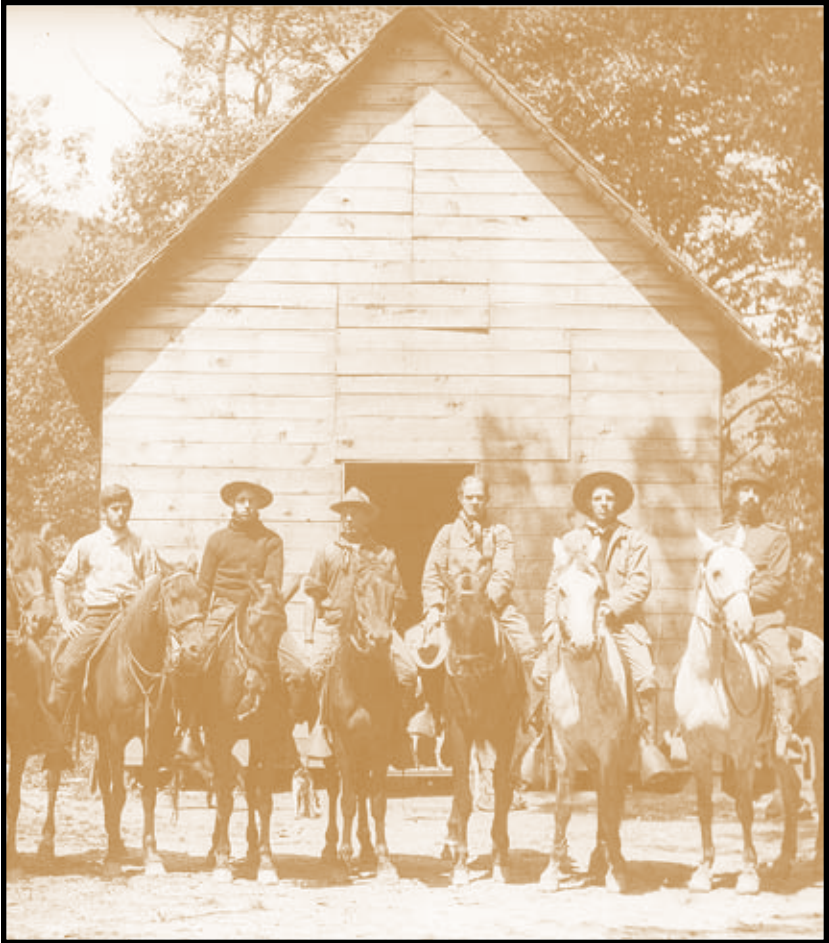


Cradle of Forestry Trail Guide



U.S. Forest Service
National Forests in NC

Pisgah National Forest
Pisgah Ranger District



FRONT COVER PHOTO: Students take a break from their classes to pose with their horses in front of the Biltmore Forest School (1906).

DEDICATION: The Cradle of Forestry Trail Guide is dedicated to the Biltmore Forest School alumni, who documented their lives in the Pink Beds through diaries and photographs, and to their families, who donated these artifacts to the U.S. Forest Service.

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Biltmore Forest School students participate in field study.

The Beginning

The Cradle of Forestry in America's story began in the late 1800's with a dream.

The dreamer, wealthy George Vanderbilt, purchased 2,000 acres of land south of Asheville, NC, in 1888. Spread over this vast estate, which he called "Biltmore," were eroding farm fields and fire-damaged, carelessly cut woods.

Vanderbilt dreamed of changing this land into beautiful gardens and lush forests. He saw Biltmore as the proving ground for "forestry," a new idea circulating in America.

Until this time, only European

foresters applied science over time to grow trees for beauty and income. In America, homesteaders made few efforts to reestablish forests after cutting the best trees for lumber and inferior ones for firewood. People didn't plan for future sources of wood.

"Biltmore could be made to prove what America did not yet understand—that trees could be cut and the forest preserved at one and the same time," wrote Biltmore's first forester, Gifford Pinchot, in his autobiography, "Breaking New Ground."

Vanderbilt continued to acquire forest lands. In 1895 he bought 80,000 acres that stretched 20 miles south

from his Biltmore House. He called these additional acres “Pisgah Forest,” which included the valley where the Cradle of Forestry is today. At one time, Vanderbilt’s land ownership in western North Carolina totaled 125,000 acres.

With a recent doctorate in forestry, Dr. Carl Alwin Schenck arrived that same year from Germany to replace Pinchot as Biltmore’s resident forester. Schenck soon acquired the admiration of people interested in his plans to harvest trees while maintaining healthy forests for future lumber, scenery, and wildlife habitat.

Since America had no forestry schools, those who wanted to learn about the profession asked to volunteer as apprentices under Dr. Schenck. Recognizing a need for forestry education, Dr. Schenck founded the Biltmore Forest School in 1898.

For the first time in America, students studied the science and business of forestry. During the 15 years the school operated, over 350 students practiced tree stewardship, lumbering, and maintaining productive woodlands. They learned from lectures, books, and hands-on work in Pisgah Forest. The students also enjoyed camaraderie as “Schenckes Foresteers (sic),” the title of a school song.

Today the site of this first forestry school is called the “Cradle of Forestry in America.” In 1914 the Forest Service purchased this site and the rest of Pisgah Forest from Vanderbilt’s widow, Edith. Mrs. Vanderbilt required the buyer keep the original name, so Pisgah Forest became Pisgah National Forest.

“Thus was my beloved Pisgah Forest saved from dissection and destruction,” wrote Dr. Schenck in his autobiography. “I am thankful, and I pay everlasting tribute to Mrs.



