

THE SMOKY MOUNTAINS AND THE PLANT NATURALIST*

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The Great Smoky Mountains are surely the naturalists' garden, for where in America is there such a display of vegetation! The Appalachian Mountains, which include the Smokies, are higher than any east of the Rockies, but it is their plant dress that makes the region exquisitely beautiful and most alluring.

The acres of indigenous hardwoods in the Smokies form the largest tract in America; it is probable that here the hardwoods of this nation and perhaps of the world originated. According to a report submitted to Congress in 1901 by President Roosevelt, there are 137 species of trees and 174 species of shrubs recorded from the Southern Appalachian region, and it is supposed that most of these occur in the Smokies. Sudworth (1927) lists for Eastern Tennessee approximately 150 trees. In contrast with our 150 species of native trees, there are but 85 tree-species native in all Europe. In a week-end trip through the Smokies one may see more indigenous trees and shrubs than in a cross-continent trip from Boston to the Pacific coast, or in a European trip from England to Turkey.

At the University of Tennessee we now have under way check lists of the flowers, trees, ferns, mosses, and fungi of Eastern Tennessee and plan to cover the state as rapidly as possible. We have listed 362 flowers blooming before July 1, and 203 blooming after July 1. There are some duplications in these lists. We have checked over 140 trees and shrubs. There seems to be even a greater abundance of larger fungi; among casual collections of these plants made in the fall of 1926 there were scores of bracket-fungi alone.

One of the first botanists to visit and collect here was William Bartram. He botanized in the southern portion of the Tennessee mountains in the year 1776, and later described some of our most remarkable plants, such as *Rhododendron punctatum*, *Stewartia pentagyna*, and *Rhododendron calendulaceum*. Some of you are familiar with his description of flame azalea in which he refers to it as the "most celebrated species of azalea."

Another botanist to visit in the vicinity of the Smokies at an early date was Michaux, who, under privation and hardship, collected around Grandfather Mountain in North Carolina and passed over into Tennessee near Jonesboro. Michaux collected extensively and some of his plants have not been rediscovered up to this time.

Other botanists to visit the region in question are Fraser, Nuttall, Curtis, Gray, Small, and at various intervals Trelease. Most of these men explored in the North Carolina mountains around Grand-

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Fig. 1.—Tulip tree; the "big tree" of the East.

father and Blowing Rock but did not get into the Smokies, and while it is probable that the flora of these regions is similar it is yet to be confirmed.

The factors influencing the great number and variety of plants comprise climate, range in altitude, soil formations, and rainfall. The superior forest development is due mainly to the heavy rainfall. There are places along the North Carolina-Tennessee state line where the annual precipitation amounts to 84 inches, and there are few localities in the region where it is less than 50 inches. During the spring and summer months there is rain almost every day, and the ground is moist at all times. On the summits of some of the high mountains there are typical cold bog formations with beds of sphagnum, and in other places muck and mire many inches deep.

Hemlock, buckeye, tulip tree, chestnut and a number of other trees reach their maximum growth in these mountains (Fig. 7). One of the most striking things to be seen along the trail up Mt. LeConte is the giant yellow buckeye trees, specimens of which often attain a diameter of four feet and a height of 90 feet. The king of the Smokies is the tulip tree; on the moist mountain slopes this tree reaches 10 feet in diameter, and 190 feet in height. The trunks are straight and free of branches for 100 feet. The trunks of the tulip tree are unsurpassed in grandeur of column by those of any eastern American tree. Assuredly this is the "Big Tree" of the east (Fig. 1). Forest stands of tulip trees do not obtain, but many individuals grow thickly scattered throughout the range.

The rarest of our eastern trees—the yellow-wood, *Cladrastis lutea*, is found in the Smokies. To come upon a rare plant such as this provides a thrill; and the plant lover is thus amply repaid for the effort expended in exploring the Smokies. Yellow-wood may be found growing on the banks of the west fork of the Little Pigeon River, a tributary to the Tennessee. The trees are large with trunks cleft nearly to the base; the large branches droop, giving them the appearance of extreme flexibility. The compound leaves and panicles of green pods present a rather feathery, graceful appearance, which serves to distinguish it at some distance.

