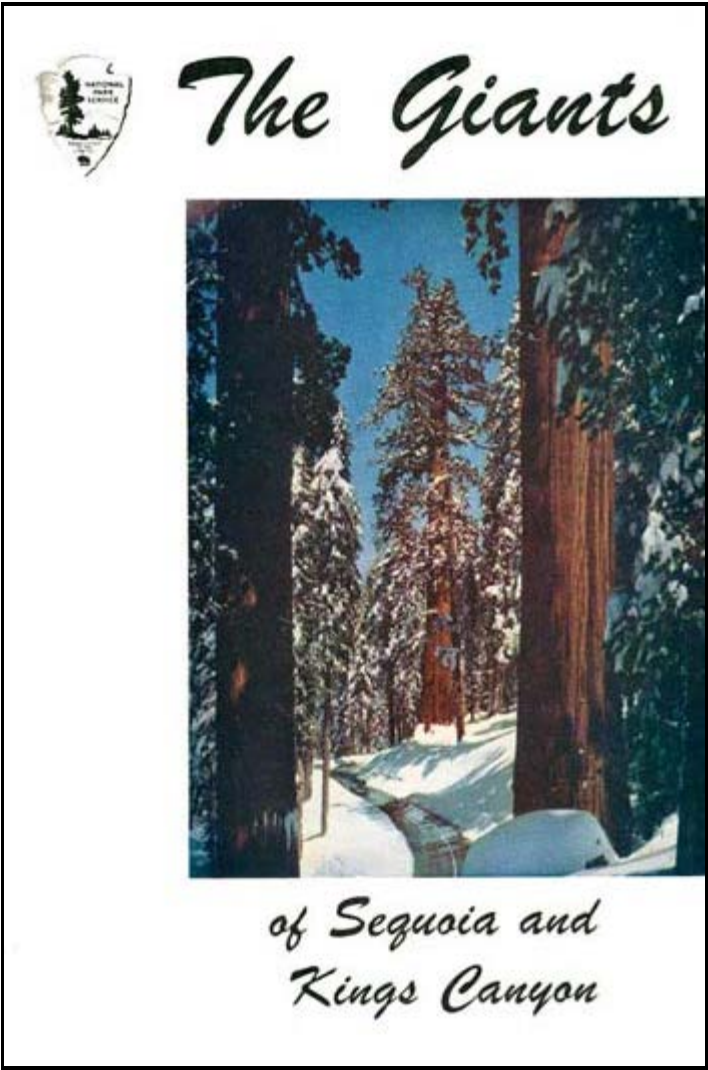


SEQUOIA-KINGS CANYON

The Giants of Sequoia and Kings Canyon



THE GIANTS
of Sequoia and Kings
Canyon

By
Howard R. Stagner

1958

Published by
Sequoia Natural History Association
Three Rivers, California

TABLE OF CONTENTS

SEQUOIA-KINGS CANYON

The Giants of Sequoia and Kings Canyon



CONTENTS

[Cover](#)

COVER—Along the Generals Highway, Giant Forest

[Introduction](#)

[Colossal Trees in a Colossal Setting](#)

[Discovery](#)

[Sequoia and General Grant National Parks Established](#)

[Sequoia Gigantea is of an Ancient and Distinguished Family](#)

[A Short Life History of a Long Lived Tree](#)

[General Sherman and General Grant](#)

[Giant Sequoia's Natural Enemies](#)

[Recovery](#)

[Sequoia Seldom Dies on its Feet](#)

[These You Will Want to See](#)

[For Additional Reading](#)

Published in cooperation with the National Park Service<.P>

1st Printing—1952

2nd Printing—1953

3rd Printing—1954

4th Printing—1956

5th Printing—1958

PUBLISHED BY
SEQUOIA NATURAL HISTORY ASSOCIATION
THREE RIVERS, CALIFORNIA

<<< [Previous](#)