Gifford Pinchot

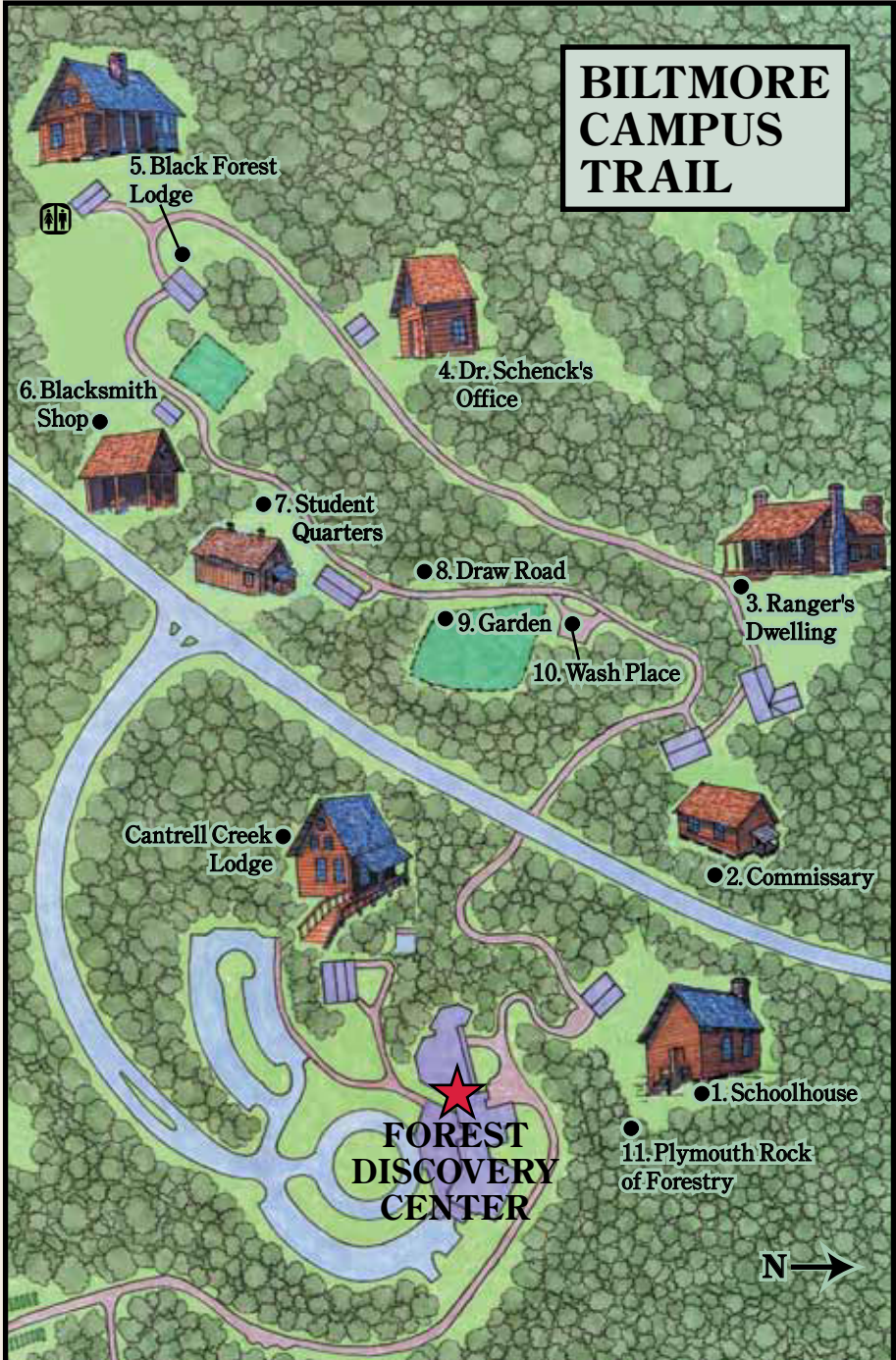


Dr. Carl Alwin Schenck

Vanderbilt for having preserved those forested scenes of our struggles, so that millions of Americans may draw inspiration from their beauty and some lessons from our pioneer forestry work.”

“Biltmore could be made to prove what America did not yet understand—that trees could be cut and the forest preserved....”

BILTMORE CAMPUS TRAIL





Visitors tour the ranger's dwelling, built in 1882.

Explore the Cradle of Forestry

Today the Cradle of Forestry preserves the history of America's first forestry school. You can enjoy paved trails with a tour guide or discover the site at your own pace using this booklet. The one-mile Biltmore Campus Trail winds through Biltmore Forest School's historic buildings—some more than 100 years old.

A 1.3-mile walk on the Forest Festival Trail offers a look at past and present forestry. Learn about efforts to manage forests for many uses. Ring the bell of an authentic 1914 logging locomotive that steamed through the mountains. Along both trails, enjoy getting to know Dr. Schenck, the dedicated forester and teacher who cared for these woods over a century ago.

Biltmore Campus Trail

As you explore the Biltmore Campus Trail, visualize a landscape dramatically different from the lush forest before you. An open, green valley decorated with splashes of pink wildflowers spreads below a backdrop of forested mountains. Rustic cabins, creeks, and clumps of

trees interrupt the zig-zag lines of split rail fences as horses and cattle graze the flat valley floor.

Settlers called this land the Pink Beds long before George Vanderbilt acquired the property. Named after its bounty of wildflowers, the Pink Beds served as the perfect place for



A Biltmore Forest School student photographed this “hillbilly cabin” in 1906.

summer sessions of the Biltmore Forest School. The mountain community provided old farm cabins as housing, and the surrounding forest gave students opportunities to apply their forestry knowledge.

Dr. Schenck held classes on the Biltmore Estate during the winter until he left the employment of Vanderbilt in 1909.

For a time, the school met in the Sunburst community below Cold Mountain.

Dr. Schenck also traveled with his students to Michigan, Oregon, France, and Germany. Eventually

universities, including Yale and Cornell, added forestry programs to their curricula. However, the Biltmore Forest School suffered from competition and graduated its last class in 1913.

The Biltmore Campus Trail offers a glimpse into the past lives of the first American forestry students and the families who lived here. As you visit the cabins and paths, imagine the bustling activities on this rustic campus. Walk back to a time when hoofbeats shook the ground as men on horseback rushed by to their next forestry lesson.

1. Schoolhouse

The year is 1906. A black horse named Punch scratches at the packed dirt under the hitching rail as his rider delivers a dynamic forestry lecture inside the schoolhouse. Waiting patiently nearby for their riders, a chestnut gelding and dapple grey mare move only to flick their tails at horseflies. The buzzing

insects harmonize with the hum of learning inside the simple wooden structure.

A typical summer day for the students included a morning lecture in the schoolhouse, a stop at the commissary for lunch, and an afternoon of hands-on work in the forest. Classes included silviculture, surveying, tree and plant identification, zoology, and law.

***Classes included
silviculture,
surveying,
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zoology, and law.***

New students could join the Biltmore Forest School at any time, as long as they arrived at the beginning of one of 21 required subjects.

A 6-month internship followed a year of course work. Students wrote papers on the internship to earn bachelors' degrees in forestry.

The Pink Beds schoolhouse represents the frugal ways of settlers

and the wisdom of using a structure for more than one purpose. Constructed in 1891, the building served as a primary school and church. After the Biltmore Forest School came to the Pink Beds, Dr. Schenck sometimes preached here on Sundays and bought an organ for the congregation to "improve the singing."

Over the years, the Pink Beds residents moved to less remote areas, and the schoolhouse crumbled to the ground. Biltmore Forest School Alumni donated money to reconstruct the building in 1965.

Photographs of the original structure and alumni recollections helped planners to reconstruct the building to the smallest detail, including the "historic graffiti" above the fireplace.



Biltmore Forest School students in botany lab.

2. Commissary

The weather is mild for July as two Pink Beds women pause from their chores to share gossip on the commissary porch. Mr. Jenny, the storekeeper, is caught up in a tight game of horseshoes and kindly shouts to another customer, “Wait on yourself or wait till the game’s over!” The mail carrier charges his spotted pony up the dirt road for one of three weekly deliveries, as two wagon drivers maneuver around each

other on the rutted trail. An iron shoe clinks as it scores a winning shot in the horseshoe pit.