One of the most beautiful trees of the Great Smokies is the silver-bell, or snow-drop tree. The silver-bell is usually a small tree or shrub; but, like the tulip and other trees it has here found conditions favorable for its greatest development, and it is possible to find them three feet in diameter and 90 feet in height. In the spring when each branch is fringed with white bell-shaped flowers the sides of the mountains appear as if a light snow had fallen.

The evergreens are no less interesting than the deciduous trees. There are five species of pines which occur on the sandy ridges and dry slopes of the mountains. Red and black spruce are common at higher altitudes. Tennessee is usually not included in the range of black spruce, which, however, was observed by Small and is recorded in Gattinger's Flora of Tennessee. We have observed it

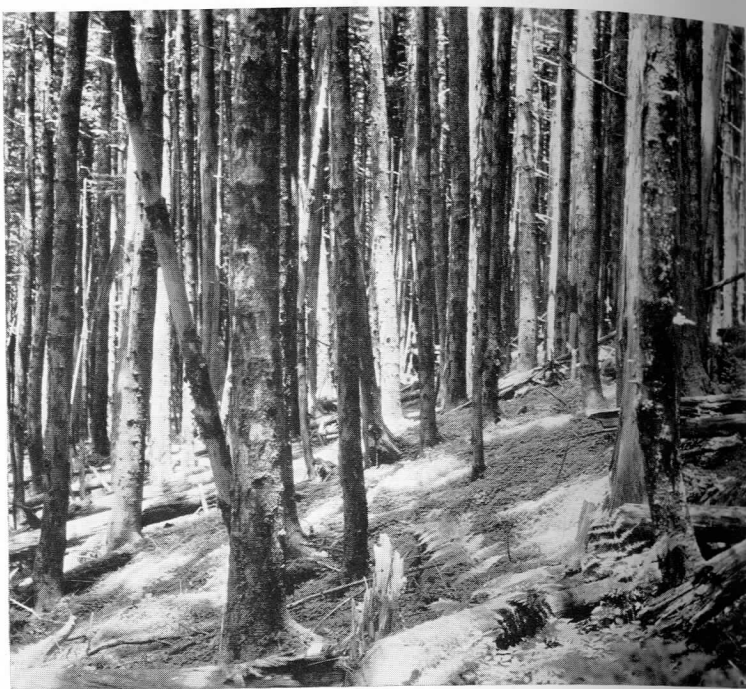


Fig. 2.—Balsam near summit of LeConte.

on Mt. LeConte and Clingman's Dome. There is one species of *Abies* in the Smokies—Fraser fir, or balsam. It is found only in the region of the Smokies and is the characteristic tree on the tops of some of the higher mountains (Fig. 2). The tree, when isolated, has a pyramidal top composed of whorls of horizontal branches. The bark of the younger trees is dotted with resin blisters, and it is a rather common practice among the mountain people to break open the blisters and chew the resin, although it is so bitter that one can taste it long afterward; one sample is sufficient. The leaves of this balsam are broad and silvery-white beneath, and fill the air with their fragrance.

In going from the base of one of our high mountains to the top one traverses the same floral zones that are to be found in a trip from southern Tennessee to southern Canada. Plants of southern range, such as magnolia and sweet gum, are found in the valleys. On the tops of the high mountains at altitudes ranging from above 6,000 feet are found plants of northern range such as black spruce and mountain ash, both natives of Canada. Another northern plant occurring in the Smokies is the climbing fumitory. This species is in its most southerly range here and is rare; only a few of the most ardent explorers have found it. It grows on a rocky ledge known as Devils' Den on the Chilhowee Mountain at an altitude of 2,500

feet. It is a delicate climbing vine which blooms in late summer and fall. The two enlarged petals which form the heart-shaped flower become pithy and are persistent, thus being a very attractive vine in fruit as well as in bloom.

