THE CLEMSON EXPERIMENTAL FOREST
ITS FIRST FIFTY YEARS

BY ROBERT T. SORRELLS

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A HISTORY
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Instead of the thorn shall come up the fir tree,
and instead of the briar shall come up the myrtle tree;
and it shall be to the Lord for a name,
for an everlasting sign that shall not be cut off.
***Isaiah** 55:13*

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PREFACE

One of the happiest fruits of writing is discovering things you never knew before you started. I have tried to make this brief history as interesting as possible for the general reader, while still making it useful for a forester who might be expected to have a professional interest in the subject - at least that was the charge given me by Larry Reamer, manager of the Clemson Experimental Forest.

Though it went slightly against my grain, I chose not to follow the scholarly path of carefully footnoted references with full bibliographical support. However, there has been plenty of research involved and I have been as careful with facts and details as possible, though there will no doubt be some slips or some disagreements - as when people's memories disagree with written documentation.

As always, there are those scattered about who have helped without knowing: my thanks to them, especially the staff of the Department of Publications and Graphics Services for their many kindnesses in putting up with my strange comings-and-goings. Otherwise, my specific thanks to Hurley E. Badders of the Pendleton District Historical and Recreational Commission; to Holly Ulbrich, my “in-house” economist; to Michael Kohl and his wonderful staff in the Robert Muldrow Cooper Library’s Special Collections division; to Debbie Dunning, whose alert editorial eye has doubtless saved me much embarrassment; to Boo Cheney who let me have office space, word processor use, coffee privileges, and other kinds of room to work in; and, of course, those in the Forestry Department who wanted this work done in the first place - especially to Larry Reamer who pulled together so much material for me to see and use: I hope this will do until the centennial edition needs writing.

Most of all, though, my thanks to everyone from George Hubert Aull who had the vision to suggest the original Fant’s Grove project, to all the managers, woodsmen, students and others who have worked to develop this wonderful gift of the Forest. It is a treasure, pure and simple.

Robert T. Sorrells Clemson 1983

FOREWORD

The story of the Clemson Experimental Forest is rooted most clearly in the Great Depression of the 1930s - the letter from George H. Aull that got the whole thing started was written in 1933. But the need for the Forest in the first place is also to be found in that agricultural depression which had been going on for years before the stock market crash of 1929. No one talked much about it, that other depression, though here in the South virtually everyone was affected by it.

Because the Forest is a product of the region in which it is located, there will be matter here that some will consider extraneous to a history of the Forest, preferring, instead, a more compacted view of that little world now comprising 17,051 acres stretching north and south of the Clemson University campus. But, in fact, nothing exists by itself. The Clemson Experimental Forest is tied inextricably to the history of Clemson University, and Clemson University is bound just as inextricably to the history of the Upcountry, and it to the state, and it to the region, and that region to the times this history deals with.

The Clemson Experimental Forest was conceived of when people in this nation - and certainly in this section of it - were jobless, hungry, homeless, wandering, and desperately poor. We forget that at our peril, it seems to me. And we also forget that what we see today in the lush growth, the greenery, the clarity of the lakes, the wildlife, the recreation - the "good life," in short - was not always here, that so much of what we take for granted was the result of visions and re-visions, of planning, of despair, of renewed energy coming from sources we didn't dare dream we had.

The making of a forest is not an overnight thing. And it is not a task to be entered into by impatient people. There are no instant profits, no instant results, no instant gratifications. Mainly there is a great mass of detail work that involves planning, hoping, decision-making, tromping through briar fields to stretch a measuring chain straight while cruising a stand of timber, running through fire to save your life, figuring out how to fight a beetle that can destroy your woods, filling out countless variations of forms which are designed to tell you a mass of information you had better have if you want to stay in the business.

And at the same time there is the need to inform and educate a public to understand that if they want good water to drink, clear lakes to fish, protective fields and woods to hunt, literally thousands of wood-based manufactured products to use, then they had better make themselves aware of their forests and encourage their proper maintenance and use.

Still, the trees grow, the forest ages, the stands mature, and the work goes on. A forest is organic: It lives and dies; it gets sick and it heals; it provides us with more forms of sustenance, probably, than practically anything else we can think of. Yet, here at Clemson, we take it all for granted. And this in only 50 years.

The Clemson Experimental Forest is first and foremost a classroom and a laboratory, but also a business and a vacation. And the reason it can be so many things to so many people is because it is *managed* for multiple-use. With so many people so correctly concerned about our environment today, there are still so many who don't understand how a forest works. Such people often are willing to play the instruments, wear the clothes, live in the houses, eat the food, and in other ways take advantage of the products of the forest; yet they will get upset if a forester wants to fell a tree to provide those goods while making it possible to increase the production of more and better trees.

Perhaps this brief history will help explain more about the nature of forests to people who don't already know, but who are concerned. And perhaps at the same time it will be of interest to those who simply want to know about the series of events which led to this wonderful treasure, the Clemson Experimental Forest.

CHAPTER I

Origins: The Great Depression

TODAY, IF YOU DRIVE FROM THE CLEMSON CAMPUS through town, dip under the Southern Railway bridge, and head north out the roller coaster run of State Highway 133 toward Six Mile, you'll quickly leave the jangle of traffic heading to Anderson or Greenville or Atlanta and be rolling across several arms of Lake Hartwell, still and glazed under the hovering mists of early morning. Follow the sharp curve on around the high school for about four-tenths of a mile, then bear left at Maws Grocery - just before you get to the Lawrence Chapel United Methodist Church - then turn right and almost immediately you are surrounded by the quiet hush of the Issaqueena Lake area of the Clemson Experimental Forest.

It's gravel on dirt, that little road, and it's rough on tires, and you'll have to ford a shallow stream, but it winds through arching stands of timber to lead you to sanctuary. On the left, after not too far, you can pull your car over at the Indian Creek area. If you want, you can take a little hike on the nature trail there. Or you can drive on to Willow Springs, or to the Wildcat Creek shelter for a picnic with a group of friends, or follow the road on around Issaqueena Lake until you get to the falls and the dam. Those streams running through the woods are bright and clear - cooling even in the deep heat of August. There is solitude, if that's what you need. There are birds to watch and plants to marvel at. There are even those occasional startled explosions of a flushed deer. If you are quick enough, you can follow its crashing leaps left and right through the brush to escape your intrusion.

Children from local elementary schools come to these woods for field trips; townfolk come to get out "into nature" for a few hours; sweethearts come to be by themselves for a while. How lucky to have such places. But it was not always like this. There was a time when, if you climbed to the top of Tillman Hall tower on the Clemson College campus and looked out over the landscape, you would see eroded hills patched with stunted pines and decadent hardwoods, the farms gullied, desperate with poverty. The Clemson Experimental Forest was born of that terrible desperation.

"THESE CRUSHING DAYS OF WANT," is the way President Franklin D. Roosevelt described the United States of America in 1932. The stock market crash of 1929 had come, but had by no means gone. Some of the causes of the greatest economic failure this nation has ever had to endure are worth considering.

During World War I, American farmers produced more than they ever had. We had an increasing population at home to feed, and we had a large portion of Europe to feed since the ravages of that entrenched War were destroying not only Europe's future - over ten million of their young men killed - but their ability to produce their own food and fiber crops. America didn't get into the War until it had been going on for nearly three years, which helps explain part of our towering increase in production: We weren't having to manufacture gunpowder instead of fertilizer or caissons instead of tractors. And since foreign markets were so desperate, prices were abnormally high. Thus, farmers had an incentive to produce as much as possible.

In 1919-1920 there was a world-wide economic surge when nations hustled to replace the inventories depleted during the war years. After a brief recession, there followed one of the most sustained periods of boom the world had ever seen. For about 10 years a tidal wave of goods swept across the land, and with the increasing swells of manufacturing magic came parallel waves of buoyant enthusiasm on the part of our citizens, still high from "winning" the War to End All Wars. There was such a feeling of inevitability about the wealth and power and progress associated with our having come of age, that virtually no one bothered to question how long the swell of prosperity could last. The possibility that it might end seemed not only absurd, but downright unpatriotic as well.

By 1928 the stunning surpluses of goods were matched by debts equally as stunning. Many bank failures started in the first half of 1929, and after:

"Black Tuesday," October 29, 1929, the nation's economic problems could no longer be ignored.

THE DEPRESSION IN AMERICA was so deep there was hardly a segment of the population that wasn't affected by it in some profound way. Not only were the people who had tried to manipulate the stock market wiped out, but so were those who had never heard of it; not only were the high rollers and risk takers beaten, but so were the frugal. People came to understand what an interrelated web of dependencies a modern society was. No one stood alone any more. Everyone was dependent in some very real way on everyone else. People in small towns in the Midwest or the South could laugh easily enough in the autumn of 1929 at the rich and the foolish who had fallen in the Crash, but before it was all over, the virtuous among them would end up as battered and degraded as the sinners.

During the same period, years of land exploitation on the Plains came home to haunt the nation as the winds rose to swirl the soil away, to blow farms from the face of the earth and with them the lives of thousands of people. And where it wasn't man's own greed that had started to bring him to his knees, there came drought, flood, and a plague of locusts. Crops were totally destroyed, and nothing but drifted dirt marked where there once had been farms.

It soon became frighteningly apparent in the deepening shock that for vast numbers of farmers, the depression had been around for a long time. It's just that no one had paid any particular attention. Talk of land use and crop rotation and not letting plows bite so deep into the soils of the Plains states wasn't as glamorous as talk of money and factories. Plans for reforesting at least some of the 700,000,000 acres that once had stood in timber, arguments for diversification of crops, proposals for allocating funds for soil regeneration: These were not topics as heady as stock splits or buying on margins or cornering markets in exotic fruits.

Too, there was no such thing as Social Security, unemployment compensation, or relief that wasn't private, local, or church-related, funds that were depleted almost immediately. For one out of every six families in this land, there was nothing. Their problem was one of survival, pure and simple. Young parents gave their children away, or simply deserted. It was the day of babies left in baskets on doorsteps; of people trying to find food when there was no food; of trying to buy fuel to keep from freezing when there was no money. It was a time when you could hear fear scuttling in the corners of the shacks and lean-tos people called home, a time when you could smell fear in the smoke from the barrel fires dotting the landscape as the hopeless hovered around them doing what they could to get through one more night.

All along, though, we thought there was the land, at least.

AS IT TURNED OUT, three generations of Americans had so abused the land, had proved themselves to be such poor stewards of what our poet Robert Frost called "this best slice of a continent," that there was no good reason to think there could be any place to hide from the depression there, either. Forests had once covered some 800,000,000 acres of our land. By 1933, virgin timber was reduced to 100,000,000 acres, a reduction of monstrous proportions because the results were erosion of the soil, reduction of the water tables, and destruction of wildlife.

Every year water was washing away three billion tons of some of our finest land. Wind was blowing off an equal amount, so that by 1934 more than 300,000,000 acres of our former pastures, fields, and forests were gone. Three hundred million acres: one-sixth of the continent either gone or on its way. Instead of the Great Plains being lush with grass, there were dust storms burying houses and darkening skies clear across the nation. Instead of green hills in Texas, there were dwarfed tufts clinging tenuously to what was left of the eroded soil.

Farms by the thousands had become totally unproductive during the 1920s and 1930s. People simply abandoned them, hoping they might find something better somewhere else. Those who stayed farmed more and more desperately: felling trees to make new fields because the old ones had worn out; growing their cotton, tobacco, wheat, and corn up and down hills, causing greater and greater erosion; going deeper into debt for fertilizers which could help the crop, but which did nothing good for the soil itself. Farmers were frantic for cash so they

could pay expenses. To sweat a living from their farms, though, they had to do the very things which made the farms less and less capable of supporting them. It was a classic dilemma.

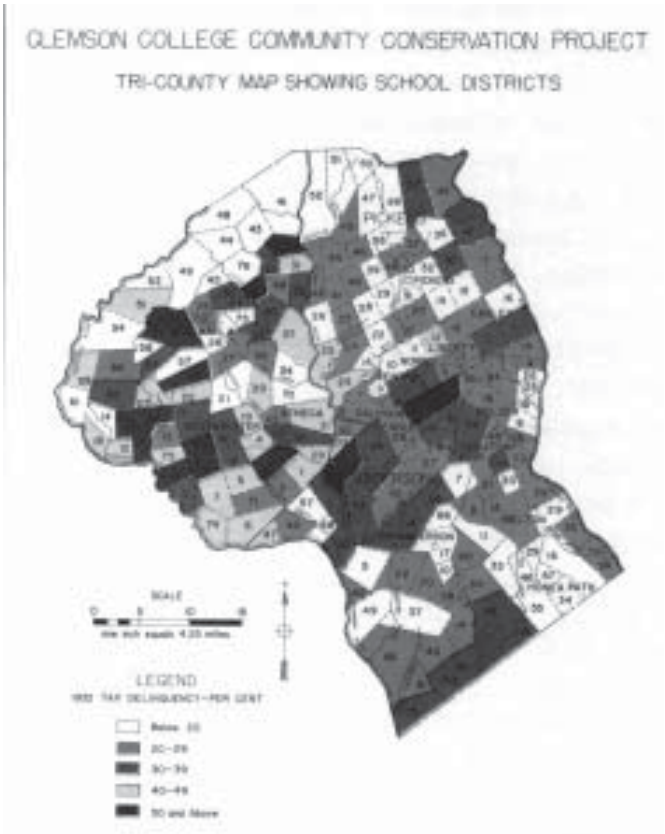
CHAPTER II

The South: Could It Ever Rise Again?

SOUTH CAROLINA NOT ONLY DIDN'T ESCAPE any of these ravages, but was in fact one of the most ravaged of all. In the beginning, in its virgin condition, South Carolina's soil was not very fertile. There was no Grade I land and only scattered bits and pieces of Grade II, hunkering in river and creek bottoms. The bulk was Grade III, IV, and V. At best the soil of South Carolina's steeper Piedmont land was not good for longterm crop production. Add relatively heavy rains, and what few nutrients there were, were leached from it.

We also need to remember the heritage of poverty left by the Civil War. The state was economically depressed from the war years, the occupation, and the Reconstruction which followed. With no money, there was nothing: neither schools, nor seed, nor animals, nor a government of its own, nor reasonable means by which to start pulling itself back into shape. By 1888 South Carolina - as with most of the southern states - was as used to destitution as the human soul can get. Share cropping was becoming the way people had to live even to have a chance to make a crop. With slaves freed and thousands of former landowners dead from battle, prisons, and disease, labor was hard to come by. And, of course, there was virtually no industry.

By the 1930s only a third of the farmers owned their own land, another third were share croppers, and yet another third were tenants, who along with their families comprised nearly a third of the state's total population. With 25 percent of the tenants loading everything in the world they owned into wagons and trekking to the next place every year, there was no center to agricultural life. People who didn't own their own farms and people who weren't going to be back on those farms the next year in any event were not likely to care for them properly. It takes a long view to work the earth as well as the crop, and too many people could not afford that long a view. When a man is poor, there is no point in talking to him about conservation and land management - not for someone *else's* land. The poor man needs to get something out of the land now.



This map indicates the economic condition of much of the land in the Land Use area. Note the extent of tax delinquency.

Under this system, the cash crop - which meant cotton - was just about the only crop people were interested in growing. It was a half-year crop, unlike dairying, for instance, and once you got past the danger of rain ruining the vulnerable pink flowers which became the bolls, there was little that needed doing other than keeping the rows cleaned out, then picking it in the fall and getting it baled at the gin. And it was a crop that would keep. If the price didn't seem quite right, you could lay some by, which was another way of saying you could boycott the market. It wouldn't rot, and the price might go up. It was better than money in the bank, especially when the banks were none too trustworthy.

Besides, there was always the mystique of cotton. Cotton had made people millionaires. Cotton had always been in demand. Cotton was what daddy had done and granddaddy, too.

Cotton was the South. Cotton was King. Again, never mind that cotton had also ruined planters, wasn't always in demand, and that granddaddy's land had been at least a little better than that same land 50 years later. Never mind any of that. Cotton was cotton, and that's all there was to it.

So the share cropping grew and the tenancy grew, and the people who once had owned their own farms found themselves having to work for other men. And as the years went on and the land got worse and the crops got runtier and the cash ran shorter, the chances for a man to get himself back onto his own feet grew fewer. Before long, tenancy had become a way of life for an entire class of people. They courted tenant, they married tenant, they beget tenant, and they died tenant. "Nothing less than the shadow of peasantry over six and a half million farm families," was the way President Roosevelt put it. Peasantry.

Tenant ... Cropper ... Squatter: These were people who not so very many years earlier had been the neighbors and equals of those they now worked for - and during the worst of the depression, they were often willing to work for no more than a meal and a bed. Yet they were human beings, people who had plowed their fields, chopped their cotton, and wiped the sweat from their eyes at the end of the turn rows.

The best of them left the farms for the growing number of mills springing up around the Piedmont, preferring to take their chances with the hourly wage, with getting laid off, and with the twelve-month-a-year job than with fighting the boll weevil, too much rain, too many years of ten-cent cotton and forty-cent meat, and having to move nearly every year. It was not an easy thing for them to do, leaving their land - or the land they had sowed with their labor - and moving from the relative freedom of the farm to the relative closure of the mill villages. But they did it. It was something they could do, a step they could take for themselves.

The infestation of the boll weevil in the early 1920s caused the price of cotton to rise because of the decreased supply. That, in turn, encouraged people to plant more and more cotton. In Texas and Oklahoma farmers were turning to mechanical production methods, but in South Carolina production went down considerably as it did in Alabama and Georgia, resulting in numerous bank failures in the Atlanta Federal Reserve district during 1929. Industrial growth still made no significant headway in South Carolina during the twenties and thirties. In fact, as late as 1940, three-quarters of the state's population lived either in open country or in towns with populations less than 2,500.

