger,
The bond of truth, beauty, and freedom.
The world is ours to create,
Never to be unmade for we, together
Know how it should be.

-Tom Schultz
Club Activities
This year the Iowa State chapter of the Forest Products Research Society (FPS) was involved in several exciting endeavors. With larger than normal group numbers (15) plus the wisdom of our faculty advisor Dr. Monlin Kuo, we were able to take on larger tasks. With a steady income of approximately $30 a month from a recently constructed recycling bin for beverage cans, the club was in good financial condition and is considering several different means of appropriation including scholarship opportunities.

Early in the fall semester the club assisted seven student members and two faculty/staff (John Smith and Dr. Monlin Kuo) to the 1995 Midwest Section Fall Meeting. This meeting was held on September 13th in Rockford, Illinois, and was aimed at educating current users of wood products, and promoting the importance of wood products in society. Throughout the weekend, several intriguing events took place including a tour of a truss mill production facility and several great lectures.

The main task currently at hand for the Forest Products Society is the construction of large wooden signs, for use on a self guided tour at the Ames waste water treatment facility. We are currently in the design process and are working closely with Chris Ball and Joe Colletti. Construction will begin early spring semester and the signs will be installed when the ground thaws. The signs will include one large “welcome” type sign much like those at state parks with information and maps. There will also be 10 removable tour station signs. This project will entail the design, cost-estimate, construction, and installation from the club members.
Forestry Club
By Cory J. Levendusky

The Forestry Club of 1995 and 1996, was filled with many exciting times. The first step on the ladder of non-stop excitement, was the welcome picnic. Many people attended the festivities, and enjoyed the fellowship. As the year went on, so did the Forestry Club. Eight forestry students and one staff member traveled to Illinois, for the 44th Annual Forestry Conclave. Once there, the students began to compete in many forestry related events. Everyone gave 100% of themselves, and had a great time in the fellowship with other colleges and universities.

Activities which included trees were the Forestry Club’s major emphasis. The first of these activities was the planting of conifer seedlings for VEISHEA, Earth Day, and Arbor Day. The seedlings were planted in late October, 1995, and grew to be approximately four to six inches high. Towards the end of November 1995, the forestry club had a campfire out at the Christmas tree plantation. Forestry students ate smores and told stories as the fire slowly faded away into the night. The plantation Yeti made a quick appearance, and then fled to the safety of the trees. As December rolled around, and the chilly winds blew down the backs of everyone, the scent of Christmas was in the air. When Christmas is near, then we know it is time for the annual Christmas tree sales. This year, the Forestry Club made a handsome profit from the plantation and from the trees the club bought and resold.

When baby new year blew its horn, and the 1996 semester fell upon us, the club climbed up onto the second step of the ladder of non-stop excitement. The Wild Game Banquet was directed by Mr. Monte Pope. The turnout of students, faculty, and staff was equally as large as the task of organizing the event. As an overall rating of the banquet, I would have to give Monte two thumbs up! April and May was a time for new things. The emergence of beautiful flowers, arrival of birds, and buds breaking for the new season. During this time, most of the seedlings were given away at VEISHEA, Arbor Day, and Earth Day. This is the year in review, and I am sure that the years to come will be filled with many new memories. I would like to thank my officers: Rob Rubsam, Joel Skelley, Loran Ramsey, and all others who helped in organizing and direction. Because without you, I would not have been able to lead the Forestry Club into a successful year!
Student Chapter of the Society of American Foresters
By Rob Rubsam

With the start of the 1995-96 school year came a revitalized student chapter. This year's officer team was composed of Cory Levendusky, Chair-Elect, Mary Hogan, secretary, and Jeremy Cochran, our prized treasurer who kept careful watch over the few dollars that we had, and myself as Chairman.

This year we managed to pull off a few activities and have a good time in the process even though our membership has not yet grown into the hundreds. This was or is the year of the Seventh American Forest Congress in Washington, DC. With the coming of this event we saw an opportunity for some valued learning experience and a chance to get involved in the process. This fall we held our own mini-Roundtable conference here on campus where other clubs and individuals from around campus could come to voice their options concerning the future of our nation's forests. The event was a success. We carried our results to the State roundtable meeting that was held in December. Some of us served directly in the discussion and others helped as scribes. In February, five of us are decided to road trip out to DC to participate in the National Congress.

Some other activities included giving some elementary students from Webster City a Walk-in-the-Woods experience that was educational for all who were involved. In our hopes of raising a few bucks and having a good time we sponsored the first spring picnic for the department (Spring '95). This proved to be a positive experience and one that we hope to make a tradition just as the Forestry club has done with the fall picnic. Seven of us survived a weekend canoe trip that took us to new heights in dealing with people who..... well, it was interesting. The fall Iowa SAF meeting that was held in Burlington proved to be a worthwhile event for some of us who decided to road trip down. We will soon be hosting the spring Iowa SAF meeting the end of March. We also hope to have another picnic and possibly some sort of camping experience.

It has been an exciting year. I would like to say thank you to Dr. Hall, our advisor, on behalf the students for all his help and encouragement throughout our activities. We truly 'preciate it! Well...that's about all for now. Good Luck...and may the force be with you!

I find the great thing in this world is not so much where we stand, as in what direction we are moving.

-Oliver Wendell Holmes
In the fall, eight members of the Society of American Foresters ventured up north to Steamboat Rock, Iowa, where we tested out our survival skills. We camped overnight at a county park just outside of Steamboat that had the scenic Iowa River running through it. The night was spent sharing stories around the campfire of old times and ideas of where each of us thought we were heading in our lives. As the night progressed the talking slowed, as one by one, we burrowed into our tents for a good night's rest before our true adventure began.

