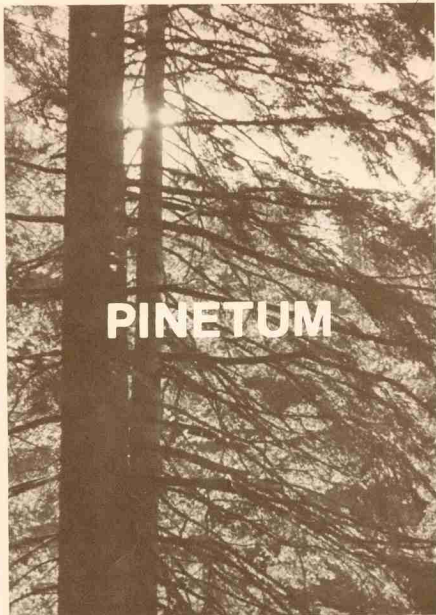


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1977



W L Holley



PINETUM

SCHOOL OF FOREST RESOURCES
NORTH CAROLINA STATE UNIVERSITY
RALEIGH, NORTH CAROLINA

Volume XLIII 1977



NO PAPER
N.C. STATE
PHYSICAL PLANT
NO. 114
WOOD PRODUCTS
ONLY

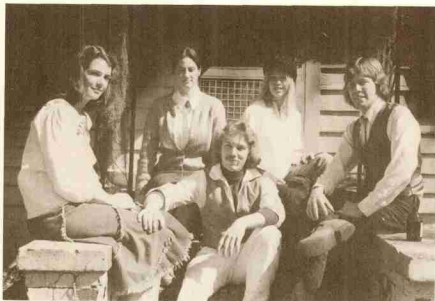




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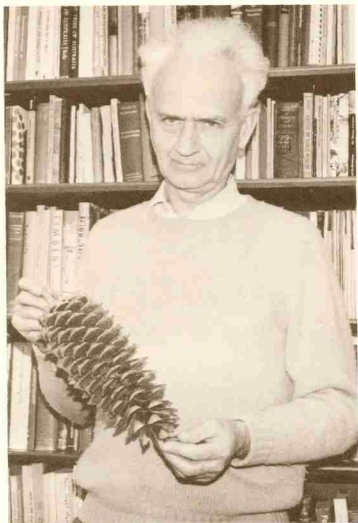
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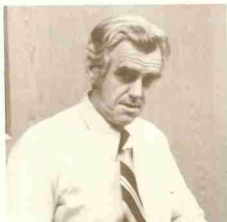
The PINETUM Staff would like to thank Sarah, Mrs. Liles, Marge, and all the contributing writers for helping us get it all together (even before the deadline), John and Dennis for their patience as we slowly engulfed them in our debris, and themselves for having survived.

Dedicated to Dr. John W. Duffield



SCHOOL PROGRESS REPORT

STUDENT ENROLLMENT AND FACULTY AND STAFF CHANGES FOR 1976-77



by Eric L. Ellwood

Enrollment (Fall of 1976)

<u>Curriculum</u>	<u>Undergraduate</u>	<u>M.S.</u>	<u>Ph.D.</u>
Conservation	37		
Forestry	403	37	19
Natural Resource Recreation Management	34		
Recreation and Park Administration	278	21	
Pulp and Paper Science and Technology	113		
Wood Science and Technology	<u>43</u>	<u>22</u>	<u>18</u>
TOTAL	908	80	37

Degrees awarded in 1975-76 were:

Bachelor	200
Masters	19
Doctorate	<u>4</u>
TOTAL	223

Faculty and Staff

Changes in faculty personnel included the following appointments, retirements, resignations and reassignments:

Mr. Leon Harkins was named to succeed Walt Keller who retired in July as Specialist In-Charge Forest Resources Extension.

Mr. Ross Douglass announced his retirement in forest resources extension.

Dr. William T. McKean resigned to take a position with Weyerhaeuser Company, Everett, Washington, and **Edward Sossaman** joined Weyerhaeuser Company in New Bern, N. C.

Dr. Kenneth Cordell resigned to take a position with the U. S. Forest Service and relocated at Clemson University, Clemson, South Carolina.

Dr. Venkatesh Venkatakrishnan was appointed Visiting Assistant Professor in the Department of Wood and Paper Science.

Dr. Chrystos D. Siderelis was appointed Assistant Professor of Recreation Resources. Dr. Siderelis was previously at the University of Georgia.

Mr. William Gardner was appointed Liaison Silviculturist working with the Hardwood Research Cooperative.

Dr. Arthur W. Cooper returned to NCSU as Professor of Forestry and Botany after working as Assistant Secretary of the Department of Natural and Economic Resources since 1971. He is now located in the Department of Forestry.

Dr. Hou-min Chang returned to Raleigh after a one-year sabbatical leave with the Weyerhaeuser Company.

Mrs. Adrianna Kirkman was appointed a Research Assistant in the Department of Wood and Paper Science.

Dr. John W. Johnson was appointed Professor and Associate Department Head of Forestry in August and subsequently as Director of Cooperative Programs. Dr. Johnson was previously at Syracuse University.

Mr. Wayne Haines resigned as director of the Forest Fertilization Cooperative to accept a position with International Paper Company.

Dr. Bruce Zobel stepped down as director of the forestry research cooperative programs. **Robert Weir** was appointed as director of the Pine Tree Improvement Program and **Dr. Robert Kellison** was appointed director of the Hardwood and Forest Fertilization Cooperative Program.

Several awards and recognitions and special assignments were made during the year to the faculty as follows:

Drs. Ralph Bryant, T. E. Maki, Bruze Zobel and Richard Preston were presented Bicentennial Awards by the North Carolina Forestry Association.

Dr. J. W. Duffield was named Editor of the Southern Journal of Applied Forestry.

Dr. Josef S. Gratzl was named the Elis-Signe Olsson Professor of Pulp and Paper Science and Technology.

Dr. Myron Kelly was named director of the SWST-Visiting Scientist Program.

Dr. Ellis Cowling was appointed to the Board on Agriculture and Renewable Resources of the National Academy of Science.

Dr. E. Wald Maki was selected as a member of the Academy of Outstanding Teachers.

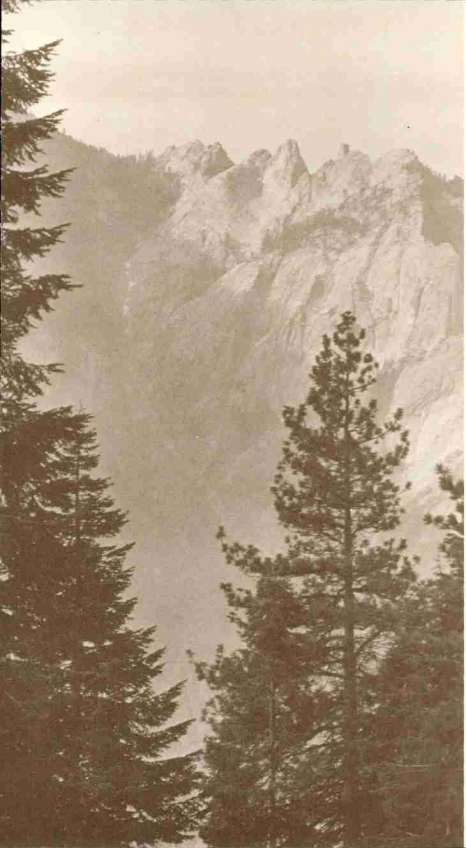
Dr. Irving Goldstein and Dean Eric Ellwood participated in a national study—"Committee on Renewable Resources for Industry and Manufacturing" initiated by the National Research Council.

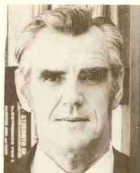
Dr. Goldstein was appointed chairman of the Gordon Conference on Chemistry and Physics of Paper.

Dr. C. B. Davey completed his tenure as President of the Soil Science Society of America.

Dean Ellwood was named chairman of the Society of American Foresters Accreditation Committee.

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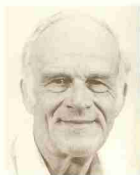


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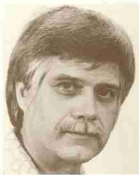
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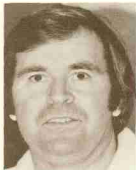
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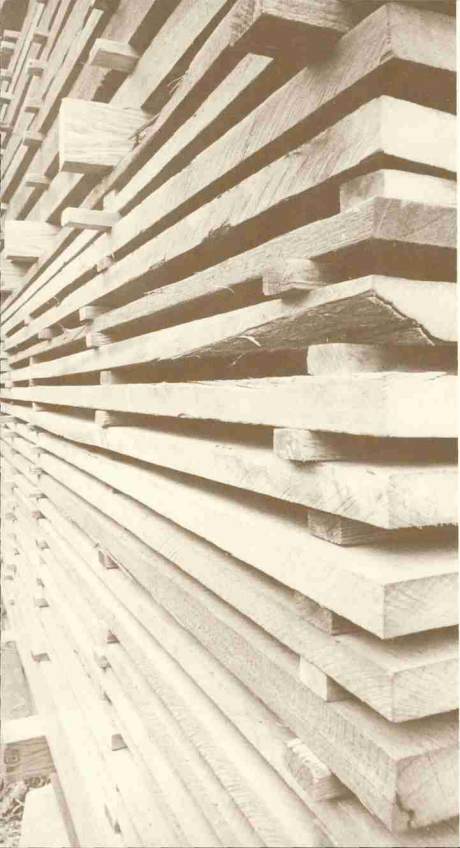


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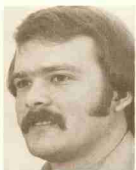
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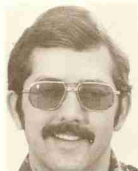


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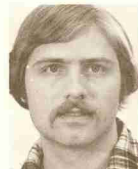
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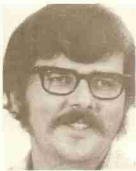
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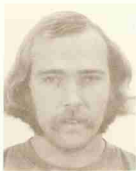
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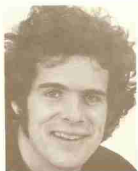
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PPC
TAPPI



John Shannon
FOR/NRR



Boyce Shore
RPA/Con.