The use of fertilizer also helped raise the crop and deplete the land. The South generally spent $4.38 for fertilizer per acre while the average in the rest of the country was $.66. That made the need for a cash crop all the more imperative. The results were years in coming, but they were there for anyone to see who was willing to look: In 1933 two-thirds of the badly eroded and gullied land in the United States was in the Southeast.

And finally, there was disease. Hookworm, pellagra, rickets, tuberculosis, and malaria were endemic to the South. Rickets and pellagra were diseases of nutrition; hookworm a problem of poor sanitation and bad sanitation habits. By the 1920s and 1930s, southern labor was losing up to a third of its potential output because of the general bad health of its workers, a health which left so many mortally vulnerable to yet other diseases.

One of the many sad ironies is that until Franklin Roosevelt took office as president of the United States in 1933, there was no relief for the South, which had been so terribly poor and so terribly undereducated and so terribly blighted for so many years. Only then did the South begin to get the kind of relief Herbert Hoover had so diligently and efficiently and humanely effected to save ten million Frenchmen and Belgians during World War I with his Belgian Relief. Doctors with Hoover's Commission were horrified at the growth of glandular diseases, tuberculosis, rickets, and other health problems stemming from substandard diets in those occupied territories. South Carolinians, having experienced some 15 years of occupation themselves, had been living with those problems for a long time.

BUT IT WAS ROOSEVELT WHO HELPED US start the ascent from despair and hopelessness. As a Charleston cotton exporter said of him early in his administration, "He's the first president who has ever tried to help us down here. He's the first

president who has made us feel that we are a part of the United States." The first 100 days of the Roosevelt administration - the New Deal - have been well documented in numerous places, but of importance here are several acts which set the stage for certain kinds of relief including the purchase of land to be regenerated.

As late as 1938, of the slightly more than 19.5 million acres available for cultivation in South Carolina, 5,000,000 were planted and harvested. But of the remaining, nearly 8,000,000 acres were so badly depleted as to be virtually destroyed, and a large number of the rest were unfit for agriculture. This condition was exceptionally bad in South Carolina and the entire Southeast, but it was bad enough throughout the nation for Arthur M. Hyde, then secretary of agriculture, to call a National Conference on Land Utilization as early as 1931. The primary result of that meeting was the formation of the National Resources Board, which was charged with gathering data to identify those lands that most needed reclamation.

In 1933, President Roosevelt issued an executive order establishing funds "to buy land, retire it from cultivation, and develop it for pasture, forest, range, park, recreation, wildlife refuge, and similar uses." In response to this executive order, the Board suggested that a better method of dealing with land use and rehabilitation would be to buy carefully selected pieces of submarginal land and set up demonstration acreage to show landowners and farmers how to husband their land properly. In 1934 the Board recommended that the federal government purchase 75 million acres of submarginal farmland. All the land bought by the government for these purposes was authorized under the provisions of the Bankhead-Jones Farm Tenant Act.

Roosevelt's moves in this direction were hardly unprecedented. Congress enacted the Creative Act of 1891 which permitted the president to set aside portions of already existing public lands as "public reservations" in which the land and its resources would be retained for the benefit of the public. Six years later the Organic Administration Act, 1897, established basic directions for the management of forest reserves.

Probably the most important work straddling the entire problem of how to preserve our land for long-term high productivity and usefulness was *A National Plan for American Forestry,* more familiarly known as "The Copeland Report," submitted to the Senate in March of 1933. Two basic recommendations of the report were to extend public ownership of land and to manage public lands more intensively.

The early months and even years of the New Deal were a constant flurry of action. Roosevelt was trying to do something - sometimes anything, it seemed - in order to restore a workable economy. It was the time of the NRA, WPA, FERA, and dozens of other organizations abbreviated to letters. It was an administration which sensed that Americans' loss of confidence in themselves was the thing to be feared most, the thing that could finally destroy us. So he did everything he could to get people up and working again, doing what was practical and useful.

One of the pieces of legislation to effect this was the Unemployment Relief Act which established the CCC, the Civilian Conservation Corps. In that act Congress also authorized funds for forest research and for acquisition of land by purchase, donation, condemnation, or otherwise. The CCC eventually grew to 300,000 mainly young and single men who were fed, housed, clothed, and paid a small salary, with the bulk of their pay sent to their families. The men were used primarily in the forests - or on those lands that eventually would become forests. They set out seedlings, cut fire trails, removed dead, dying, and diseased trees, fought forest fires, and became one of the most politically untouchable organizations ever created by a two-party government.

With the vast array of bills trundled down Pennsylvania Avenue from the White House to the Capitol, Roosevelt was trying to do a number of things with American agriculture generally and its forests even more specifically. For one thing he wanted to increase the value of farm production by creating a more equitable balance between agricultural and industrial interests. If farmers did not have money to spend, there was no way industrial products could be bought - not, for instance, when a third of the nation depended in some way or another on just two crops, cotton and wheat.

Roosevelt also wanted soil conservation emphasized, and he wanted to circumvent boom-or-bust economic cycles by encouraging cheaper production methods through greater agricultural planning. He hoped agriculture could become more attuned to supply and demand pressures as industry was. Further, Roosevelt wanted a greater balance to develop in two directions: first, between agriculture and industry; secondly, in the form of crop diversity within agriculture itself.

To Roosevelt, the matter was actually pretty straightforward: If farmers didn't have any money, they couldn't buy anything that nonfarmers manufactured. Since about half the population depended economically on agriculture, a poor farm population meant a poor urban population, too. So he wanted to do anything he could to get the farm income tip to a point where farmers had excess spendable income. For many southern farm people, of course, that didn't necessarily make any sense because there had been a pretty long history in the South of people doing well from the land, but without having to reckon overmuch on cash. Too, though farmers generally understood that much of their problem was one of over-production, they continued to fight any action that would limit that production.

Thus the "New Deal" started to fall into place with its new "bureaus": Civilian Conservation Corps, Work Projects Administration, National Recovery Act, Relocation Administration, the Agricultural Adjustment Administration, and all the rest. In efforts to convince the people of the nation that his proposals were good ones and to let the people know what he was doing, he inaugurated a series of "Fireside Chats," radio programs dealing with specific problems and his proposed solutions.

People would hitch their chairs around closer to their radios and have them turned on so the tubes would be thoroughly warmed up by the time the president spoke, his voice casting its spell of calm, decisive assurance over them. People felt that at last someone was *doing* something. They were ready, and they were willing to help if they could. In 1933 one who thought he could help was George H. Aull, a graduate student working on his Ph.D. in land economics at the University of Wisconsin. A 1918 graduate of Clemson Agricultural College, Aull was on leave from his position as assistant director of research under the dean and director of agriculture, Henry W. Barre.

Aull's imagination was sparked by one of those Chats in which Roosevelt spoke of restoring abandoned and depleted farm lands to productive use - the Land Purchase Program - and relocating indigent families under the Resettlement Administration to land good enough for them to have a chance to earn a living.

Out of such times and from such bonding of visions and imaginations came the beginning of the Clemson Experimental Forest.

CHAPTER III

George Aull: A Vision Takes Shape

WHAT AULL HEARD REMINDED HIM OF HOME: of the squatters and croppers playing their miserable lives out on the sad, bare land around the Clemson College campus; of the eroded gullies, two mules high, a wagon wide, and half a mile long; of the silted streams, the piddling crop yields, the pathetic lack of a future for the College's neighbors. And he recalled how he used to notice the difference between the land the College farmed and maintained, and the other, the land owned by people who often lived somewhere else.

Typical conditions of the land included in the Land Use area. It was scenes such as these that caused G.H. Aull to propose the original Fant's Grove Community Development Project, which eventually became the Clemson Experimental Forest.

At about that time there were a million acres of cropland idle in the state. Rice, once a money maker in South Carolina, had long since gone to Louisiana where it could be grown cheaper. Indigo, another one-time major crop, had been put out of business by coal tar dyes. Now it was happening to cotton. It was moving to Texas and Oklahoma, again for economic reasons. Fruit and truck crops couldn't compete with New York markets, and pecans were considered an exotic, not a staple crop. That left tobacco, expensive to grow and vulnerable to weather. And as a not terribly unusual example of the plight of agriculture and thus the people in Aull's home state, in one county of the Upcountry 19 percent of the land area - 90,000 acres - was destroyed beyond recognition of the original soil due to gully erosion.

In South Carolina there had been a strange phenomenon. Farm families were more than keeping up with birth rates. That is, the rural families were growing. That was a problem because our history has been one in which fewer and fewer people have been needed to produce more and more of the food for the rest of the nation. But when farm populations increase, there is less land for each to farm. Usually the excess supply of farm labor will gravitate to the cities and to industries. But in South Carolina there was no really developing industry for people to go to other than the textile industry, which to a large extent came South not only to be near the source of its raw material, cotton, but also to make use of very cheap labor. In certain ways life was better for textile workers, but a great many of them were never able to become "permanent" people and always remained on the fringes as temporary help. Their economic lot was nearly as severe as the lot of those who stayed on the land. In the state, then, there was little real diversity of chance for a person. "The" crop was cotton, and "the" industry was the textile mill. The first was washed out, the second was low paying.

When he got back to Clemson later in 1933 to take up his College duties again, and with Roosevelt's words and his own desire to help still fresh in his mind, Aull sent a letter to L.C. Gray, the principal economist with the Division of Land Economics of the United States Department of Agriculture. In that letter, Aull expressed his concerns about life in South Carolina and his interest in Roosevelt's plans for relocation and reclamation, summarized his own academic and professional qualifications in land economics, and asked if there was anything he could do to help the people who were living such blighted lives within hailing distance of where he worked.

Gray's response was so encouraging that Aull immediately began to develop a plan. There was a small community centered in an area of some 8,500 acres south of the College campus called Fant's Grove, a section which included, among other once

fine old houses, "Altamont," the early 19th century home of Governor Thomas Pinckney, as well as Saint John's Baptist church on just about the same site as the present Fant's Grove Baptist church. In 1933, however, Fant's Grove was a run-down area of windowless houses, swept yards, and a school that was five miles from some of the children who were supposed to go there. Aull's proposal would provide money to buy the land, plant trees, develop pastures, build public recreation facilities such as campsites and nature trails, and restore some of the historic houses in the area. He justified the project on the basis of providing both short- and long-term jobs.

Aull wanted this to be "a repeatable demonstration of what can be done in the way of shifting disadvantaged people within narrow limits from submarginal to profitable land and of adjusting the social and economic institutions in the area to the changed conditions." Beyond that, Aull acted like a man with a mission, a sense that there was something here to be done not just until things got better, but for generations beyond himself; something transcending mere temporary "relief"; something that would serve people into ages and generations to come; something that would redound to the honor of Clemson College.

So with great hopes and the endorsements of his dean and director - as well as leaders of businesses, county supervisors, the Pendleton Farmers' Society, College history professors, county agents, and just about everyone he could think of, and especially with the blessing and help of Henry W.: Barre, the director of the Experiment Station - Aull sent his Fant's Grove Community Development Project off in the mail. Then he waited for what he felt to be a very long time.

At last, word came. The proposal was turned down.

THERE WERE TWO MAIN COMPLAINTS about it as originally submitted. First, it involved too little land, and second, it involved too little money. Aull decided he could think as big as the next fellow, so he went back to the map boards and came up with essentially the same plan, but with its scope greatly expanded. First, he proposed the government purchase 35,000 acres rather than the initial 8,500. Then he threw everything he could into it including game sanctuaries, fish hatcheries, educational trails, botanical gardens, a nature museum, and possibly a few things by now long forgotten. Again, with all the letters of recommendation, endorsement, and approval he could muster, he sent the new proposal - now called the Clemson College Community Conservation Project - back to Washington.

One major condition required by the government was that there be a guarantee of future ownership and management before it would commit itself to purchasing any land. According to Aull, E.W. Sikes, president of the College at the time, had enclosed a letter fulfilling that requirement "in every respect." Not too many years later, that commitment came to be a bone of contention.

In the meantime, however, the proposal was accepted and Aull was offered the job of "project manager and state coordinator," with the rank of senior administrative assistant. His duties ran the gamut from directly supervising laborers to paying out salaries to signing bills to requisitioning supplies and probably to feeding the mules if that needed doing.

The Land Use Area stretched about eight miles both north and south of the campus, and in order to get the project started, Aull asked for and received a year's leave of absence from the College where he was chairman of the Department of Agricultural Economics and Rural Sociology as well as assistant director of the South Carolina Experiment Station. He not only got a hundred dollars a month more in pay, but he got it in real money rather than scrip, which the state of South Carolina - along with many another state - was having to use during those times.

The first thing he did was hire 20 people to start work: secretaries, clerks, draftsmen, surveyors, and so forth. The laborers for these projects were to come from the relief rolls of the local areas. The idea was simplicity itself. People on the relief rolls of the three counties involved were given work that needed doing and for it they were paid money. It got things done, it got people back into the habit of useful days, and it relieved them of the burden of feeling they were nothing but the shards of a system that didn't want to bother about them any more.

They dribbled in slowly at first, but before long Aull found himself personally directing men -

1,500 before it was all over - in clearing stands of low-grade timber, building fire lanes, and clearing stream beds. But the most important thing he started them doing was planting seedlings - gum, pine, poplar, and oak. Soon he employed two Clemson College engineers to design and build a dam on Six Mile Creek to form Lake Issaqueena. Eventually a bath house was built as well as boat docks, picnic shelters, and other amenities.

Though work actually started in August and September of 1934, the first check did not come until October of 1935, approvals, recommendations, and endorsements not withstanding. In fact as late as March of 1936, nearly a year and a half after work had begun, only nine checks for land payments had come through. The slowness of the payments caused some concern to a number of people, though to others there was no problem since they were not resident on the land in any event. Much of the delay can be attributed to agency swap-overs, bureaucratic red tape, and government simply being involved in so much work for which there had never been any precedent.

In fairness to the various alphabetical agencies involved, there were real problems of title clearance, though few problems in getting owners to approve the offers tendered by the government. The problems involved getting some of the property legally identified. Few if any plats defined property lines in terms that made sense at the time. Instead, a parcel of land might be described by natural landmarks: “Turn south at the boulder,” a deed might say, “and proceed to the old hickory; then turn easterly and proceed to the stream at which follow the stream down until you get to Blank’s fence.” All very confusing when there was no longer a boulder, a tree (hickory or other), a stream, or a Mr. “Blank,” much less his fence. But with some older memories, some good guessing, some good luck, and some good lawyers, it got done.

When it was all over, 300 parcels of land totaling 29,665 acres had been purchased at an average price of $13.00 per acre. The Clemson Land Use Area, as the project eventually came to be known, was in business and under way

ONE OF THE MOST IMPORTANT THINGS about the entire project so far as Aull was concerned was that it was a community project, one designed to deal with an entire set of concerns rather than with a single person or a single family. It constituted a recognition that people live together and the actions of one affect the actions of others, too. It was a matter of applying to the community of people what was obvious in dealing with the land.

When Aull accepted the position of project manager, something like two-thirds of the area was in cultivated fields. The best that could be said about the acreage was that it demonstrated just about every problem the rest of the state had: terrible erosion because about 60 percent of the rainfall ran off to form ruinous gullies, depleted soil, abused timberland, and high rates of tax delinquency. The point was obvious: Soil which can no longer produce crops is soil farmers cannot make a living from. Even so, on the land there were 180 families doing what they could to eat. Many of them were tenants and share croppers who had no good reason to care for the land - even if they knew how. For some, the only question was how to stay alive - literally, how to stay alive.

Also in the Fant’s Grove area were a number of historic houses which had gone to ruin. “Altamont” was eventually torn down, though one of its mantelpieces is in the Trustee House on the Clemson campus. The historic houses simply constituted another facet of the purpose of the project: regaining a piece of our history which - like our land - was slipping into degradation and oblivion.

Those houses with their marble mantelpieces shipped from Rome a century earlier, being lived in by people who neither knew nor cared about such things because they were trying to stay alive, constituted a stunning reminder - not of a romanticized bygone era of cotton aristocracy - but of what can happen when people pay no heed to reason, when they pursue what they consider current “needs” at the expense of their true longterm heritage, the land.

After the first year, Aull was asked to stay on for a second. He got the appropriate permission for an extension to his leave of absence and kept pushing the project: building roads, clearing the

1940 photo of WPA (Work Projects Administration) workers preparing pot holes for kudzu plants on the banks of a stream. Soil from the banks was silting constantly into the water.

Field with a three-year growth of loblolly pines. The land here has already been largely stabilized.

This triple-arched bridge over Six Mile Creek was built of native materials by relief labor.

woods, planting more seedlings, using both relief and WPA (Work Projects Administration) laborers to construct more trails, fish ponds, camp and other recreation sites. The place was taking shape. Ten thousand acres of trees had been planted; a fish hatchery with six ponds had been built; the newly dammed Lake Issaqueena was stocked with fish; construction included two fire towers as well as shelters, picnic tables, the dock, the bath house, miles of roads, and bridges.

There were also plans to relocate people who had been on the acreage purchased by the government, but nothing ever came of that. In some cases, as high as 85 percent of the people working the land were either squatters or tenants who would have been gone the next year in any event. Although relocation plans had been part of the initial project, final blueprints were not drawn up until April of 1937. The relocation village, to be called Saluda Gardens, on the old Pettigrew Place across from Old Stone

The concrete dam and spillway at Lake Issaqueena.

Church, was composed of 47 lots averaging more than three acres each, two common pastures totaling more than a hundred acres, and a common wood lot of just less than 20 acres. But Aull, for one, lost interest in the project partly because it got swaddled in more and more red tape and partly because he didn't think it was right for the government to provide housing that was better than Clemson faculty and staff had. In addition, Aull really felt that while building houses for individuals in already established communities might be fine if the houses could be built with the individual in mind, he bridled at the thought of programs which intended to create communities out of whole cloth according to standardized plans. As for the College, it never was interested; so the project was abandoned.

However, the people were not left totally hanging. Some were able to continue farming under the farm tenancy program. Others bought better land nearby with money received for their old property, and still others remained on the project as wardens, caretakers, and maintenance men.