<<< [Contents](#)>>>

[Next](#) >>>

SEQUOIA-KINGS CANYON

The Giants of Sequoia and Kings Canyon



THE GIANTS of SEQUOIA and KINGS CANYON HOWARD R. STAGNER

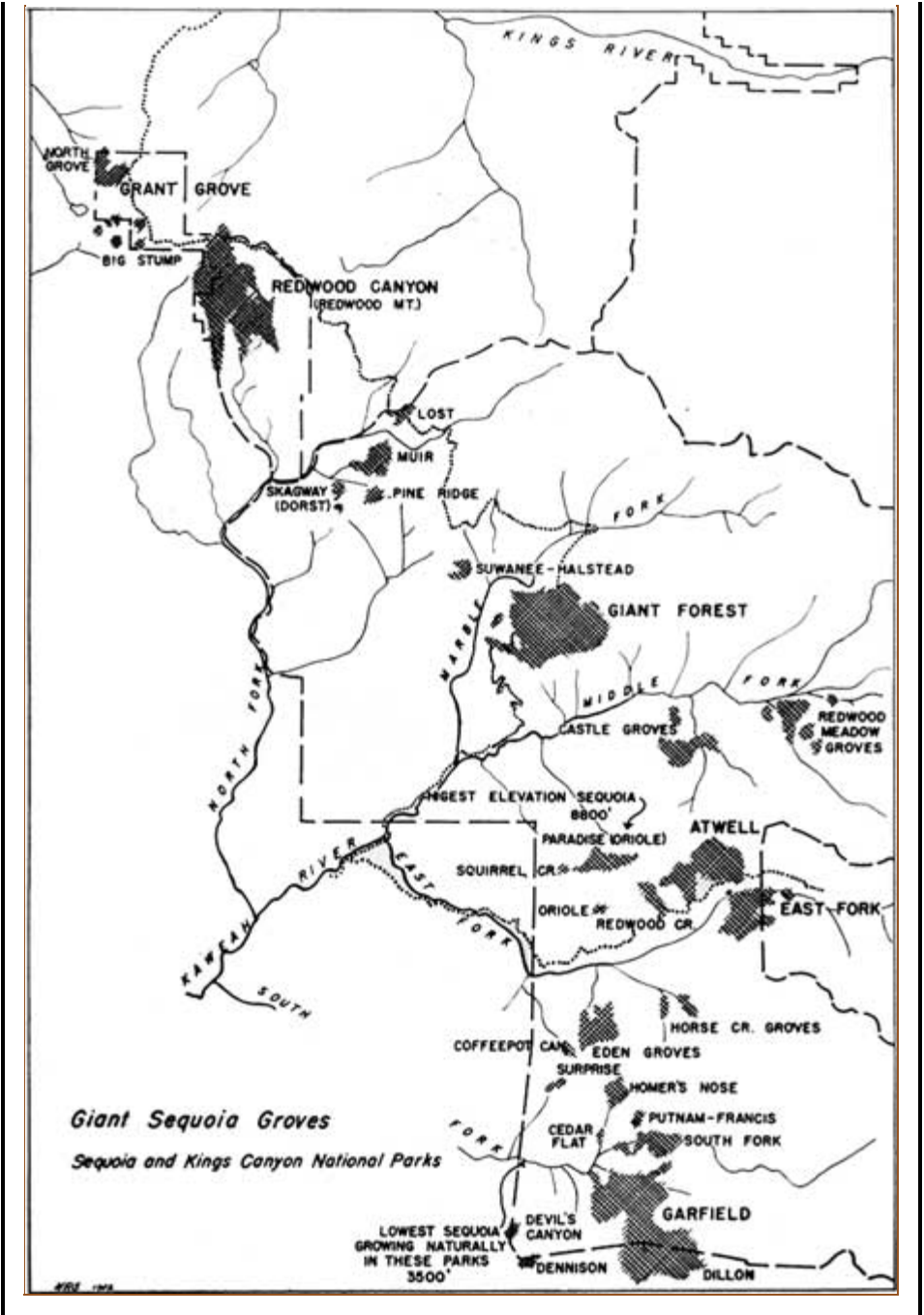
INTRODUCTION

How do the giant sequoias grow? Why do they live so long and grow to such tremendous size? What caused the black scars and the snag tops? How do they die? What are the important trees and groves that I should see? These are the *first* questions concerning the giant sequoias usually asked by Visitors to Sequoia and Kings Canyon National Parks, and these *first* questions are the chief concern of this booklet.

You will find this booklet helpful, then, in answering the more important questions about the big trees, and in finding those trees and groves which are most interesting. Perhaps, as is often the case, your curiosity will be further stimulated and you will want to peruse the subject beyond the scope of this booklet. You are invited to visit the museum, to consult with the rangers and ranger naturalists, to accompany them on guided walks through the groves, and to attend the camp fire programs where the big tree story is amplified. Recommended too are the more detailed publications: "Giant Sequoias of California" by Cook, "Redwoods of Coast and Sierra" by Shirley, and "Big Trees" by Fry and White. These are available in the museum, ranger stations and stores in the parks.