Robert A. Short
FOR/Rec.
ROTC, 1st Commando Group,
Pershing Rifles,
Scabbard & Blade



Phil Shroats
FOR
SAF, U. S. Navy (Ret.)



Scott Sillars
FOR



Bess Simons
FOR
SAF, Pinetum (Assoc. Editor,
1975; Editor, 1976)



Dan Smith
FOR



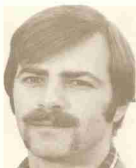
Herman Speece
FOR
Forestry Club, SAF



Ronnie L. Spivey
FOR



Thomas R. Sternloff
RPA
Rho Phi Alpha, Xi Sigma Pi



Rick Thayer
FOR



Larry Don Tyndall
WST



Doug Van Valkenburgh
FOR



Gary Vickers
RPA



Robert E. Wallace
FOR
SAF



Renee Watson
FOR/WST
Xi Sigma Pi, FPRS



Harry Watt
WST
Xi Sigma Pi, FPRS,
Forestry Club



Russell D. Weber
FOR
Forestry Club



Michael Webster
RPA



Teresa Wiggs
RRA



Floyd Williams
NRR



Harold Williams
FOR
Forestry Club, Xi Sigma Pi



John Williams
FOR



Bruce Wilson
FOR/SSC



Katie Yates
RPA
Xi Sigma Pi (Sec.-Fiscal Agent)
Forestry Council (Sec.)
Rho Phi Alpha



John Patterson
FOR



Mike Smith
NRR/RPA



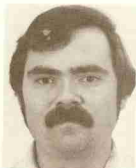
Phil Stafford
FOR



Dave Van Covern
RPA



Steven Vrydaghs
RPA



Williams Wells
FOR
American Forestry Assn.

SENIORS NOT PICTURED

Alexander, James Daniel	WST	Macrae, Marvin Britt	WST
Anthony, Dennis A.	WST	Mathews, Melissa Louisa	RPA
Berkman, Steven Barry	RPA	McAdams III, Charles Rupert	RPA
Boles, Vicky Sharon	RPA	McHone, Joy Johnson	RPA
Bryson, Thomas Ross	FOR	McIver, Michael Adrian	FOR
Carroll, Richard Neil	FOR	Michenfelder, John Peter	RPA
Champion, Joye Leigh	RPA	Milovicz, Richard Edward	PPT
Clifford, William Vincent, Jr.	FOR	Mlinek, Kirk Arnold	FOR
Cole III, Thomas Leo	RPA	Monteith, Joel Kent	PPT
Colosanti, Nick	CON	Napier, Jerome Edward	RPA
Cook, James Raymond	FOR	Parker, William Wayne	RPA
Cross, William Ray	FOR	Parks, Reid Walker	WST
Daugherty, William Malvin	FOR	Penny, Mary Amanda	RPA
Dawkins, William Ellis	RPA	Perry, Haywood Langley	RPA
Dickinson, Charles Edwards	RPA	Person, Dennis Preston	CON
Driscoll, Thomas Riley	NRN	Pettigrew, Mary Walker	RPA
Edwards, Terry Gene	RPA	Powell, Alice Lorraine	RPA
Efird, Lee Mitchell	FOR	Rice, Ann Brelsford	RPA
Fox, Charles Mayer	RPA	Ryan, Dwight Carey	PPT
Gaines, James Stephen	PPT	Sawyer, Kenneth Michael	RPA
Gordon, James Max	WST	Setser, Helen Virginia	RPA
Gurley, Elizabeth Olive	RPA	Shareck, John Michael	WST
Gwyn, Wright Hamilton	RPA	Smith, James Robinson, Jr.	FOR
Hagen, Georgia Kaye	RPA	Tharrington, Elizabeth Fulenwider	CON
Hamer, Eugene Floyd	FOR	Thompson, Kiska Ann	RPA
Harrelson, James Lawrence	RPA	Thompson, Nancy Arden	RPA
Hollar, Michael Edward	CON	Thomson, Douglas Arthur	RPA
Hosterman, Stephen Lynn	RPA	Van Riper, Edwin Leon	RPA
Hull, Philip Wayne	RPA	Walters, Tony Crawford	RPA
Hunter, James Fletcher, Jr.	CON	Warren, Michael Rojer	RPA
Jarman, Robert David, Jr.	FOR	Weinstein, Sandra	RPA
Johnson, Mary Wetzel	RPA	White, Pamela Ann	RPA
Kelly, Janice Rebecca	RPA	Wilson, David Rhyne, Jr.	RPA
Kidam, Abdul Rahmid	FOR	Wilson, Stephen Lamont	FOR
Lipsak, Michael Ray	RPA	Wiseman, Steven William	PPT
Leonard, Timothy Martin	RPA	Yates, Rodney Dale	RPA
Lyttle, Bernard James	RPA		

ARTICLES



THE SCHOOL FORESTS

by Dr. Ralph C. Bryant

Several developments on the School forests in the last two years are of interest. Forest supervisor Larry Jervis has had the responsibility for doing most of the work. His crew included eight Biltmore and Conger work scholarship students and several work study students. He has done an outstanding job.

On the Hill forest the big news is the assignment of \$142,300 for Slocum Camp improvements. The funds came from interest on monies received from the Corps of Engineers for Hope Valley lands. Architectural plans include six student cabins, a caretaker's house, class room, tool shed, and new toilet and shower facilities. These are urgently needed to make the camp adequate for the number of students attending and to protect the facilities from vandalism. Last summer one hundred attended camp including twelve women. Tentative plans are to use the camp for training of wildlife students after the forestry session.

Three tracts totaling 166 acres, a house, and tobacco allotment have been purchased for addition to the Hill forest with funds from Hope Valley and another 750 acres have been appraised for acquisition.

On the Schenck forest the picnic area has been vastly improved. Last year the students constructed a large A-frame shelter, and it now has been provided with electric lights and a water supply has been developed. The use of the area by university groups increases every year.

A bottomland clearcut from the Reedy Creek road south to the natural area has removed timber that would be flooded by the SCS dam going in downstream from the Reedy Creek Road.

A greenbelt trail along Richlands Creek will be part of a city-wide system of foot, horse and bike trails. In addition interpretive trails have been developed to show various phases of forest management. It is interesting to note that buck rubs have played havoc with our small white pine christmas tree plantation. This winter because of the extended cold spell, the student chapter of the SAF has been cutting fuel wood on the forest for the needy people of Raleigh.

A tornado touched down on the Goodwin forest and some 50 M.ft. b.m. of sawtimber blown down were salvaged. Larry and crew have cleared and planted some twenty acres in the last two years. Wayne Haines fertilization studies in forty-one and thirty-six year old loblolly stands have shown an advantage of 2,117 and 1,721 board feet growth over a four year period when compared to control plots. Using interest rates of 10% Wayne computed the cost for an additional thousand board feet was \$37.34 and \$34.83, respectively. One can apply any going stampage price to compute the profit from fertilization. An area where the needy could cut firewood was set aside on the Goodwin.

The seniors this spring are making a periodic inventory on the 345 acres the School still has of the Hope Valley forest. Sawtimber cuts and pulpwood thinings are being marked for harvest later in the year. Several past research plots are also being remeasured for further analysis by Walde Maki.

It appears that the serious bark beetle attacks of the last few years have about run their course on all the forests. Only two small spots have shown up on the Hill forest, and they have been treated.

With each passing year the value of the forests becomes greater for instruction, research and income.

INDUSTRY-SCHOOL RELATIONS

by Eric L. Ellwood

A strong tradition of the School of Forest Resources has been the high degree of interaction and cooperative relationships that have been developed with the forest products industrial sector. Perhaps, more than any other School of Forest Resources in the USA, we have sought out and fostered these relationships. The reasons for this are several, but an underlying concept is that, it is the industrial segment which undertakes the enterprise of converting the resources of the forests to products of value to society. The means by which this conversion is done and the way our forest resources are perpetuated have major impacts on society. Consequently, linkages with the industrial sector can more effectively bring the input of the university into enhancing the value of the forest resource for society.

Research Cooperatives. One measure of the degree of interaction with industry is the existence of our industry-school research cooperatives. These started, and are most highly developed, in the Department of Forestry. The oldest and largest of these—the Pine Tree Improvement Cooperative—was started in 1956 by Dr. Bruce Zobel with the very specific objectives of increasing forest productivity and improving wood quality of selected southern pines through genetic means. [Dr. Zobel tells the story that in those early days so little was known about wood qualities in relation to industrial needs that he requested, in writing, from each cooperating company their priority needs of various wood qualities. He is reputed to have locked these statements in a safe should questions be raised twenty or so years later after genetic selection had been put into effect in growing trees.] This tree improvement cooperative, which now has 28 industrial and 3 state members, owns or controls 19 million acres of land and during this year planted 334 million improved tree seedlings. Within 2-3 years all industrial forest plantings in the South will be of improved first generation genetic stock which will provide substantial gains in tree growth as well as in wood qualities desired for manufacturing various products from these trees.