By the end of his second year, Aull decided that for a variety of reasons (one of which was that President Sikes told him the Board took a dim view of people who took too much leave for noneducational purposes) he had better resign as project manager and get back to running his department at the College. A good start had been

"Saluda Gardens" was a proposed housing project for those displaced from their land during the early days of the Land Use project, but it was never built.

made on reclaiming the land and providing the base of what eventually would become the core for the College's students in forest management, for providing area residents recreation sites, and for laying the base for jobs in both the near and distant future. All seemed well, but problems had started to surface, two in particular. Both were closely related, but can be talked about more or less separately.

CHAPTER IV

Disputes, Uncertainties, and War

THE FIRST WAS AULL'S DISPUTES WITH WILLIAM A. HARTMAN, regional director, Region V of the Resettlement Administration in Mobile, Alabama. Exactly what caused what is unclear from any of the available correspondence, but it became apparent that Hartman and Aull simply did not get along. At least, Hartman did not get along with Aull when the two were not together. When they were face to face, talking over those matters concerning the Clemson Project as well as the other projects in South Carolina (Aull was state coordinator), things seemed fine. But Aull would hear others who had business with Hartman say there were grave problems with the Clemson project: with the way things were being run, with methods of accounting for equipment, and on and on. Aull said he never could figure out what was bothering Hartman, but it finally got to the point Hartman was overheard telling someone rather heatedly he was going to shut down the Clemson project. Aull speculated Hartman might have been angry with him for having to rehire 500 men he earlier had insisted Aull lay off, or that while Hartman wanted large tracts of land farther from the College, Aull wanted land near the College and was willing to mess with the details of securing the smaller tracts which still had people living on them.

Whatever the cause of the friction, Hartman still had to be dealt with. As director of the region in which Aull worked, and as Aull's supervisor, his reports to the administrators in Washington carried a good deal of weight. Matters between Aull and Hartman never quite managed to come to a head except insofar as one eventually got his way and the other didn't, but apparently the air never cleared between the two.

In 1937, when a showdown was looming over who would be recommended to get title to the Land Use Area, Hartman said it was his "conviction that no existing State or Federal agency functioning in Region V was qualified legally, by experience or with necessary trained personnel, to manage those projects and produce the greatest possible social and economic value." He thus recommended that a Federal Business Corporation be established to manage the lands. Even to someone who knew nothing of the project - either in its history or its then current details - that recommendation would have to seem strange. After all, Clemson was the land-grant school of the state; obviously Clemson had professors specifically trained in such matters including forestry, rural sociology, land management, rural economics, and so forth; the land in question was adjacent to Clemson land; the land in fact *had* been managed by someone on the spot, and the results of that management were evident to anyone curious enough to wander around and have a look.

During those years, Aull engaged in a lengthy correspondence with John C. Taylor, South Carolina's Third District representative to Congress. In so many of those letters Aull kept insisting that Congressman Taylor keep in mind that Clemson College was supposed to be named manager and eventual owner of the property the U.S. Government had purchased. Time after time, Aull bore in on Taylor about making sure things didn't simply slide out from under them. Taylor, all along, certainly was disposed to be for Clemson, but even Aull eventually recognized he might be making a bore of himself when he acknowledged Taylor's patience in reading all his letters and taking so much time to deal with other officials in Washington. Taylor, naturally enough, was courteous to a fault, and at the same time managed to put in some good words for people he knew to be looking for jobs of one sort or another with the project.

Interestingly enough, a great deal of that correspondence came long after Aull had left the project and gone back to Clemson as head of the Department of Agricultural Economics and Rural Sociology, an indication of the extent to which the project seemed to have become the focal point of his life. It was during this time especially that Aull and Taylor were in such close contact with each other and with others involved in the project regionally and nationally.

The correspondence paid off for Clemson, because in August of 1937 Will W. Alexander, administrator of the USDA Resettlement Administration, rejected Hartman's plan for a Federal Business Corporation and instructed him

to rewrite his recommendations to "involve cooperating with State Agencies." Thus, Alexander wrote to Taylor, the Resettlement Administration would then be in a position to give proper consideration to the request that the Clemson College Project be run by officials of Clemson College.

That this was the final disposition of the matter should have been no surprise, but it had come to be an issue that could not be taken for granted even though the regional director had written to D.W. Watkins, director of the Extension Service at Clemson, in June of that same year, ". . . we are ready to recommend that the Clemson College take the responsibility of managing the Clemson Project." Also at some time during the summer, the South Carolina Senate passed a resolution stating that Clemson was the logical agency to manage the project. In addition, President Sikes had already proposed to the College's Board of Trustees that they approve accepting the project, which the Board did.

In October of 1937, Hartman wrote his recommendation that Clemson College be the managing agency for the Clemson Project. And that was that - except for a modest little problem. Now that the Washington/Montgomery axis had been secured with the defeat of Hartman, there appeared a breech in the interior lines. All of a sudden there seemed to be some real question as to whether Clemson College itself was willing to take on the job of continuing the project. Aull found himself girding his loins for yet another fight, even though it turns out this one was part and parcel of the first one.

THE SECOND PROBLEM - CONFUSION IN WASHINGTON about who was going to continue the Clemson Project - was not all Hartman's doing. There were also mixed signals coming from Clemson itself. In the beginning, back in 1933 when Aull submitted his first Fant's Grove proposal which became the Clemson Community Conservation Project, he garnered some 37 endorsements from local people in support of the idea, including a letter from Sikes which said that Clemson College supported the proposal as long as they could afford to take it on.

The entire point all along was for the College eventually to get title to the land and have the chance to manage it as a multiple-use area, to relocate the people who had been living on it, and to develop it for demonstration, education, and conservation purposes. It was Aull's best guess when he started the actual work that by the time he left the project the College would have been presented with the deed and things would be bumping along in wonderfully professional and cooperative ways. Everything seemed clear to him. The College supported the project; the community supported the project; the state Legislature supported the project; the Board of Trustees supported the project; the third district's representative in Congress supported the project; the chief economist of the Resettlement Administration in Washington supported the project; the regional director in Montgomery supported the project. That was a lot of heavyweight support for something that eventually took 20 years to happen.

Part of the problem likely was that as with any project starting out to "do good," people at first are excited. Soon, though, they have to get back to the rest of their lives while the heart of the matter remains with just a few. Later, when things don't go exactly according to plan and when there are the usual kinds of organizational snags any project will have, some get discouraged. Nothing happens all at once. Results are often slow to develop. People lose interest.

But according to the agreement between the College and the government, the College was supposed to manage, and in all probability eventually own, the lands the government was to purchase for reclamation. What came to be the clinker, in a way, was the business of costs. Sikes in his original letter of support had stated he was for the project "insofar as funds for this work may be provided either by appropriation or by receipts from the project itself." In the early days, naturally, there was no way the project could pay for itself, although the initial cutting of dead and diseased timber from the stands of trees that were left was enough to bring in at least some money. Over the years as the timber stands became larger, increased revenue could reasonably be expected.

Still, there were problems. As of March 1936, only nine parcels of land had been paid for. People who had approached the project willing to sell their land and who had agreed on the price

Dr. G. H. Aull (l) presents the first government check to Preston Brooks Gailey, Sr. Also pictured is Yancey McLeod, an attorney from Anderson. The check was dated October 17, 1935.

offered, were having the government's options run out two and three times. So while their land was increasing in value over the years, they were stuck with having to accept the original price offered. In addition, they were also paying the taxes on their land the entire time; so the "offer" to buy was being voided, essentially. With no money from the government but with an obligation to sell to the government, the land was still tied up. Thus there was no way the owners could buy land elsewhere. In several cases owners had been willing to sell solely on the basis of Aull's recommendation. When things were not getting worked out as quickly as he thought they should, he felt people would impugn his word.

Also, many families were not getting moved to better land as they had been promised. With so much delay and so little clear reason for it, Aull feared that people would think the government was going back on its word. Then there was the dissension and confusion with Hartman. Finally, administrative backing started to waver.

At its meeting on November 25, 1936, the Clemson Board of Trustees asserted its support of the Clemson Project with the statement, "The Board of Trustees feels that the College is willing and desires to assume the responsibility for administration of the Clemson College Resettlement Area under appropriate agreement with the Federal Government."

In spite of this statement by the Board, Dr. Sikes and his business manager, J.C. Littlejohn, became convinced the College could not afford to keep the project going or that it was not worth the time and trouble as well as the expense to keep it going. So they worked to get the land deeded to another state agency, perhaps the State Forestry Commission. A certain amount of bitterness and acrimony developed over the matter, as might be expected in any such internal fracas.

Aull felt Sikes had gone back on his pledge, though the real culprit in his mind was Littlejohn. Whether Aull read the situation correctly or not, it was true there was talk about Alf Richardson - as director of the South Carolina Fish and Game Commission - getting involved in the project, and of Clemson's probably being interested in whatever portions of the property Fish and Game didn't want. In February of 1938, Sikes remarked - while writing in support of Clemson retaining its interest - that he thought "we can work out a satisfactory plan with the Fish and Game Commission," which certainly would suggest some previous exploration of that possibility.

Also, as late as June of 1938, Washington was still trying to get a definite answer from Clemson about its intentions regarding the land. Everything was ready to move toward signing the lease agreement Clemson had drawn up. One of the paragraphs of that lease clearly stated Clemson would be responsible for defraying "all costs, charges, expenses and obligations incident to the use" of the land, but there was nothing new in that.

Still, it doesn't seem reasonable that the likely costs of running the project would have been the only thing in Littlejohn's or anyone else's mind. As early as 1937, Aull had delivered a statement to the Board of Trustees in which he defined the project, enumerated its uses, and estimated its income as well as its probable costs. From grazing fees, sales of pulp and fuel wood, sawtimber, rental of farm lands, and so forth, Aull conservatively estimated an income of $11,200. Expenditures for salaries for a manager, forester, and several other professional people, plus wages for labor, and money for repairs to equipment, maintenance of vehicles, supplies, etc., would amount to $14,500.

In addition, there were numerous other agencies which had additional funds available, the Soil Conservation Service, the National Park Service, and the Bureau of Agricultural Economics among them. He also suggested the possibility of getting labor for no cost by having certain families live on the land in exchange for rendering various services. In short, so far as Aull was concerned, any talk of not being able to afford the project was nothing but spindrift, moonglow, a smokescreen. It made no sense to him. So he decided to fight the issue as vigorously as possible.

It must be remembered that at the time, he did not have any official clout or say-so about the matter because he was simply a department head with the College, not the manager of the Forest. But he had some friends - including Edgar A. Brown, a powerful member of the state Legislature as well as an influential member of the College's Board of Trustees.

The Board had said that if the state Legislature would give Clemson $5,000 yearly to run the forest, they would accept responsibility for it. (Aull much later said the figure was $10,000, but according to at least three sources, it was $5,000). An item in an appropriations bill for that purpose was introduced near the end of one session of the Legislature, but Aull was convinced Sikes had reason to expect the appropriation to be cut from the regular funding bill. He would then be able to shrug his shoulders and say he had tried. But through Brown and a few parliamentary machinations of other of Aull's friends in the Legislature, Clemson, by means of a "Deficiency Bill," was voted the $5,000 Dr. Sikes had said he would need. As Aull suspected, the original appropriation did not pass, but Clemson had its money anyway. It was a back- door power play on Aull's part, and it worked.

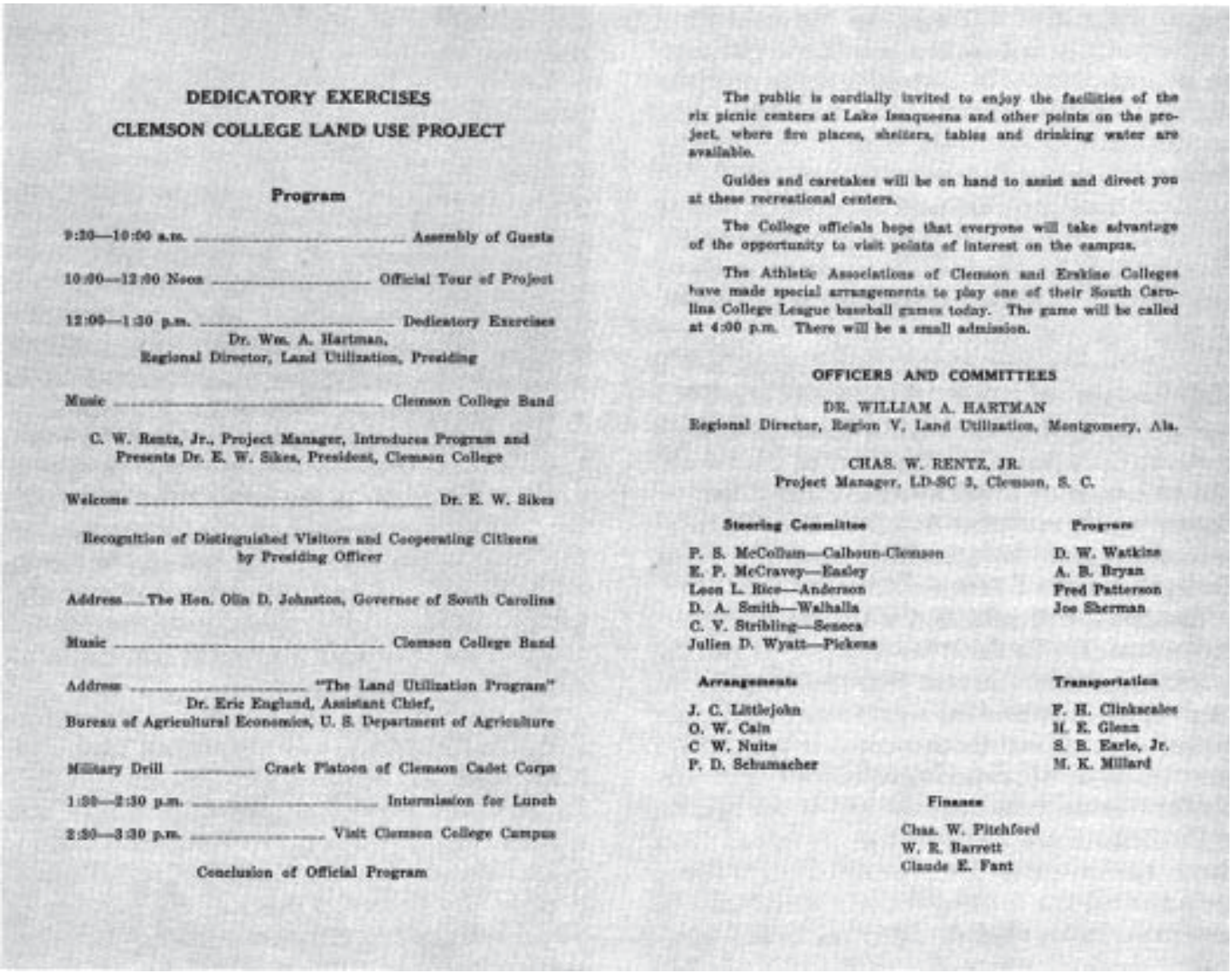
Two members of the Clemson Board of Trustees, Christie Benet and W.D. Barnett along with strong support from Brown and W.W. Bradley, convinced the rest of the Board to accept the government's lease offer, and on July 7, 1939, the Board voted to approve the terms of the lease. As before, Clemson agreed to manage the land while -the United States retained all mineral rights.

The lease was for 50 years with three, 15-year renewals possible. Also according to the terms, the College was allowed to operate the land as a demonstration/conservation area and was charged with maintaining, protecting, and developing its natural resources. Income from the property was to be set aside for repairs and replacements, for conservation and development, or for purchasing additional land to be included in the project area. The government reserved the right to terminate the agreement any time it felt the land was not being used properly. When the land finally was deeded to the College, there were the stipulations that the government retained certain mineral rights and that the lands must continue to be used for public purposes.

ONCE AULL HAD GONE BACK TO WORK FOR THE COLLEGE in the fall of 1936 and while he was fighting the twin battles of getting the federal government to name Clemson as the administrator of the property and getting Clemson to accept that administration, the management of the project area passed to people who did not continue to develop the land as thoroughly as might have been expected.

Charles Nuite, Aull's successor, reforested an additional 5,000 acres of abandoned farmland. Nuite later was replaced by C.W. Rentz, a Soil Conservation Service officer, who in turn was replaced by D.J. Watson, superintendent of campus, roads, and buildings, and Dr. H.P. Cooper, dean of the School of Agriculture, neither of whom had any experience or training in managing that large a multiple-use tract. As a matter of fact, in his proposal to the Board in July that it accept the money voted by the state Legislature, Barnett also proposed that Aull be named project manager. The Board of Trustees accepted the lease arrangement with the government, but in October they appointed Cooper instead. The Board had agreed on a set of guidelines as to the purposes of the land, but from 1939 to 1946 or so the new roads became chuckholes, bridges got washed out and remained unrepaired, hiking trails became overgrown, and campsites fell into disrepair and were cruelly vandalized.

Worst of all, perhaps, the reclaimed forest land was not being managed with any real intensity. Twelve thousand cords of firewood, for instance, that had been cut and stacked from stunted or



DEDICATORY EXERCISES

CLEMSON COLLEGE LAND USE PROJECT

Program

9:30—10:00 a.m. ..... Assembly of Guests

10:00—12:00 Noon ..... Official Tour of Project

12:00—1:30 p.m. ..... Dedicatory Exercises
Dr. Wm. A. Hartman,
Regional Director, Land Utilization, Presiding

Music ..... Clemson College Band

C. W. Rentz, Jr., Project Manager, Introduces Program and Presents Dr. E. W. Sikes, President, Clemson College

Welcome ..... Dr. E. W. Sikes

Recognition of Distinguished Visitors and Cooperating Citizens by Presiding Officer

Address....The Hon. Olin D. Johnston, Governor of South Carolina

Music ..... Clemson College Band

Address ..... "The Land Utilization Program"
Dr. Eric England, Assistant Chief,
Bureau of Agricultural Economics, U. S. Department of Agriculture

Military Drill ..... Crack Platoon of Clemson Cadet Corps

1:30—2:30 p.m. ..... Intermission for Lunch

2:30—3:30 p.m. ..... Visit Clemson College Campus

Conclusion of Official Program

The public is cordially invited to enjoy the facilities of the six picnic centers at Lake Issaqueena and other points on the project, where fire places, shelters, tables and drinking water are available.