A plant of the same family which occurs rarely at altitudes ranging from 4,000 to 5,000 feet is dutchman's breeches—a quaint little plant, the flower of which is very suggestive of its name. Associated with dutchman's breeches, and a member of the same genus, is squirrel-corn. It is so named because of the yellow corn-like bulbets on the roots.

Members of the heath family are outstanding in the vegetation of the Smokies. The mountain streams are bordered with rhododendrons and laurel (Fig. 3), and the mountain slopes are thick with flame azalea and "wild honeysuckle" beneath the dense stand of trees. The bold mountain summits and knife-like ridges have a dense covering of rhododendrons and sand myrtle which make them appear from a distance to be less rugged and precipitous. There are two species of rose-flowered rhododendrons on these mountain summits. One is the large *Rhododendron catawbiense* which sometimes grows three times as high as one's head and has large clusters of rose-purple flowers which beautify the mountains from June to September. It is also to be appreciated when the flowers are gone because of its leaves—gracefully drooping, glossy, green, and almost white beneath. The other rhododendron is a short shrub rarely over waist high, with dense clusters of smaller rose-colored flowers. The leaves are small and tend to stand erect rather than to droop. They are also characterized by a slight scaliness and small dots on the under surfaces and petioles which fact suggested the specific name *punctatum*. Since the flowers of this rhododendron are so numerous and the bushes are uniform in height, the end of a mountain often appears as a solid sheet of rose color. Standing on one mountain and looking across to another, the summits and knife ridges extending downward appear rose, thus breaking the monotony of an otherwise sombre landscape. The sand myrtle, with its tiny shellacked leaves and myriads of star-like pink and white flowers, is always an object of admiration (Fig. 4). Growing in crevices and on rocks on wind-swept summits, one marvels at its ability to obtain nutrient materials and to withstand the storms which so frequently test its stout roots. Sand myrtle is such a sturdy shrub that one can lie down on it and spring up and down and never touch the ground. This plant and the small pink rhododendron are described in Small's Flora of the Southeastern United States.

Mountain laurel, known to the mountaineer as "ivy," reaches its maximum development in the Smokies. It is not unusual to find arborescent laurels one foot or more in diameter and many feet high. However, the most beautiful blooms occur on the smaller bushes of cut or burned-over areas where the plants receive a max-



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Fig. 3.—The mountain streams are bordered with rhododendrons and laurel.



Fig. 4.—*The sand myrtle with its tiny shellacked leaves and myriads of star-like pink and white flowers is always an object of admiration.*

imum of sunlight. The large clusters of pink and white cups make an unforgettable picture.

A rose-purple laurel has been reported from the Smokies, although we have not observed it.

Another heath which is indigenous to the Smokies is a rare species of *Andromeda*. This plant is usually found on pinnacles or rocky prominences and is spectacular with dense white-flowered panicles.

Leucothöe, also native to the Smokies, is found along the mountain streams. Its graceful recurved branches bearing shiny evergreen leaves and racemes of wax-white flowers make a handsome show. Some of the mountain folk call this plant "dog-hobble," but it is also called by its scientific name by people who can neither read nor write. It may be that they originally got the name from some early botanist exploring the region—perhaps Bartram, or Michaux, or Gray.