This outstanding cooperative program demonstrates in a very clear way the advantages for all concerned of university-industry joint efforts. For industry it provided a mechanism to make large gains in forest productivity at a reasonable cost, and in a comparatively short time, by sharing costs and pooling information. No one company could have possibly progressed by itself to the extent that all progressed through the mechanism of the cooperative. For the School it provided an opportunity to appoint and fund an outstanding group of scientists who were able to reach a high level of productive research which was directly applicable to needs and put immediately into effect. The productiveness of the research program and its application attracted high quality graduate students, who in turn further enhanced the quality of research and productiveness. These same students became leaders themselves in tree improvement programs in various regions of the USA and in foreign countries.

Not all cooperative research programs are as successful as the tree improvement program, but the possibilities exist for similar gains in a number of research areas. Besides the tree improvement program three other industrial-research cooperatives exist in the Forestry Department. These are the Hardwood Management Cooperative, the Forest Fertilization Cooperative, and the newest cooperative in Forestry Equipment/Systems, which is only one year old. The number of companies supporting these cooperatives are 21, 19 and 11, respectively.

Each cooperative has its own mode of operation, *e.g.*, some require a substantial field effort by each supporting company in order to build a data bank, and to carry out particular parts of an overall experiment. In others, such as the forestry equipment cooperative, the great bulk of the research and field testing is done by the university research group. However, all the research cooperatives have one thing in common; that is, a system of industry advisory committee which work with their university counterparts on program objectives and program budgeting. Each cooperative also has an industry executive committee which works closely with the university scientists on matters that cannot be conveniently brought before the whole advisory committee.

In contrast to the relatively long term nature of the Forestry Department research cooperatives [which are inherent in the long times involved in tree growing], those in the Department of Wood and Paper Science tend to be of a shorter duration, *e.g.*, two to five years, with the specific objectives of generating data and undertaking studies that might lead to better wood or fiber processing, or to the development of new and improved products. Cooperative research program areas in wood utilization must be chosen with considerable care to avoid the problems arising out of the development of patents and their assignment. Consequently, the utilization research cooperatives tend to work in that part of the research spectrum which is more basic in its orientation than it is developmental or directly applied. Thus each industry can best utilize the information generated to its own advantage in a manner which best fits its own unique circumstances.

One recently concluded research cooperative which worked on soda-oxygen pulping for three years involved 27 U. S. and foreign companies. Yet another industry cooperative which was conducted on bark utilization, under the leadership of the Wood Products Extension Specialists group, led to large scale testing of bark for use as a soil stabilizing medium in road construction and for various horticultural applications. Undoubtedly, this work will lead to more extensive markets for bark as a useful material.

Contract Research, Extension and Consulting. In addition to the multi-company research cooperatives, we work with individual companies, or trade associations, through the mechanisms of research contracts, grants or cooperative agreements. Most of these contracts are of relatively short term duration, *i.e.*, from some months to a year or two, and are usually in the wood and fiber utilization field. Examples of this type of work cover projects such as aspects of furniture production, lumber and fiber processing, pulp chemistry and the like. As an approximation, half of the School's total research budget is provided from the industry research cooperatives and from individual company research contracts.

Apart from research activities a considerable exchange occurs also between the extension forest resources department and various wood using industries. These contacts are more frequent with the smaller, rather than with the larger corporations. The primary role of the extension operation is one of education and transfer of new and improved technology to industry and consumers. An important part of the extension operation, however, is bringing back research needs to the School which are gleaned from the extension specialists' interactions with consumers, manufacturers and producers.

Another form of interaction, which is done to a limited extent, is that of individual faculty consulting work with industry. This activity is limited to that

type of work which cannot normally be done as a School activity or which otherwise is confidential in nature. Within limits, some degree of consulting activity by appropriate faculty has substantial advantage for both the teaching and research programs of the School as it provides experience and insights which can be applied to our programs.

Teaching Program Support. An outstanding example of this relationship with industry is the support of our regional Pulp and Paper Science and Technology program by the Forest Products Industry and their suppliers through the medium of the N. C. Pulp and Paper Foundation. This Foundation, which has membership of over 50 companies and many scores of individuals, annually provides about \$120,000 the majority of which is used to provide scholarships for students in pulp and paper at our School. Each year some 17-20 new students are financially supported by this program. The Foundation also provides enrichment support to other facets of the program and, through a number of committees, carry on action and advisory programs which benefit the School. As a result the pulp and paper program has achieved a degree of excellence paralleled by few.

The Future. The question is increasingly being raised that, primarily due to inflation, U. S. universities might not remain the vital centers of scientific research that they have been in the past. Federal support of University research is declining and the U. S. leadership in technological innovation in a number of fields is no longer existent. Most recently, Richard Atkinson, the Acting Director of the National Science Foundation, proposed that private industry should take a larger role in supporting basic research done by universities. He further suggested setting up research institutes supported in part by industry but under University auspices. To this we would say "right on" to Dr. Atkinson as it parallels what we have been attempting to establish over the last 12 months. But at the same time we say—what are the consequences if government does not support its fair share of university program costs? The strongest system, we believe, is a balanced partnership of industry, university and government.

WOOD AND PAPER RESEARCH

by Irving S. Goldstein

As the utilization arm of the School of Forest Resources the Department of Wood and Paper Science has as its mission the enhancement of the value of the material products of our forests to the people of North Carolina and the United States. To accomplish this objective the Department conducts a diverse research program ranging from fundamental studies of wood structure and properties to the utilization of manufacturing residues, and embracing a size scale from structural wooden beams to papermaking fibers.

Financial support for this effort comes from several sources. Federal and State appropriations provide a continuing base budget as does an annual contribution from the Pulp and Paper Foundation. However, as much or more research funds are supplied by industrial organizations, singly or in consortia, or governmental agencies such as USDA Forest Services, Environmental Protection Agency, National Science Foundation, etc. These funds support specific projects of limited duration which are of interest to the sponsors.

Space limitations will not permit discussion of all the research in progress, but some representative projects are described in the following sections.

Biological Deterioration of Wood

A study is in progress to evaluate the rate of fungal deterioration of trees killed by the southern pine beetle and its impact upon subsequent utilization of the wood. Changes in specific gravity, moisture content, strength and chemical composition of beetle-killed trees dead for up to two years have been measured for both standing and felled trees. Rates of deterioration are highly variable and strength losses up to 50% have been observed.

Other studies seek to determine the mechanism by which wood destroying fungi penetrate cell walls and the effect of environment and preservative distribution on the performance of wood against fungi. Chromium is not depleted from treated wood, but the fates of arsenic and copper appear to be more variable. The effect of impregnation of wood with a methyl methacrylate polymer on its resistance to decay and marine borer attack is also under investigation.

Chemicals from Wood

The increasing cost of petroleum as well as its ultimate depletion make the substitution of a renewable material such as wood for petroleum as a raw material for synthetic organic chemicals and polymers a desirable objective. The conversion of wood into chemicals for the production of most of our synthetic plastics, fibers and rubbers is technically feasible. Refinements in this technology will improve the economics of the chemical conversion of wood. Successful completion of research now being planned will allow our dependence on finite petroleum resources for synthetic organic materials to be broken.

Drying of Wood

Ongoing fundamental studies of the wood-moisture relationship have provided spin-off in the form of two important applied developments. An empirical equation has been derived which makes it possible to develop a computer simulation broadly applicable to the sorption of water by wood. The simulation accurately duplicates both single specimens and entire kiln charges for both adsorption and

desorption over a wide range of temperatures and humidities.

The other development is the concept of a moisture pallet approach for the air drying of refractory hardwoods which has the potential of greatly reducing both drying degrade and energy consumption. By sandwiching the refractory wood between sheets of plywood or veneer, protection is provided against excessively low surface moisture contents that result in surface checking of the wood. Oak protected in this manner can be rapidly dried without degradation.

Mechanical Properties of Wood

An experimental and mathematical study of the effects of knots on the tensile strength of wood is under way. Tensile failure in softwood lumber is generally caused by the initiation of cracks in the zone of distorted grain around a knot. The study will provide information about the effect of size and location of localized defects on the tensile strength of glued laminated wooden members.

Much of the hardwoods in the South are in the form of low-quality trees unsuitable for conventional utilization. Such material is being investigated as raw material for a low density fiberboard. By incorporating low density fiberboard as a core between southern pine veneer surfaces a wood composite with adequate mechanical properties has been produced. Continuing studies are directed at determining the optimum methods of fastening these boards.

Pulping and Bleaching

Following the successful development of a sulfur-free non-polluting oxygen-alkali pulping system research is continuing on other pulping systems which will not only be non-polluting but may also have other advantages. An alkaline process using an organic oxidation-reduction additive such as anthraquinone mon-sulfonate shows promise of providing remarkably improved rates of delignification along with significant increases in pulp yield.

The removal of lignin from wood by biological agents is not well understood. Lignin is resistant to most microorganisms, but certain fungi convert it to humus or otherwise degrade it in the process of decaying wood. A study of the mechanism of lignin degradation will not only provide basic information concerning the chemistry of biodegradation of the earth's second most abundant organic material, but may also eventually lead to biological pulping systems for the isolation of cellulose fibers or enhanced hydrolysis of lignocellulose to useful sugars.

The residual lignin remaining in fibers after pulping differs from other lignins in reactivity and ease of removal. A better understanding of its nature will allow the development of improved bleaching processes. These studies are closely related to the specific investigation of ozone, a reactive form of oxygen, as a bleaching agent which will be free from the polluting effects of present chlorine-containing bleaching agents.