We anxiously awoke for our day of canoeing to a glorious fall morning. As the sun came up over the trees it highlighted all of the colors of the changing leaves. The river was flowing smoothly and carried our canoes swiftly over the water. On occasion, the more daring of the canoeists would steer off to the side where a tree had fallen out over the water and find a way to maneuver around it or under it. Not always did the plans work out but it did throw some excitement into the trip. At lunch time we pulled our canoes over to the side where there were big rock outcroppings. We climbed to the top of the cliffs, exploring the area and realizing where Steamboat Rock got its name. At the top there was a huge buck that pounced off when we surprised him. We made a campfire, and Jeremy Cochran had his first smore over a fire. When everyone had gotten enough rest, even though Pete Smith was still soaked from his canoe spill, we ventured on.

The whole day was a relaxing break from the hustle and bustle of school. We floated along, soaked in the sun, admired the beautiful colors of trees that outlined the river and most importantly, enjoyed one another's company.

Participating foresters included: Rob Rubsam, Traci Eldridge, Pete Smith, Joel Skelley, Robb Jackson, Gretchen Holstein, and Chris Feeley. We all thank Chris much for organizing the trip by utilizing his "connections". We had a riot!

Praise makes good men better and bad men worse.

-Thomas Fuller
On Friday October 20th eight Iowa State Forestry Students and one Staff Member set out on what would be an experience they would never forget. Tony Cline, Gretchen Holstein, Mike Lichter, Cory Levendusky, Monte Pope, Loran Ramsey, Rob Rubsam, Chuck Rodrigues(Staff), and myself traveled to Kennekuk County Park in East Central Illinois to compete in the 44th Annual Midwestern Foresters Conclave. When we arrived at the park it was already dark which proved a challenge in making camp. All of the other teams had arrived and set up camp including the University of Illinois (the host university), Southern Illinois, South Eastern Illinois, Purdue, Michigan State, Michigan Tech., and Missouri.

The competition was set to begin at 8:00 a.m. sharp on Saturday and continue throughout the day ending at about 6:00 p.m. There were about 12 different events for men, women, and coed teams and individuals. The events included tobacco spit, wood identification, log rolling, dendrology, one man buck, traverse, chain throw, two-person buck, match split, speed chop, bolt throw, pulp toss, and a special event. We placed in the top three in log rolling (1st and 3rd), match split (1st), and pulp toss (3rd). We finished 4th out of 8 teams when all was said and done. This ranking was quite impressive considering the average team size of the other teams was about 20 to 25 people. Our equipment from the middle ages added to the challenge of the competition, but with help from Purdue and Southern Illinois of lending equipment and coaching we made it through.

That night we were all treated to an awards banquet and party to celebrate the Conclave and all our accomplishments. Sunday morning was time to pack up and take off back to ISU to hit the books again. The weekend turned out to be a memo-
rable one in which we pushed our physical limits and mental capacities and enjoyed every minute of it. We also made new friends and formed closer relationships with each other. I would whole heartedly recommend the experience to anyone and everyone.

**Xi Sigma Pi**

_by Mark Vitosh_

Xi Sigma Pi, was founded at the University of Washington on November 24, 1908, and is the oldest and largest national forestry honor fraternity. The Alpha Gamma chapter at Iowa State University was created in 1965. The objectives of the fraternity are:

- to maintain a high standard of scholarship in forestry education,
- to work for the improvement of the forestry profession,
- and to promote a fraternal spirit among those engaged in activities related to the forest.

The requirements to become a member as an undergraduate student include:

- junior or senior status in a forest management curriculum,
- having completed a minimum of 74 credit hours,
- be ranked in the upper 25 percent of the class scholastically,
- and completion of a minimum of 10 semester hours in forest resource management courses.

The requirements to become a member as a graduate student include:

- completion of a minimum of 10 semester hours in forest resource management classes,
- an outstanding record in graduate work,
enrollment for at least one semester in a school in which a chapter is located. 

During the 1995-1996 school year, the Alpha Gamma Chapter of Xi Sigma Pi nominated ten initiates. As one requirement the initiates must complete a community service project during the academic year in order to become members of the society. The initiates this year donated their time to assisting with the setup of the Fourth Annual 8-Hour Relay For Life which is a fund-raising event for the American Cancer Society.

The 1995-1996 executive committee for the Alpha Gamma Chapter is comprised of: Forester-John Nahas, Associate Forester-Mark Vitosh, Ranger-Ju Wang, and Secretary-Andy Arends.

The Alpha Gamma Chapter is responsible each year to select the winner of the Keith Bauer Award that is presented to an outstanding sophomore at the annual Forestry Club Game Banquet. The award is named after Keith Bauer, a graduate student in silviculture, who died in an automobile accident in 1965. The award is based on scholastic achievement and professional qualities that best exemplifies the qualities of Keith Bauer. The chapter also selects the winner of the G.B. MacDonald Memorial Senior Leadership Award for advanced studies. This award is given to a Xi Sigma Pi member that exhibits outstanding leadership potential, and is a graduating senior that will be continuing on with graduate studies.

VEISHEA
by Gretchen Holstein

VEISHEA, Iowa State’s traditional spring celebration, met another year’s success in 1996. The Forestry Club joined in the activities by giving away blue spruce and white spruce seedlings to people of all ages. An informative proper tree care card was also handed out with each seedling. This was to get the new arborists started on the right foot. These seedlings were planted back in October by some helpful volunteers, and kept in the greenhouse over the long Iowa winter. They were thinned once just before Christmas and really took off in growth over the first part of the new year, reaching a height of around five inches. The seedling give away is always a popular activity, almost as popular as the guest appearance of Smokey the Bear.

This year, a group of foresters got together to reconstruct a small scale model of the cant holder frame from the conclave competition. There was even talk of trying to build a full scale demonstration model, but time and money ran short, maybe next year!!

VEISHA proved itself to be an all around feel-good weekend, where family and friends of fellow Iowa Stater’s came together to enjoy one another’s company and the atmosphere that this magical place creates.

Solitude is as needful to the imagination as society is wholesome for the character.

-James Russel Lowell
Seventh American Forest Congress
by Gretchen Holstein

The Beginning

In February of 1996, five forestry students attended the Seventh American Forest Congress that was held in Washington D.C. The students first became involved in the process when they took part in a student held roundtable discussion that was sponsored by ISU's Society of American Foresters student chapter. The idea was to get interaction amongst different clubs on campus such as Fisheries and Wildlife and Landscape Architecture along with Forestry. The next step was to take part in the State Roundtable discussion either as active participants or as scribes for the different roundtables. At the state meeting the group as a whole came up with their vision statement for the forests of the future and developed guiding principles to support that statement. This vision was then submitted to the national congress along with the other vision statements coming from all over the country.