The commissary became the center of daily life in the Pink Beds community. Built in 1902, the store offered a reprieve from the 14-mile trip to the town of Pisgah Forest for supplies and food.

Residents came here to pick up their mail, buy goods, or discuss the latest news. Each day before heading to the forest, Biltmore Forest School students stopped for a quick lunch including hoop cheese, pork and beans, or canned peaches. The students played baseball and

football in the open area around the store. Always anxious for letters, the students hoped for money from their parents or notes from their sweethearts. In Mr. Jenny’s absence, students climbed through the window to get their mail.



At the Pink Bed’s first commissary, horses wait to carry goods.

Proud of the commissary and other developments in the area, Dr. Schenck wrote, “I had succeeded in obtaining daily rural mail service for the folks living in Pisgah Forest. The preachers who came to the Pink Beds for Sunday services were no longer detained by floods in the rivers, since all fords had been replaced by solid bridges—And there were two stores for general merchandise, both belonging to my forest department—Civilization had definitely arrived, after a struggle of eight years!”

To the side of the commissary once stood a building of similar

proportions, used for storing grain and horse feed. Although the commissary is a reconstruction, the light fixtures are originals; they burned kerosene in earlier use.

3. Ranger's Dwelling

Since 1882 this old home has offered shelter in a landscape that changed from field to forest.

Children played on the porch with homemade dolls and button spinners, women snapped beans, and men gazed with pride across herds of cattle to the forested slopes beyond. Hiram King, a community leader, built this two-story home, large by local standards. A carpenter by trade, he owned a sawmill and kept a

number of beehives.

King sold his home and property to Vanderbilt in 1895. Dr. Schenck used the King House as a forestry employees' residence. Ranger Jimmy Case and his family were the first to live here. They farmed, cooked, and raised children, just as they would have on a place of their own.

In 1904 Ranger Case had two daughters old enough for marriage. One day, at the same time, two suitors came to ask Mr. Case for his daughters' hands in marriage. Mr. Case sent the girls upstairs, because "this is men's business." Finding a knothole in the floor, the girls listened to the conversation below in the kitchen. Ranger Case agreed to give away his two daughters, and the family held a double wedding on the front porch. In 1954 the two couples returned to the same porch to



Children perch on the King house steps, which became home to Dr. Schenck's head rangers. Note the ladder and "scuttle hole" replaced by steps in the early 1900's.



Dr. Schenck's office stood in this meadow where Pink Beds Picnic Area is today.

commemorate their 50th wedding anniversary celebration.

Later residents of the King House included ranger George Gillespie, his family, and Biltmore Forest School students, who boarded upstairs. Mrs. Gillespie cooked twice a day in the kitchen for herself, her husband and children, and eight forestry students.

Behind the house, King planted a fine garden that later became a seedling nursery for school projects. Each student tended a bed containing small trees, such as oak, maple, and cherry.

Just as Biltmore Forest School students lived in the house and cared for its land, Forest Service rangers used the King House as a home and guard station until the 1960's.

4. Schenck's Office

In addition to providing year-round instruction to Biltmore Forest School students, Dr. Schenck worked for Vanderbilt to improve Biltmore and Pisgah Forests and create a profitable timber program. Such a busy, hard-working person needed an office.

Dr. Schenck contacted Judson Meece, the local handyman, and asked him to find, repair, or build a structure for a suitable work space. Meece converted King's abandoned barn into a fine office. Eleanor Ketchum, Dr. Schenck's secretary, and Dan Marshall, the bookkeeper, occupied the outer room. Dr. Schenck worked in the back room.

As Dr. Schenck prepared for

the next day's lecture, his beloved dachshund, Minnie, rested at his feet. Stacks of reference books lined the shelves near his desk, and Dr. Schenck's muddy boots waited to tramp through the forest another day. This is the original desk where the forester graded papers, planned timber improvements, and prepared lectures. Dr. Schenck furnished the office with presses to print his own textbooks, as no English-language forestry texts existed at the time.

Various guest lecturers for Biltmore Forest School somewhat eased Dr. Schenck's workload. One of these men, Dr. Collier Cobb, taught geology at the University of North Carolina at Chapel Hill.

Dr. Cobb enjoyed his visits to the Pink Beds and preferred staying in

a tent to the relative comforts of a cabin. His letters to fiancée, Mary Knox Gatlin, express his feelings for the rural setting: "The strenuous life of these mountains is agreeing with me, and I wake up every morning feeling well and strong though I go to bed dead tired every night. I hope I can keep up this kind of thing well into old age I can't understand how any man could be willing to shut himself up in a store shop, a factory, or a lawyer's office when the whole wide world lies before him and is his for the taking."

This building on the trail is a reconstruction of Dr. Schenck's office pictured to the left. The twisted apple tree in the photo bloomed every spring and marked the location until it fell in a windstorm in 2007.

5. Black Forest Lodge

This unique cabin served as the living quarters for rangers who protected Vanderbilt's Pisgah Forest from trespassers. These defiant settlers hunted, fished, cut timber, and sometimes started fires with little regard for Vanderbilt's property rights. "It dawned upon me that the real owner of Pisgah Forest was not George W. Vanderbilt, but these mountaineers, who were using his property for farming, pasturing, and hunting at their own pleasure," Dr. Schenck grudgingly wrote. "To my own European feeling, they were

Dr. Schenck later convinced Vanderbilt to increase protection of Pisgah Forest by hiring more rangers at \$50 a month.

equal to theft and robbery."

At first, Vanderbilt hired one ranger to protect his property from residents of 300 private tracts. Dr. Schenck later convinced Vanderbilt to increase protection of Pisgah



A truck moves the Rock House Creek Lodge to the Cradle of Forestry. On top of the roof, a workman hitches a ride.

Forest by hiring more rangers at \$50 a month. These workers lived in Black Forest Lodges built in strategic areas in the forest. The Bavarian architecture shows Dr. Schenck's German influence.

Eventually, Dr. Schenck became more sympathetic and wrote, "We have never succeeded, so far, to stop trespass and fire in Pisgah Forest The natives cannot forget that these woods were theirs, for all intents and purposes, prior to 1890; theirs for squatting and logging, theirs for pasture and chase and moonshine.

Can we expect assistance from those who consider themselves dispossessed?"

This lodge is an original chestnut structure that the Forest Service moved from Rock House Creek on Davidson River's headwaters. The lodge replaces another Black Forest Lodge that stood on this spot.

The only other surviving lodge is Cantrell Creek Lodge, named after the creek it originally stood beside. Vandalism concerns prompted the Forest Service to move the cabin. In 1979 the Young Adult Conservation Corps disassembled the structure at its original site. A helicopter flew the material here, and the corps reconstructed the Cantrell Creek Lodge by the Cradle of Forestry parking lot.