Most people, too, like something to take home as a memento of their visit to the parks of the Giant trees. You can't take a sequoia giant home with you. Twenty freight cars would be required to transport the trunk of one of the larger trees. Nor does a cone or a mere shred of bark seem adequate even if the law permitted taking these out of the parks, and emphatically it does not. No sequoia material of any kind may be removed from the parks. This booklet contains a series of photographs which are representative of the scenes you will see in the sequoia groves of both national parks. Let this booklet and its photographs serve as your guide while here, and be your souvenir recalling long hence the days enjoyed in association with beauty and majesty, stateliness and serenity in the groves of giants.





Giant Sequoia Groves, Sequoia and Kings Canyon National Parks. (click on image for an enlargement in a new window)

SEQUOIA-KINGS CANYON

The Giants of Sequoia and Kings Canyon



COLOSSAL TREES IN A COLOSSAL SETTING

Highest mountains, deepest canyons, and biggest trees—only in superlatives can the main features of Sequoia and Kings Canyon National Parks be described. No other mountain in the United States proper equals in elevation Mount Whitney's 14,495 foot summit. No other canyon in America exposes walls as high as those of Middle Fork of Kings River; and the largest living things in the entire world are seen in the General Sherman and the General Grant trees.

The setting, amid a wilderness of colossal proportions, certainly is appropriate to the forests of giants, and these titans of the plant world are among the paramount features of this wilderness. Other lands have high mountains. Other canyons may be more famed, but nowhere on earth except along the Sierra Nevada western slope will you find entire forests of giant trees, some 30 or more feet in diameter.

DISCOVERY

Members of the Joseph R. Walker exploration party are generally credited with being the discoverers of the giant sequoias along the western slope of the Sierra Nevada. From the descriptions of Zenas Leonard of this party, we conclude that in 1833 they came upon the Merced and Tuolumne groves in what is now Yosemite National Park. General knowledge of the giant sequoias came later, however, with the publicity following the discovery of the Calaveras Grove in 1852 by A. T. Dowd, a miner.

The greatest of all sequoia forests remained unknown until 1858. In that year, Hale Tharp, who had settled two years earlier at Three Rivers, was guided by Indians from Hospital Rock to the upland behind Moro Rock. Here he discovered the grove which later, in 1875 was named by John Muir "The Giant Forest". In 1861, Tharp returned to establish a summer cabin in a fire-hollowed fallen sequoia log, and occupied it for many seasons. Tharp's Log is today a popular attraction in the Giant Forest. The carved record "H. D. Tharp 1858" could still be seen on the side of the log until destroyed by vandals in 1953.

The discovery of Giant Forest led to other explorations. The details of these events are obscure, but within a few years the Kings River groves, the Garfield and other neighboring groves became known.

Another friend and mountain companion of Hale Tharp was James Wolverton. Perhaps it was on one of his travels between Tharp's Log and his own lean-to cabin on Silliman Creek that he discovered the largest of all sequoias in 1879 and named it the General Sherman. Joseph Hardin Thomas discovered the largest tree in the Grant Grove in 1862. Five years later it was named the General Grant tree by Mrs. Lucretia P. Baker of Porterville.

SEQUOIA AND GENERAL GRANT NATIONAL PARKS ESTABLISHED

While today both Sequoia and Kings Canyon National Parks are quite as famous for their high country wilderness as for their big trees, it was primarily the urgency of preserving the giant sequoias that led to the establishment of these two national parks in 1890.

John Muir earlier had described the sequoia forest between the Kings and the Kaweah rivers as the only occurrence of sequoia gigantea that properly might be called a forest, the most magnificent portion occurring just south of Kings Canyon. During the 1880's lumbermen reached some of this forest, and there began a devastation that left parts of the grandest of all sequoia forests a desolation of stumps and sawdust, broken and shattered giants, and piles of slash. Similarly, an enterprise was being developed along the Kaweah which some people feared would result in time in the destruction of the Giant Forest.

It was to halt this devastation and to save the remaining groves, that Sequoia National Park was established by Congress October 1, 1890, and General Grant National Park was created two weeks later. The first action directed toward these goals was started by those who were closest to the scene—citizens of Fresno and Tulare counties, and Californians at large. Colonel George W. Stewart and associates of Visalia, Dr. Gustavus A. Eidsen of the California Academy of Sciences, and John Muir were the leaders, but there were many others, who through ceaseless efforts and the expenditure of personal funds, aided in the establishment of the nation's second national park, Sequoia, and its third and fourth, General Grant and Yosemite. Later, in 1940, the larger Kings Canyon National Park was created and General Grant National Park made a part of it.