The students were given the opportunity to attend the National Forest Congress and saw it as a chance to help in developing policy that will be used to manage our future forests. In order to make the trip economically feasible we solicited funding from private organizations from around the state as well as receiving money from the Forestry Department and the Forestry Club.

The Trip

The five of us headed out to D.C. in a van on a Saturday night. We woke up the next morning (except for the driver, who was already awake!) to Pennsylvania. We decided to stop in Gettysburg, Pennsyl-

- Robert G. Ingersoll
The 1996 Wild Game Banquet went off very well this year. It was held in the Scheman building on March 2nd at 6:00 p.m. The banquet began with a buffet that left everyone who attended filled to the brim. We had a variety of dishes made from the different types of meats and according to Gretchen Holstein, "The Antelope lasagna was excellent!"

Following the feast the program continued in Benton auditorium with speaker James L. Bowyer from the University of Minnesota. Dr. Bowyer spoke about how the world needs to look at forestry and how there needs to be specific questions answered like “What do we do about the ever-growing population”? His speech was quite thought provoking for all who attended and according to Dr. Mon-Lin Kuo “Dr. Bowyer’s speech corrected a lot of misconceptions in the public and showed that our forests are where the future lies”.

The presentation of student awards and scholarships are as follows:

**Conservation Scholarships**
awarded by: Dr. Paul Wray
received by: Michelle T. Ludwig
Jeffery Cronin

**The Samuel R. Nagel Scholarship**
awarded by: Dr. Countryman
received by: Chad Garrett

**The Freshman Scholarships**
awarded by: Dr. J. Michael Kelly
received by: Shawn M. Coons
Faith A. Vawter

**The Kenneth D. Obeye Scholarship**
awarded by: Dr. Carl Mize
received by: Michelle T. Ludwig

**The J. Milton Cone Memorial Scholarship**
awarded by: Dr. Steven Jungst
received by: Christopher A. Janda

**The George Thompson Memorial Scholarship**
awarded by: Dr. Floyd Manwiller
received by: Amy M. Etzel
Robert R. Rubsam

**The SAF Full Membership Award**
awarded by: Brent Olson, ISU Alumni and Chairman of the Iowa SAF Chapter
received by: Cory Levendusky

**The SAF Student Membership Award**
received by: Traci Eldridge

**The SAF Fall Sequence Leadership Award**
received by: Ty Kirk

**The Forest Products Society Awards**
awarded by: Dr. MonLin Kuo

**The FPS Book Award**
received by: David W. Smith

**The FPS Student Membership Award**
received by: Christopher P. Schrauth

**The Xi Sigma Pi Keith Bauer Award**
awarded by: John Nahas
received by: Michelle T. Ludwig

**The Forestry Club Student Involvement Award**
awarded by: Dr. Mike Kelly
received by: Gretchen Holstein
Tony Cline
Megan Dvorak
The Diamond Hitch Awards

The Forestry Club President
recieved by: Cory Levendusky

The Iowa State Chapter of SAF
recieved by: Robert Rubsam

The Iowa State Chapter of the Forest Products Society
recieved by: Ryan Chandler

Co-editors of the Ames Forester
recieved by: Chad Garrett
Tom Schultz

The announcement of the new officers:

The new Forestry Club officers:

Forestry Club President: Monte Pope
Vice President: Chris Janda
Treasurer: Casey Bourke
Secretary: Pete Smith

The new SAF officers:

Senior President: Cory Levendusky
Senior President Elect: Gretchen Holstein
Junior President Elect: Michelle Ludwig
Secretary: Traci Eldridge
Treasurer: Pete Smith

The new Forest Products Society officers:

President: Chad Garrett
Secretary: Chris Schrauth

The awards presentation ended with a few inspiring words from Dr. Kelly. He mentioned that the profession of Forestry is a great challenge and foresters are faced with global decisions and, as foresters, we will make the decisions for the continu-

ance of our future. On this note, Monte Pope presented all forestry under-graduates a tree made of oak as a symbol of unity and one of pride in forestry here at Iowa State.

The Game Banquet was a great success this year with over 180 people in attendance. There were many good comments and Dr. Harold S. McNabb commented, “This was the best banquet of the 44 I have attended”.

Thanks to all who helped put this banquet on, if it wasn’t for you it would not have been possible. And thanks most of all to everyone who attended, if it wasn’t for you and your participation it would not have been such a success. I hope to see all of you next year and bring a friend!

Progress, far from consisting in change, depends on retentiveness... Those who cannot remember the past are condemned to repeat it.

- George Santayana
Joe Colletti

Joe Colletti received his Bachelor's Degree in Forestry from Humboldt State University in 1972. He received his Master of Science in 1974, and his Ph.D. in 1978. Both his M.S. and his Ph.D. are in Forest Economics from the University of Wisconsin, Madison. He has been a member of the Forestry Faculty at Iowa State since 1978.

Teaching

Dr. Colletti has a 55% teaching appointment. His current courses include Multiple Use/Decision Making (FOR 204), Integrated Forestry Laboratory (FOR 205), Forest Resource Management (FOR 452), Forestry Grad. Seminar (FOR 510), Advanced Quantitative Methods in Fororestry (FOR 550), Resource Allocation in Forestry (FOR 570), and Advanced Topics in Forest Econ (FOR 654), as well as guest lecturing in Environmental Issues (ENV ST 425), and Public Lands (ENV ST 326). Dr. Colletti also chairs the departmental Curriculum Committee.

Research

Dr. Colletti has a 45% research appointment. His research emphasis in the economics of short-rotation woody crops, agroforestry systems, the integration of forestry and agriculture via mathematical programming models, and optimizing private forest resource management.