6. Blacksmith Shop

Blacksmiths were once as indispensable as food and medicine. Without the blacksmith's skill, horses would become lame and unridable, and wagons and logging equipment would break down. Dr. Schenck understood the need for a blacksmith, and Judson Meece built a shop like this one.

Two men took different turns working here. Tom English and Fate Snelson had their own businesses

in town, and each traveled more than 14 miles to the Pink Beds. They performed regular maintenance on horses and wagons. The men also had "lightweight" portable equipment for logging operation repairs.

Across from the shop, horses waited for blacksmith services. Each student acquired his own horse to keep up with Dr. Schenck on outdoor lectures. The German forester loved to ride hard.

While Dr. Schenck visited Europe, his favorite mount, Punch, died.

In the horse's honor, students engraved a plaque that read:

"Who is the man on a horse named Punch/
Riding along at the head of the bunch/
Giving no time to eat our lunch?"

Graduating students usually sold their steeds to incoming students, so horses spent most of their lives at Biltmore Forest School. A common saying was, "I don't remember your name, but your horse looks familiar."



Dr. Schenck mounted on his favorite horse, "Punch," in 1910.



Students relax on the porch of the Hell Hole. Little Hell Hole is in the background where U.S. 276 is today.

7. Hell Hole: Student Quarters

Katydid and tree frogs fill the air with evening song as four students surround a makeshift table on the broad wooden porch of their quarters. The men's tired bodies rest on overturned wooden crates. A kerosene lamp illuminates faces intent only on the cards in each calloused hand. In the far reaches of the lamp's glow, a shadowed open door reveals last week's winning poker hand tacked to the wall beside a rattlesnake skin.

Students had little leisure time, except for Sundays and 2 weeks at Christmas. When the day's studies ended, students enjoyed meeting for a game of cards or sharing stories of copperheads and rattlesnakes living in dark places around cabins.

Tuition fees for the Biltmore Forest School increased slowly during its 15-year life. In 1906 the cost was \$1,100, a fortune for some, so many students came from wealthier families. With these students' refined upbringing, the Pink Beds seemed like an extended camping trip. Dr. Schenck told new arrivals to "find yourself a place to stay." They did so in the cabins left by settlers after Vanderbilt purchased their land. Dr. Schenck's "boys" loved the Pink Beds, but showed a genuine sense of humor when choosing names to describe their living quarters.

Hell Hole is a replica of the original cabin that stood here. "Little Hell Hole" once stood where U.S. 276 is now. Other quarters were named "Gnat Hollow," "Little Bohemia," "The Palace," "The Ark," and "Rest for the Wicked."

8. Draw Road

Imagine the sound of squeaky wheels as a farmer's cart passes on its way to town. The heavy workhorse snorts dust from his nose and whinnies greetings to another horse and rider returning from a trip to the blacksmith's shop. Few roads existed in the mountains at the turn of the 20th century. Many roads resembled muddy trails.

The draw road is an original remnant of the Pink Beds' main link to the outside world. In the days before Vanderbilt, mountain families made a living from raising livestock, such as cattle, pigs, geese, chicken and turkeys. Farmers used this road to drive their animals to distant markets in Greenville, SC.

In those days, the word "draw" described a creek or stream. The road came up the Davidson River, following creeks or "draws" around the west side of Looking Glass Rock. Continuing between the commissary and the King House, the road wound its way to Wagon Road Gap, where the Blue Ridge Parkway is now. Today the Forest Service's Headwaters Road (FS Road 475B) follows the track of the original route from the fish hatchery to a mile below the entrance to the Cradle of Forestry.

For his forestry plans to succeed, Dr. Schenck constantly emphasized the need for well-maintained roads. His many projects included improvements for the draw road and constructing several new routes through Pisgah Forest.



Students study inside "The Palace."

9. Garden

Rhododendron, mountain laurel, and galax are some common native plants in the Pink Beds valley. These plants are beautiful, yet indicate the soil is too acidic for commercial farming. Settlers in this valley raised and sold livestock rather than vegetables to earn extra money.

This vegetable garden illustrates the great success of growing crops for personal use. With common sense and time-honored methods of composting and fertilization, the farmers easily grew enough food to feed their families and student boarders.

Farmers used a horse-drawn plow to open the ground for planting.

They mixed food scraps, manure, and wood ashes with the earth and plowed under crop stubble in the fall to enrich the soil. Starter seeds usually came from the previous year's harvest. The most common crops were potatoes, cabbage, onions, squash, beans, and corn. Farmers valued corn above all other vegetables because corn fed both humans and livestock. Settlers prepared corn in many ways, including turning it into moonshine. Women wove the dried shucks into mats, brooms, dolls, and other items.

Forest Service archaeologists uncovered many American Indian artifacts in this garden. Flakes, projectile points, and ceramics indicate that American Indians occupied this site beginning at least 3,000 BC.

10. Wash Place

Living in a remote mountain community meant staying busy with seemingly endless chores. Wash day came once a week. Everyone from student boarders to Mrs. Case and Mrs. Gillespie came here to wash clothing and bedding. They boiled these items in a kettle over an open fire and hung them over branches and fence rails to dry.

The commissary brought the popular brand of soap called "Octagon" to the Pink Beds valley in 1902. Before this time, frugal families made lye soap with wood

ashes and animal fat.

The soap-making process began with emptying the ashes from the fireplace into wooden V-shaped boxes called hoppers. Rainwater leached through these ashes and collected below in buckets. The water became a strong lye solution after being poured through the ashes several times by hand. Women mixed the lye with animal fat, such as lard or bear grease, and boiled the mixture until it thickened. When ready, the mixture cooled and hardened in a flat pan. As a final step, the women cut the soap into cakes and used it to clean everything from hardwood floors to the dirtiest child.



At the 1951 Biltmore Forest School Reunion in the Pink Beds, Dr. Schenck, far left, teases alumni. Left to right: Verne Rhodes (Class of 1906); first forest supervisor of the National Forests in North Carolina; Gustav A. Schulze (1909), Howard R. Krinbill (1909).

11. Plymouth Rock of Forestry

Before rejoining the modern world at the Forest Discovery Center, pause to read the plaque on the large rock beside the schoolhouse. Biltmore Forest School alumni held a reunion here in 1950 before the schoolhouse's reconstruction. At that time, they dedicated this "Plymouth Rock of Forestry" to mark the place where the schoolhouse stood. The landscape has changed dramatically since those early days, yet history lives on in the stories of those who lived here over a century ago.

Dr. Schenck felt great pride and affection toward the 300 students who graduated from his strict teaching program. He kept in contact with his former students and called them his "boys" even in later years.