Parts of the Giant Forest and other groves already were in private ownership when these two parks were established; but many people helped in the purchase of these lands. To federal appropriations of \$50,000 were added to a similar amount by Stephen T. Mather who was then Director of the National Park Service, \$20,000 by the National Geographic Society, \$10,000 by the County of Tulare, and sizeable amounts by George Eastman, Senator W. F. Chandler of Fresno, and many other individuals and organizations. The Redwood Mountain-Redwood Canyon area was purchased by the federal government in 1938, and added to Kings Canyon National Park shortly after its establishment in 1940.

Today most of the important sequoia groves are safeguarded in national parks, state parks and national forests, and only some 8 per cent of all giant sequoias remain in private ownership. Some cutting continues on private lands, but public sentiment is such that effective appeals continue to be made to bring as many as possible of the remaining groves under state or federal protection.

* * * *

The Sierra juniper may live almost as long as a sequoia. Growing at higher elevations, its growth rate is extremely slow, and a four foot trunk may have more than 2000 annual growth rings. The Tule cypress of Mexico is another long-lived tree. The bristlecone pines, found near 10,000 feet in the White Mountains of California, are the oldest known living things. One of these gnarled trees is over 4,600 years old.

[<<< Previous](#)

[<<< Contents >>>](#)

[Next >>>](#)

SEQUOIA-KINGS CANYON

The Giants of Sequoia and Kings Canyon



SEQUOIA GIGANTEA IS OF AN ANCIENT AND DISTINGUISHED FAMILY

There are two kinds of sequoias: the *Sequoia gigantea* of the Sierra Nevada, and the *Sequoia sempervirens* of the central and northern California coast. The two are members of the same sequoia genus. Both may be called sequoias. The sequoia of the mountains is the giant sequoia, and *coast redwood* is the accepted common name for the other. The following table compares the two species.

COAST REDWOOD		GIANT SEQUOIA	
Monterey County to S. Oregon, near the coast	location	West slope Sierra Nevada, between 5000 and 8000 feet elevation	
300'—350'	usual height	250'—300'	
364'	tallest	324'	
12'—20'	usual diameter	15'—30'	
1200—1800 years	mature age	2500—3500 years or more	
seeds and root sprouts	reproduction	seeds only	
single needles like the fir	foliage	small, overlapping, awl shaped needles	
many in pure stands	associations	mixed forests with pine and fir	