David Countryman

David Countryman received his Bachelor of Science Degree and his Master of Science Degree in Forest Management from Iowa State University in 1966 and 1968 respectively. He received his Doctor of Philosophy Degree in Forest Management and Planning from University of Michigan in 1973. He has been a member of the Forestry Faculty at Iowa State since 1975.

Teaching

Dr. Countryman has a 62% teaching appointment. His current courses include Multiple Use Decision Making (FOR 204), Integrated Forestry Laboratory (FOR 205), Fire Protection (FOR 390), Resource Policy
(FOR 453), Forest Resource Case Studies (FOR 454), and Advanced Forest Resource Management (FOR 594).

Research
Dr. Countryman has a 38% research appointment. He is currently conducting research on Oak regeneration in Midwestern forests. He is also involved in research related to strip cropping with trees which contributes to the departmental Agroforestry research focus.

Richard Hall
Richard Hall received his Bachelor of Science Degree in Forest Management from Iowa State University in 1969. He received his Doctor of Philosophy Degree in Plant Breeding/Plant Genetics (Forestry) from the University of Wisconsin, Madison in 1974. He has been a member of the ISU Forestry Faculty since 1974.

Teaching
Dr. Hall has a 47% teaching appointment. His current courses include Introduction to Forestry (FOR 101), Silviculture (FOR 302), Forest Tree Improvement and Genetics (FOR 501), Advanced Forest Ecology and Silviculture (FOR 504), and Forest Biology (FOR 602)

Research
Dr. Hall has a 53% research appointment. His research focuses on genetic selection and intensive silviculture. He is currently involved in selection of genetically superior hybrid Poplar for use in short rotation fiber production. Dr. Hall is also a member of the Interdepartmental Genetics Major faculty. Along with Dr. Sande McNabb, Dr. Hall has recently received transgenic hybrid aspen from Nippon Paper Company of Japan as the beginning of a 5-year research project with that company.

Roger Hanna
Roger Hanna received a Bachelor of Science Degree in Forestry from Iowa State in 1969. In 1972, he received a Bachelor of Science Degree from Iowa State in Farm Operations. He received his Master of Science Degree in Forestry from Iowa State in 1985. He has been a member of the Forestry Department since 1984.
Research

Mr. Hanna has a 100% research appointment. His responsibilities as a Research Associate in the Forestry Department involve research on short-rotation woody crops.

Woody Hart

Woody Hart earned his Bachelor of Arts Degree in Biology from Cornell College in 1959. He earned his Master of Education Degree in Science Education from Texas A&M University in 1965, and in 1972, he earned his Doctor of Philosophy Degree in Entomology, also from Texas A&M. He came to the Entomology Department in 1974, and was appointed a Professor in Forestry in 1989.

Teaching

Dr. Hart has a 59% teaching appointment in Entomology. In addition to the courses he teaches in there, he also teaches courses in Forestry. Those courses include Forest Pest Management (PIP/FOR 416) with Dr. Sande McNabb, and Wood Deterioration and Preservation (FOR 483) with Dr. Monlin Kuo. Dr. Hart also contributes to Community Tree Management (FOR 475X).

Research

Dr. Hart’s research interest is forest insects in urban and woody biomass plantation systems, including agroforestry. His specific interests are in determining the impact of economic species and in the plant-insect interface, particularly in the mechanisms responsible for resistance to attack. Other research is in the study of within-plantation dispersal and the definition and conservation of natural enemy complexes. Dr. Hart’s research is done in cooperation with personnel from the departments of Forestry and Plant Pathology.

Steve Jungst

Steve Jungst received his Bachelor’s degree in Forestry with an option in Forest Resource Management from Iowa State University in 1969. He received his Master of Science degree in Forestry (Biometry) in 1976, and his Ph.D. in Forestry (Biometry) from Iowa State in 1978. He has been a member of the Forestry Faculty since 1974.
Teaching
Dr. Jungst has a 60% teaching appointment. His current courses include Integrated Forestry Laboratory (FOR 205), Management of Small Forest Properties (FOR 310), Natural Resource Photogrammetry and Photo Interpretation (FOR 445), and Seminar (FOR 510). In addition, he serves as advisor to the student publication, The Ames Forester.

Research
Dr. Jungst has a 40% research appointment. His research interests are in remote sensing and use of Geographic Information Systems. He is currently conducting research on the Bear Creek Watershed as a part of the department’s focus on agroforestry research.

Mike Kelly

Mike Kelly received his Bachelor of Science Degree in Biology from East Tennessee State University in 1966. He received his Master of Science Degree in Plant and Soil Science from University of Tennessee in 1968, and in 1973, he received his Doctor of Philosophy Degree from University of Tennessee in Forest Ecology and Soils. He assumed duties as the 7th Chair of the Department of Forestry in October, 1995.

Dr. Kelly holds a 5% appointment in teaching, a 91% appointment in research, and a 4% appointment in extension. Although approximately 75% of his time is occupied in administrative duties in the department, he will be developing his own teaching and research program in the areas of Forest Ecology and Soils once he has settled into his role as the new Chair of the Department.

Monlin Kuo

Monlin Kuo received his Bachelor of Science Degree in Forestry from Chung-Hsing University in 1965. He received his Master of Science Degree in Wood Science from University of Missouri, Columbia in 1971, and in 1977, he received his Doctor of Philosophy Degree in Wood Science and Technology from University of California, Berkeley. Dr. Kuo joined the Forestry faculty at ISU in 1980.
**Teaching**

Dr. Kuo has a 49% teaching appointment. His current teaching responsibilities include Harvesting & Wood Utilization (FOR 202), Integrated Forestry Laboratory (FOR 205), Chemical Conversion of Wood (FOR 481), Wood Deterioration and Preservation (FOR 483), Mechanical Conversion and Physical Properties (FOR 487), and Advanced Topics in Wood Science (FOR 587).

**Research**

Dr. Kuo has a 51% research appointment. His research interests are in the area of wood bonding. He is currently conducting research on the use of corn starches as an additive to wood adhesives.