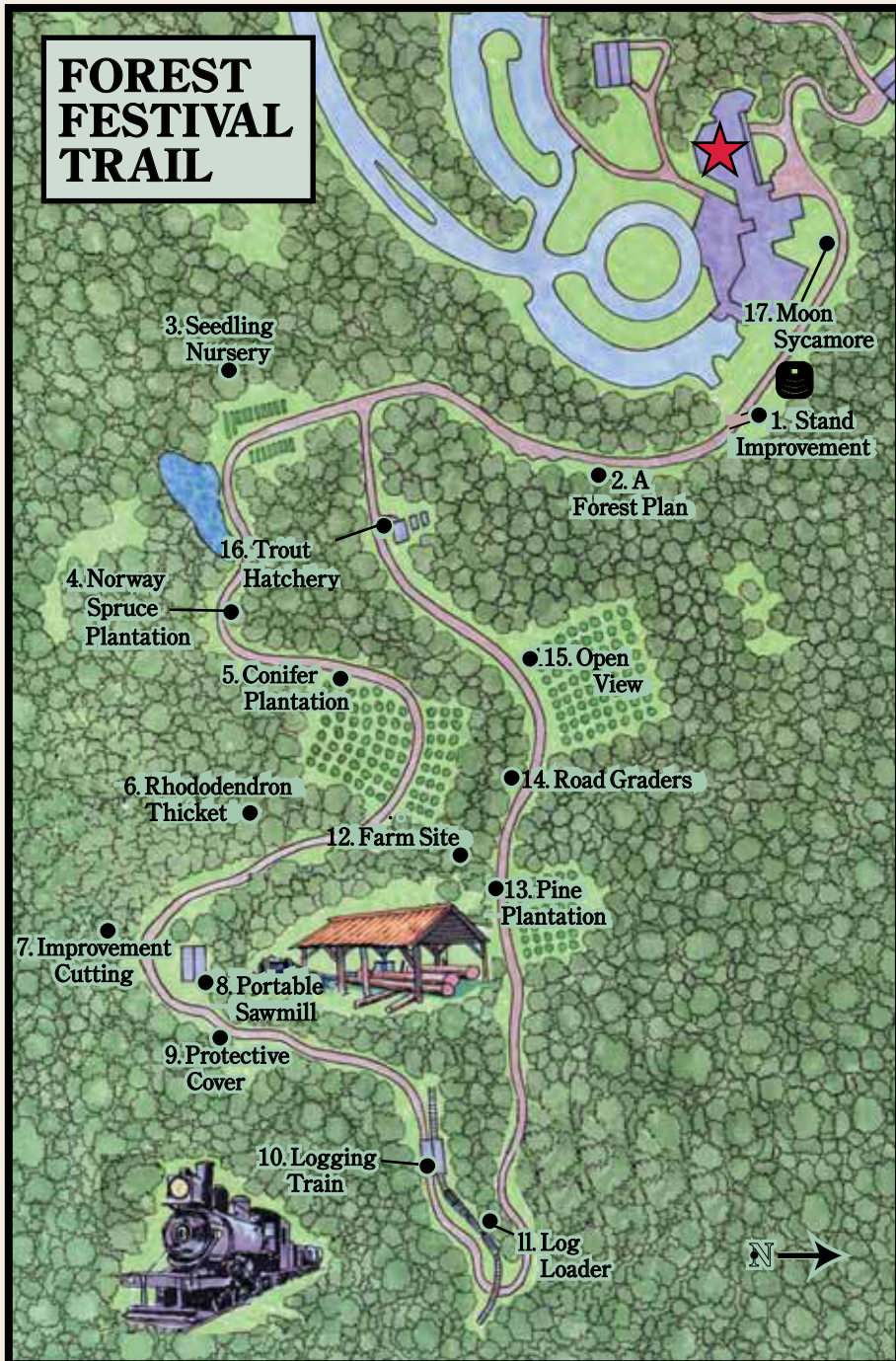
The teacher returned to Germany after the last class graduated in 1913. He visited America a few times later, but never moved back. Letters to his

students reflect on his memories in North Carolina.

Dr. Schenck never lost his sense of awe and respect for the forest and its inner workings. He chose forestry as a profession early in life to make himself strong after a sickly childhood. In his final years, he drew strength from gazing at a stand of trees visible from his hospital bed in Germany. Nature's everyday miracles inspired Dr. Schenck to write sermons, which he occasionally gave at the schoolhouse.

"Every tree is a manifestation of the Divine," Dr. Schenck wrote in 1954 to his students. "If we were all living like trees, we would be much happier, would be more social, more democratic, would interlock arms with the neighbors continuously, and no wonder the trees are long-lived! They are living in the woods all the time! The fellow who tries to find God in the woods is on the right track."

FOREST FESTIVAL TRAIL



Trail Tells Stories of Time

Forests tell stories of time, heritage, and nature. The Forest Festival Trail reveals stories of old farm fields and pastures, wooded slopes and laurel thickets, and a German forester who nurtured the forest over a century ago. Dr. Carl Alwin Schenck, who held a doctorate in forestry, accepted George Vanderbilt's offer in 1895 to come to North Carolina to succeed Gifford Pinchot as manager of more than 80,000 acres of potential forest land.

For the next 14 years, Dr. Schenck focused all his skills on changing these fields and woodlands into superior examples of forestry for America.

Encouraged by successes and wiser from failures, the forester offered a 3-day excursion through the Biltmore Estate and Pisgah Forest to show the accomplishments and possibilities of practical forestry. At a time when the word "forestry" was a vague and newfangled idea, Dr. Schenck invited businessmen, lumbermen, politicians, and educators to the 1908 Biltmore Forest Fair and wrote a guidebook of



Vanderbilt's land, Pisgah and Biltmore Forests.

sites along the forest tour. Today you are invited to walk the Forest Festival Trail, where you, too, will see the successes, failures, and possibilities of forestry—past, present, and future. Enjoy your surroundings and the stories this forest tells.



1. Stand Improvement: Making Room



White Pine



Time brings change to a forest. Whether the change is for better or worse is a matter of perspective. For a forester, it's a matter of purpose. In 1997 foresters were concerned over struggling white pines and the lack of young white oaks to replace the old oaks in the rear of the plot. They cut tangled undergrowth and declining overstory trees, creating more light and space. Working within nature's design for this area, foresters left the strongest young pines to grow with

hardwoods in this mixed species stand. And grow they did!

Despite the increased light, natural oak regeneration has only been successful by the trail. Thick root masses of the buckberry understory in the plot have likely contributed to this as acorns need mineral soil to sprout. Attempting to keep white oak in the mix for future wildlife food and wood, foresters planted six-year-old white oaks in the area in 2010. New growth gives hope for a healthy community of plants and animals that need shelter and food. Time will tell if this plan succeeds.



White Oak



Eastern Hemlock

“Leave nature alone or help nature! Give it increased chances! Do not hitch it up, using narrow-mindedness for the harness! ... learn from nature!”

*—C.A. Schenck,
Biltmore Forest Fair guidebook.*



Pinchot's Biltmore Forest Plan categorized land for specific uses.

2. A Forest Plan: Looking Forward

Making sound decisions about a forest requires a plan based on the best science available.