Some of the drier, sandier mountains support an abundance of the widely distributed trailing arbutus, which in early spring is a delight and an inspiration to all who go afield. One rarely has to remove the fallen pine needles to find the clusters of fragrant,

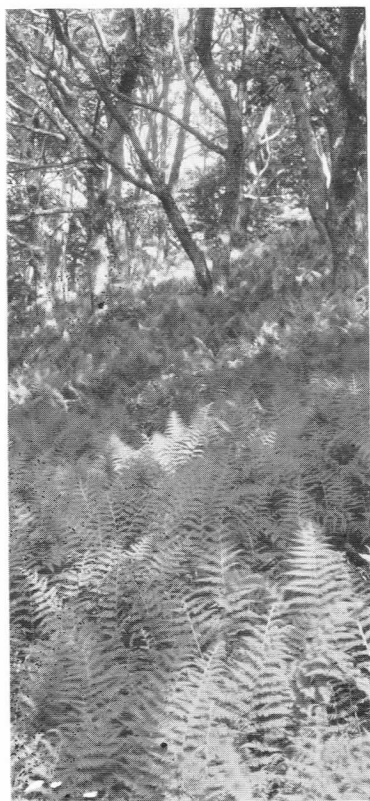


Fig. 5.—Shoulder-high ferns on Gregory Bald.



Fig. 6.—Saxifrages populate the shady retreats and banks of clear, cold streams.

waxy, pink and white flowers, for they bloom in plain view and seem to invite the onlooker to feast his eyes to genuine satisfaction.

Among the outstanding flowers of the Smokies might be mentioned the bluets (*Houstonia*) which grow along the mountain streams and in upland fields, sometimes occurring in beds of several acres in extent. There is burning-bush, a wand-like shrub which glorifies the mountains in the fall with its clusters of peculiarly constructed cerise and coral fruits. The mountaineers so romantically call it "hearts bustin'-with-love." Thornless blackberries bloom in June and ripen in September. Many kinds of orchids populate the mountains. The most beautiful one is the purple fringed orchis which is found at rare intervals growing in damp, shady recesses, its delicate fragrance clinging closely about it. Yellow fringed orchis is abundant, especially on burned-over grounds. There is rattle snake plantain with its tall racemes of white flowers and rosettes of white-veined leaves. Five species of trilliums, including painted

trillium, lure the plant lover. There are two clintonias, including the northern *Clintonia borealis*. Great beds of galax occur on the mountain sides displaying shiny green leaves in summer, deep bronze in winter. In May and June when galax is in full bloom, the mountain paths are often arched over with the tall spikes of white flowers.

The great abundance of ferns is due mainly to the variety of soil formations. Walking ferns are common in limestone regions at lower altitudes. At higher altitudes is to be found the rare climbing fern. On limestone rocks are to be found great beds of common polypody. On some of the moist mountain slopes the ferns grow in rank profusion, and there is one species which often grows to be shoulder high (Fig. 5).

It would seem that nature has here provided a mantle of plants for every square inch. Every stone and fallen branch has its covering of lichens, and in the higher altitudes trees are fringed with these plants, reminding one of Spanish moss. The candlestick lichens, with their knobs of bright colors, always attract one's attention as do the negro-scalp lichens which may grow to be a foot in diameter.

Mosses of the Smokies are in profusion; there are numerous species, some of which may never have been described. The mosses are so prolific in their growth that decaying logs, rocks, and tree trunks all have their moss-covering. Large rocks along the streams are usually moss covered to the very water's edge. At higher altitudes are to be found huge beds of sphagnum and mountain fern-moss forming a carpet often a foot deep. A person interested in mosses should not miss a trip up Mt. LeConte, for more mosses can be seen in one hour than could be found in many-day trip of the ordinary type.

The fungi are abundant. After a reasonably wet season one can find bushels of forms—bracket fungi, polypores, mushrooms, earth stars, puff balls, and stink-horns. The colors of the mushrooms are striking; there is almost every color from the pure white of the destroying angel to the black of the inky caps. There are delicate shell-pink ones, and brilliant orange, red, yellow, and purple ones; there are even green ones. It is not always easy to convince the inquiring freshman that the color is not due to the leaf green of higher plants.