Wood Ulstructure Studies

Better utilization of low-quality hardwoods requires a foundation of fundamental knowledge about the properties of these woods. Light and electron microscopy studies are in progress to explore and characterize the anatomy of nine southern hardwoods and where possible establish relationships between wood ultrastructure and physical properties. Particular effort is being directed at anatomical structures which compose the flow pathway because of the importance of permeability to the preservation, pulping and drying of wood.

The pulps produced by oxygen pulping differ from conventional pulps in many aspects. A study of the surface morphology of oxygen pulp fibers by scanning electron microscopy reveals similar characteristics. However, oxygen pulps seem to have a more uniform lignin distribution and higher shrinkage than kraft pulps.

PARK/RECREATION EDUCATION IN NORTH CAROLINA

by

J. Harold Moses, Chief, Advisory/Consulting Services Section,
Division of Parks and Recreation, N. C. Department of Natural
and Economic Resources. Also Adjunct Assistant Professor,
Recreation Resources Administration, North Carolina State
University and Visiting Lecturer, University of North
Carolina-Chapel Hill
AB, MS—University of North Carolina, Chapel Hill

There has been phenomenal growth of local government (municipalities, counties) recreation/park departments in the last decade and, in particular, the last five years. The growth of public agencies providing a variety of leisure services has come about mainly because of four factors: (1) A sensitive attitude by Boards of County Commissioners as related to the leisure needs of county citizens in our 100 counties, (2) A more keen awareness of the importance of adequate recreation areas, facilities, and programs in the smaller incorporated towns in the State, (3) The availability of well trained young professionals to increase the success probability of new departments, and (4) The development of expertise in advisory and consulting assistance provided local units of government through the Raleigh and Regional Offices of the Division of Parks and Recreation, N. C. Department of Natural and Economic Resources.

To simply illustrate the growth of public recreation agencies in recent years, the following charts are presented:

Growth of Public Recreation/Park Departments

	1967	1972	1977 (March)
County	1	6	50
Municipal	<u>46</u>	<u>61</u>	<u>92</u>
Total	47	67	142

Growth Percentages

	Five Year Growth (‘67-’72)	Five Year Growth (‘72-’77)	Ten Year Growth (‘67-’77)
County	500.0%	733.3%	4900.0%
Municipal	32.6%	50.8%	100.0%
Total	42.6%	111.9%	202.1%

With the expansion of new departments, there are other factors to be considered in the overall growth pattern of parks and recreation. The most important of these include professional personnel, finances, park areas, recreation facilities, and program of activities. Certainly, none are as vital to a well balanced department as the calibre of professional leadership personnel who largely determine the direction and destiny of a department. The system of public and private colleges (and universities) have an awesome responsibility as well as unique challenge in preparing our youth for leadership service in the profession. It is reasonable to assume that the quality of a curriculum somewhat determines the general preparation a student receives and the projected success or failure of the student's professional endeavors. Students are no longer satisfied to sit in a classroom while a faculty member, with or without a PhD, reads from a textbook or uses out-

dated notes with distortions and inaccuracies. The student needs and wants a challenge to prepare him or her for greater challenges after graduation.

During the past several years, the growth of university or college recreation/park curricula has been expansive in terms of schools providing degree programs, in the number of graduates, and by the large increases in number of faculty members. While the quantity of the program opportunities is obvious, evaluation of and determining the quality is more difficult.

Historically, North Carolina was one of the first states in the nation to provide professional education courses in Recreation and Parks. This program began in the early 1920's at the University of North Carolina-Chapel Hill under the late Dr. Harold D. Meyer. The Masters degree program was begun at UNC-CH in 1950-51.

Soon after the end of World War II, North Carolina State University began a Bachelor's degree Program in **Rural Recreation**. That program expanded in numbers of students and faculty into a Department of Recreation and Park Administration, School of Education. Later the Department was transferred to the School of Forest Resources. Shortly thereafter, the name of the Department was changed to the Department of Recreation Resources Administration and a graduate degree program was implemented. Professor Thomas I. Hines has headed the Curriculum and Department since its inception.

During the above years, professional training was provided in parks and recreation at other state supported schools in North Carolina. Although the park and recreation emphasis was secondary to Health and/or Physical Education, it still served an important role in training potential leaders. Two universities in this category include North Carolina A&T State University in Greensboro, and North Carolina Central University in Durham.

It has become rather ironic that the State of North Carolina has funded the expansion of park/recreation curricula at an ever increasing rate and much faster than the increased demand for the end product—the degree holder. This approach has created an inflated supply of qualified young professionals.

To point out curriculum growth other than the two degree programs, at UNC-CH and NCSU mentioned earlier, the following "new" degree programs have been developed in the last decade. It is interesting to note that all the programs are in state supported institutions. They are:

Appalachian State University	Boone
East Carolina University	Greenville
North Carolina A&T State University	Greensboro
University of North Carolina-Greensboro	Greensboro
North Carolina Central University	Durham
University of North Carolina-Wilmington	Wilmington
Western Carolina University	Cullowhee

Note that in the Raleigh to Greensboro vicinity, a distance of 78 miles, there are five state supported degree programs in the cities of Raleigh, Durham, Chapel Hill, and Greensboro (2). Can the State afford to continue expanding degree programs to other institutions in consideration of the surplus of graduates and that North Carolina has become an exporter of graduates to other states. Mars Hill College has recently announced a new degree program. This Baptist supported school is the first private college or university to confer a degree. Also Louisburg College, provides a two year program with "transfer" capabilities.

To compound the sensitivity of the situation, there are now eleven (including two new programs) Community Colleges or technical institutes with recreation/park related training. Many students will complete courses and secure meaningful positions for which they are specifically trained. This may include work in therapeutic, grounds maintenance, face-to-face leadership, forest/outdoor recreation, and other related positions.

Other community college or technical institute students will transfer to the four year bachelor's degree programs. Still others will attempt to enter the competitive job market and compete with the four year degree graduate. All of the community colleges and technical institutes are also tax supported at the federal, state, and local levels.

Educators and practitioners now in North Carolina have a growing responsibility to direct, define, and determine the future trends of professional education both in quality and quantity.

A coordinated effort is needed to curtail further curriculum expansion at taxpayers expense. This effort should be started by all the professionals through the North Carolina Recreation and Park Society, Inc. This is the only agency representative of all park/recreation related interests in the State.

As a first step it is recommended that the North Carolina Recreation and Park Society establish a special committee to study the future growth needs of recreation/park curricula in North Carolina. The study should include the roles of existing programs at the University, Community College and Technical Institute levels.

The park and recreation professional body in the State must exert every effort to assure graduates are not employed for professional positions for which they are not trained for or qualified to fill. Since there is no way to legislate this, it is essential that the North Carolina Recreation and Park Society bring a professional awareness to all administrators in the State to employ persons qualified to adequately fill a vacancy at a salary commensurate with the job responsibilities. The supply-demand ratio imbalance must not be used for park/recreation agencies to use bargain basement tactics in the employment of professional personnel.

While it may be much too late to reduce the number of degree or non-degree programs of instruction in North Carolina, the time is now at hand to call to the attention of legislators and educators the supply/demand imbalance and permit the demand to grow to the supply level prior to further expansion.

Both the Universities and Community Colleges, and Technical Institutes should reassess their overall objectives in providing education opportunities for our youth.

Expanding the number and size of programs of instruction without comparable job opportunity growth only reduces the meaning of a degree and leads to a market in which only the "ultra-select" can qualify.

It is appropriate to repeat that our "system of public and private colleges (and universities) have an awesome responsibility as well as unique challenge in preparing our youth for leadership service in the profession". Also emphasis should be placed on the same responsibilities our system of public and private colleges (and universities) have in helping graduates secure meaningful and challenging positions in their chosen profession while receiving reasonable remunerations for their services. This can only be accomplished in the foreseeable future if a moratorium is placed on curricula proliferation now.

SCHOLARSHIPS AND AWARDS

AUDRY LEE BROOKS SCHOLARSHIP

Robert Lee

BILTMORE WORK SCHOLARSHIP

James Boyd Robert Ernst
Cynthia Cates Jeffrey Pardue
Vernon Ray Phillips

CONGER WORK SCHOLARSHIP

Gary Allrea Peter Hight

WILLIAM HOLT AND ELLA TURRENTINE

Samuel Kirkland Wendy McBane

HOMELITE AWARD

Kathy Mattson

JAMES M. JOHNSTON SCHOLARSHIP

Marvin H. Bagwell Sheree Bowyer
Joe Willis

KIWANIS CLUB SCHOLARSHIP

Tommy E. Andrews

JEFFERSON MILLS SCHOLARSHIP

Victoria Gardner

N. C. GARDEN CLUB SCHOLARSHIP

Gregory Cheek Ken Pollock
Terry Edwards David Ruff
Michael Fernandez John Shoffner
Douglas Hancock Bess Simons
Mary Leatherman Carlene Warren
Jeffrey Pardue Glenn Woodard

RICHFORD SCHOLARSHIP

Jimmie Lane

FRED SILER MEMORIAL SCHOLARSHIP

Russell Strader

SIRRINE SCHOLARSHIP

John Campbell

PULP AND PAPER FOUNDATION SCHOLARSHIPS

SENIORS

John V. Aderton
Robert E. Barlow
Scott M. Bradshaw
Carl R. Brothers
Calvin W. Bucher
Robert S. Damsky
James R. Edwards
J. Stephen Faines
John H. Gurganious
Frank D. Harper
Robert R. Kaminskas
Thomas J. Lawson
John M. May
Edward M. Melton
Richard E. Milovicz
William M. Ray