Gifford Pinchot, Vanderbilt's forester from 1892 to 1895 and the first Forest Service chief, developed the first plan for managing a forest in the United States.

The Biltmore Forest plan included improvement forest cuttings for natural regeneration, tree plantings on old farmland, and protection from fire and free-roaming cattle.

Today the law requires every national forest to have a land management plan. Forest planners update these documents to meet the ever changing demands of our diverse society and the needs of future generations. Some values addressed are clean air and water, endangered

“The forest managed by a good trust would never be depleted; and there would be forestry.

*I trust in trusts;
in good trusts...”*

*—C.A. Schenck
Biltmore Forest Fair guidebook*

species protection, and quality recreation experiences.

From this spot on the trail, you may notice a stream, layers of forest vegetation, and standing dead trees. If you were a forest planner, why would these features be important?

On the national level, the Forest Service plans strategies with researchers and partners to respond to threats such as exotic invasive species, climate change, and wildfire.



Students prepare tree seedling beds.

3. Seedling Nursery

Dr. Schenck's first challenge in carrying out Pinchot's plan was to reforest over 3,000 acres of abandoned worn-out fields on the Biltmore Estate. Because hardwoods are the most common trees in this area, Dr. Schenck tried planting acorns and hickory nuts. Field mice and squirrels had great appetites for his work, and this experiment failed. Since no nurseries sold tree seeds or seedlings in America, he started his own nursery. Dr. Schenck bought seeds and trees from Germany until his nursery was operational. Biltmore Forest School students planted and tended the beds as part of their training.

Today many seed orchards across America provide foresters

with stock genetically improved for resistance to diseases, insects, and drought. Managers of mixed hardwood forests like these rely on seedlings and stump sprouts to naturally reforest an area disturbed by fire, farming, timber harvest, or other means. Planting is done where natural regeneration needs a boost. Dr. Schenck learned these lessons from the many experiments at Biltmore and Pisgah Forests, the proving ground for forestry.

“Greater men than I have planned ahead and built ahead for centuries. Pardon me...when I have the check to meddle with the decades!”

— C.A. Schenck, *Biltmore Forest Fair guidebook*

4. Norway Spruce Plantation: Lesson in Neglect

Do you see any trees in front of you that look 100 years old? The tall, skinny trees with branchless trunks are living artifacts—remnants of a one-acre Norway-spruce seedbed Dr. Schenck planted a century ago. Establishing this European species on the Biltmore Estate, the forester decided to test its growth in the Pink Beds valley. He abandoned the experiment when he left George Vanderbilt's employment in 1909.

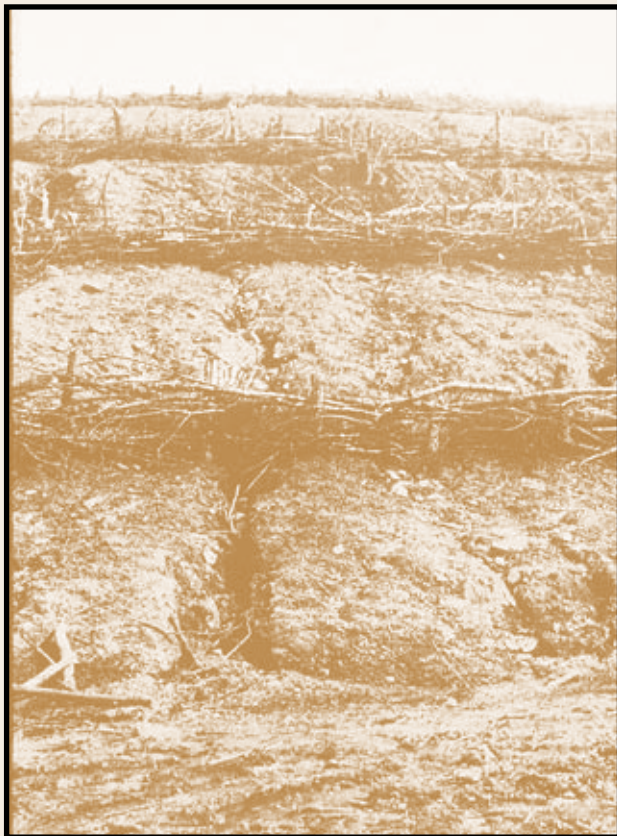
Neglected, the crowded plantation struggled to survive. The southern pine beetle killed the most weakened trees. Once discovered the Forest Service rescued these strong survivors by cutting out competing vegetation. In 2007 forest workers planted Norway spruce seedlings on the other side of the trail to hold the site's history.

Hemlocks in this plot seeded themselves from the surrounding forest, "free of charge," as Dr. Schenck often said. Today a non-native insect, the hemlock wooly adelgid, is killing native

hemlock trees. Attempting to save them, the Forest Service released pin-head sized predatory beetles specific to this adelgid on some Eastern and Carolina hemlocks along the Cradle of Forestry's trails. Science partners collected hemlock seeds throughout the trees' ranges to save DNA in the hope the trees will eventually re-establish themselves once the adelgid threat passes. Now there is another experiment to monitor—can the non-native beetles save these trees? Would it have been negligent to not try?



Norway Spruce



Dr. Schenck's apprentices built "wattles" on Biltmore Estate's bare slopes to control erosion.

5. Conifer Plantation: Comparing Growth

Experiments taught Dr. Schenck that hardwoods grow best from natural seeding and sprouting. He proved conifers grew well when planted, but which ones grew best in these mountains? Which conifers grew the fastest on old farm fields, holding soil with their roots and nurturing it with

their needles? How close can landowners plant conifers so they still grow well and make a profit? Dr. Schenck experimented with comparison plantations like this one, planting different native and non-native species at the same time. Which conifer is growing the best on this site?

Today plantations are established on tree farms where maximizing production is the most important consideration. Planting on national forests is done to mimic nature using species native to the site. Many plantation results pleased Dr. Schenck. He

believed miracles do happen after seeing trees and a layer of humus where once deep gullies funneled away soil and water.

"If men should hold their peace, the trees would cry aloud: 'Honor and thanks to you, George W. Vanderbilt!'"

— *C.A. Schenck, Biltmore Forest Fair guidebook*



Rhododendron
Maximum

6. Rhododendron Thicket

This rhododendron thicket tells stories of ice and wind, sun and shade, and old and new growth. Dr. Schenck called rhododendron “the beauty and the beast of the forest.” He revered rhododendron for its beautiful blooms and cursed it for its impenetrable thickets and shadows that restrict new tree growth.

The oldest rhododendron stems died here, and more sunlight is energizing a variety of young trees. Could this be a reaction to an overstory opened by a severe ice storm in 1986 and removal of damaged trees in 1991? Notice the vigorous growth sprouting from large root systems. Is the decline and new growth a natural cycle for old rhododendron? This may be so. Foresters observe rhododendron dieback both under forest canopies and in sunny openings. Will the rhododendron sprouts grow quicker

than the young trees and eventually shade them out? We still have much to learn about plant communities.