Guides and caretakes will be on hand to assist and direct you at these recreational centers.

The College officials hope that everyone will take advantage of the opportunity to visit points of interest on the campus.

The Athletic Associations of Clemson and Erskine Colleges have made special arrangements to play one of their South Carolina College League baseball games today. The game will be called at 4:00 p.m. There will be a small admission.

OFFICERS AND COMMITTEES

DR. WILLIAM A. HARTMAN
Regional Director, Region V, Land Utilization, Montgomery, Ala.

CHAS. W. RENTZ, JR.
Project Manager, LD-SC 3, Clemson, S. C.

Steering Committee

P. S. McCollum—Calhoun-Clemson
E. P. McCravey—Easley
Leon L. Rice—Anderson
D. A. Smith—Walhalla
C. V. Stribling—Seneca
Julien D. Wyatt—Pickens

Program

D. W. Watkins
A. B. Bryan
Fred Patterson
Joe Sherman

Arrangements

J. C. Littlejohn
O. W. Caln
C W. Nuite
P. D. Schumacher

Transportation

F. H. Clinkscales
M. E. Glenn
S. B. Earle, Jr.
M. K. Millard

Finance

Chas. W. Pitchford
W. E. Barrett
Claude E. Fant

Program dedicating the Land Use Project at Lake Issaqueena in 1938.

diseased timber, were left in their stacks to rot. Plantings were neglected, and the roads and bridges were left in terrible shape by the later managers to discourage the public from using the woods, even though the original land use proposal included public recreation. In short, it appeared that everything that could have been done to generate revenue to pay the costs of management was being left undone.

It was quite a sad comedown from that early April day in 1938 when several hundred people had gathered out at Lake Issaqueena to attend the dedication of the land with speeches by Governor Olin D. Johnston, Dr. Sikes, and, as the main speaker, Dr. Eric Englund, chief of the Bureau of Agricultural Economics of the Department of Agriculture in Washington.

The trees still grew, but not in the way expected of a well-managed forest, a major purpose of which had been erosion control. The place was heading backward even though some of the farm land was being used. But nothing else positive was happening. And then came World War II.

WITH SO MANY OTHER THINGS ON PEOPLE'S MINDS - especially people in military academies such as Clemson College - certain matters simply had to get put on back burners. The nation was at war, and war imposes its own heavy burdens and sweeps aside all but its own grim priorities. Rationing of food, rationing of gasoline, lack of young men to do the usual civilian chores, military training in deadly earnest, periodic lack of attention to one's own job as thoughts wandered to

old fields newly blooded: These were the daily issues that dominated our attention during those years. And in truth the Clemson College Community Conservation Project went to war along with the College's students- at least a portion of it did. Not only was mica - a vital war mineral - mined on about six acres within the project area, but the College turned over a 135-acre tract north of the campus to the U.S. Air Corps.

When Lake Issaqueena was drained in 1954 to restock it with a better balance of fish, a casual observer would have noticed a number of black objects with their tails stuck up from the lake bottom like so many thousands of trolls trying to hide in the muck. But they weren't trolls; they were the 100-pound bombs dropped from B-25s stationed at Greenville Air Base (later Donaldson Air Force Base) during the Second World War.

Regular practice runs for skip bombing were made over the lake and the target area just north of it. The air would fill with black plumes of smoke from the bombs, 95 percent sand and only 5 percent black powder, loaded to be seen, not to be blown up. Although the Air Corps was primarily interested in testing the efficiency of their bombardiers rather than in blasting the land back to where it had been in 1930, that area was cleared and periodically burned so it did hark back to its former devastated state. But it has since been reclaimed.

But as with all things, this too came to pass, and after the War was won, there was time again to think of building the world rather than of flattening it, and in July 1946 one of Clemson's contributions was to hire a real forester to manage the Clemson lands properly. His name was Norbert B. Goebel, a graduate of Duke University in forest management.

CHAPTER V

Growth: A Forester, a Lake, a Department

HIRED ORIGINALLY AS A RESEARCH FORESTER with the Department of Botany and Bacteriology, Goebel was named by President R.F. Poole in 1946 to be forest manager of the Land Use Project. Under Goebel, proper management finally got under way with timber inventories, management programs, and cutting budgets. Goebel, along with Koloman Lehotsky, also a new forestry professor who joined the staff in 1947, cruised the Land Use area, made use of aerial photographs to define boundaries, delineate compartments, and name divisions. Lehotsky made stand maps of the Lawrence Chapel division in 1949, and Goebel followed up with maps of the remaining 14 divisions of the Forest. He also improved the Lake Issaqueena recreation area, thinned stands of timber, and worked diligently at fire control.

Because there was not a pulpwood market in the area at the time, Goebel created one by negotiating with Champion Paper and Fiber Company to handle the marketable products derived from the Clemson Forest. In 1950, the first carload of pulpwood was loaded and shipped out. Rounding out one phase in the history of the Clemson Forest, the College finally got the land in its own name. Mainly because of the interest and work of Charles E. Daniel, an industrialist, philanthropist, and Clemson Lifetime Trustee serving a brief term as U.S. Senator, a bill introduced by Senator Daniel, along with Senator Strom Thurmond, was passed on December 22, 1954, by the Senate. This bill deeded the land - 27,469 acres of it - to Clemson College for a token one dollar. This was 20 years and slightly more than four months after George H. Aull sent his initial letter to Dr. L.C. Gray expressing an interest in doing something to help save both the land and the people who were trying to live on it.

YOU WOULD BE HARD PRESSED TO IMAGINE THE INTENSITY OF THE FIGHT against the creation of Lake Hartwell if you were to drive over or by it today. Now on typical summer days the lake near the University looks like a travel poster: sail boats, their sails taut against the blue of the sky, glide with the grace of swans; beautifully bronzed young men and women, towed by power boats, lean into the wakes rippling in front of them; anglers, probably wishing for a little more calm on the lake's surface, keep casting about for the big one that won't get away. At one point near the campus during football season, a cove of the lake is chock a block with houseboats snugly harbored, well stocked to drown defeat or celebrate victory. Now one of the biggest recreational and visually esthetic points of interest in the entire area, Lake Hartwell in the 1950s was the center of a major controversy.

Hartwell dam was built primarily as a source of hydro-electric power, with minor bits and pieces of flood control, navigation, and recreational benefits thrown in as fillips. It was intended that Clark Hill and Hartwell would work in tandem as the two major pieces of the proposed 11-dam system for developing the Savannah River. There had been an initial survey of the region in 1936, then another in 1944. That report recommended the Savannah River and its tributaries be developed for their power potential. At the time Hartwell dam got started, the dam down at Clark Hill was nearly complete.

Many favored the dam because they felt that if the South was ever going to be able to compete industrially, educationally, and thus financially with other sections of the country, it was going to have to get rid of back-labor jobs and develop a diversified industry. That would require both electricity and regional rather than state-bystate planning and development. Hence, the Savannah River project, which dealt with at least three states, was seen as necessary and good.

In South Carolina, the project was strongly supported by such people as Governor Olin D. Johnston who spoke for the dam before the Senate Appropriations Subcommittee on Public Works, and Edgar A. Brown who proudly stated at one point that he had been for such public power projects for 25 years.

But against this force a counter-force developed. The Clemson Alumni Board of Directors formed a

three-man committee to investigate the impact of flooding on Clemson College if the dam were constructed at the level the Corps intended, which would raise water 670 feet above mean sea level. The figure becomes important because references to elevation 670, elevation 612, elevation one thing and another were, in fact, vital to the various cases being developed on both sides. The result of that committee's investigations was a privately printed and circulated report written by Cecil L. Reid and dated January 7,1952. In fact, the report was concerned with far more than the dam, but its adherents were swayed less by the earnestness of its social rhetoric than by the rather solid counter arguments which it presented.

The fact is that if the dam had been built exactly as the Corps of Engineers designed it, there would indeed have been extensive damage to property and considerable chaos in the agricultural programs at the College. In 1957 the USDA wrote its own evaluation of the project as presented by the Corps, and though it seemed less concerned about being inundated by Socialism than Reid was, it nonetheless was fully as concerned about the effect water would have on the College and its ability to carry out its agricultural missions.

Simply put, Hartwell reservoir would be created by damming the Savannah River and impounding the Seneca, Keowee, and Twelve Mile rivers which flowed through Clemson property. In all, a total of about 7,000 acres would go under with land lost to the dairy, animal husbandry, agricultural engineering, botany and entomology, agronomy, the farms department, and of course forestry, which would lose some 6,200 acres of the Forest, acres which generated approximately 30 percent of the Forest's annual income. Some of the forestry research going on at the time made extensive use of terribly scarce bottomland to study hardwood timber types, which were important to the furniture industry in the Southeast. Also, forest management research, not very extensive in the region at the time to start with, would get pretty badly unhinged.

In 1956 the Forestry Department was engaged in 11 research projects, four of them on the threatened land. The bulk of the research was made possible because of the sale of forest products, and now some of that land was about to go under.

Clemson kept making three primary suggestions. The first was, don't build the dam to start with, a suggestion generally accepted as a voice crying in the wilderness. Realistically, then, the College's suggestions devolved to two: first, lower the 670 elevation to 610. If that were done, no Clemson land worth mentioning would be affected. Secondly, if that was not possible, then move the Seneca River west along about a three-mile stretch and build four dikes. That would save some 2,624 acres and cause the least amount of damage while allowing the Corps to have the same amount of storage it said it needed. This was the proposal put forward by Robert C. Edwards who had been working with the Corps of Engineers daily at the behest of the Board of Trustees and with the cooperation of President R.F. Poole.

Fighting several battles at the same time, Clemson officials were also starting to screw down their thinking about what method was to be used in computing the value of the property that would have to be lost to progress. A problem is that land is worth whatever you think it's worth. How do you put a fair price on it? There were two principal ways the College could see: market value or replacement value. Reasonably enough the College was insisting on replacement value. To replace the 147 married student apartments behind Memorial Stadium, for instance, would cost vastly more than they could ever be sold for. And what is the dollar value of land which *cannot* be replaced? That was what the College kept' insisting the Corps had not worried itself about enough, and what it kept insisting the Corps start worrying about. To an agriculture school, as the USDA report stated, "the land resources are comparable to the microscope, the calculator and the electronic brain that the scientist uses." With the loss of bottomland, the College would not be able to carry on experiments it had started. There simply wasn't any more such land around Clemson.

All along, Clemson insisted, "The College Must Be Made Whole." Cows separated from pastures, herds of swine separated from hog pens, farmland 10 miles distant from anyone at the College who would be using it - these would not constitute a whole College.

H.E. Glenn, director of the Engineering Experiment Station, checked the Corps' blueprints, then developed maps that

demonstrated the extent of the land that would be taken. Also, during an eight-month stopwork order, the Board retained the services of Lockwood-Greene Engineers, Inc., to make another survey so the Corps of Engineers would have an acceptable third party opinion of the value of the College lands as well as viable alternatives to the Corps' construction plans. And eventually the USDA came out with its report. They all agreed in essentials. First, the flood as it would be executed by the Corps with no changes in its plans would wreak havoc on Clemson College. Secondly, with dikes and ditches to divert the Seneca River, there would be little problem, the only thing needed being the exhaustive accounting to tot up what the government would need to pay Clemson.

Interestingly, there was even another opinion rendered, this one by the U.S. Agricultural Research Services in its *Report on the Impact of the Hartwell Reservoir on the Clemson College* which concluded, "It is our judgment that the total annual losses to agriculture from disruption of Clemson College research and teaching efforts are large in relation to the annual benefits from the Hartwell project."

Edgar Brown, in the meantime, was continuing his fight for the lake, though in a November 1956 letter to W.L. Watkins he did admit it "would seem that Hartwell is going to do a lot more damage to Clemson than I had imagined."

Tempers got pretty ragged now and again, and there was a fair amount of sniping at each other among the Board members, though probably no more than any such major difference of opinion might be expected to breed. Brothers can be pretty rough in their fights, after all.

Be that as it may, the plan the Corps of Engineers finally came up with was very close to the one Edwards had recommended pretty much all along: a dike north of the campus near the Seneca River bridge, and another downstream tying in to Fort Rutledge, in addition to a 2,800-foot diversion canal to move the river between the two dikes west of where it was.

In spite of differences of opinion - no matter how vigorously presented -it would be wrong to suggest that everything was done with squinched eyes across the table and clenched fists under it. For the most part, Clemson had a very good case. For the most part, the Corps of Engineers listened with attention and courtesy, and as one simple illustration of the kind of cooperation that was being extended, Clemson once suggested to the Corps that if it would come down to elevation 610, the College - with the approval of the secretary of agriculture - would cede the government the land without cost.

SO THE DAM GOT BUILT, THE LAND GOT FLOODED, AND LIFE PROCEEDED as it usually does. As they also usually do, agreements by some meant work for others. The Land Use area that was to go under water had more than 4,000 acres of timber on it, timber that needed to be cut and moved out. As early as the fall of 1955, Norbert Goebel, the forest manager, and M.H. Bruner, who became the forest manager when Goebel returned to research, urged the College to start cutting the timber below the 670 elevation - literally to cut what otherwise would become their losses. Goebel's plan for clearing the salable timber was approved by the Board of Trustees at its meeting in April 1956, and he started right away to mark the 670 level on the Clemson land.

A committee to establish prices was formed, and Goebel sent letters to prospective timber buyers. In May, a sawmill operator and three pulpwood buyers were in the condemned basin cutting timber. In July, the Board appointed a committee to appraise the entire College, including the timber. Bruner decided the committee's work could go a good deal faster if it had type maps of the timber; so he gathered some students, put together the type maps, including the relevant acreage information, and a rough estimate of the volume of timber involved.

That spring, the Doane Agricultural Service and the Corps of Engineers cruised the area to determine accurately the volume of timber they were dealing with. This was important because Bruner got two significant concessions from the Corps. First, the College was to be allowed to continue cutting until it was formally asked by the Corps to quit. This obviously allowed for a larger income from the land, which soon would be worth nothing to the Forestry Department. Secondly, he got the Corps to agree to pay for any timber that remained on the

land, after the Corps applied its quit-cut. Both agreed that *that* price would be determined by subtracting the amount already cut from the estimate made by the Doane people, an estimate dated May 28, 1957. As it turned out, the College was allowed to cut for slightly more than a year, until July 1958.

All told, 11,680,479 board feet worth $167,310.58 were brought out, 4,317,000 board feet worth approximately $73,000 were left in, for a total of 16,032,479 board feet totaling $240,835.58. It was a trying time for the department. The buyers had to work a difficult terrain, often during very inclement weather, and at the same time Bruner had to keep the operators satisfied with the way things were going. All of this, of course, was under the pressure of time and, at least figuratively, rising tides. Toward the end, in July of 1957, management of the Forest passed from Goebel to Bruner.

DURING THIS TIME THE DEPARTMENT OF FORESTRY grew into maturity. The roots of the modern department go back to 1947 when a two-year pre-forestry program was inaugurated under Dr. Lehotsky which prepared students to finish a degree in forestry at some other school. Before that, forestry had been taught, but only one course and that by various departments.

Initiated in 1903 and entitled "Elements of Forestry," the first course was offered in the Department of Botany and Bacteriology as a general two-hour, one term senior lecture. The next year a required two-hour laboratory section was added. Though it was taught for three years, no one bothered to enter a description of it in the college catalog until 1906. In 1907 the two-hour lecture was coupled with a required four-hour laboratory taught by Professor H.W. Barre.

The course was taught in succeeding years by professors C.H. Shattuck, L.I. Knight, J.G. Hall, and A.B. Massey, with Barre returning to teach it until 1917. But it remained a bit haphazard, a kind of guessing game as to where it would show up next. From 1904 to 1908 it was listed in the Department of Botany and Bacteriology; from 1908 to 1910, with Botany and Forestry; Botany, Forestry, and Bacteriology had it from 1910 to 1912; then back it went to Botany and Forestry from 1912 to 1918. In 1918 the course stayed put, but the department name changed to Botany and Bacteriology. That's where things stood until 1956 when forestry became an independent department in the School of Agriculture.

From 1917 until 1935 the lone forestry course was taught by D.B. Rosenkrans, the only change being that the laboratory was dropped for five years in the 1920s, but in 1926 it was reinstated. It was then that students spent a great many of their laboratory hours to establish a number of timber stands including one of the oldest loblolly plantations in the Upcountry.

In 1935 R.A. Cockrell, the first professional forester hired by the College, taught the "Elements of Forestry" course. He planned to develop a program to allow agricultural graduates to acquire an emphasis in forestry, but the plan never got off the ground. Instead, a pre-forestry program was proposed for students interested in becoming foresters, and two forestry electives were planned for general agricultural students. The pre-forestry curriculum would have included courses in general forestry and dendrology along with basic courses and agricultural electives, plus woodland management, the handling of wood products, and treatment and care of woodlands. Again, however, none of those was ever taught, and pre-forestry had to wait.

For the next 10 years nothing happened academically in forestry, but a considerable amount was happening in the profession. With funds provided through the 1924 Clarke-McNarey Act, the Cooperative Extension Service was authorized to create a forestry division. With that money, Clemson hired Henry H. Tryon, the state's first Extension forester whose work consisted of setting up programs and demonstrations to teach the forest owners good forestry practices: In 1924 when Tryon was hired, 70 percent of South Carolina's land surface was forested, and of that, 75 percent was owned by small landowners.