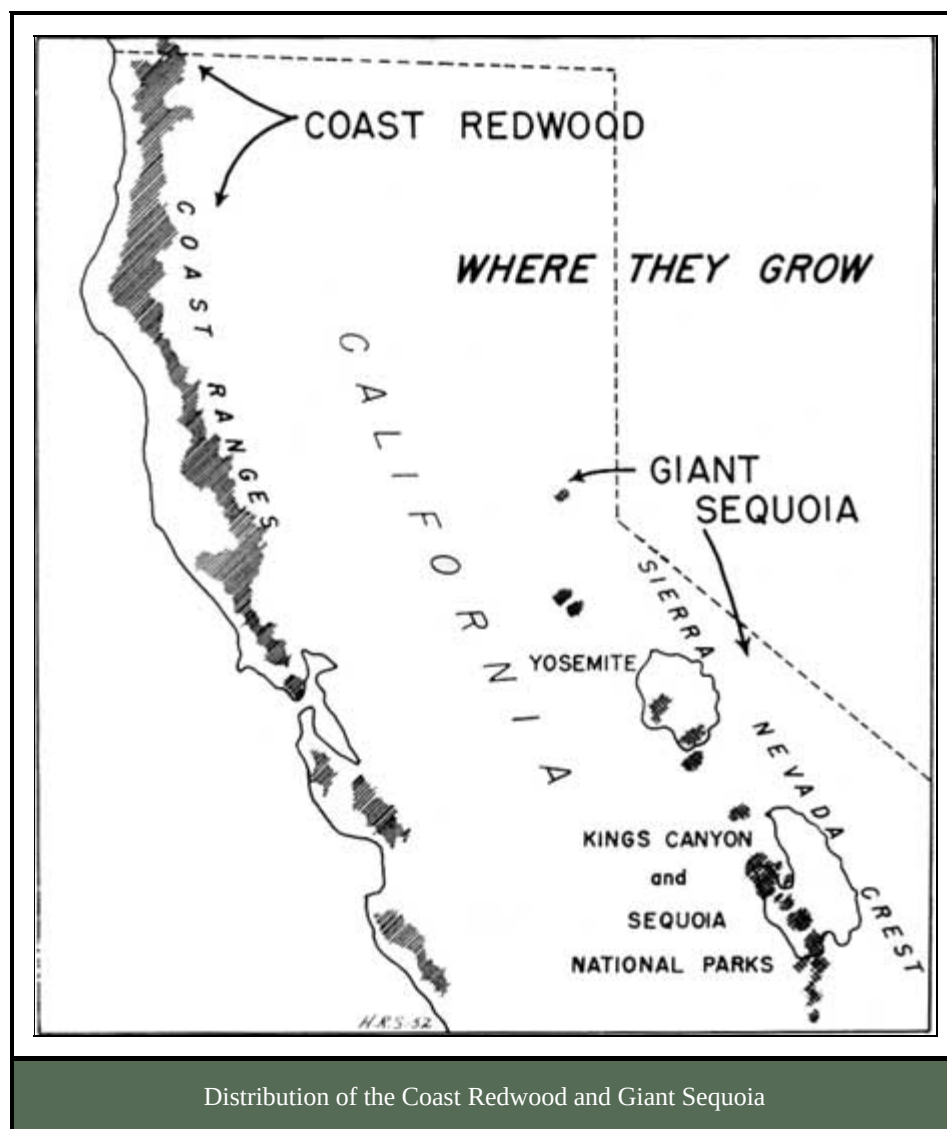
The two sequoias of today are all that remain of many species that once grew widely in every northern hemisphere continent, and the fossil record of the sequoia genus extends back a hundred million years or more in geologic time. The coast redwood once grew abundantly throughout North America, and in western Europe. The fossil record of the giant sequoia by comparison is very meager. Its fossils are few, and are restricted to western United States. We can only speculate, but perhaps this tree was always a mountain tree growing where the opportunities for entombment and fossilization were infrequent.

As world climates changed during the latter part of the Cenozoic era, first toward drier, then colder conditions, some species of sequoia became extinct, and the range of the surviving ones became more and more restricted. Only along the coast where the climate is moist and temperate did the coast redwood find conditions favorable for its survival.

Something similar must have occurred in the case of the giant sequoia. Today these trees do not form a continuous forest as is more or less the case with the coast redwood, but are separated into individual groves, distinctly and in some cases widely separated from each other.

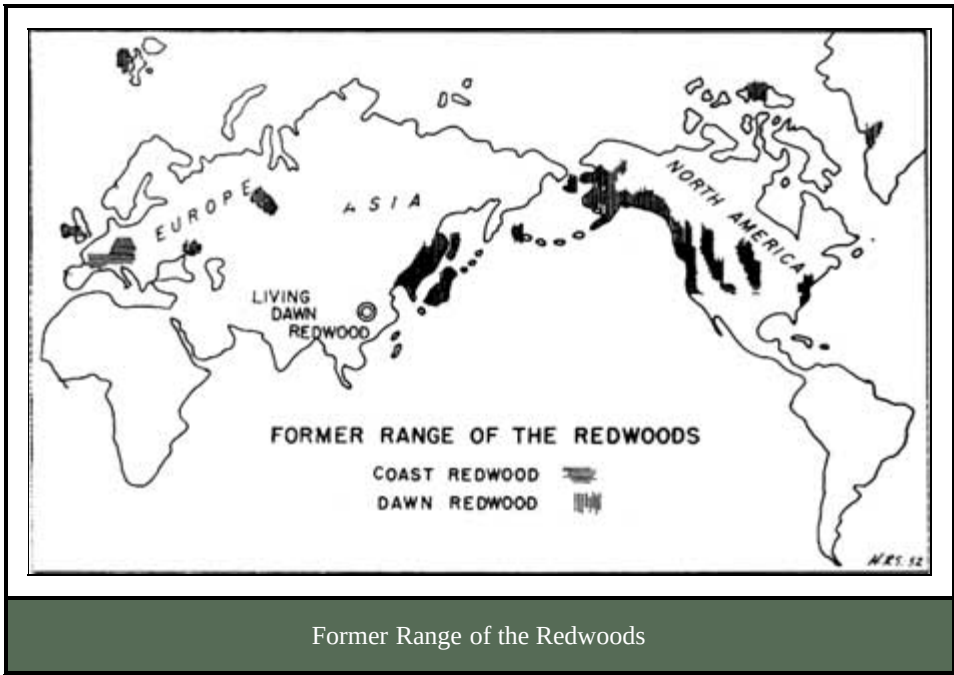
This is a surprising circumstance, but perhaps at one time these trees did in fact comprise a more or less continuous forest along the entire length of the Sierra western slope. Just as the glacial advances during the Great Ice Age restricted the range of the coast redwood, so the alpine glaciers that moved down the Sierra canyons may have cut this continuous forest into