JUNIORS

Patricia A. Adams
Joel M. Anderson
J. Lamar Anglin
Alan F. Armstrong
Blas P. Arroyo
James H. Bunch
Ronnie W. Campbell
Stanley J. Carlyle
Robert L. Cate
Terence D. Cutler
Bradford C. Garnett
Jimmy C. Gregg
Michael J. Kerkhof
Andrea J. McAfee
Jeffrey C. Merck
David M. Osborne
John E. Richardson

Robert T. Slockett
John C. Watson
William H. Watson
Michele L. Webb
Larry L. Williams

SOPHOMORES

Robert T. Canup
John E. Chrise
Jimmy L. Duncan
John C. Gill
Ardith E. Graden
Edward B. Hickman
Michael H. Holden
Michael J. Jacobs
Gary L. Martin
Jeanette E. Moore
Ronnie W. Newman
Mary S. Parker
Robbie L. Robertson
Keith L. Stevens
Robert A. Vinson
Charles L. White

FRESHMEN

Jeffrey S. Asher
John P. Campbell
Eric M. Crouse
Janice L. Davis
Collier M. Hall
Emma N. Hazen
Richard N. Mead
Stephen J. Nielsen
Robin G. Phillips
Amada L. Rowell
Christopher I. Terry



ODE TO PAPA BRYANT

*Hail blessed oral finals:
Seek knowledge and find truth.
With intellectual exercise
We quickly shed our youth.
As tension mounts, excitement builds,
A fevered pitch prevails,
And dreams are shattered on the rocks
As all our wisdom fails.*

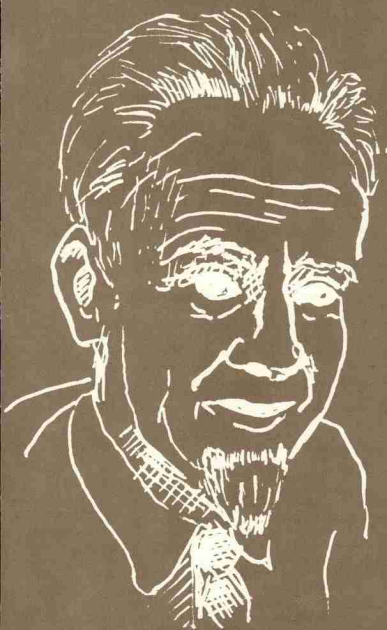
*With stuttering of twisted tongues,
And chattering of teeth,
Our answers fall like dying swans
With no chance of relief.
Interrogation clouds the ruins,
Response assaults the ear.
And gazing clockward, we shall find
The end is nowhere near.*

*Papa Bear does not intend
To put one on the spot,
He merely turns you inside out
And ties you in a knot,
Oh, blessed muse of cellulose
Please hear our mournful cry,
And halt this inquisition
Ere happy hour goes by.*

*—Bruce Harvey
Forestry 1976*



WHO ELSE BUT DR. DUFFIELD



WHO ELSE BUT DR. DUFFIELD



WHO ELSE BUT DR. DUFFIELD?

It was unanimous from the first staff meeting—the only thing that was ever unanimous in any staff meeting! Scott Sillars, never one to mince words (except, perhaps, when you find him at Mitch's), came up to me and said, "The dedication is yours." That was all! I had never dedicated anything to anyone before, so I had not the faintest idea where to begin. After some thought, all that I knew was what I did not want this dedication to be—no ten page essays. We all know Dr. Duffield, who has been at NCSU for fifteen years, and most of us have been through "Dendro!". What I finally decided was that, in this dedication, this farewell address, I wanted a picture of the complete Dr. Duffield—the Dr. Duffield of the great Northwest as well as of Raleigh, North Carolina. So I wrote to some of his old friends and classmates and associates, as well as people here for their input. And some hilarious and some serious replies began flooding our mailbox. (They were so good that I even forgave them for addressing the letters to MR. Terry McGuirk!) So friends, beginning with the home front, here they are.

Terry McGuirk

John (Jack) Duffield is a "students' teacher." His enthusiasm, interest and broad knowledge of many subjects are remarkable. I like to categorize Jack as an "idea man," most helpful to student and researcher alike. Jack's impact on people and the forestry profession is great. When he was at the Institute of Forest Genetics in Placerville, California, Jack had a profound influence on many persons; for example, it was he who got me interested in Forest Genetics and who suggested the study and methods and helped obtain data for my research on the natural hybrid between Jeffrey and Coulter pines.

Jack Duffield's influence has followed him all along his career—1946-1952 at the Institute of Forest Genetics in Placerville (with time out to complete the Ph.D. at the University of California at Berkeley in 1951), 1953-1954 on the faculty at the University of Washington in Seattle; 1954-1963 with the Industrial Forestry Association at Nisqually, Washington where he started a tree improvement program as well as ran the nursery; and 1963 to 1977 here at N. C. State, after we were able to lure him from Washington.

In Raleigh, Jack concentrated on teaching, both graduate and undergraduate. As Graduate Administrator he had considerable influence on which students were admitted; from the very high quality of the present and past graduate students, one knows what a good job Jack did. He not only works with his "own" students but also is constantly called upon by others for help and advice. Through students, Jack's influence will continue and expand.

Jack's contributions in the professional field are very great, starting with the pioneering work at the Institute of Forest Genetics with special emphasis on the most difficult but important research on variability within Bishop pine. Perhaps the best known, most often cited scientific work is Duffield's revision of the taxonomy of the pines. He took a very complex and confused system and, using the best information then available, reordered the *Genus pinus* into a simple, logical system that is still the best and is in use today.

Especially in later years, Jack's contribution has expanded to the forestry political arena. He was called upon to testify before several Congressional committees plus writing "opinions" that were very clear and had considerable influence. Their success was based upon a good technical knowledge expressed clearly and simply in lay language.

The last superlative that I will mention (although there are more) relates to his editorial duties. Jack has been editor or associate editor of numerous magazines, particularly *Forest Science*, the *Journal of Forestry*, and currently is editor of the new *Southern Journal of Applied Forestry*. As editor of these first-class magazines Jack has had a very strong influence on the forestry profession.

We will miss Jack and his wife Marjorie, as they go back to their beloved Hartsteen Island in Puget Sound. But for persons like Jack and Marjorie, one does not feel sorry at their leaving; the feeling is, instead, one of appreciation, gratitude and betterment of each of us for their having been associated with us at N. C. State.

Best of luck!

Bruce Zobel

"Jack's scientific and academic accomplishments are widely recognized but few are aware of his physical ability. Jack could climb with the ease of a squirrel. When we were making controlled crosses on Douglas fir, my hands would soon be stuck with pitch while Jack's were clean. He would laugh and comment about my "death grip" on the limbs.

Jack is known for honest, and sometimes blunt, answers. One time a local committee concerned with beautification of the city parks and streets asked his advice on how Douglas fir under power lines should be trimmed to maintain their beauty. Jack's answer, "Shear them at the groundline".

On the more serious side, Jack was a pioneer in the genetic improvement of forest trees, being the first forest geneticist employed in the Pacific Northwest. His contributions to this field were many, and they have earned for him the respected position of a founding father. We will always look up to him."

J. G. Wheat, Director
Tree Improvement Laboratory
Industrial Forestry Association

"As you or your informant (Bruce Zobel ?, Bill Johnson ? or ??) may know I have known Dr. Duffield since the fall of 1936 when we first met at the start of our respective graduate study careers at Berkeley, California. Not only do I consider him one of my oldest and best friends, but I have the greatest esteem for him as probably one of the ablest professional foresters, scientists, and educators in the world that I have known, bar none.

So, with some trepidation I attempt to give the light touch—if I can, a little later in the epistle. I should add to the above that all across the USA I am sure, as well as in Canada and elsewhere he is known for his breadth of outlook, contributions to the field of forest genetics, wry humor, economy of words, and impressive grasp of all phases of forestry and related fields. Perhaps this is enough of "elulogy", biased as it may be.

Although probably only Jack can appreciate this first comment, he might be amused if asked to remember the time when he and the late Lee Cox, another graduate student, and I were on the way for Christmas holidays to my home in San Diego when we stopped by to see someone, I think a friend of Lee's at a spot on the Mojave Desert. Remember this was 1936. Anyway it was funny to me. This old guy in the prospector's shack or whatever, tried out a new electric razor on his well grown beard. It buzzed and groaned to a crunching halt, like a lawn mower in tall grass.

At the U. of C. summer camp, Lee Cox, formerly a research plant physiologist and forester for Beechnut Corporation in New York and a fellow teaching assistant with us at this place on the Plumas National Forest, was a great practical joker. We slept in boarded-up tent frames, some of which for various reasons were placed upon short, fir pilings. Lee and his cohorts, proceeded to create what was a "high rise" apartment that Jack occupied into a low rise one, by removing the tent supports. I'm sure Jack will remember that.

In ruminating on the matter, I finally came to the conclusion that the obvious stunt was to make the tent up off the ground rather than to lower it. Anyhow,

the jokers surprised Jack one way or another. Jack is made to look like one of the original "high rise" apartment dwellers in his rustic penthouse—or something like that.

In a more serious vein, when we were students in Berkeley around 1938 I think it was, there was a botany-biology student organization known as the "Calypso Club". It was led by such illustrious faculty nabobs as Dr. Herbert L. Mason, G. Ledyard Stebbins, et al. One of the main functions was to conduct or participate in field trips to various places within reach of Berkeley within a day or so. At any rate, the trip I am referring to was to the famous Point Reyes area and Tomales Point in particular, which is "right on" the San Andreas Fault. (I just thought of an angle here.) I was then single and didn't meet my wife-to-be until a little later. However, Jack on this trip first met his wife-to-be Marjorie Olney—who was a graduate student in zoology (ornithology), also at U. C. Berkeley. Doubtless, he doesn't remember as much of the botanical features of the excursion as I do. Perhaps (?) he was looking elsewhere than at the rare occurrence there (for California) of the plant treasures such as *Arctostaphylos uva-ursa*, etc. that the great Prof. G. Ledyard Stebbins of Evolutionary Botany fame was calling to our fascinated attention. Also, perhaps not surprisingly, Jack was feeling the deep earth tremors of the love-struck, induced by the San Andreas Fault.