Tryon resigned after three years, but during his tenure he spent a great deal of his time waging war against the wildfires so prevalent in the state. It was due largely to Tryon and his energy in pressing for state-wide controls to prevent such fires and the support of forward-thinking lumbermen and other concerned citizens that the State Commission on Forestry was established.

After Tryon resigned there wasn't another Extension forester until 1938 when Donald R. Brewster was appointed. Brewster served only half a year, and was replaced by Marlin Bruner in 1939. Since then South Carolina has always been served by forestry Extension personnel, whose primary task has been to translate the research of forestry laboratories and experimental stands into practical applications for landowners.

One of the most important tasks they have had is to work with county agents to help landowners understand the value of forest conservation and how it fits into a total scheme of agriculture. One way of approaching this has been to show landowners that their timber can be developed into a solid cash crop. This has been done not only by means of old fashioned personal visits, but by means of demonstrations, films, slide/tapes, and a host of pamphlets and other publications.

In addition, forestry Extension personnel have helped with information on tax savings, cruising timber, selling timber, developing Christmas tree plantations, controlling insect infestations, disease infections, and so forth.

In 1946 when N.B. Goebel came to Clemson and the next year when Koloman Lehotsky was added to the Department of Botany and Bacteriology, forestry as an academic discipline was on its feet and ready to grow. Lehotsky, following Dr. Henry Hansen the year before, taught the "Introduction to Forestry" course, "Dendrology," and a course called "Farm Forestry" as an elective for students in agriculture.

In 1951 Lehotsky also established the College's arboretum. Because of student housing construction, it was moved in 1958, but was settled on a 75-acre home on what is now Perimeter Road. After Goebel resigned as manager of the Forest and became more active in research again, he took charge of the arboretum until that job was assumed by Dr. Roland Schoenike in 1969. Today the arboretum contains more than 2,000 plants including 600 species of trees from China, Japan, Europe, and South America. There is also a nursery for raising plant specimens.

Though Lehotsky was put in charge of the preforestry program in 1947, it was not until 1956 that forestry at Clemson College became a full-fledged department within the College of Agriculture. In that year Lehotsky was promoted to department head, Bruner, manager of the Land Use area, became an actual member of the department, and in 1957 Forestry was able to offer a complete four-year program leading to the Bachelor of Science in Forest Management. With the creation of an actual Forestry Department, the Land Use area became one of the premier teaching tools of its kind in the nation. In the 1970s, it was renamed the Clemson Experimental Forest to more accurately define its function.

With its expansion to a degree-granting department, course offerings expanded, enrollment increased, the Forestry Club was founded, and in 1962 the department was granted provisional accreditation by the Society of American Foresters. Only two years later, the minimum time allowed, that accreditation became permanent. In 1965, by which time Clemson College had become Clemson University, the faculty felt the department was strong enough to offer a master's degree. In 1966 the first graduate degree was awarded to L.D. Reamer who stayed with the department and is now manager of the Clemson Experimental Forest, overseeing those very acres some of which he had helped plant as a student in the College. Though Reamer may be unusual in that he has become the Forest manager, he is more typical of the University's graduates in that he stayed in South Carolina as a forester.

One of the most important functions of the department is to educate the forest managers and scientists of the future. The jobs available to forestry graduates broadly include scientific, engineering, technical, and managerial ones. More specifically, there are positions in forest use, economics, and recreation; in watershed and wildlife management; and in allied or associated fields such as soil analysis and erosion control, park development and management, shade tree and landscaping, surveying and land appraisal, and industries which need people knowledgeable about wood technology.

All told, something like 50 percent of the more than 30,000 foresters in the United States work for public agencies such as federal, state, and local governments; 33 percent are in private industries; six percent are consultants; and about 11 percent are teachers. Approximately half of Clemson's graduates remain in South Carolina as working

foresters - a far cry from the first eight students who graduated in the 1936 program, none of whom ever made their livings in the profession.

A professional graduate degree was offered by the department in 1970, the same year the College of Forest and Recreation Resources was established to include the Department of Forestry and the Department of Recreation and Park Administration. Later an additional undergraduate degree in Wood Utilization was offered.

During the 1981-1982 academic year, 27 students were awarded the Bachelor of Science degrees, 21 in Forest Management and six in Wood Utilization. Seven Master of Science and three Master of Forestry degrees were also awarded. But the highlight of 1982 came in January when the state's Commission of Higher Education approved the department's proposal to offer the Ph.D. in forestry. Nine doctoral students were enrolled in the program by early 1983.

CHAPTER VI

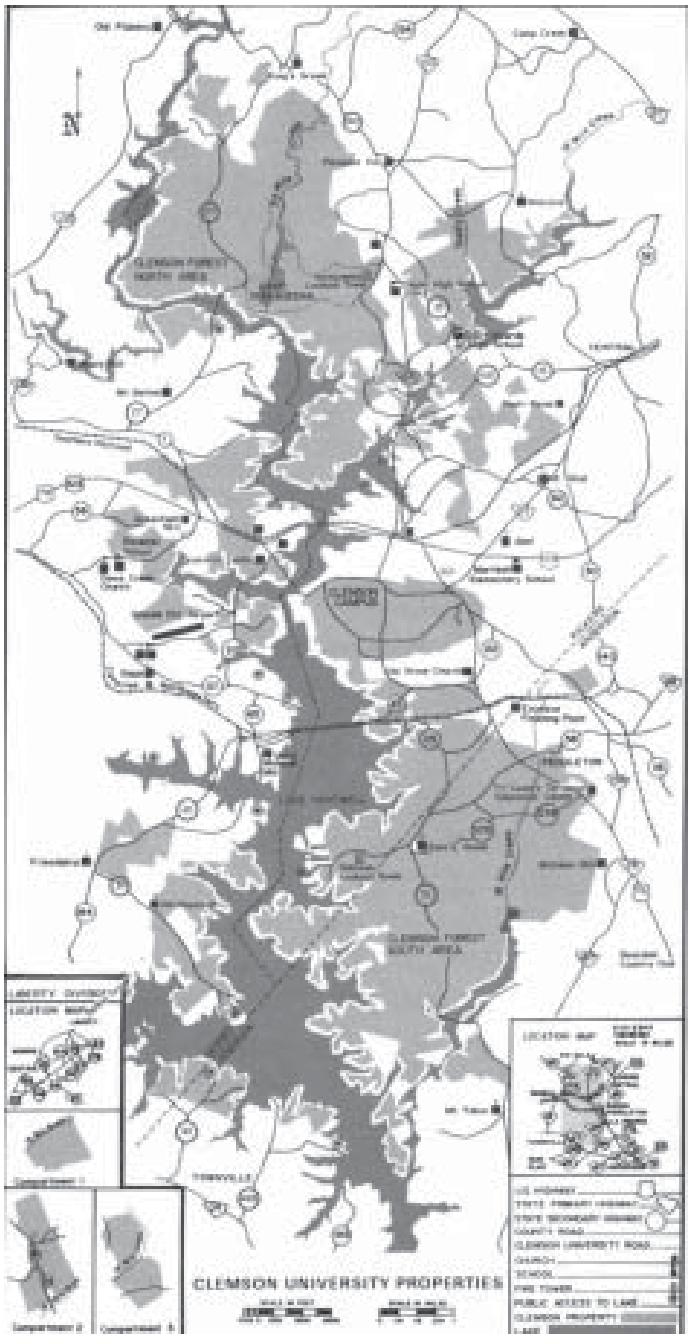
The Forest Itself

BUT WHAT OF THE FOREST ITSELF? So far we have been speaking of the Clemson Experimental Forest in historical terms: the times which gave it birth, the problems overcome to get it started, the labor expended to keep it going. But there are a great many other matters to consider.

Geologically, the northern section of the Forest is in the transition zone between the Piedmont and Mountain Physiographic Regions, while the lower or southern half consists of soils characteristic of the Piedmont. Beyond that as a start, though, a forest is so many things. It is a place of business where timber is raised as a crop: where we learn how to grow bigger and better trees faster. It is a reservoir that holds pure drinking water in the earth, and when it is healthy it doesn't silt up or flood. It is a means of keeping rain water from running away with the land. It is a refuge for wildlife and a place to take the family on outings. In addition, forests have an esthetic value which defies any economic "bottom line" evaluation.

That it is both a potential means of livelihood in itself as well as an indirect agent of livelihood for others is what makes forests so important, especially in a state such as South Carolina whose once magnificent virgin stands of timber were destroyed by people not only who cleared land for food, housing, and timber products for trade, but who also chased cotton crops up and down the hills for badly needed cash.

As for wood products, there seems to be virtually no end to what can be made. From the foliage come oils, extracts, and decorations. From the bark come drugs, dyes, oils, tannin. From the stems or trunks come logs for lumber to make boxes, furniture, flooring, musical instruments, parquetry, sills, laminated woods, boards. There are also bolts for barrel staves and shingles; residues for animal bedding, dowels, fuel, industrial alcohol, particle board, stockfeeding yeast, mop handles; crossties; veneer for baskets, furniture, and plywood. From the various resins come varnishes, waxes, shoe polish, wood fillers, soaps, crayons, cleaning fluids, drugs, paint driers, ceramic enamels, greases, solder flux. From pulpwood come cellulose products: sponges, sausage cases, artificial hair, explosives, molded plastics, rayon, phonograph records, and hundreds of other products. Among the fiber products is the mass of paper products and fiberboards. And from the roots come smoking pipes, teas, and oils.



Map of the Clemson Experimental Forest.

What the layman must keep in mind, though, is that a forest such as the Clemson Experimental Forest is a product of the desires and wishes of Man. Before the New Deal's agencies, laws, and bureaus; before any fireside chats; before Man's dreams and visions and labor, Clemson had no "forest" as we know it today and as it continues to evolve. The Clemson Forest is a product of Man's devising as surely as an automobile or a graphite fishing rod or a space shuttle.

First of all, the Clemson Experimental Forest is a *managed* forest, which means it is more than a mass of trees growing naturally over a large area. From the very beginning, the Clemson Forest was designed for multiple use, meaning that it was planned to exist for more than one purpose. Originally, the basic aim was to reclaim the land and to demonstrate how to care for the land so people would have a chance to better their lives.

Managing a forest is a highly technical matter that requires foresters to know how to make forest management decisions and - at Clemson - how to recognize potentially valuable areas of research. Once the families living in the area had been relocated, the College had received the deed, and the Forestry Department was able to start using the acreage as a classroom, the administrative decision was to use the Forest for teaching and research in four areas: timber, water, recreation, and wildlife.

FIRST, THEN, FOR THE TIMBER. Nearly two-thirds of South Carolina's land surface is covered by forests - 12.5 million acres - which makes South Carolina a natural place for an extensive forest industry. In fact, behind textiles and chemicals, forestry is the third largest industry in the state, which puts it in a very good economic position when we realize that the Southeast accounts for more than half the timber harvested in the entire nation. The rate of harvest is two-fifths higher than for the Pacific Coast and three-fifths higher than for other sections of the country, an important fact to keep in mind considering that the demand for timber in the country was projected to rise from 13.3 billion cubic feet in 1976 to 28.3 billion cubic feet by 2030.

A commercial forest exists to grow a crop - among other things, timber for pulpwood.

In South Carolina the growth of the timber industry has been consistently strong over the past 20 years. Between just 1977 and 1981, for instance, the number of timber and wood products firms rose from 582 to 663; new capital investment rose from $74.3 million to $119.6 million; and total wages paid were up from $296.5 million to $452 million. As a percent of the state's total production, the forest industry was down from 10.3 percent in 1980 to 9.3 percent in 1981 and a thousand fewer people were employed as well. But at least somewhat balancing that effect of the recession on housing was a $51 million increase in the forest industry's payroll.

All in all, the forest industry in South Carolina appears to be in very good shape with a great deal of room for expansion without any shocks to the environment. The resources that are already here can produce more fiber than they currently do and thus increase industrial growth. By planting better seedlings, increasing the use of prescribed burnings, and managing another three million acres of unproductive and understocked land, timber production can be greatly increased with an even more significant growth in the industry.

South Carolina is also fortunate in that it has a major port city, Charleston, which is in a position to significantly influence the forest industry's export business. Within that framework of state and regional forests, then, we can get another angle of vision, for the development of the state's forest industry depends to a large degree on the research and development going on in the Clemson Experimental Forest.

READING ANYONE'S ANNUAL REPORTS CAN BE AN EXERCISE IN PATIENCE, but after a point there comes a time when things start to make sense and you even look forward to the next report to find out how things went during the year. In a forest, the separation of uses is primarily in the eyes of the observer rather than in the forest itself, because when one thing happens, other things are also automatically happening. But it is necessary to talk about those things as though they were separate.

"A forest is not a park," as Larry Reamer, the current manager of the Forest, has said. It may include a park, but a managed forest is a working organism designed to raise trees for timber fibers. In short, trees are a crop just like cotton or corn or tobacco, and like any crop, trees are to be harvested. One of the many beauties of the Clemson Forest is that it produces a cash crop which pays the costs of keeping it in business for the University.

To reap the maximum benefits from the Forest, then, there have to be continual management decisions and reexaminations of those decisions in light of actual results. The original and perhaps obvious decision about the timber was to find out what kind was there, how much there was of it, and what needed doing with it in order to attain specific goals over the next number of years.

According to N.B. Goebel's report of 1947, the Forest was supposed to provide "a continuous supply of forest products and hence a regular sustained annual income," and his job was "to oversee cuttings, fire protection, control of insects and disease, reforestation, timber inventory, and timber sales." Goebel's 1947 report, by the way, took only one page. Currently they go to 10 or more.

Ten years later, Goebel reasserted in his 1957 report that "sustained yield management has been, and will continue to guide, my management plan of Clemson's forest resource." During the 10-year period between those two reports, the Forest had yielded a total of $263,845, much of which came in the last two years because of the forced clearing of the Hartwell Basin for the reservoir.

But a somewhat closer look at the monetary value of the Forest will give a greater indication of its worth. In the period from 1940 to 1950, stumpage receipts (money paid for standing timber) totaled $16,204 - that was when a dollar would buy 100 board feet. In 1982-83, those receipts ran to $210,367, when a dollar buys only eight board feet. From 1940 to 1983, receipts have totaled $2,649,123. At today's prices, that would amount to a whopping $10,252,812.

In spite of the demonstrably dramatic economic impact of the Forest, the matter of fact thing about forestry is that nothing very exciting happens each morning. The trees all look about the same when you go to bed at night as they did when you had your coffee at breakfast; therefore, forestry is a long-term commitment requiring people with patience and the ability to plan ahead 30 to 80 years. Because the Clemson Forest was associated with the College, there was always the assumption it would be experimental, as its present name suggests. So an obvious early decision was to keep it a forest so long as it was a part of the College. The first cuttings, then, were designed to get rid of the worst timber so stand improvement could begin right away.

What a manager wants to do is shape a forest so that each acre of harvested timber is replaced immediately by another which has just been planted in seedlings or regenerated from seed or sprouts. In between the two extremes - the trees ready to be cut and the ones just getting started - there should be a near perfect balance in tree ages and acreage. In a forest that is managed for many years, the "sustained yield" that Goebel spoke of is possible. Each year's crop - subject to the tremors of weather, economics, and chance that all agriculture is subject to - is then pretty well predictable, and predictability is vital for economic stability.

When the Forest was entrusted to Bruner's management in 1957, it had become a permanent part of Clemson College. Goebel had prepared basic maps, set permanent property corners, marked the boundaries, and divided the Forest into 15 divisions which, in turn, were subdivided into 143 compartments averaging 124 acres.

Bruner then was able to carry on by gathering data that would guide management decisions. With his staff, he set up a system of controls called Continuous Forest Inventory (CFI), a management tool just getting started in the Southeast. During the next year, 200 permanent plots were established

on the 15 divisions. After the plots were established, Lehotsky devised a system to divide the compartments further into stands. That way Goebel's already mapped compartments were operated on a basis of "stand management."

The compartments were formed by roads and other topographical features. Next, each compartment was photographed from the air and the photos examined with a stereoscope, which gives a three-dimensional effect useful to detail and outline the discernible stands. (A stand is an area defined by what's happening on it in terms of plant growth. For instance a stand can be occupied by trees with the similar characteristics of age and density, or it can be an open field, a grassed area, a wildlife plot, or a plot grown up with kudzu or other vines which could keep trees from being established on it.)

After the photographs had been studied and the stands defined, it was back out to the Forest where each stand was walked off to check it against the photos. All told there were about 2,800 stands averaging 6.5 acres. Detailed maps of each stand were made, and equally detailed records of everything relevant to that stand's good health were kept on stand cards. Stand delineation was completed in 1964, and the first treatment cycle was completed in 1966. After that, it was time to start things all over again with redelineation of stands.

On large acreages, inventory data normally are derived from small sample areas. So CFI is a sampling technique having four broad aims: to determine the volume of timber on the Forest in terms of cubic feet, board feet, and cords - that volume then being broken down further into the volume in each of the 15 divisions according to forest type, topographic position, product class, species group, and quality class; to measure the changes in tree volume due to growth, harvest, and mortality; to record the changes that occur in tree quality resulting from more intensive management practices; and to aid teaching and demonstrations. Such information can help a management program develop and keep a forest in a vigorous growing condition. Before a manager can come up with a sensible cutting schedule, for instance, he must be as certain as it is possible to be that he will not be cutting into his forest "capital," but into its "interest" -the amount of timber and fiber naturally accumulated in annual growth. A CFI will provide that kind of stocking, composition, growth, and mortality information.

Traditionally, the sampling was called plot sampling in which a predetermined number of plots, usually 1/5 acre each, were located throughout a forest. All trees falling within those bounds were then measured. But in 1952 a system called point sampling was introduced in America by Lewis R. Grosenbaugh, an inventory specialist with the U.S. Forest Service. Point sampling used special ocular instruments called angle gauges, which selected sample trees surrounding fixed points on the forest without regard to any fixed plot size. Because point sampling was simpler to use, it saved time in the field as well as the office, reduced personal errors, and provided a more accurate sample. In 1958 when the system was begun at Clemson, fewer than 10 point sampling CFIs were in use in the nation. There are now 200 permanent points on the Clemson Experimental Forest with some 2,000 sample trees providing the raw inventory data which is processed by computer to average the volume and trees per acre. The averages are summarized and grouped for up to 26 forest growing-stock and 28 area subsample categories as well as for summaries of the entire Forest.