From the standpoint of the naturalist, the Smokies are interesting all the year 'round. In the spring the awakening of life is manifested by the return of the birds, the blooming of the hepaticas and spring beauties, and by the renewed activities of the animals, including our own regenerated curiosity and enthusiasm. Then the mountains grip our interest when the first bloom of each flower is a delightful find. In the summer we seek the clear, cold streams and shady retreats where saxifrages (Fig. 6), ferns, and orchids grow. In the fall when a soft, purplish haze veils the distant moun-

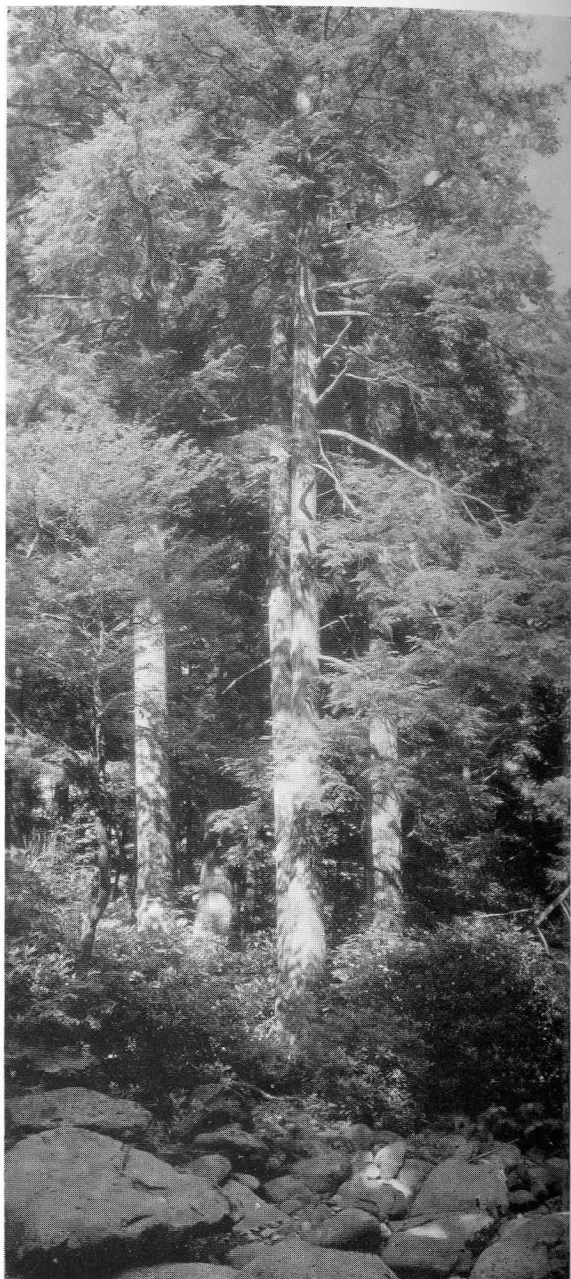


Fig. 7.—Giant hemlocks near the water's edge help keep the landside moist and cool.

tains we are impressed with the pompous brilliance of the flowers—joe-pye-weed, jewel flowers, cardinal flowers, sun-flowers, great lobelias, golden rods, asters, and a host of others that grow in tangled profusion along streams and roadsides. In the wooded regions our attention is claimed by the fungi; we have intimated that mushrooms and bracket fungi grow in astounding numbers. Fairy rings under the pines remind us of the "Romance of the Fungus World," while puff balls and some other varieties tempt our palates with their piquant fragrance. In late fall and early winter the lactarias are prevalent. Often they and their relatives are caught by the first snow-falls, to remain for days in a numbed state. Later when the mountains are not mantled with snow the mosses attract our attention. In winter the evergreens (Fig. 7) in their picturesqueness are a delight. There is never a time when the flowers are not in bloom; even when the ground is covered with snow and the winds are piercingly cold, one can dig down under the snow, and, if lucky, find those harbingers of spring—the first pale flowers of hepaticas, or bluets, or violets.

As one born in the foothills of the Smokies, one who loves them through association, the speaker begs your generous allowance for superlatives. Natural beauty, when constant at one's door, lifts one up, so that in moments of reflection, it is but fair to indulge in terms which attempt honest expression.