Finally, another incident that sticks in my mind, or comes loose more easily, is related to a part-time job Jack had at the same place I worked for a while after we were both just out of the armed services (different branches) after World War II in, I think the early part of 1946 or very late 1945. It was at the late Carl Salbach's iris and gladiolus gardens in Berkeley Hills, and both Jack and I worked there—at different times I think—packing "glad" bulbs for shipment from their storage trays in banks, with screened bottoms, etc. Anyhow, Carl Salbach was a plant breeder and gave special names to his bulbs or rather the variety. Thus, some were named for their color, shape, or for certain persons. One that caught Jack's attention with his gift for humor was called Mrs. Mark's Memory. It reminded him of a crematorium, pulling these bulbs out of the vault, so to speak.

Philip G. Haddock
Professor (Silviculture)
The University of British Columbia



"Jack has been a dedicated forester throughout his professional career and respected by all his associates. His inquiring mind, keen powers of observation, and analytical ability have enabled him to get to the center of most issues while others less endowed were still at the perimeter. His entrance into the Northwest forestry scene soon corrected many of the extremely poor practices prevalent in forest tree nurseries. One of my first working assignments with him was to make a study of nurseries practices in Washington and Oregon, and out of that came the improvement of the Industrial Forestry Association Nursery.

Another cherished memory was his introduction to me of a distinguished forester from Australia, Dr. T. N. Stoate. Jack had met him while on a tour of Australia, and Jack and I arranged to meet Dr. Stoate upon his first visit to North America in a tavern just outside Vancouver, B.C. Between Stoate and Duffield I became a lifelong beer drinker and also a close friend of a fine gentleman from Australia. I count Dr. Jack Duffield as one of my great associates and friends."

Stanley P. Gessel
Associate Dean
University of Washington

"I regard Jack Duffield as one of the most thoughtful and perceptive individuals in forest ecology and silviculture in the U. S. Early on we thought of him as F. S. Baker's successor and it was just an accident of timing that he is not now at Berkeley rather than Raleigh.

We were together at the U. C. Forestry Summer Camp in 1937 and during those three months we became well acquainted. Camp started off with a 3-week's quarantine because of mumps. The students were advised to leave and F. S. Baker, Lee Cox, Jack and the Cockrells remained in camp. Jack got his job of "Equipment Man" well in hand and then studied the Sierra flora. His plant collections made the camp herbarium a useful teaching resource—up to this time it had been just an incidental camp project. Although nominally the "Equipment Man", Jack added tremendously to the forestry education aspect of camp all through the summer. He was always intellectually stimulating to be around and made most effective use of his spare time.

Later, when the Duffields were living in Berkeley (late 1940s), Jack and I jointly took on the leadership of a high school age group in the Unitarian Church School. This was a rewarding experience for all concerned and Jack's healthy attitude towards people individually and society in general gave these young people a real lift as they worked out their personal solutions to life's perplexities."

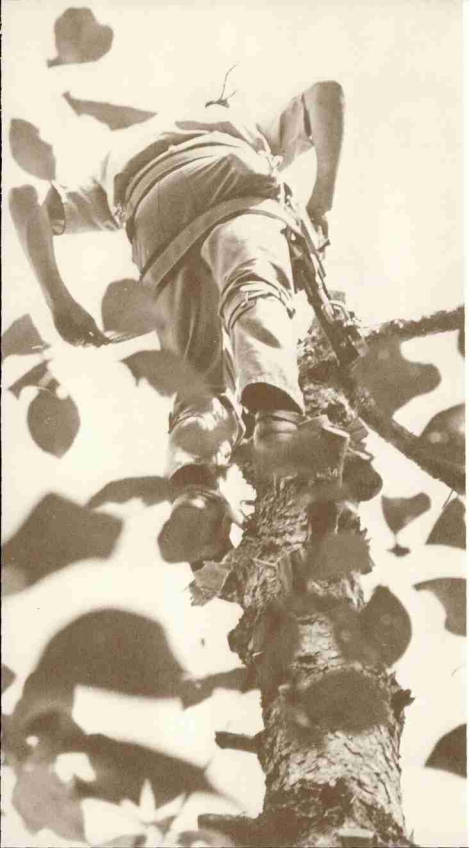
Robert A. Cockrell
Professor of Forestry
University of California,
Berkeley

"Dr. Duffield always impressed me as a broadly educated man who could discuss various topics knowingly and interestingly—be they about the behavior of native parrots in the introduced pine forests of Australia, early afforestation projects in France, or Milton's *Paradise Lost*.

Recently, I learned more about the extent of Dr. Duffield's scientific zeal. My wife, Jean, described to me an incident that happened years ago, before we were married. She had read that seals (or sea lions) are fascinated by the sound of an ordinary bamboo flute. Eager to test this information and knowing that Jack was vacationing at his home on Puget Sound, she asked his cooperation and sent him a bamboo flute. Jack reported that indeed when he was in a small boat away from shore and was playing the flute, a sea lion (or seal) approached, swam twice around the boat, and then floated off on its back, flippers folded. He added the intriguing observation that the flute played nothing but Rimsky-Korsakov."

Nicholas T. Mirov

STUDENT LIFE





FOREST RESOURCES COUNCIL

This year the Forest Resources Council has functioned very smoothly in its role of coordinating activities and maintaining communications between the various organizations and departments within the School. Every club, fraternity, society, and each department in the school elects a representative to the council which meets twice a month. All the meetings are open to any interested students.

The activities of the council include sponsoring and financing the "Pinetum" conducting the Teacher's Evaluation at the end of each semester, selecting the Outstanding Teacher and Alumni Distinguished Professor from the school, disbursing funds for activities such as group picnics, providing several of the more popular magazines in the school library, and serving as a panel for student grievances. One of our more satisfying accomplishments of the year was the final completion of some steps on the banks leading down to the upper intramural field. This may sound like a small thing, but it took a year and a half, a ton of red tape, and a lot of jawboning to get it done. Our thanks go to the University Facilities Planning Division for assisting us in this effort. We have also tried to make the students more aware of the council's activities by putting together a newsletter and distributing it throughout the school and by preparing a semester calendar, listing each organization's activities. The council would like to express its thanks to Dean Saylor for all the help and advice he has given us. It is our hope that this year's council has served in the best interest of the students and that future councils will continue to do so.



N. C. State Student Chapter of the SOCIETY OF AMERICAN FORESTERS

The N. C. State Student Chapter of the Society of American Foresters was re-started in the Fall '76 semester after folding last year. The main objective of the new chapter was to get the chapter active again. The first meetings were devoted to electing officers and to writing the by-laws. The elected officers were as follows: Chairman: Frans Coppus; Vice Chairman: Mike Lewis; Secretary-Treasurer: Joe Cox.

Several possible projects to get the chapter active were considered. At first we thought the Chapter might be able to set up a consulting service for private land-owners and state land management organizations. This idea was dropped because of the possibility of our competing with the Consulting Foresters in North Carolina. Then along came January and the cold snap. The Raleigh Social Services Organization was asking for volunteers to cut firewood for the needy. With the help of Dr. Bryant and Dr. Duffield we got permission to cut firewood in the Schenk Forest. So far we have cut three times at the Schenk and we estimated that we delivered approximately twelve cords of wood to the Social Services Organization.

The Raleigh Junior Women's Club contacted the school about the possibility of their obtaining tree seedlings to plant on one of the Raleigh Watersheds. We were asked to help plan and supervise the planting operation and to be present at a booth at North Hills Shopping Center to answer questions about the tree planting. Upon being contacted, Weyerhaeuser donated several thousand loblolly seedlings to the Women's Club for both the planting operation and for the fund raising booth. As of this writing, the planting operation is a week away, and a large turnout is expected.

For the first semester, the Chapter has met its objectives fairly well. For the future, several things are in the planning stages. The first of these is to get the freshmen and sophomores involved in the Chapter. A membership committee will be formed to explore the possibilities of a picnic or party for the freshmen and sophomores. Also, the Chapter has been contacted to help with the Appalachian Section's annual convention which will be held here in Raleigh next January.



TAPPI

The activities of the NCSU Chapter of Tappi began with a picnic at Schenk Forest at the close of the spring semester. The picnic got off to a smooth start except for a locked gate. Everyone got inebriated after which the picnic adjourned to Mitch's and the Red Wolf. The first picnic was such a success that it was decided to start off the fall semester with another one. Weather was a limiting factor, but we found that it was not raining at Mitch's.

Several technical sessions revealed to us the secrets of kicking shot transoms while hanging from your tail, understanding square circles, and a wealth of practical experience from an alumnus while watching the World Series at Jake's.

In October, a contingent from the hallowed halls of Biltmore descended upon Richmond like a pack of crazed wolves. After an afternoon of learning and an evening of drinking, all persons able to move the next day straggled back to the Capital City.

As officers of Tappi, we wish to make the following observations:

- 1) Women are getting more numerous, if not more attractive.
- 2) Salaries are getting more attractive, if not more numerous.
- 3) Students consider themselves to be wits (but are only half right).



XI SIGMA PI

Service functions, social activities, and differing interests marked the 37th year of the Mu Chapter of Xi Sigma Pi. Xi Sigma Pi is the honor society for the School of Forest Resources and one of the top service organizations at N. C. State University.