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**Floyd Manwiller**

Floyd Manwiller received his Bachelor of Science Degree in Forestry from Iowa State University in 1961. In 1966, he received his Doctor of Philosophy degree from ISU in Forestry with an emphasis on Wood Science and Plant Cytology. Before joining the faculty at ISU, he served as Principal Wood Scientist for 12 years with the U. S. Forest Service Southern Forest Experiment Station in Louisiana. He joined the ISU Faculty in 1978.

**Teaching**

Dr. Manwiller has a 70% teaching appointment. His current teaching responsibilities include Orientation in Forestry (FOR 110), Harvesting/Wood Utilization (FOR 202), Integrated Forestry Laboratory (FOR 205), Wood Anatomy and Properties (FOR 280), Wood Identification/Adhesive (FOR 281), Bonded Wood Products (FOR 485), and Wood Drying (FOR 486). Dr. Manwiller also serves as Advising Coordinator for the department and advises half of the new Freshmen, Sophomore, and Transfer Students in the department.

**Research**

Dr. Manwiller has a 30% research assignment. His research interests lie in the area of wood anatomy.

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**Carl Mize**

Carl Mize received his Bachelor of Arts Degree in Math and Chemistry from Brockport State University in 1969. He received his Master of Science Degree in...
Forest Ecology from Humboldt State College in 1973, and in 1977, he received his Doctor of Philosophy Degree in Quantitative Silviculture from the College of Environmental Science and Forestry, SUNY. Dr. Mize has been a member of the Department of Forestry at ISU since 1977.

Teaching
Dr. Mize has a 29% teaching appointment. His current teaching responsibilities include Resource Measurements and Evaluation (FOR 203), Integrated Forestry Laboratory (FOR 205), Dynamics of Forest Stands (FOR 342), and Forest Biometry (FOR 543).

Research
Dr. Mize has a 71% research appointment. His research interests lie in the area of forest biometry, forest growth and yield, and agroforestry. He is currently conducting research on growth and yield of hybrid Poplars in midwestern settings and on modeling the impacts of field shelterbelts on crop production.

Patricia Negreros-Castillo earned her Bachelor of Science Degree in Agro-Chemistry in 1976 from the University of Puebla, Mexico. She earned her Master of Science Degree in Ecology and Natural Resource Management in 1983 from the National Research Institute for Biotic Resources in Xalapa, Mexico, and in 1991, she earned her Doctor of Philosophy Degree in Forestry with emphasis in Biology from Iowa State University. Before joining the ISU Forestry Department, she served as the Head of the Forestry Research Program for INIFAP in Mexico. She has been with the Department of Forestry at ISU as an Associate Scientist since 1994.

Teaching
Dr. Negreros-Castillo’s teaching duties involve Forest Biology (FOR 201), Integrated Forestry Laboratory (FOR 205), and Agroforestry Systems (FOR 560X).

Research
Dr. Negreros-Castillo has a 100% research appointment. Her research interests are in the area of tropical silviculture and agroforestry. She is currently developing a research project which will contribute to the department’s research focus in agroforestry.

Nature never deceives us; it is always we who deceive ourselves.

-Jean-Jacques Rousseau
Dean Prestemon received his Bachelor of Science Degree in Forestry with an Option in Wood Products from Iowa State University in 1956. He received his Master of Science Degree in Wood Technology in 1957 from the University of Minnesota, and in 1966, he received his Doctor of Philosophy Degree in Forestry (Wood Science) from University of California. Dr. Prestemon has been a member of the Forestry Department at Iowa State since 1965.

Teaching

Dr. Prestemon has a 9% teaching appointment. He teaches "Wood Use and Construction" (FOR 488) and team teaches "Harvesting/Wood Utilization" (FOR 202), and "Integrated Forestry Laboratory" (FOR 205).

Extension

Dr. Prestemon has a 91% extension appointment. His specialty areas include proper use of wood in structures, timber processing and marketing, and physical properties of wood. He coordinates the Master Woodland Managers Program and programs on the Proper Use of Wood in Housing. He is also the primary contact for Individuals with inquiries relating to timber processing, marketing forest products, proper wood use, and housing.

Richard Faltonson

Richard Faltonson received his Bachelor of Science Degree in Horticulture from Iowa State University in 1977. He has been a member of the Forestry Department since 1970.

Teaching

Although Mr. Faltonson does not have a teaching appointment, he provides excellent teaching support. He has co-taught an experimental offering of urban forestry emphasizing arboriculture, and he has co-taught a Nursery Science course. He contributes to the forestry teaching program both in the classroom and in field settings.

Research

Mr. Faltonson has a 100% research appointment. He is a research coordinator/project coordinator for the Iowa State University agroforestry research team (IStART). He specializes in 1) the propagation and culture of woody plant materials used in temperate agroforestry systems, 2) cultural management of
agroforestry systems including riparian buffer strip systems, woody and herbaceous biomass-for-energy systems, and woody and herbaceous food crop systems. He is an investigator with Dr. Richard Schultz, Dr. Joe Colletti, and others on the Bear Creek Riparian Buffer Strip Agroforestry Project and the Ames Agroforestry Biomass/Biosolids-for-Energy Project. Mr. Faltonson is also co-leader of a new international agroforestry project involving the Philippines.

Charles Rodrigues

Charles Rodrigues received his Bachelor of Science Degree in Chemistry from Southeastern Massachusetts University in 1985. In 1990, he received his Master of Science Degree in Plant Pathology from Iowa State University. Before coming to the Forestry Department as a Research Associate, he worked as a field/lab technician for ICI Seeds. Chuck joined the Forestry Department in 1993.

Research

Mr. Rodrigues has a 100% research appointment. His responsibilities involve supervision of the Forest Biology research laboratories, assistance with research projects utilizing those research spaces, and research involvement in water quality related to riparian buffer strips.

Lita Rule

Lita Rule received her Bachelor of Science Degree in Forestry Extension from University of the Philippines at Los Banos in 1975. She received her Master of Science Degree in Forest Resources Management from University of the Philippines in 1982, and in 1988, she received her Doctor of Philosophy Degree in Forest Economics from Texas A&M University. She has been a member of the Forestry Department at ISU since 1989.