Though the point system was set in place in 1958, its measurements were used primarily to adjust and fine-tune it for Clemson's use in the 1962 inventory.

Inventory data show there was a sharp reduction in the pine working group caused mainly by silvicultural treatments designed to reduce the number of stands of shortleaf pines, which are very susceptible to a disease called "littleleaf." The selective removal of mature shortleaf pine along with the pressure of climax species (trees which are best adapted to compete on a given site) to replace pioneer species has also contributed to the change in character of the Forest.

The board foot volume in the pine-hardwood, upland hardwood, cove hardwood, and bottomland hardwood stands has continually increased. And there has been a dramatic increase in board foot volume in pine plantations of 1938 vintage.

When early foresters of Europe said, "The forest is molded by the axe," they meant, simply, that proper harvesting removes the weaker and less

View of a 15-year -old pine plantation

desirable surplus trees. Thus, the quality as well as the amount of timber is improved. An analysis of the timber harvests from 1962-1982 would show a number of things. The planned maximum cutting schedule for sawtimber totaled 33 million board feet while the cords of pulpwood planned for cutting totaled 90,000. The actual cuts, however, were intentionally kept below the maximum. During that 20 years, there were actually 28,673,115 board feet and 67,568 cords harvested.

It must be noted that nothing is necessarily wrong when actual cuts fall below planned cuts. The projected cutting schedule is arrived at by a basic formula, but the shortfall can indicate - as it does here - that the management has allowed the Forest to build up its stocking (the *number* of trees growing toward maturity) or its stand (the *volume* of timber, which is a matter of tree size as well as number.)

But such figures can be overwhelming. What do they all mean? One way to see the amount of timber harvested from the Forest since management began is to imagine the 5,160 houses that could have been built from it. If families averaging four lived in each one, that would equal housing enough for a town of more than 20,000.

Equally *as* stunning is the realization that the inventory of 1938 showed there to be 38 million board feet in the Forest. In the 1983 inventory there were 138 million board feet, an increase of more than 360 percent. Even so, more timber has been harvested from the Forest than there was in it in that 1938 inventory. That's a renewable resource worth taking care of. And the Forest today is capable of producing more now than it was 20 years ago.

WHILE IT MAY BE THAT NOTHING TERRIBLY DRAMATIC in the sense of fast-breaking events (other than fire) occupies a forester's time, there are still a great many routine matters which need tending to on a daily basis. A forest manager, after all, is the chief administrator of an extensive property. As such he must, for instance, provide for public recreation, initiate or execute land surveys, help settle boundary disputes, be on the lookout for encroachment, and be involved with law enforcement in such criminal matters as vandalism and poaching. At Clemson, the Forest manager is responsible for a project that covers 85 square miles, and he must be able to understand as well as devise legal documents covering timber sales, road building, special use leases, and other contractual matters.

Two dangers to forests are kudzu and honeysuckle. This tree has been reduced in value because it was bent by the weight of the vines.

In addition to such executive details, of course, the manager must be prepared to deal with any threat to the Forest. This ranges from beetles that eat trees, to unwanted trees, to ground covers that choke out seedlings, to fires, diseases, and conditions that no one can do anything about like drought.

In the annual reports from 1947 to the present, a number of problems recur, one of which is in the form of two plants most of us usually don't think of with any particular venom in our hearts: honeysuckle and kudzu. Both were deliberately introduced into this country, and - certainly in the case of kudzu - because it grew fast and held the soil in place better than nothing, its growth was encouraged. Anything was better than watching the soil flow away every time there was even the gentlest of showers. Honeysuckle has long had mostly pleasant associations for many of us as we think of the nectar from the bugle-shaped flowers sitting sweetly on our tongues, the soft warm nights when its aroma purely fills the air behind our houses: lovely stuff, but - like kudzu - sure death to pine seedlings trying to get their start in the world. Protection from erosion is now better done with ground covers other than kudzu, which sits up high enough for soil to wash out from under it, and even honeysuckle loses its romantic appeal to the gardener who really would rather have tomatoes, corn, and lettuce than the persistent vines.

But for years the health of timber stands has been put to risk because of the tenacity of both plants. Well-entrenched honeysuckle especially has been a problem when deserted house sites have been reforested. Poisoning, uprooting, ditching: Nothing, it seems, has been totally successful in getting rid of the pest. The seeds fall to the ground and are protected even though the parent plants are rooted out. They grow quickly, and their tendrils will climb and destroy young seedlings within a season. They also eventually will destroy older, established trees as well, though it takes much longer. In the meantime they prevent maximum growth by climbing to the light and spreading so the trees can't photosynthesize. That means smaller trees which means less timber, or trees badly bent by the weight of the vines so they have to be used for the lower-priced pulpwood. In either case the result is less income from the forest.

It sounds like a silly little thing, a problem which ought to be easy to deal with. But any time a "small" problem is involved with more than 17,000 acres, it ceases to be small. Also, because they are most destructive to the regenerating forest, because they most quickly and easily kill the smaller plants which constitute the forest of 30 years or more from now, they are especially dangerous.

While we may still have problems accepting honeysuckle as a threat worth worrying over, fire is something we can all understand as a life-threatening danger. Early in the days of the Clemson Forest, there were a great many annual fires. In fact, the threat of fire was considered one of the most important dangers to be dealt with. Some were caused by cigarette-smoking hunters, still others by campers. Some obviously were cases of arson by people who bore grudges for whatever reasons. And some presumably were caused by lightning,

Fire! One of the gravest potential dangers to a forest. Not only does it destroy property and thus potential income, but vital experiments that could take years to reproduce.

though the demonstrable instances of that are rare enough to have been worth noting in one annual report. In the days before Smokey the Bear and other intensive public relations schemes to make people more aware of the care they needed to exercise while enjoying the nation's forests, people were less knowledgeable about the speed with which a fire could get started - especially in the high-risk, dry times - and of how quickly a fire can be out of control with even a moderate wind pushing it on.

The worst offenders for a number of years were the trains running through the Forest. There were places where crews from the dining car of the Southern Crescent often dumped coals from their stoves. They certainly didn't intend to start fires, but their ignorance burned timber and put lives at risk even so. Word from the College plus some bills for damages and the costs of fire fighting finally got through to the Southern Railroad, which took steps to eliminate preventable fires.

A cursory glance at the record of fires over the years will give an indication of the success of the Forest managers in preventing them. In 1946-47, nearly 41 acres were burned. The next year, more than 44. In 1950-51, 60 acres were burned, and the Forestry Department requested a fire truck with a pumper to help control the blazes. In 1954-55 the department requested two-way radios to help in communication. In 1959-60, the report stated that fires from railroads still continued to be the biggest fire threat, as 55 acres were burned. The following year was the first time the Forest suffered no loss from the railroads.

Since then there still have been fires, but the acres lost were mainly in single digits - except for the year the National Guard burned up 33 acres with a demonstration of its own brand of fire power. And there was even one year when Marlin Bruner, the manager, admitted with an obviously red face that one fire occurred when a demonstration of prescribed burning got out of control.

While the danger of a forest fire is terrifying enough in its own right - the actual or potential loss of lives, loss of property, loss of timber production - in a forest such as Clemson's, there is an additional loss because of the special nature of an experimental forest. There is research going on all the time. A "project size" fire could wipe out years of experiments and information in addition to hundreds of acres of timber. That's why complacency can be almost as dangerous as a clear threat. It can let foresters be victimized by their own hard work and good record.

Another constant problem is the threat of insects and diseases. Normally, the most destructive insect in the Forest, the one that has caused more mortality than any other, is the pine bark beetle. When a section gets infested, there is often little that can be done other than to clear out the affected pines before the infestation spreads. However, prevention can be effected by means of silviculture, in this case reducing the density of the pure coniferous stands so the trees will be more vigorous and thus more resistant to the beetles. Additionally, infected debris from salvaged trees can be burned. In 1979 the Forest suffered one of the worst epidemics of the Southern pine beetle in its history. Often, detection through photo reconnaissance is possible, and if salvaging doesn't seem to be enough to deal with the problem, then spraying with chemicals where possible may be the only alternative. The rest is up to researchers who try to figure out the causes and cures of such sudden and massive infestations.

Another damaging insect is the pitch-eating weevil. This pest, which attacks young pine seedlings, usually can be prevented simply by not replanting coniferous trees for a year after harvest. Another example of control by silviculture is the method used to combat littleleaf disease, the deadliest disease organism in the Forest. Here,

trees are cut earlier than usual and replaced with a different species of pine after harvesting.

These are the kinds of battles constantly being waged, and part of the daily routine of those who manage and tend the forests to make certain they stay healthy.

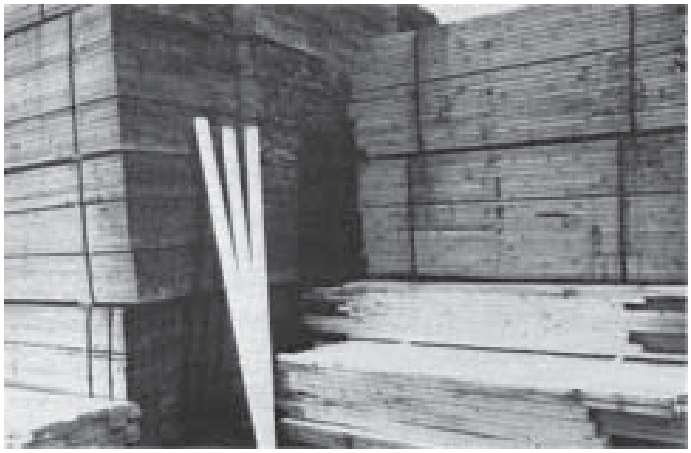
Over the years, the success of the management decisions made for the Forest certainly can be seen in the record of planting and in the income from the sale of forest products, generally sawtimber and pulpwood. Records of plantings do not go as far back as 1946, but in the 30 years between 1951 and 1981, more than 3,120,000 trees (mostly loblolly pines) have been planted on nearly 4,200 acres. Of these, many died of disease, fire, or other causes, but many were culled for an optimum balance of trees to acreage for the best growth. As pointed out earlier, the Forest has grossed more than $2,600,000 since 1940. In addition, if we look at volume by species, we can more clearly see other specific management strategies and how they have worked.

At this point it should be interesting to get a look at a complete production cycle in a stand of intensively managed loblolly pines. The following report was prepared in 1978 for a South Carolina Forestry Association press tour.

Well more than 3,000,000 seedlings such as this one have been planted on the Clemson Forest in the past 50 years.

1938 1. Trees planted on an abandoned field by Civilian Conservation Corps workers. The trees were one year old when planted at a spacing of 8’x 8' or approximately 680 seedlings per acre.

1966 2. The first thinning was made in 1966 when the trees were 28 years old. In this thinning approximately 210 trees per acre were removed yielding 22 tons of pulpwood. Note: thinning was delayed because of a research project.

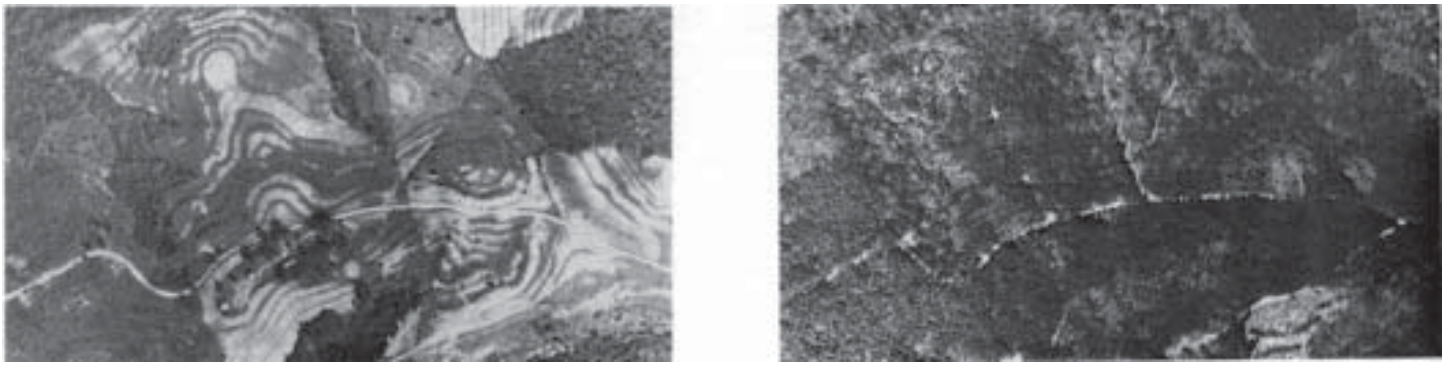


The sawtimber removed in a thinning from one acre in 1974 was enough to build one-third of an average sized house.

1974 3. The second thinning removed 53 trees per acre and yielded 29 tons of sawtimber.

1976 4. In 1976 the stand was prescribe-burned using a slow-burning, low fire to reduce undesirable plant competition and provide succulent browse for wildlife. Another burn will be done in three or four years and a final burn will be done just prior to complete harvest.

1978 5.The current stand contains approximately 120 trees per acre that would yield 90 tons of material suitable for manufacture into lumber. Note: 197 trees have died from natural causes; early thinning would



These aerial photographs graphically demonstrate the difference a forest can make. The photo on the left is a 1944 composite taken by the U.S. Army Air Corps. The one on the right was taken in 1983 by Clemson University's Forestry Department. The area in the lower right of the recent photo is an area that has been clearcut and replanted.

have permitted utilization of a part of these.

1988 6. At the end of the cycle (rotation) in 1988, the stand should contain approximately 120 tons per acre of material. At that time we estimate the value of the material will be more than $2,400 per acre (standing value or stumpage). At the end of the rotation the cycle will be repeated.

At the end of these six points there was a note concerning benefits, which pointed out that pulpwood thinning from just one acre was enough to furnish the paper an average person would consume in 14 years; that the sawtimber removed from one acre in the 1974 thinning was enough to build one-third of an average sized house; and in 1988 at harvest each acre will supply enough lumber to build one and a third single residence houses.

THE OBVIOUS HAS A WAY OF BEING CLEAR only after it has been pointed out to us. As recently as early in this century there were people - including the chief of the U.S. Corps of Engineers - who did not believe there was any direct, significant relationship between forests and flood control - the flow of water into streams and rivers. It was not until the 1930s, when President Roosevelt helped establish research centers for hydrological study, that any major work was done to determine the more precise relationship between the two.

In their natural states, forests by now are known to be effective in preventing erosion by holding water in place rather than letting it run off. But as more and more pressures are placed on the forests - including the pressures of management - their water-dispensing nature becomes more important than ever. In the managed forest, trees are planted, sites are prepared (often by prescribed fires), trees are harvested, roads are built, chemicals are sprayed. All such activities take their toll on the ability of the earth to hold water and on the quality of the water itself. Fortunately, surface runoff is easily controlled.

In a forest, the amount of vegetative manipulation as well as the nature of that manipulation determines the amount of water initially caught then passed off by transpiration and evaporation. Planting more vegetation and improving the health of the stock adds to the good quality of the water. Conversely, removing vegetation and adding roads and camping facilities can degrade the quality of the water because the natural water-soil chain is disrupted. Good management practices, then, require that water quality be improved if at all possible, or, at the least, be degraded within tolerable limits.

Part of the purpose of the original Clemson Land Use area was to improve the quality of the water as well as to help prevent the kind of horrible erosion prevalent at the time. The average yearly rainfall of 51 inches translates into 24 billion gallons of water drenching the Forest, enough to service a city of one million for a year. Because a good bit of the water in the Seneca River arm of Lake Hartwell comes directly from the Clemson Forest, and because the lake, with its 98 miles of Clemson Experimental Forest shoreline, is the source of

municipal water for three incorporated communities, the University, and several industries, as well as several rural water districts, the purity of the flow into the lake is especially important.

But the high quality of the water is important not only because of its potability. With impoundments such as Lake Hartwell, another important factor is the level of silting. One of the concerns people had during the Lake Hartwell dispute in the late 1950s was the question of whether the basin would silt up badly enough to make the lake useless. That silting from the local rivers was a problem demonstrated in a 1950 study, which concluded that during the nearly three year period between 1938-41, Lake Issaqueena's average storage capacity was reduced by 1.69 percent annually. In the eight-and-a-half-year period between 1941-49, however, after the Forest had been in a state of management for a number of years and many thousands of trees had been planted, the average annual storage loss was down to .78 percent due to silting. The likelihood is that loss of storage capacity from silting is even lower by now, a conclusion strongly suggested by the clearness of the lake even after heavy rains.

The water is closely tied to the soil because the nature of the soil determines to a large extent the nature of the purity of the water as well as its propensity to run off or soak in. A detailed statement of the kinds of soils prevalent in the Forest can be found in the Appendix, but it is worth pointing out here that they tend to be clayey, which makes the Clemson Forest erosion-prone.

The fertility of the soil helps determine the kind of vegetation it can support as well as the kind of vegetation needed to help return the earth to productivity. Those areas that were most intensively used for farming are those areas most in need of reconditioning. The fertility of forest soil depends on the quantity and quality of the nutrients put back into it as well, of course, as the chemical makeup of the parent material. In a natural state, decomposition will return such nutrients into the upper layers of the mineral soil. In a managed forest, this natural process is closely followed but somewhat modified in order to develop certain kinds of commercially preferred trees.

Part of the Clemson Forest manager's job, then, is to foster the growth of vegetation that can return needed nutrients to the soil. These auxiliary species, as they are called, help create a gradual buildup of soil fertility through decomposition, deposition, and nutrient-bearing litter. Hence dogwoods, sourwoods, red cedars, gums, maples, yellow poplars, and ashes are encouraged in the stands of pines because these are the trees which most help create the desirable litter on the forest floor.