Serving the school and the community is an important function of Xi Sigma Pi. The tutorial plan was again continued free of charge to students in forest resources. Favorites, as always, were 'Doc's' economics and mensuration classes and T.V.'s computer course. In conjunction with the Society of American Foresters, Xi is planning to assist the Raleigh Junior Women's Club in the planting of over 30,000 seedlings throughout the city. Phil Mitchell, Assistant Forester, has done an excellent job of coordinating the efforts of members in setting up the coffee pot in the snack bar of Biltmore. Repeated thefts have made this job increasingly difficult and may have to be discontinued completely. Xi Sigma Pi also operates a concession stand at the Rolleo every fall.

The membership of Xi Sigma Pi consists of students and faculty from forestry, recreation and parks, pulp and paper, wood science, and conservation curricula. Social activities play an important role in unifying this broad cross-sectional membership into one finite organization. Many thanks to Dr. "Papa Bear" Bryant and his wife "Mama Bear," T. V. Gemmer and his wife, "Doc" Steensen, Mrs. Liles, and the rest of the faculty for their time and service given at all functions of the Chapter. Hats off to Katie Yates, Secretary/Fiscal Agent, who has been the workhorse behind all Chapter functions. Without her bubbly personality and her hard work, those functions would never have gotten off the ground. Social events include the smoker dinners, the freshmen picnic, chili and wine tasting (featuring Doc's high and low octane chili), a steak dinner, and the senior picnic. On occasion, we have been known to adjourn to Jake's.

Meetings this past year have featured such speakers as Mr. Glass of Natural and Economic Resources on the topic of job interviews and the job market and Mr. Koehler who discussed the relationship of water quality and forest resources management. David Brande, Forester, initiated the concept of each curriculum providing a speaker for designated meetings. David has continuously stressed participation of all curricula in Chapter activities.

Xi Sigma Pi upholds its scholastic ideals by presenting the Freshman Axe Award to the freshman with the highest grade point average in the School of Forest Resources. Congratulations to Phil Mitchell for his nomination for the Southern Regional Scholarship of the National Office of Xi Sigma Pi.

Next year should prove to be another successful year for Xi Sigma Pi as Jake Bridges, Ranger, has courageously led a fine troop of pledges through the initiation rites. Jake's jovial personality and concern for the pledges made initiation a little easier to endure.

Ray Phillips



The N. C. State Student Chapter of the FOREST PRODUCTS RESEARCH SOCIETY

The N. C. State Student Chapter of the Forest Products Research Society is in its 24th year of existence. Our chapter has received its official charter signifying that we were the first student chapter of the FPRS. The date of the charter is April 10, 1953.

The fall barbeque chicken picnic opened things by renewing acquaintances between interested students, FPRS chapter members, and faculty. The Wood Science and Technology exhibit at the Open House was a success thanks to the help of the FPRS student chapter and Professor Pearson. Members from our chapter attended the Carolina-Chesapeake Sectional Meeting in Clemson, S. C., the FPRS National Meeting in Toronto, Canada, and a Special Energy Conference in Atlanta, Georgia. A spring picnic and senior banquet are planned for the end of the spring semester.

Meetings held during the year involved speakers giving presentations on wood utilization and the Forest Products Industry. Guest speakers included Steve Hinton from Irvington-Moore Dry Kilns, Earl Deal presented a slide show on Scandinavian Logging, John Landi from Mebane Lumber Co. spoke about the small lumber business, Steve Hanover presented a slide show on the Central America Forest Products Industry, and Dave Groom from Sperry and Hutchinson Co. spoke about their Research and Development lab.

The Student Chapter is advised by Professor Roy Carter, and the officers are Jerry Carpenter-Pres., Paul LoCicero-Vice Pres., Phil Mitchell-Sec., Jim Gordon-Treas., and Mollie Hall-Program Director.



RHO PHI ALPHA

This school year for Rho Phi Alpha could best be summarized as one of growth. Participation and membership increased, services and activities were expanded, and most significantly, a new chapter was established at Slippery Rock State College in Pennsylvania. This brought the honorary parks and recreation fraternity one step closer to becoming a national organization. John Lojko, president of the fraternity, was largely responsible for the initiation of the Beta chapter.

The increased participation within the fraternity began with the efforts of the officers to introduce activities and services that would interest the members and allow them to get to know one another. Among the social activities which proved successful were the ice cream party (the salt goes on the ice, not the ice cream), along with the Warren Olympics, the smokers and covered dish suppers, and the formal initiation banquets (we repeat, there are no jobs in the state park system). A special thanks goes to Dr. Warren, faculty advisor, for the use of his home and for his excellent leadership throughout the year.

The variety of services provided by Rho Phi Alpha helped to spread recognition of the fraternity throughout the department. Most significant, was the introduction of "Recreation Info", a newsletter containing pertinent news from the field and within the recreation department. Fred Bayley, vice president, was the initiator of the newsletter and certainly did an admirable job as editor. The trip to Land Between the Lakes will be back this year due to popular demand. Sponsored by Rho Phi Alpha and coordinated by Dr. McKnelly, this yearly pilgrimage allows recreation students to participate in the annual Consortium on Outdoor Recreation. The picnic for all Recreation majors is also planned and sponsored by Rho Phi Alpha. This year was an important time for the entire department as we became the first university to be examined and considered for accreditation by the National Recreation and Park Association. The Rho Phi Alpha officers were fortunate to be a small part of this process which will increase the effectiveness of our curriculum which better prepare students to be professional recreators.

The increased success of Rho Phi Alpha could be partially measured by the largest group of initiates ever in the spring semester. Mark Hall, Sgt. at Arms, handled this procedure extremely well for such a large group. With these additions to the fraternity, next year proves to be even more promising. Each of the present officers will be graduating and each one of us will miss the fun and opportunities Rho Phi Alpha has provided us. The participation of the entire faculty in the organization was a special treat that did not go unnoticed by any member of Rho Phi Alpha. Finally, a special thanks to Joye Champion, treasurer, who had the unenviable task of wringing money out of the members and keeping the financial records for the fraternity.

Sharon Boles, Secretary





FORESTRY CLUB

Joe Fibreman
Corona Eucalypt Co.
2837A Conifer Dr.
Silvinton, KA.

Dear Person:

I'm writing you in hopes of finding employment for all the folks in the Forestry Club here at N. C. State. We seniors are waiting for those forest management positions that really don't exist, and an awful lot of people are asking me about summer work. Me, of all people!

So let me tell you what we've been up to lately. I guess I might as well start where George Melton left off, at the Conclave. It was held down in Georgia last year, and we all had a great time watching Gary Grubbs cruise thru 12 cases. Terry Jordan made a fine appearance and was proclaimed hero and head root-pruner for his efforts in keeping us well stocked in points, not to mention good spirits. Terry later made the mistake of missing the last club meeting of the semester and was promptly elected president by a unanimous vote. Enough of him . . . he has a job.

Well, after the Conclave came the famed Loggers Brawl, held at Jordan Hall in Cary. That was definitely a fine time, especially the part where the people from Chapel Hill tried to punch holes in the floor with their funny shoes.

Anyway, we started off the fall semester with the introductory freshman beer-blast in which Terry's new truck was appropriately christened. That was quickly succeeded by the annual pig-pickin' featuring part of the Ghotknow Band and most of the rain.

After a brief recovery period, intensive preparations for the annual fall Rolleo began. Gone were the shackles of the State Fairgrounds. Back again were the comforts of ole research farm number 3. Spirits were high on the day of the Rolleo and rose even higher as the first keg was tapped at mid-day. This year of the ERA marked the first women's crosscut which, although interesting, was not half as exciting as the tobacco spitting which germinated a potential conclave champion in Cullen Whitley. After the awards ceremony (the Juniors had a clear-cut victory) spirits continued to rise as the kegs were transplanted to Kirby St. for the first annual Forestry Club Halloween fest.

Meanwhile the club supported itself as usual with weekendly tree jobs. Cullen whose tree climbing techniques stemmed from rock climbing experience, valiantly led the club's efforts for the fall semester, underbidding all the way.

Well, everything was going along just fine until, at the last meeting of the semester, disaster struck. Scott Sillars was elected president. The shock subsided somewhat over Christmas break and things seemed to go all right at the start of the Spring Semester. Right now everybody's getting geared up for the Conclave in Texas. This year I'm sure we'll be able to make a good stand.

Well, that's about it.

Sincerely, The Kid

PARADISE LOST or SOMEWHERE IN ROUGEMONT . . .

Recalling those glorious weeks of summer camp is difficult these days. As the months pass, all those once-vivid memories tend to melt into one collage of images. It's a lot like trying to explain a Fellini Film Festival or a lost weekend in Tijuana.

Summer camp is that session required for forestry students, during which they are exposed to intensive instruction in the P's and Q's of manipulating Mother Nature. It augments the normal course load and provides experience not available during the regular school year. So says the course catalog. What the course catalog doesn't say is that for ten fun-filled weeks, you will wish you'd listened to your mother and enrolled in pre-med.

Camp Slocum is the scene of this annual clambake, located on who-knows-how-many lovely acres called the Hill Experimental Forest, in lovely Rougemont, North Carolina.

I admit that my first reaction to camp was one of *deja-vu*, followed by an immediate shudder of disbelief. "Boot camp memories, nothing more," I told myself. I could see the same look in the glassy eyes of other dazed campers.

But all fears were laid to rest, once the daily routine had begun.

Instruction was offered in surveying, mapping, mensuration, silviculture, dendrology, entomology. The weeks passed swiftly as the happy campers went about their chores. It was a happy time.