Teaching

Dr. Rule has a 41% teaching appointment. Her current teaching responsibilities include Multiple Use Decision Making (FOR 204), Integrated Forestry Laboratory (FOR 205), Forest Resource Economics and Quantitative Methods (FOR 451), Forest Resources Management (FOR 452), and Forest Resource Policy and Administration (FOR 453). Dr. Rule also
serves as one of two primary advisors for all new Freshmen, Sophomores, and new Transfer students in the department.

Research

Dr. Rule has a 59% research appointment. Her research interests lie in the area of agroforestry and forest industry with emphasis on forest economics. She is currently conducting research on agroforestry systems which are applicable in midwestern settings, and she has recently begun work on a joint agroforestry project involving Mexico and the U. S. Forest Service Center for Agroforestry.

Richard Schultz

Richard Schultz received his Bachelor of Science Degree in Forestry with an Option in Forest Management from Iowa State University in 1965. He received his Master of Science Degree in Forest Biology from Iowa State in 1968, and in 1970, he received his Doctor of Philosophy Degree, also in Forest Biology from Iowa State. Before joining the faculty at Iowa State, he worked as the Head Environmental Coordinator for the Iowa Depart-

ment of Transportation for two years and as a faculty member in the Department of Forestry at the University of Georgia for 7 years. He joined the Forestry faculty at ISU in 1979.

Teaching

Dr. Schultz has a 51% teaching appointment. His current teaching duties include Integrated Forestry Laboratory (FOR 205), Forest Ecology (FOR 301), Forest Watershed Management (FOR 407), Agroforestry Systems (FOR 475X), Advanced Forest Ecology and Silviculture (FOR 504), Adv. Topics in Fore Biology (FOR 602), and Tree Growth and Development (FOR 603).

Research

Dr. Schultz has a 49% research appointment. His research interests are in Forest Ecology and Hydrology and Agroforestry with emphasis in the ecology and hydrology of riparian zone management systems, short-rotation woody crops, agroforestry systems, the integration of forestry and agriculture; nursery production of large hardwood seedlings, and establishment of oak and walnut plantations. Dr. Schultz also serves as Chair of the Agroecology Issue Team for the Leopold Center for Sustainable Agriculture.

The whole of science is nothing more than a refinement of everyday thinking.

-Albert Einstein
John Smith

John Smith received his Bachelor of Science Degree in Forestry from Iowa State University in 1994. He joined the Department as a Research Associate in Wood Science in 1995.

Research

Mr. Smith has a 100% research appointment. His responsibilities involve oversight of the wood science laboratories and wood processing facilities. He provides research support for the wood science faculty, and assists graduate students with research involving the wood science facilities.

He is currently involved in supervision of students working on research associated with a grant from the Iowa Soybean Promotion Board to explore the use of soy protein in wood adhesives.

The scarcest commodity in the world is common sense.

-Dean R. Prestemon

Jan Thompson

Jan Thompson earned her Bachelor of Science Degree in Forestry Soils from Michigan Technological University in 1981. She earned her Master of Science Degree in Agronomy from Iowa State University in 1984, and in 1991, she earned her Doctor of Philosophy Degree in Forestry with emphasis in Biology from Iowa State University. She joined the Forestry Department as an Associate Scientist in 1994.

Teaching

Dr. Thompson’s current teaching responsibilities involve Forest Biology (FOR 201), Integrated Forestry Laboratory (FOR 205), and Community Tree Management (FOR 475X).

Research

Dr. Thompson has a 100% research appointment. Her research interests are in forest biology, nursery production, and urban forestry.
Mark Vitosh received his Bachelor of Science Degree in Forestry with an Option in Forest Management from Iowa State University in 1988. Before returning to the Department as an Extension Program Assistant, he worked as a Service Forester with the Oklahoma Department of Agriculture for four years, and as a Research Associate with the Department of Plant Pathology at ISU for 1 year. He has been a member of the Forestry Department since 1994.

**Extension**

Mr. Vitosh has a 100% appointment in Extension. His responsibilities include program coordination for all Extension Forestry Urban & Community Forestry Programs and Youth Education Programs. Specific program responsibilities include the Iowa Community Tree Steward Program, Iowa Community Tree Workshop Program, and the Tree Steward Program For Youth. He also assists individuals with inquires relating to urban and community forestry and woodland management. Although he has no formal teaching appointment in the department, he has provided assistance in teaching Community Tree Management (FOR 475X).

Paul Wray received his Bachelor of Science Degree in Forestry with an option in Forest Management from Iowa State University in 1968. In 1974, he received his Doctor of Philosophy Degree from ISU in Forest Biology. Dr. Wray's professional interests are in forest management, biology, Christmas trees, windbreaks, and extension education. He has been a member of the ISU Forestry Department since 1975.

**Extension**

Dr. Wray has a 100% extension appointment. His duties in extension include coordinating Forestry Field Days, Forestry Educational Programs, and Windbreak Schools. He also assists individuals with inquires relating to all aspects of woodland management and urban and community forestry.
Tom Isenhart earned his Bachelor of Science Degree in Botany and Environmental Studies from Iowa State University in 1983. He earned his Master of Science Degree in Water Resources from Iowa State University in 1988, and in 1992, he earned his Doctor of Philosophy Degree from Iowa State University in Water Resources. Tom joined the Forestry Department as a Postdoctoral Research Associate in 1994. Prior to joining the Department, Tom was a Temporary Assistant Professor in the Department of Animal Ecology where he taught classes in aquatic ecology.

Research

Dr. Isenhart has a 100% research appointment with interests in aquatic and riparian ecosystem ecology. He is currently conducting research in landscape or watershed-scaleriparian and wetland buffer zones, and in the biogeochemistry of nitrogen in aquatic and riparian systems.
Amanda Benbow

Degree(s):
Bachelor of Science in Forestry Resource Management

Awards and honors:
Ames Forester Editor 1994-95

Employment Experience:
Iowa Arboretum intern for 2 years

Future Plans:
Move to Cody, Wyoming and hopefully work for the Forest Service; start a family

Hobbies:
reading, hiking, camping, horseback riding, skiing

Advice to underclassmen:
Organization is the key to success!