Again, it must be remembered that such development is gradual. Forestry is a matter of initiating actions which will take half a lifetime to accomplish. It's something like dieting. You can't take off in one week what you spent years packing on. Generations of land abuse cannot be corrected in a matter of a few years. Further, it is sometimes difficult for laymen to understand how peculiarly intricate a forest is. The trees are so big, the acreage often so vast it is easy for us to assume that sheer bulk makes for permanence. But once we understand that two to three inches of soil can be worn off in one season around heavily trafficked recreation areas, then we can start to get a clearer picture of the fragile balance of even so massive an entity as a forest, especially when we keep in mind that it is only two to three inches of topsoil plus rain that make life on earth possible.

Because the whole point of a managed, multiple-use forest is to perpetuate its productivity, rules for effecting this purpose are continually reviewed and altered as necessary. Still, there are general guidelines followed in the Clemson Experimental Forest to protect the water/soil resource.

Clearcutting - cutting down all the trees rather than *selected* trees in a given area - is the most destructive form of timber harvesting there is when it is done indiscriminately. It leaves the earth totally exposed to the ravages of rain with the resulting runoff, gullying, and land erosion that so blighted this section of the country earlier. The problem is not just the sudden lack of trees, but scars resulting from the heavy equipment used to fell them and haul them away. To avoid that, any clearcutting on the Clemson Experimental Forest is restricted to 30 acres. In addition, no clearcutting is allowed unless runoff can be completely controlled. At the end of the operation, skid trails and any access roads used to get equipment to the timber stands are sown with grass.

"Indiscriminate" is important to note, however, because there are times when clearcutting is essential to a well-managed forest, depending on the kind and quality of the stand and the nature of the terrain. In order to establish some high-value, genetically improved species, for instance, it is necessary to plant them on completely open spaces so they can receive full sunlight. Otherwise, they will not grow. In such cases, clearcutting is a management technique used to increase the value of the forest, one of the many techniques that allows a managed forest to produce three times the timber of a virgin forest. When the manager applies appropriate measures to the site after the harvest, the scars of the cut are soon hidden and quickly healed.

Over the years, more than a hundred miles of roads have been built on the Forest lands. Some of these are public access roads, others are primarily for administrative purposes, forestry classes, fire control, and research use. Constructing roads involves not only laying roadbeds, but building culverts, drainage ditches, bridges, and so forth. In addition, once the roads are built, they must be maintained. That kind of construction is an intrusion into the "naturalness" of the Forest's workings; so care must be taken to make certain the roads are consonant with the purposes of the Forest itself. The primary concern is water drainage, especially during periods of heavy rain.

On the Forest, care is taken to deal with runoff because the road itself would need a greater amount of maintenance otherwise. Large amounts of water can accumulate close to the road and undermine it. Also, when soil, seed, and other desirable material on the Forest floor are carried off, silting of streams is probable.

Between management operations, some roads are closed to traffic. These are often "paved" with grass. Several results of that are a decrease in dust and better controlled runoff because the grass slowly releases excess water into the side ditches.

Still in the area of protecting the Forest, recreation sites, as already pointed out, can lose as much as two to three inches of topsoil in a single season. For that reason, such areas have to be designed to guide people away from certain spots from year to year and to other places by simple relocation of grills, trash cans, and other facilities.

When a given site is being prepared for seedlings, it has to be cleared of certain pests (as

An example of road stabilization. This road "paved" in grass helps prevent runoff from rain.

A prescribed burn often is used to prepare sites for further planting. Such controlled burns also help reduce destruction from wildfires by destroying unwanted, highly flammable materials such as dry pine needles from the Forest floor.

honeysuckle and kudzu). Sometimes this is done by machines, other times by burning. At these times, the land is especially vulnerable to erosion, which can be controlled - along with degradation of the water - by filling small ravines and gullies with debris, by windrowing debris on the contour of the land, and by planting grass on the steeper slopes. Prescribed burning, as demonstrated on the Forest, not only is often an excellent way to clear and prepare land, but is also an excellent way to help prevent wildfires by ridding the floor of highly flammable pine needles and other debris, and tests have shown that it does no harm to the stability of the soil or the quality of the water.

AT THE BEGINNING OF THIS HISTORY, I spoke about driving out from Clemson to Lake Issaqueena, the primary area for recreation in the Forest. With its large rock shelters, picnic tables, sanitary facilities, nature trails, and the water, Lake Issaqueena is one of the loveliest places in the South Carolina Upcountry. All along, recreation was intended to be one of the uses of the Forest. The work and planning that went into the 106-acre lake are often taken for granted, a mark of the success of the project.

One of the primary reasons for the lake was fishing. Completed in 1938 by the WPA (Work Projects Administration), the lake has had a kind of up and down history. For many years it muddied during rainy seasons through extensive silting, though with the increase in the health of the Forest, that has ceased to be a problem. In 1954 the lake was drained to restock it with a balance of bluegill, bass, and bream. Right now, though, the lake needs to be drained and restocked again, but there is not much hope that that will happen since Lake Hartwell is backed up right next to it.

Good fishing or not, however, the lake is still the focal point of the entire northern recreational area of the Forest, with three hiking trails around and near it: Indian Creek, a one-mile, improved nature study trail, and Issaqueena Lake and Lawrence trails, both of which are primarily for hiking. In addition, there are seven picnic areas including the boat landing and the falls. Too, much of the northern section of the Forest is a game reserve for wildlife research.

The southern portion of the Forest is not as extensively used for recreation as the northern, but the Treaty Oak site about a mile south of the campus has been cleaned up and monumented and is maintained as a historical site. It was at a huge Red Oak on November 28, 1785, that General Andrew Pickens rode out to sign a treaty with the Cherokee Indians in which they ceded to the state of South Carolina land which eventually became Oconee, Pickens, Anderson, and Greenville counties.

Also in the southern Forest is the Recreation Outdoor Education Research Laboratory, usually referred to as the Outdoor Laboratory. A camping/conference center with modern cabins, dining rooms, a picnic shelter, and an amphitheater/chapel, the Outdoor Laboratory is also the home of Jaycee Camp Hope, Camp Logan, and Camp Sertoma. In addition, the Outdoor Laboratory is used extensively by numerous campus as well as non-campus organizations. Though the area is no longer maintained by the University's Forestry Department, it is on the Forest property and is an example of the manner in which the land has been developed for outdoor recreation. In addition, there is an eight-mile bridle trail for horseback riders in the Fant's Grove section as well as some hiking trails.

As a general rule there are virtually no limits on the use of the Forest's recreational assets. Public hunting is permitted in season in most places except for the wildlife research area between the confluence of the Keowee and Twelve Mile rivers. The southern game management areas are operated under an agreement with the South

Carolina Wildlife and Marine Resources Department. Rabbits, quail, doves, squirrels, and deer are hunted, and there are even bears and turkeys in the protected Issaqueena area. Hiking is encouraged, and fishing available. But certain problems have cropped up over and over for years. Vandalism has been reduced a good bit by barring entrances during off seasons and by increasing patrols of the most public areas, but there is still a problem with litter and with offroad recreation vehicles. Four-wheel drives, dune buggies, trail bikes, motorcycles - all can shred in hours an area that has taken literally years to build up both esthetically as well as silviculturally.

There is no question about the success of the Issaqueena Lake area. In 1970, for instance, there were 2,300 users during the heavy months of March, April, May, and June. But the success of the recreational areas is now working against the Forest managers, in certain ways. Along with all other expenses, the costs of running the place are going up. It is getting very expensive to keep the buildings and land in good condition, to repair or replace shelters, garbage pits, tables, and benches, to clean up the litter of the 18,000 visitors who now ramble through the area each year, and to patrol against vandalism. Partly because there are so many free or inexpensive recreational areas in the vicinity and partly because the old Land Use area is committed to the public, there has never been a charge for its use. Still, costs must be borne by someone, and that someone is the Forest itself.

For many years these costs were relatively negligible, but with increasingly heavy use, the dollar outlay has steadily risen: $15,000 in 1975-76; $16,500 in 1977-78; $17,000 in 1978-79 (plus an additional $10,000 to replace a large picnic shelter which had been burned by arsonists); $18,000 in 1980-81. Even back in 1976, the annual report plaintively stated, “To put this cost in terms of the method of internally generating operating funds we must allocate the returns from approximately 25 acres of the area harvested in the Forest each year to operate the Issaqueena Lake Recreation Area. It may be platitudinous,” the report continued, “but the fact is that providing public recreation is an expensive, and generally thankless, proposition. This becomes more evident with each passing

The types and quantity of wildlife are a major consideration in the Forest.

year.” What eventually will be done is not certain, but a reading of the annual reports makes clear that some kind of accommodation will have to be thought about in the future. In all probability the University will not be doing much in the way of expanding its current recreational facilities, primarily because of the presence of so many other places and the costs of maintaining what already exists.

A FOREST WITHOUT WILDLIFE WOULD BE NO FOREST AT ALL, and with the extensive reforestation which has been going on for nearly 50 years now, the land has been changed so it can accommodate more and more kinds of wildlife. But the increased number of trees was not the only factor involved. Over the years many wildlife food plots have been established to lure varieties of fowl and mammals such as turkeys and white-tailed deer. Each of these grubbing spots is about 1.65 acres.

Wildlife supervision is a responsibility shared by the Department of Entomology, Fisheries, and Wildlife, which conducts research into the Forest’s zoology, and the Forestry Department, which deals with habitat management. At the same time, game laws are enforced by the South Carolina Wildlife

and Marine Resources Department, which also cooperates in overseeing the 6,400-acre wildlife sanctuary lying between the confluence of the Keowee and Twelve Mile rivers.

In 1954 the sanctuary was stocked with white-tailed deer, which have by now become established in the area. Also well established are beaver, which had not been around until the Forest itself started settling into maturity. Though the number of beaver seems to be rather extensive and while the ponds they created have attracted a great many desirable fowl, their presence is not always looked at with unfettered admiration. They build their dams by chewing down trees. That's all right as long as the trees they chew down are not those the foresters want to grow for timber. And while the ponds are good for attracting water fowl, they can also cause more than acceptable flooding in seasons of heavy rain. So there is a need to keep a weather eye on them, which is not always easy since beaver breed with a will and multiply rapidly.

On the Clemson Forest, wildlife habitats are constantly reviewed. Though one of the Forest's main purposes is to provide timber for commercial users, the managers understand that necessary cutting obviously disrupts the homes of numerous forms of life. It is then the job of the managers to make certain such disruptions are as unobtrusive as possible and that plenty of additional woodlands are available and attractive for migrations. But while trees disappear from any given tract, the preparation of those newly cut-over sites is done in such a way as to bring in other forms of life that help maintain a forest-wide balance.

Much of the wildlife can be managed silviculturally, that is by the various procedures of planting, growing, and caring for forest trees. For instance, by maintaining various types and sizes of forested stands, the white-tailed deer, American woodcocks, wild turkeys, foxes, and squirrels are helped. Through prescribed burning, deer, turkeys, mourning doves, and bobwhite quail benefit. By protecting streams and creeks and rivers, fur-bearing mammals, fish, and water fowl are protected as well. Newly cleared areas provide places to breed and live for mourning doves, song birds, rabbits, and birds of prey. And even the despised honeysuckle is good for small critters that like to burrow on the Forest's floor.

Such benefits to game come about as a natural by-product of normal practices of silviculture, which improves soil fertility, controls and preserves moisture, and promotes vigorous growth of tree species adapted to specific sites. The Forest management also understands that nongame life is as necessary and desirable as the game birds and mammals. Song birds, for instance, add an important dimension to a person's enjoyment of the woods. There are times when we don't notice a thing until it isn't there any longer. The immediate impact of Rachel Carson's most well known book came from its title, *Silent Spring*, which suggested what life might be like without the songs of birds.

The songbirds have more than an esthetic function, however. They also eat mosquitoes, gnats, and flies for us while birds such as woodpeckers are working away earning their keep by gouging out bark beetles and other tree-boring insects. They cannot save forests all on their own, but they nonetheless do a vast amount of work. And while we may not like to think of it in these terms, small animals provide the needed food for larger animals and birds of prey.

Then there are the other creatures, like honey bees which pollinate certain species of trees; skunks which, though we usually prefer (for good reason) to avoid them, help make our visits to the Forest more pleasant because they love to eat yellow jackets, which can be a potentially lethal danger to anyone who might happen to step into one of their nests hidden under roots in the ground.

IN THESE VARIOUS WAYS, THEN - through timber production, water and soil conservation, recreation, and wildlife protection - the Clemson Experimental Forest is growing into a unified entity. Not only have the managers since 1947 done their jobs with professional skill and professional dedication, but the work they have created - the Clemson Experimental Forest - has received appropriate recognition in the form of high praise.

Few things in life are more difficult than going to work every day, performing that work truly and well, knowing it is work worthy of a person's time and labor, yet feeling that its results go unappreciated. Such labor is the proverbial labor of love, the labor

of doing a thing well for its own sake. So it was an especially good feeling for the Forestry staff when their dedication and skill and work finally resulted in a meaningful accolade. In 1977 the Forest received national recognition when the Institute of Ecology selected it as one of the 67 primary experimental ecological reserves in the nation. Of 171 considered, only 17 ranked higher than Clemson.

BECAUSE THE CLEMSON EXPERIMENTAL FOREST HAS BECOME so much a part of the local scene, and since more than 70 percent of it is visible from either Lake Hartwell or a highway, Forest managers have taken special care that the work-a-day world of harvesting and other forms of management don't impinge unnecessarily on its visually esthetic character. For it is that character as much as any direct economic advantage the Forest offers that has helped make the Clemson area one of the most attractive in the tri-state region for people to live in.

The economic value of the Forest - that is its dollar and cents income value - has already been talked about. But it isn't possible to point with absolute precision to everything that influences an economy. For instance, the presence of the Forest and the various non-economic advantages of recreation and beauty it offers doubtless has something to do with the desire of many non-University people to locate their businesses and their families here.

More and more industries compatible with the pattern and quality of life already established are moving to the area, and that means plant managers of the so-called high-tech industries who find a place with an increasingly educated labor pool as well as a place which is retaining its natural beauty at the same time it is contributing to the economy of the region. In addition, many of the retirees who are anxious to settle in the Clemson area are former University faculty and staff. Their skills, talents, and interests create a pool of knowledgeable people with concerns for such public matters as schools, health, local government, and the environment.

The Forest also helps serve as a keeper of the history of the area. In addition to the several sites

listed in the Appendix, there are other places either on or near the Forest that have been preserved because they constitute the roots of the University, which itself constitutes a major chronicle of this entire region. In fact, one of the early purposes set forward in the original Fant's Grove proposal was the preservation of some of the houses of historical interest.

In these and other ways, the Clemson Experimental Forest has both a direct economic impact as well as various indirect influences on the local scene. It is a presence without which this area would be the poorer, and a presence we pass so often without really seeing or taking note of. But like the sounds of bird songs, its absence would leave a gaping void in our lives.

CHAPTER VII

Research and Accomplishments: The New Legacy

". . . EXPLORE THE POSSIBILITY OF HOW TO BEST DEVELOP the overall management of the Forest in such a way that management is a research project in itself." That's the wording of part of a memorandum from the head of the Forestry Department to the Land Utilization Committee dated November 5,1976. The result of that memorandum was another course correction in the direction of the Forest's management and the creation of what is known as the Management Alternatives Research Project, or MARP.

Research in forestry traditionally has been oriented toward specific problems: regeneration techniques, the ways in which specific tree species react under particular conditions, the nature and control of insects and diseases, the most accurate methods to measure growth, and so forth. These have resulted in practical solutions to specific problems. While such research has resulted in a vast amount of concrete information to help manage forests, it has not generated any data about combined management practices over the long haul.

The purpose of the MARP plan is to address itself to what happens when individual management practices are united into a single program applied to an entire forest, and to gain quantifiable data on the responses to that management. The program is to last as long as need be, so there is no pressure to obtain results within a limited time. However, for the project to have a chance to yield useful results, it is necessary to maintain all the continuity required of any well-conceived research project. Therefore, all the detail work of the Forest's operations is to be based on getting the project's results.

More specifically, MARP's objectives are to measure the biological, economic, and social responses to the effects of forest cultural practices; to interpret those responses on the environment, commerce, and society; to develop norms against which regional forest management can measure itself; and to maintain diverse forest conditions for the University's teaching and research programs.

To accomplish this, the Forest was divided - literally and administratively - into what now actually is three separate forests: commercial, multiple-use, and protection. The commercial forest is managed for the maximum production of wood fiber: to grow as much timber as possible in as short a period as possible with maximum profits and minimum costs. The multiple-use forest is designed for a combination of benefits with a "bottom line" which doesn't necessarily have anything at all to do with money. The benefits can be a blend, for instance, of timber production and esthetic values. Neither is primary, both are equal in management goals. The protection forest is managed to protect the environment against both man and nature by reducing the likelihood of soil erosion and water runoff, and by stressing esthetic and wilderness values. One way to do this is to encourage climax vegetation by reducing the number of thinnings, by harvesting less frequently than is usually done in a commercial forest, and by growing trees to an older age class before harvest.

A project of this magnitude is one of incredible risk-taking. The entire process of managing forests, as we have noted before, requires patience and time. Too, it is clear to most of us that we live in an age when goals and values seem to change overnight. But forests have such a variety of uses and functions both in nature and in man's uses of nature that projects such as MARP are essential. Still, there is bound to be a sick feeling in the stomach of a forester when the thought crosses his mind that he might have made a terrible mistake, a misreading of the signs, a miscalculation which ends up - years later - working totally against everything he had been trying to do.