Instructional trips were made to Kinston and the mountains. Ostensibly, these trips were made to learn fire fighting techniques and specifics of mountain ecology. Realistically, these trips were a vacation designed to give the students a break in the monotony of spending ten weeks in Rougemont.

Speaking of Rougemont, let's speak a little about Rougemont. For those of you who may have forgotten, this lovely little suburb is only minutes north of Durham. "The Pearl of Durham County," as locals call this hamlet, is a peaceful respite and favorite retreat of the jet set. The Tourist Information Center, also labeled "The Taxidermist", is the local watering hole. Its quaint atmosphere and rustic charm will have you patting your wallet every fifteen seconds, just to make sure it's still there. On my first visit, I couldn't shake the feeling the Burt Reynolds and Jon Voight should make a movie here, or that I needed a haircut and a shave, in a hurry.

In a lot of ways, summer camp seemed silly, and a poor way to spend the summer. I think the information can be taught without the trauma of spending ten weeks in the woods. I believe that the most positive experience to be had at camp is the interaction with the other students. This living experience may be the most valuable lesson taught at camp, and to be sure, is unique among the schools at State. Ten weeks of swearing, sweating, working, drinking (a little) and learning can bring people closer together. Camp serves to unite all the students of the Forestry School and many friendships result. For this, if nothing else, summer camp is worthwhile.

A word of thanks is due to Dr. Donald Steensen for his tireless efforts in organizing the whole show. Thanks too, to Larry Jervis who seldom lost his sense of humor, no small feat, considering. And thanks to all who worked so hard and helped so much.

Of all the good and bad things that can be said of summer camp, perhaps the best thing is "We survived".

—Bill Clifford





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Mr. Bill Hall	Kathy Mathews
Mr. Charles Wilson	Don Wood
	Don Larson
Mr. Tom Baker	David Johnson
Mr. Charles M. Green	John Green
Mr. Lloyd Peterson	Bob Green
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Many people thoroughly enjoy forests. They enjoy fishing and hunting and all the other recreation forests can offer. Other people simply like to view a huge tract of trees and marvel at one of nature's most beautiful creations. Still others take a strictly utilitarian viewpoint—forests are watersheds, trees produce oxygen, wood is a raw material. But whatever their point of view, all Americans have this in common: they rely on forests in many ways.

Jobs and a Payroll

Many people rely on America's forests directly for a livelihood. In 1975, the forest products industry—including wood, pulp, paper and furniture—employed an estimated 1.15 million people whose paychecks for the year totaled nearly \$11 billion. But that's just the initial value of the paychecks. The sawyer in the lumber mill spent some of his paycheck for groceries. The grocer used part of the same money to buy clothes. The clothier used a portion of the money which he received from the grocer to pay the plumber. And so it goes. A single paycheck spreading out to purchase a wide variety of goods and services. And all of it ultimately derived from forests. In addition, several million other people in thousands of companies earn their livelihood selling products and services to the forest products industry.

Taxes and Services

Privately owned forests also provide tax revenue. Last year, taxes paid by companies in the forest products industry amounted to many millions of dollars. Part of these dollars went to the federal government. The rest helped to support local schools, fire and police departments, sewage disposal systems, and other services provided by state and local governments.

So the government relies on forests for tax revenue, and people, in turn, depend on the services which are provided by the taxes.

There are thousands of companies in the forest products industry. These companies manufacture a variety of products ranging from plywood and lumber to pulp, paper, and chemicals. Georgia-Pacific is one of these companies.

Georgia-Pacific employs over 33,500 people. The Company owns more than 4.5 million acres of timberlands in the U. S., Canada, and Brazil; and has exclusive cutting rights to another 1.5 million acres, mostly in Indonesia and the Philippines. G-P's significance is reflected in some revealing statistics: In 1975 Georgia-Pacific's assets amounted to \$2.4 billion. Sales totaled \$2.36 billion. And the Company paid out a total of \$525 million in payrolls to employees and taxes to the federal government, and state and local governments.

The Endless Bounty

Today, more than 5,000 products are made from wood. Many products which we have come to consider as necessities are derived from forests. And it seems that new products are continually being developed from

wood and wood by-products. So, even if you are not directly affected by the forest products industry, you still rely on America's forests.

Fortunately, forests are a renewable resource. And that may be their greatest value. They will continue to provide man with the luxuries and necessities of life.

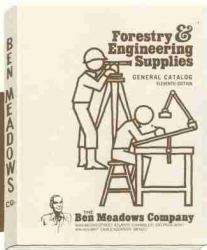
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High Yield Forestry



John E. Lilley
logging superintendent



Dr. R. G. Campbell
soil scientist



S. Thad Cherry
wildlife resources supervisor

Our High Yield Forestry depends on people!

Forests are one of the nation's renewable resources.

With every man, woman and child using the equivalent of a 100-foot tree every year — for building materials, paper and packaging — it takes dedicated people to make sure our forest resource is keeping pace.

In our High Yield Forestry, our people are involved in research; land preparation; forest management; protection from insects, disease and fire; and harvesting and manufacturing. Concern for wildlife and forest recreation are important too.

And our people are coming up with better ways to harvest the wood fiber and use it for new products, so our renewable resource goes further than before.



North Carolina Region

The Tree Growing Company

How International Paper helps mother trees have stronger, healthier offspring



This woman is—well, you might call her a matchmaker.

She's using a syringe in one of our seed orchards to make just the right kind of match: the pollen of one very special pine tree to the flower of another.

It's all part of an effort to grow a better kind of tree—one far taller, straighter and more resistant to disease than its ancestors.

That effort could be critical to America's economy.

Nature under pressure

America uses more than half a ton of wood each year, for every man, woman and child. (That's the equivalent of a 55-foot-tall southern pine tree with a 12-inch diameter for each one of us.)

And, the huge demand will double by the year 2000 if we are to meet our needs for housing, protective packaging, communications and other critical demands of a modern economy.

So America must grow more trees—and trees with a lot more usable wood fiber. That's where International Paper is helping.

For 20 years now, International Paper has been

breeding better trees. They're not only taller and straighter than ordinary trees. They also grow *faster*. And they have fewer, smaller branches. That means they contain more *usable* fiber.

Our first man-bred tree, the Supertree, contained 25 percent more wood fiber. Now we're breeding a tree expected to yield 20 percent more fiber than that.

In fact, our tree breeding program is so extensive that by 1978 we expect to replace every southern pine that we harvest with even better, man-bred trees.

And we've extended our breeding program to hardwood trees like gum and sycamore, so that hardwood lands will be more productive, too. We've also developed a Landowner Assistance Program, to help small landowners do a better job of managing their forests.

Right now, there are over 500,000 acres of land involved in this program.

And there's still more. We're finding ways to get more wood

fiber out of the trees we harvest. We're involved in cooperative nursery programs and tree farm programs.

We're working to improve tree harvesting techniques, while protecting forest soils and insuring our forest watersheds for the future.

More to be done

Will all this be enough to keep the world's fiber supply going strong? It will help. But more must be done.

At International Paper, we believe forest products companies, private landowners and government must work together to develop more enlightened policies to manage America's forests.

The wrong policies can make tree farming difficult and force the sale of forest land for other purposes. The right policies can assure continuation of America's forests—a renewable natural resource.



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At Chesapeake we believe in the forests. They have to be protected and wisely used to supply man with his growing needs.

Forest regeneration. Just another way Chesapeake is working with nature to serve man.

Our professionally trained foresters will be glad to advise you on any questions you may have concerning forest management. Contact: Director of Forest Information and Education, The Chesapeake Corporation, (804) 843-5375, or The State Division of Forestry in Charlottesville.



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MY NAME IS PINUS TAEDA

But most people call me "Loblolly."

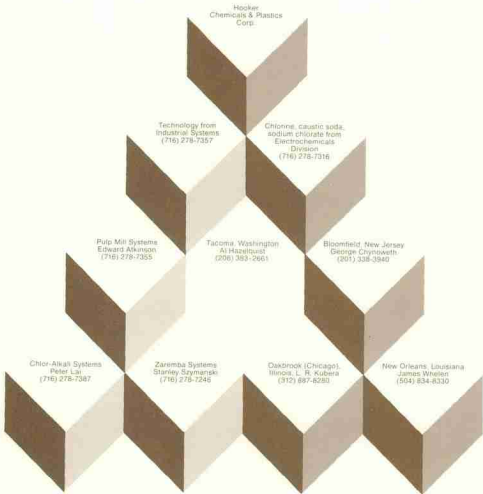
I live in the rich sandy loam of North Carolina's northeast.

I am a superior tree, identified and designated by professional foresters because I am most like what a good loblolly pine should be.

I have given small branches for grafting so that my children, by the thousands, will also be superior trees.

I mean jobs for North Carolina people, taxes for North Carolina counties, income for North Carolina forest landowners.

I mean a lot to you. So take care of me. Insects will kill me, fire will scar me. I need your help.



We're organized to serve the pulp & paper industry.

It's no accident that so much of what we do at Hooker is geared toward the pulp & paper industry. We planned it that way.

Our pulping and bleaching chemicals are produced in plants strategically placed to supply major pulp markets and our technical experts have either been drawn directly from mills or have worked closely with mills as engineers, designers or just plain troubleshooters.

As you can see we split our service to your industry pretty much down the middle. On the one hand, our systems people provide you with the equipment and technical expertise you may need to make your own operation run more smoothly. On the other hand, we have people who make sure that our chlorine, caustic soda and sodium chlorate reach you where and when you need it.

To make things even easier, the two

groups make a point of working together so that the left hand knows what the right hand is doing. That's organization.

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