Comment:
I have enjoyed my time at ISU especially the professors and my many “Forester” friends. If your ever in Cody, please look me up!

Ryan Chandler

Degree(s):
Bachelor of Science in Forest Products with an emphasis in marketing

Awards and honors:
Forest Products Society President 1995

Employment Experience:
Custom woodworking

You can never plan the future by the past.

-Edmund Burke
Andy R. Clark

Degree(s):
Bachelor of Science in Forest Resource Management with an emphasis on Urban Forestry and Plant Health

Awards and honors:
Certified Nebraska Arborist, Delta Sigma Phi National Fraternity member

Employment experience:
Ridgewood Tree Care Co. (summer 1994, disease/pest management assistant and assistant tree trimmer.
Omaha Public Power District, Forestry Department (summer 1995, utility forestry assistant)

Future Plans:
I plan to work in the forest utility industry.

Hobbies:
bodybuilding, hapkido, basketball, watching re-run episodes of "The Simpsons" and "Seinfeld"

Advice to Underclassmen:
"These days grades aren’t everything, get involved or get left behind!"

Cory J. Levendusky

Degree(s):
Bachelor of Science in Forest Management with an emphasis in Urban Forestry

Awards and honors:
Eagle scout award, dean’s list, Forestry Club President, member of the Society of American Foresters, Member of the Forest Products Society

Employment Experience:
Forestry greenhouse assistant (fall and spring ’94, ’95, ’96)
Philmont Scout Ranch program staff (summers ’91, ’92, ’93)
Ecology director at Camp Ingawanis (summers ’88, ’89, ’90, ’94)
**Future Plans:**
I plan to work in urban forestry, write children's books and poetry, try out for minor league baseball, serve God, help people, and try to save the earth.

**Hobbies:**
backpacking, camping, laughing, photography, most sports, poetry, and outdoor activities of all kinds.

**Advice to underclassmen:**
"The superficial non-sense society is overwhelming at times, however; be sure to follow your own path and direction!"

**Comment:**
"View all things from all aspects, and then will you better understand"

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**Employment Experience:**
Woodland Acres Christmas Tree Farm

**Future Plans:**
I would like a job with private industry or the Forest or Park Service.

**Hobbies:**
hunting, fishing, sports

**Advice to Underclassmen:**
Get involved with all the activities you can!

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**Chris Thies**

**Degree(s):**
Bachelor of Science in Forest Management

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**Mary M. Hogan**

**Degree(s):**
Bachelor of Science in Forest Resource Management

**Awards and Honors:**
Admitted with academic recognition, Dean's List Spring 1993 and Fall 1994, Forestry Club 1994-1996, member of So-

**Employment Experience:**

Urban forestry internship with the City of Fort Dodge - Summer 1995
  - 100% street tree inventory
  - Maintenance of parks and street trees
Wood Products internship with Kendrick Wood Products - Summer 1994
  - Efficiency evaluations
  - Produced computer layouts of buildings for efficiency evaluation
  - Production support and staff

**Future Plans:**

Find work in central to western Iowa with county conservation or arboretum
Get married and eventually start a family
Find a field related job
Be happy and live life to the fullest

**Hobbies:**

reading, skiing, drawing, snowmobiling, hiking, volleyball, softball

**Advice to Underclassmen:**

"Strive to achieve your fullest potential and you will enjoy life more!"

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**All that is human must retrograde if it does not advance.**

-Edward Gordon

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Karla P. Caceres Johnson

**Degree(s):**

Bachelor of Science in Forestry Management

**Awards and Honors:**

Member of CASA (Central American Student Association), Participant in VEISHEA representing Central American countries

**Future Plans:**

I am going back to Honduras to work. I'm planning to work with a foreign project or institution for the developing of the tropical rain forest. Also I would like to work in a forestry school as teacher of forest management.

**Hobbies:**

Camping, playing basketball, fishing

**Advice to Underclassmen:**

Confront your problems in any field. Be persistent to accomplish any goal.
David Smith

Degree(s):
Bachelor of Science in Forest Products

Awards and Honors:
Member of Forest Products Society

Employment Experience:
Natural Resource Research Institute (participated on a team conducting OSB research) making boards and testing to standard.

Future Plans:
I plan to move to Clarion Pennsylvania to work at MacMillian Bloedell-Clarion, medium density fiberboard plant.

Hobbies:
mountain biking, hiking, camping, woodworking

Advice to Underclassmen:
Decide what you want to do in a career and take classes outside forestry department like industrial manufacturing or statistical process control or sales and marketing to help market yourself when looking for a job.

Jeremy S. Cochran

Degree(s):
Bachelor of Science in Forest Resource Management

Employment Experience:
6 months at Captain Jack’s Tree Farm, 1 1/2 years at Strautman’s Tree Farm

Future Plans:
I plan to get married to my high school sweetheart in October and work as a forester here in Iowa.

Hobbies:
hunting, trapshooting, hiking, making small carpentry projects
Advice to Underclassmen:

Enjoy college while it lasts because it will all be over before you know it.

Comment:
I've also been active in the Society of American Foresters, Forestry Club, and Ames Chapter Izaak Walton League.

Elmer Fernandez Gutierrez

Degree(s):
Bachelor of Science in Forestry Management
Minor in Environmental Studies

Awards and Honors:
Dean's List spring 1995.
Member of Alpha Gamma Zeta Agricultural Fraternity.
Selected by the Golden Key Society.
Selected for membership to Xi Sigma Pi Forestry Fraternity.
Granted the Fulbright Scholarship.

Employment Experience:

January - July 1993 worked for ESNACIFOR (National School of Forestry Sciences) in Honduras

August - December 1993 worked for LARESNAR (an International Forestry Project from Holland) in Honduras

Future Plans:
I will go back to my country, Honduras, in May 1996 and I hope to work with the forestry university of my country (ESNACIFOR). I will also get married in December of 1996 and I will work for a couple of years in my country. Then I will apply for a scholarship to get my masters degree in Finland, Holland, or the USA.