Today’s foresters look at ecosystems and landscapes and recognize that forests are more than trees. Shrubs, wildflowers, salamanders, and songbirds are some other occupants of valuable forest niches. Rhododendrons’ streamside presence benefits water quality with soil-holding roots and cooling shade for trout habitat. Dr. Schenck’s “beauty and the beast” is a part of multiple-use forestry.

7. Improvement Cutting

A forest is a dynamic living system. When carrying out management plans, a forester applies the best science available to the changing land. What is the forest’s condition now, and what is its desired future condition? Oak decline killed the mature scarlet oaks in this area, and the dead trees



Scarlet Oak

were removed in 1991. In the scarlet oaks’ place, foresters want to encourage a mixed-hardwood stand and the plants and animals that thrive in this forest.

Oak decline is a complex of stresses that can include drought, late spring freezes, ice and wind damage, and air pollution. Weakened trees are unable to fight off insects and



Northern Red Oak

other diseases. Scarlet oaks are the most common oak at the Cradle of Forestry. This fast grower is short-lived, thriving for only about 80 years, compared to 120 years for northern red oak and 400 years for white oak. The stressed scarlet oaks started to drop limbs and fall at the end of their expected life span—not a good thing to happen along a trail

at a historic site! Scientists from the Forest Service and universities conduct research on forest health. They monitor impacts from insect pests, fire, and air pollution. This information helps managers in forest planning.

“The forest is a boarding house; when some of the boarders are gone, those remaining obtain more food to eat.”

— C.A. Schenck, *Biltmore Forest Fair guidebook*



8. Portable Sawmill: Symbol of Industrialization

The chugging of an engine, the buzzing of a saw: These were the common sounds of the steam-powered sawmill that operated by 1900. Teams of oxen or mules “snaked” the logs out of the hills to the mill. Instead of hauling a whole log out of the forest, sawmill operators sawed the logs into boards and loaded them on wagons.

They also cut some wood into shingles. After loggers cut all selected trees from an area, the sawmill moved

to a new location.

The days had disappeared when only local residents or seasonal travelers used the forest for fuel wood and building needs. Steam-powered sawmills marked the beginning of the industrial age, when forests became national resources.

Dr. Schenck had two sawmills that supplied trees for a lumberyard, where the Pisgah Forest community is today. His improved roads allowed for economical deliveries of tanbark and chestnut wood.

In the spring, Biltmore Forest School students worked in sawmills to learn first hand how trees could be made into forest products.



On left, lumber inspector and Biltmore Forest School instructor Sam Eaton poses with students after hardwood inspection lesson at Dr. Schenck's sawmill.

“One of our sawmills! I love to hear its singing;...Ruf Galloway is the band master who keeps the saws in proper tune. Shake hands with Ruf, and feel as proud as if his grip were a president’s.” — C.A. Schenck, Biltmore Forest Fair guidebook

9. Protective Cover: Pine Plantation

Do you feel a difference in the air under these evergreens? While quieting the forest, the thick soft carpet works like a sponge that soaks up rainfall, prevents soil erosion, and quiets the forest.

Changes in forest types allow for a rich diversity of life over the landscape. While many species use a variety of habitats and can adapt to changes, some require certain

combinations of climate, soil, and plants. Much of this diversity goes unseen. Just think of the many micro-organisms, fungi, and insects in this soil that use the last bit of energy in fallen pine needles! These pine needles are then recycled back into the food chain.

Given a few weeks of dry weather, a careless match will start a fire in pine needles. Dr. Schenck saw fires as a barrier to forestry, and he instructed his rangers to prevent forest fires. Today prescribed or controlled fire is considered a tool

for improving wildlife habitat and conditions for tree regeneration. Carefully monitored controlled fire lessens serious wildfire threats by reducing levels of flammable ground debris. Preventing wildfires is still practiced today.

“The debris on the ground is a curse to the trees of the mountains by feeding fires; and a blessing to the waters of the mountains by preventing erosion, by hoarding the moisture in wet weather and by forcing the rain to enter into the subsoil. The trees whilst living are the greatest consumers of water on earth; the trees, when dead on the ground, are the greatest water preservers.”

—C.A. Schenck, *Biltmore Forest Fair guidebook*

10. Logging Train: Forestry Takes a Back Seat

Imagine standing on a railroad track amid the silence of the forest. Suddenly the ground begins to tremble and the puffing of a steam engine overtakes the silence. This restored 1914 Climax locomotive wound through forest coves in western North Carolina for over 40 years. The train brought logs from the mountains and supplies to logging camps. The railroad’s success rapidly altered the lumber industry.

Gear-driven, narrow-gauge locomotives could maneuver sharp corners in the mountains. Followed by a dozen or more heavily loaded log cars, the engines slowly moved down mountains to the sawmills below.

Sometimes a train derailed if the engine gained too much speed for the engineer to control.

The logging locomotive made its debut in the Appalachians during Dr. Schenck’s sojourn in Pisgah Forest. The teacher and his students visited and studied many locomotive logging operations.

With no forester to manage Pisgah Forest in 1912, Vanderbilt sold the forest’s timber rights to the Carr Lumber Company. The company built about 75 miles of track and trestles in the area and employed many local people. Vanderbilt’s widow sold Pisgah



Forestry students observe a loaded Climax locomotive ready to head to the mill.

Forest to the Forest Service in 1914 with the stipulation that the 20-year Carr contract be honored. Many old railroad beds are today's Pisgah National Forest trails that wind through regenerated forests.

“...on forest soil and in a forest climate, the effect of nature’s forces is a forest...”

—C.A. Schenck,
Biltmore Forest Fair guidebook

11. American Log Loader

How could you get a heavy log up to the train when the log lies on a slope 100 feet below? Steam power made a hard job easier. This log loader could lift more than 1,000 logs per day. A long steel cable with pointed tongs snaked down the hills to the waiting tongsman. He would knock the tongs’ ends into the green wood with a light sledge hammer and give a hand signal to the loaderman. With a sharp steam whistle and a loud chug, the log loader tightly



A steam-powered loader holds a log on which two workers pose.

drew the cable and slowly pulled the log to a landing by the train track. Later that day all the logs would be loaded for the long ride down the mountain to the sawmill. Loggers also used the log loader for other jobs, like track laying, coal handling, and trestle building.

What a different way of life this technology brought to many a mountain family!

As lumber companies and machinery came into the area in the early 1900's, families no longer had to depend solely on farms for their livelihoods.

“Once upon a time, Uncle Sam hitched up a team of fine horses to plough his fields...a spirited mare—he named “Liberty”... a steady, sinewy, intelligent horse—he named “Conservation.” And behold! “Liberty balked when “Conservation” pulled; and when “Conservation” stopped, “Liberty” went ahead. And it was a bad job; and Uncle Sam realized the impossibility of ploughing with “Liberty” and with “Conservation” hitched together. And thereupon Uncle Sam did a thing he had never done before; and cried like a child.”