This kind of project had never been attempted at Clemson before - or apparently anywhere else - because the stretch of time involved is so large that funding has been impossible. Also, it isn't easy for a person to begin a research project knowing he likely will not be around by the time there are any significant results. Too, the ability to collect, store, call up, and analyze such vast amounts of data has not been practical until the development of the computer. What the University plans is that over time,

the information gathered will lead to conclusions of importance in developing regional forestry policy for public lands and will be a bank of information for handling private land as well.

To get ready for the project, the Forest was divided into management units - easily enough done because there already were management divisions within the Forest which could be used as bases for the new arrangement. Also, the Clemson Forest was in an excellent position for undertaking the project because its stands were approaching what foresters call normality: the desired distribution between age and acreage. That meant each subdivision in terms of size, age, and composition could contain stands representative of both the Upper Piedmont and the Blue Ridge Foothills geographical regions of South Carolina.

For purposes of statistical analysis of data, the final plan called for 12 management units, each to be at least 700 acres. On the basis of aspect, Woodland Suitability Group (WSG), site indices, and general knowledge, the compartments established in 1947 were combined. Six of these units were located in the northern and six in the southern portions of the Forest because the two areas are different in site productivity.

So there are two commercial, two multiple use, and two protection units in both the northern and the southern halves of the Forest. The major factor used to determine the overall goals of the management units is rotation length, the number of years from the time a tree is planted as a seedling or comes up from seed or sprout to the time it is harvested, because rotation age marks a major point in a forest's development. All told, then, there are 5,989.3 acres in the north and 5,744.8 in the south for a total of 11,734.1 divided into about 3,643 commercial, 4,333 multiple-use, and 3,757 protection acres.

The compartments were grouped so the range of variation within each set was as much as possible like the range of variation in each of the other sets. After the management units had been determined, they were assigned their management goals at random. The acreage not specifically included in the MARP project is still managed for multiple use.

IN ADDITION TO THE MARP PROJECT, there are currently about 39 other specific research projects making use of the Forest. Research to many people is a mystery understood only by a select few. While it often is true that not all of us would get as excited about some research as the specialists engaged in it, and while it is also true that some research projects sound like they were invented for use in a science-fiction film, the fact is that whether it is basic research with the goals of increasing our knowledge of the way things work, or inquiries into specific problems, its ultimate target is those practical matters, the results of which will make sense in the marketplace of timber products.

Research is a funny sort of thing. While any given project has certain specific goals, there are results beyond the project itself. The attitudes of precision required to set up an experiment that will yield sensible results are best taught through actual research projects rather than through lectures about how to be thorough. For an undergraduate to have a professor skilled at and actually involved in research is one of those "pluses" that doesn't lend itself to the precision of a computer program. Something good can rub off on students whose professors teach out of their own active engagement in finding out the hows and whys of the trails their own curiosity has led them to, rather than lecturing solely from notes derived from the work of others. Two examples will illustrate the kind of research the Forest will support. The first has to do with beaver, the second with fire.

The beaver project is based on the realization that beaver are natural modifiers of their environment. Beaver populations grow at very fast rates, and the damage they can do to crop and timberland because of the flooding which results from their noted propensity for building dams can run into millions of dollars. Though their dams create wetlands, which are valuable for a wide variety of wildlife, their populations have to be controlled or the damage they do simply outruns the good.

In an effort to control populations, wildlife managers have tried trapping, controlling fertility through surgical sterilization, blowing up dams, and introducing natural predators. Trapping would be the most likely and easiest control, but it is illegal in some states and unpopular in others. There is also no strong market for beaver pelts. But when the dams keep appearing and the trees and fields keep

A large beaver dam after a partial washout. The beaver population has increased rapidly since the development of the Forest.

flooding in destructive ways, something has to be done.

This particular piece of research is aimed at finding out if there is something in beaver behavior that can be used against them. What is known is that the animals will mark their territory by means of secretions from castor glands. This scent serves to keep other beaver away with the result that any given territory will be occupied by only so many colonies, each of which typically consists of a pair of breeding adults and several litters of young. When the young get to be about two years old, they are forced out of that territorial nest to be on their own. Normally, beaver seeking to establish their own territories will pass through those areas already marked rather than confront its occupants.

Many of the young have had radio transmitters surgically implanted so researchers can trace their wanderings to see if they will avoid simulated colonies which have been marked with a commercially available castor scent. If the beaver do keep moving, then such "colonies" may help keep populations down to beneficial sizes by dispersing the younger generations farther afield.

A second research project deals with the ancient elements of fire and water. Clemson University and U.S. Forest Service researchers are working to find out what certain silvicultural procedures do to the quality of water and nutrients in the ecosystems of the Piedmont. What researchers know is that the loblolly plantations established on soil worn out by so many generations of cotton farming have stabilized that land and reduced the erosion rate to less than 0.01 tons per acre per year in the undisturbed plantations. What is not known is what that has done to the quality of water.

Secondly, fire can be used under certain conditions as a silvicultural tool to effect certain goals for a forest. Prescribed burns - low-intensity, controlled fires - can be used to control understory hardwoods and to prepare seedbeds. The prescribed burn is a procedure designed to regenerate new stands when older ones are being harvested, and to control the composition of already existing ones. Research in the Forest has already demonstrated that such burns can accomplish those ends without bad effects on water quality. However, though sediment was not increased, neither was the nutrient level of the soil.

The concern - especially in the Piedmont - is that during and after harvest, erosion is a very real problem because of storm runoff, and so is the loss, therefore, of mineral soil which leads to the degradation of the site. The tradeoff that has to be considered during a harvest is what to remove from the acres being harvested. If the entire tree including foliage and branches is removed, there is a 20 percent increase in the amount of commercially valuable material. But that increase is paid for by removing the very biomass that can increase the nutrients in the soil, nutrients still vitally needed to increase the future productivity of the land. It becomes a classic case of current profits versus future and continuing value.

Many more research projects - current as well as past - are listed in the Appendix. The point about research, in addition to finding out how things work as well as what they are, is that the more people

find out, the more they come to realize how much more there is to find out. A department or college with active research going on in it also tends to draw those faculty and research staff members who want to be teaching and working in places where there is a spirit of inquiry about the world they have chosen to make an intimate part of their lives. Too, such departments also draw the better graduate students who in turn can have very positive influences on the attitudes of the undergraduates.

At Clemson, research is both theoretical as well as practical, if that distinction really holds up: The theoretical has a way of becoming practical soon enough. Research done specifically in the Forest ranges from water relations in hardwood seedlings, to the effect of beaver on forests in South Carolina, to the use of swine effluent on forest land, to the evaluation of herbicide application on forests. A cursory glance at some of these projects makes clear that the Forest does not draw the interest of the Forestry Department alone, but that much cross-disciplinary work is also going on.

Nor does the Forestry Department alone use the Forest as a classroom. Normally there are on the order of 85 or so courses by some 22 departments that have occasion to go to the woods to teach, including agricultural education, animal science, architecture, botany, community and rural development, entomology, environmental systems engineering, geology, horticulture, military science, and zoology. Literally thousands of hours of instruction are spent in the Forest for these courses.

Forestry students learning their trade in silviculture laboratory as they study the responses of the Forest to various types of cutting.

"THEY SIMPLY AIN'T MAKING NO MORE LAND," is the way Will Rogers once phrased a fact we often heed too little. From 1930 to 1980, our nation's population grew from 122,775,046 to 226,504,825, an increase of 104 million people living on the same amount of land. The pressures felt by foresters are the same we all feel in one way or another: the demands by the mass of sheer numbers which result in more housing, more water consumption, more parking spaces, airports, airport approaches, highways, highway interchanges, shopping malls, golf courses, drive-in theaters, schools, parks, and all the rest of the land-consuming habits we have come to think of as needs. But, "They simply ain't making no more land."

There is no way any particular piece of land can be held hostage forever to one age's choice. The forester who once worked mainly in the country, now often finds that his "back woods" are very close to relatively large centers of commerce and trade. The presence of a small - or even a large - city quite near the woods puts real strains on the land he is charged to protect as a commercial investment, as a source of esthetic value, and as a linchpin for essential functions such as the quality and amount of fresh water. We in this country have been used to having all the space we want, but we now have to make decisions which more clearly define what we mean by "need."

The preservation and use of forest land is coming more and more to be understood as another form of land use as surely as density regulations, housing restrictions, sewer requirements, or any other "city" rules and regulations. Foresters today must help determine what the best use of that forest land is, how it will best serve the population generally. That means foresters must be knowledgeable about more than rates of growth of cove hardwoods or what to try next to get rid of honeysuckle. They must be able to speak to people about total issues involving the land and our dependence on it even when we don't see that dependence daily. Foresters, in short, must be articulate advocates for the proper use, the proper preservation, and the proper respect for the forests of this land.

The Clemson Experimental Forest tries to serve the wider community of the state and hence the region by warning people again and again that there is an end to things - like our land.

In addition, of course, it is virtually irreplaceable, and 50 years of management records essential to research and teaching are absolutely irreplaceable. That, of course, is the nature of education itself. Even though the Forest must earn its keep and even though its current manager considers himself a timber production person, the Forest is more than profit or loss, more than so many cubic or board feet of production, more than so many acres planted or harvested, more than so many dollars in salaries or research grants.

It is all of those things, of course, and all of those things are vital to the Forest. But there remains something beyond, something distilled from its wildlife, its visual beauty, its value in treating our water and holding our soil and letting us see what one man's vision and many men's continuing labor and knowledge and desire can do and keep on doing. Like education, the precious values of the Forest range far beyond the definable sum of its parts.

G. H. Aull and the current Forest Manager L. D. Reamer at Lake Issaqueena, 1980.

For ye shall go out with joy, and be led forth with peace.
The mountains and the hills shall break forth before you into singing,
and all the trees of the field shall clap their hands.
***Isaiah** 55:12*

APPENDIX

Major Events of the Clemson Experimental Forest

Aug	1933	G.H. Aull sends proposal for Fant's Grove Community Development Project, involving 8,500 acres, to Washington. It is turned down.
	1933	Aull resubmits proposal as the Clemson College Community Conservation Project involving 35,000 acres.
	1934	Project approved, Aull named project manager and state coordinator with rank of senior administrative assistant.
Aug/Sept	1934	Project actually gets under way.
Oct	1935	First check for purchase of land distributed.
Sept	1936	Aull returns to position as head of Department of Agricultural Economics and Rural Sociology. Charles Nuite named project manager.
April	1938	Land dedicated in ceremony at Lake Issaqueena.
	1936-1947	Forest managed by Nuite, C.W. Rentz, D.J. Watson, and H.P. Cooper.
	1942-1945	One hundred thirty-five acres of northern forest leased to Air Corps for bombing practice.
	1946	Norbert B. Goebel named Forest manager.
	1947	Pre-Forestry program begun in College of Agriculture.
	1951	Arboretum established.
Dec	1954	Land Use area of 27,469 acres deeded to Clemson College for token price of $1.00.
	1956	Forestry becomes full-fledged department in College of Agriculture.
	1954-1956	Lake Hartwell debates.
July	1957	Marlin Bruner named Forest manager.
	1962	Department of Forestry granted provisional accreditation.
	1964	Department of Forestry granted full accreditation by Society of American Foresters.
	1965	Master's Degree program instituted by Forestry.
	1966	L.D. Reamer first graduate degree recipient.
	1970	Professional degree instituted. 1970 College of Forest and Recreation Resources established.
	1970	L.D. Reamer named Forest manager.
	1975	Lehotsky Hall occupied by College of Forest and Recreation Resources.
	1977	MARP project initiated.
	1982	Ph.D. program approved by State Commission of Higher Education.

Historical Points of Interest on the Clemson Experimental Forest

Following are a few of the points of interest on the Forest property. Precise locations as well as information about other historical sites in the area can be obtained locally.

Treaty Oak: Site of large oak under which General Andrew Pickens signed a treaty with Indian Nations in 1785.

Fort Rutledge: Site of a Pre-Revolutionary War fort built as a defense against Indians.

Old Stone Church: Formerly Keowee-Hopewell Church.

Benjamin Lawrence Grave Site: Grave of Revolutionary War lieutenant.

Ramsey House Home Site: House was Army headquarters when area used for bomb range during World War II.

Colhoun Cemetery: Cemetery for John Ewing Colhoun family. The Colhouns were cousins of the better known Calhouns, though John Ewing was also a U.S. Senator.

Indian Burial Mounds: North of the campus off State Highway 133. Possible archeological site.

Seneca Indian Town Marker: Site of original town probably now under Lake Hartwell west of Clemson University.

Geological Details of the Clemson Experimental Forest

• The land is in the Southern Piedmont Soil Resource area.
• The parent soil consisted of granites, phyllites, and various schists and gneisses formed in the late Precambrian to early Paleozoic age.
• Geologically, it is in a dissected peneplain with remnants of an ancient mountain range.
• The land rises from sloping to moderately steep with ridgetops from narrow to broad.
• Forest elevations range from 650 to 1,000 feet above mean sea level.
• Most of the soils are ultisols with moderate to extremely severe erosion.
• Entisols occur along the streams, but are not extensive.
• Inceptisols occur on very steep areas.
• Soils in the area are classed in a thermic family: warm weather and moderate to heavy rainfall.
• The majority of the soils of the Forest are in the Cecil-Lloyd-Madison association: steep, eroded, well drained, deep, and generally with a severely eroded surface layer where they were used for agriculture in the past.
• The subsoils are red to dark red and firm; two divisions in the northern area of the Forest have soils classed in the Pacolet-Hiwassee association: moderately deep to deep, well-drained clayey, with very steep slopes.
• Most are transitional soils that reflect the mountain-foothill terrain.

Current Research Projects on the Clemson Experimental Forest
(As of June 1983)

- Water Relations in Outplanted Pine and Hardwood Seedlings in the South Carolina Piedmont.
- Effects of Thinning on Stem Form and Wood Quality of Loblolly Pine in Upper Piedmont.
- Effects of Soil Conditioning on the Growth of Loblolly Pine on Eroded Soil in the Piedmont Region.
- Nitrogen Fixation in Forested Soils by NonLeguminous Plants and by Non-Symbiotic Soil Microorganisms.
- Cardboard Mulch as a Vegetation Control Method in Christmas Tree Plantations.
- Production and Testing of Loblolly-Slash Pine Hybrids.
- Wood Quality of Hardwood Branches.
- Natural Succession on Clemson Experimental Forest.
- Improved Yellow-Poplar for Upland Piedmont Sites.
- Vegetation and Species Patterns with Respect to Soil and Site Conditions within the South Carolina Piedmont Hardwood Forests.
- Variations in Water Quality and Quantity in the South Carolina Piedmont.
- Impact of Beaver on the Piedmont Forests of South Carolina.
- Physiological Properties of Loblolly Pine: Nursery Practice and Field Performance.
- Breeding Native Hybrid Pines for Littleleaf Sites in the South Carolina Piedmont.
- Breeding Improved Varieties of Christmas Trees.
- Testing the Value of Seed Orchard Seed.
- Early Loblolly Pine Cone Collection in a South Carolina Seed Orchard.
- Extending the Planting Season for Loblolly Pines: Trials with Containerized Planting Stock and with Growth Retardant-Treated, Bare-Rooted Planting Stock.
- Fibrous Mulch-Mow and Fibrous Mulch-Herbicide Combinations on Vegetation Control Methods in Christmas Tree Plantations.
- Productivity and Edaphic Changes in Loblolly Pine Plantations in the South Carolina Piedmont.
- Potential Biological Productivity of Loblolly Pine.
- Effects of Light and Soil Moisture on Growth and Survival of Yellow-Poplar and Sweetgum.
- Bud Phenology and Height Growth of Yellow Poplar and Scarlet Oak Stump Sprouts in the South Carolina Piedmont.
- Stand Structure and Crop Tree Development in Forty-Year-Old Hardwood Coppice Stands on the Clemson Forest.
- Snags as Wildlife Habitat in the Upper Piedmont of South Carolina.
- The Biology and Production of Littleleaf-Affected Shortleaf Pine Stands.
- Woodcock Population and Habitat Characteristics in South Carolina.
- Growth and Yield of Loblolly Pine in the Piedmont.
- Introduction of Exotic Wood Species.
- Utilizing Swine Lagoon Effluent on Forest Land.
- State of Knowledge on the Role of Prescribed Fire in the Southern Appalachian Mountains and Upper Piedmont.
- Develop and Demonstrate a Stand Hazard Rating System for Southern Pine Beetle in the Piedmont of South Carolina.
- Regrowth Potentials of Extensively Managed Low Grade Coppice Hardwood Stands for Fuelwood on Upland Piedmont Sites.
- Growth and Development of Crop Trees from Natural Hardwood Coppice Following Clearcutting in the Upper Piedmont.
- Improved Coppice Regeneration and White Pine Enrichment Plantings.
- The Effect of Transpirational Drying on Weight Loss and Moisture Content in Sapling-Size Hardwood Trees.
- Evaluation of Herbicides for Forestry Applications.
- Investigations with Velpar in Forestry Applications.
- The Impact of Acid Precipitation on Piedmont Forest Soils.
- Management Alternatives Research Project (MARP).

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On the Clemson Experimental Forest
(As of June 1983)

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Faculty in Department of Forestry - 1983

Professors
R.M. Allen, B.H. Box (Dean, College of Forest and Recreation Resources), B.M. Cool, D.D. Hook, G.D. Kessler, C.L. Lane, W.H.D. McGregor, R.E. Schoenike, W.A. Shain, M.A. Taras (Head), D.H. Van Lear, G.W. Wood, T.E. Wooten, R. Zahner

Instructors
J.L. Haymond, S.K. Nodine

Associate Professors
J.B. Cody, B.A. Dunn, D.C. Guynn, Jr., D.L. Ham, R.L. Hedden, L.E. Nix, L.D. Reamer, G.E. Sabin, F.H. Tainter

Assistant Professors
G.R. Askew, Jr., C.A. Greshman, R.A. Harris, A.P. Marsinko, A.E. Miller, K.F. Ray, A.T. Shearin, T.M. Williams

Emeritus Professors
J.R. Warner, Norbert B. Goebel, Marlin H. Bruner