Hobbies:
Hiking and camping in the tropical forests of my country, playing the guitar, bass and keyboard, and listening and dancing to "Latino" music such as salsa, punta, boleros...etc.

Advice to Underclassmen:
Keep on going!! We have chosen the right career. The future of the forests and therefore the future of our planet may depend on us.

Comments:
For all of you, be more open for new experiences, new people, and new cultures!
Daniel Dean Anderson

Degree(s):
Bachelor of Science in Forest Management

Employment Experience:
I have worked for my father on our farm for many years before college. Since coming to Iowa State, I have worked for the Story County Conservation Board for two summers and the USPS for a summer. My non-farm experience has been based around recreation.

Future Plans:
I plan to get a job. I would like to work in county conservation. County conservation holds everything I want in a job (lots to do of many different things). Until I can find a permanent job, I will work for the USFS in the summer and farm in the spring and fall.

Hobbies:
I enjoy anything outdoors, skiing, fishing, hunting, hiking, etc. I also enjoy video games. My favorite activity is Tae Kwon Do in which I hold the rank of 1st.

Advice to Underclassmen:
Study hard but have fun. We are here to learn more than just numbers and facts.

Comments:
Yee Ha I Graduated!

Loran J. Ramsey

Degree(s):
Bachelor of Science in Forest Management

Awards and Honors:
Nominated for student employee of the year, College of Agriculture ambassador, Diamond Hitch Award, Editor of the Ames Forester 1994-95, Forestry Club Secretary.
Employment Experience:
Worked for Dr. Schultz on bufferstrip project spring of 1994-present. Summer intern for Ridgewood Co. in Omaha NE as an arborist intern. 5 week volunteer in Summit County Colorado with the student conservation association working on trail crews.

Hobbies:
Watching ISU basketball, camping, and riding motorcycles.

Advice to Underclassmen:
Don't be afraid to get involved, keeping busy is the best way to stay organized.

Future Plans:
I plan to work for the U.S. Forest Service in seasonal fire suppression and climb as many mountains as I can find.

Hobbies:
I enjoy hiking, biking, writing, and discussing enigmatic matters.

Advice to Underclassmen:
Believe in yourself and follow your dreams.

Joel H. Skelley

Degree(s):
Bachelor of Science in Forest Resource Management

Awards and Honors:
Member of the Society of American Foresters, and the Forestry Club as well as Forestry Club Treasurer
Employment Experience:
I worked for Dr. Hall for 2 years doing Poplar research and for Rich Faltonson in the summer as a greenhouse technician.

Future Plans:
I am considering graduate school for urban forestry or an urban forestry job. I also plan to get married to my fiancee.

Hobbies:
basketball, volleyball, baseball, hiking, and camping

Advice to Underclassmen:
Get involved, keep up with classes as much as possible, but no matter what enjoy yourself.

Christopher J. Feeley

Degree(s):
Associates of Arts from Ellsworth Community College and Bachelor of Science in Forestry from ISU

Employment Experience:
Worked for Dr. Hall on his research for 1 year. Worked for a church as a youth leader.

Future Plans:
I am planning to attend graduate school and get my masters degree in forest pest management.

Hobbies:
fishing, hiking, and growing trees in my apartment, camping, cooking

Advice to Underclassmen:
Have fun while it lasts, it gets tougher from here.

Comment:
I've been a member of the Forestry Club and Society of American Foresters for two years.

Other Graduating Seniors
Christopher Abel
Matthew Cosgrove
Casey Kohrt
Mark Mangrich

Graduating Graduate Students
Christopher Ball
Zhigyn Liu
John W. Mattila
Joko Pramono
Prayitno
Fernandes Sembiring
Maidiward
Currently Enrolled Students in Forestry

Seniors:

Mandy Billeb
Casey Bourke
Anthony Cline
Shane Delaney
David Douglas
Megen Dvorak
Traci Eldridge
Amy Etzel
Aron Flickinger
Chad Garrett
Sasha Giunta
William Heber
Bryan Hendricks
John Hohensee
Jason Murphy
John Nahas
Allen Niedermann
Monte Pope
Allan Rutz
Jason Sbiral
Dustin Svec
James Van Hatten
Kirk Webb

Juniors:

Dustin Bachtell
Robert Beane
Travis Bruch
Ryan Clark
Matthew Connor
Mark Cory
Jason Ewers
Margaret Forth
Jeff Goerndt
Jeff Hansen
Shawn Hartzer
Gretchen Holstein
Jesse Iverson
Robert Jackson
Chris Janda

Sophomores:

Stacy Bazal
Shannon Blockinger
Matt Clayton
Jay Guyer
David Hanson
Joshua Hughes
Valasia Iakovoglou
Shari Lindquist
Aaron Loy
Michelle Ludwig
Matt Mohr
Jason Mrizek
Jacob Parsons
Mathew Sanders
Erik Stadsvold
Ryan Stampe
Edward Szabo
Chris Wickland
Rick Woten
Freshmen

Chris Carstensen
Jason Clapper
Heather Collins
Joseph Dik
Brian Dirks
Nicole Feldman
Robert Fink
Jeremy Fritz
Matt Grubisich
Jamie Hart
Brannon Kirk
Ben Kuennen
Eric Nielsen
Mitch Roeschlein
Joel Straw

Graduate Students

Abdu Abdelkadir
Andrew Arends
Rino Bae
Robert Bardon
Luna Bharati
Sarkoro Budiatmoko
Eric Dahle
Bill Edwards
Bonnie Green
Jim Gubbels
Shabana Hameed
Abugarshall Kai
Edi Kurniadi
Kye-Han Lee
Zhiquin Liu
Ziqiang Lu
Mamun
Carmen Marquez
Joko Pramono
Prayitno
Xiaoming Qi
Morris Rule
Elif Semen

Marcella Szymanski
Girma Melesse Tabor
Aydin Tufekcioglu
John Tyndall
Mark Vitosh
Ju Wang