— C.A. Schenck, *Biltmore Forest Fair guidebook*

12. Farm Site From the Past

Have you ever chanced upon old apple trees in the woods, or a scattering of daffodils? These are places where settlers lived. Imagine the different lives they led. Abandoned farms were common in Biltmore and Pisgah Forests. Thin, weak mountain soils could not sustain crops, as nutrients became depleted and topsoil washed away. Pinchot and Dr. Schenck recommended to Vanderbilt that some old farms remain in pasture. Income from grazing permits supported Vanderbilt's vast forest holdings. Dr. Schenck

worked to reforest some former croplands, especially those with soil erosion. Today's managed wildlife openings mimic the forest edges that scattered farms provided, where many animals find shelter and food.

“Farm lots form an integral part of systematic forestry—just as woodlots form an integral part of systematic agriculture.”

— *C.A. Schenck, Biltmore Forest Fair guidebook*



In the 1930's, the Forest Service managed a fawn farm here. Workers cared for the fawns till they were old enough to move to states where deer had vanished.

13. Pine Plantation

Dr. Schenck often planted white pines to reforest farm fields. Foresters started this plantation in the early 1980's when the Forest Festival Trail was built. Foresters thinned half of the plantation to allow selected trees to increase in size and value, much like gardeners thinning a vegetable bed.

These trees now have more room, sunlight, and water. The yellow-banded trees would be harvested in a typical thinning.

Walk among these trees



Mules trudge up a typical mountain road. (1901).

and look for the difference in spacing and growth. What is the next generation growing under these pine trees?

“Here...I shall show you a ‘thinning’ in progress. It is made,—first for the benefit of the pines, and second for the benefit of our exchequer, the former profiting more than the latter.”

—C.A. Schenck,
*Biltmore Forest Fair
guidebook*

14. Road Graders: Essential for Forestry

“Gee! Haw!” the mule-skinner yelled at the mules who strained on their harnesses. “Gee” told the mules to pull to the right, a yell of “haw” and they pulled to the left. While these old graders could make a dirt road smooth, they were limited by mule and horse strength. Road builders took the route of least resistance—long, winding roads in the mountains.

Dr. Schenck believed good roads were essential for a profitable forestry program. To market Pisgah For-

est timber, he needed a transportation system. This put Dr. Schenck in a dilemma. Easier access for him to move timber meant easier access for owners of inholdings to Pisgah Forest. Would improving the forest road system lead to the already serious problems of woods arson, timber theft, and game poaching? Dr. Schenck decided his forestry program was worth the risk.

By 1905 Dr. Schenck improved or built 80 miles of road and 198 miles of trail. Today Pisgah Ranger District visitors travel some of these same gravel roads. Most roads in national forests are closed

to traffic and serve as wildlife openings and for recreation.

Management of existing roads and road building in national forests continues to be a controversial issue in America.

“... forestry was a problem of transportation and transportation was a problem of topography.”

— C.A. Schenck, Birth of Forestry in America.

15. A Welcoming



forest plan identifies a forester's vision for a wooded area and how that vision can be

realized. Retired forester and volunteer Nels Glesne developed a vision to manage this plot for aesthetics, tree diversity, and wildlife shelter in the form of brush piles.

While in his 90's, Nels hand sawed crowded pole-like white pines and mountain laurel in this plot, giving remaining trees the chance to grow well. His work uncovered an occasional cherry tree, serviceberry, sugar maple, and other tree species. Nels also created small openings for plantings of butternut, mountain ash, and dogwood. This intense management, impractical for a large

“Only the fire, only the plough, prevent nature from re-establishing the forest where we remove it.” — C.A. Schenck, Biltmore Forest Fair guidebook

forest area, has application for the small land steward.

An open understory often has visual appeal. It is also historical. In the Biltmore Forest Fair guidebook Dr. Schenck wrote, quoting a local assistant: “Believe it if you will: In 1880, these woodlands were so bare from undergrowth (being burned annually) ‘that a fellow could see his milk cow pasturing in the woods at a distance of half a mile.’”

Restoring historical landscapes is a challenge for national forest planners today. The Forest Service strives for a mosaic of forest structures and ages across a landscape. This encourages the greatest diversity of habitats and species nature will allow.

This open understory looks dramatically different from the first stop on the trail. Which do you prefer? Which would wildlife, native grasses, or trees prefer? A forester considers all these perspectives.

16. Trout Hatchery

Schenck wrote very comprehensive work plans for Biltmore and Pisgah Forest. In addition to tree and lumber work, he tried to improve game and fisheries

to make his forestry program profitable for Vanderbilt. His apprentices built fish rearing ponds at the Biltmore Estate, but heavy rains and flooding in 1899 destroyed the ponds.

To raise trout for stream stocking, the Forest Service built these fish-rearing races in 1933 under the cool, cozy cover of rhododendron. Do you see the trout swimming in the dark water? The trout pond near the seedling nursery provides the water. This was the first fish hatchery in Pisgah National Forest. The hatchery was abandoned in 1936 when the U.S. Fish and Wildlife Service built a larger hatchery on Davidson River.

The North Carolina Wildlife Resources Commission now manages the hatchery near

Davidson River, where the Pisgah Center for Wildlife Education is today. The commission establishes fishing and hunting regulations in Pisgah National Forest.

“The scenic grandeur of the Pisgah Mountains, added to the unusually favorable



A worker stocks brook trout in a mountain stream (1930's).

climatic conditions and good fishing offered in the creeks and rivers draining the mountains, make Pisgah Forest desirable as a Game and Fish Reserve,” Dr. Schenck wrote in 1898.

As you return to the Forest Discovery Center past tangles of mountain laurel and rhododendron, you will see why Dr. Schenck called the Pink Beds “the jungle.”

At the hilltop, look for a sycamore tree in the open on the trail’s right side. This special tree holds the last story on your Forest Festival Trail exploration.

Moon Sycamore

Touch this tree and feel its fuzzy leaves. You are touching a living thing that went to the moon!

Stuart Roosa, a former Forest Service smoke jumper, served as an astronaut on the 1971 Apollo XIV mission. When his opportunity came to visit the moon, he wanted to take something in honor of the Forest Service. What would be appropriate? Tree seeds! Nearly 500 seeds orbited the moon with the American astronaut.

This Moon Tree reminds us of the undiscovered knowledge of our earth’s forests. The world depends on the connected network of plants, animals, soil, water, climate, air, topography, and human activities. Science continues to teach us about our universe and the stuff of stars that is our earth, our changing forests, and ourselves.

“Woods are sanctuaries! Send the kids to the woods. They are better for them than any classrooms built of brick.”

—C.A. Schenck, age 86



Dr. Carl Alwin Schenck (June 1951)



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Under the trail guide category, the Cradle of Forestry Trail Guide earned second place in the 2002 National Association for Interpretation Media Awards Competition.



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