isolated groves. In the glacial canyons, and near the glaciers, the sequoias disappeared. In the areas between the canyons, sufficiently removed from the frigid glacier influence, they persisted. Time has not been sufficient since the last glacial advance to determine whether these separated groves will eventually reseed the areas between sufficient to establish communication with each other. This is not surprising when you consider, for example, that the General Sherman tree is approximately 3,500 years old, and that a minor glacial advance occurred as recently as 5,000 years ago. In fact, six or seven generations of trees the age of General Sherman would take us back to the climax of the last glacial period. Truly, the giant sequoia is "a living link with the geologic past."



Until quite recently only the giant sequoia and the coast redwood were known to be living. During the mid 1940's a Chinese botanist found in Central China what at first appeared to be a new species of tree. Examinations of the wood, foliage, flowers, and seeds by Chinese and American scientists disclosed an amazing fact. This new tree was identical to one long known from fossil remains found in wide distribution on all northern hemisphere continents, and already named the dawn redwood, *Metasequoia glyptostroboides*. Dr. Ralph W. Chaney of the University of California and Milton Silverman of the San Francisco Chronicle flew to China in 1948 to observe and collect seeds and specimens of this fossil tree come to life. There, growing in the same assemblage of plants with which it was associated in fossil beds—birch, oak, beech, chestnuts and sweet gum—were the last remaining groves of the dawn redwood. Best known from its remains in the fossil beds of central Oregon, here was a tree alive and flourishing twenty million years after it was thought to have become extinct, and

10,000 miles removed from its last known habitat on another continent.



* * * *

Young sequoias grow more rapidly than the other evergreens, and in favorable sites easily overtop the firs, cedars, and pines planted at the same time.

* * * *

Young sequoias growing along the roadside seem to luminesce under light reflected from car lights. Their greater shine from reflected light distinguishes them from the neighboring pines, firs, and incense cedars.

* * * *

Sequoias are remarkably resistant to decay and insect attack. Several boring beetles do work in the wood, particularly of the branches, and others live upon the foliage, but we know of no case where insects have become epidemic on the sequoia, nor where they have resulted in the death of the tree.

* * * *

The dead tops of older trees may be from lightning damage, from breakage under the weight of winter snow or from wind, but may be the result of a restricted flow of sap between the foliage and roots caused by severe injury at the base of the tree.

<<< [Previous](#)

<<< [Contents](#)>>>

[Next](#) >>>

SEQUOIA-KINGS CANYON

The Giants of Sequoia and Kings Canyon



A SHORT LIFE HISTORY OF A LONG LIVED TREE

We marvel at the great age of the giant sequoia. We are tremendously impressed as well by the physical dimensions of this tree. But, one of the most remarkable facts to contemplate is its huge bulk in relation to the minute seed from which it grows. It has been calculated that the General Sherman tree contains over 600 tons of weight in its trunk, yet this tree grew from a seed so small that 3000 or more weigh but one ounce. From seed to giant trunk represents a growth doubling in weight over 36 times—a final product nearly 58 billion times the weight of the original seed!

This tiny seed, a small cylindrical form encased in a membrane forming two lateral wings, is produced abundantly. Perhaps a single tree will produce a billion seeds in its lifetime.

Normally a 200 year old sequoia will produce cones, and some trees are reported to have produced infertile cones at the early age of 24. Ovoid, and from 1-1/2 to 3 inches long, they require two years to mature. They remain green on the tree until the squirrels cut them off. A few seeds may be released from the cones each year but the cones do not develop the rich brown color until they are cut and allowed to dry. Thus, a given tree retains cones of many years, dropping a few seeds from some cones every season.

Most of the cones, however, are harvested in the fall by the busy chickaree or Douglas squirrel. When cut down, these cones rapidly dry out, the thick scales open up, and the seeds are released within a few weeks. As you follow the sequoia trails, find a fresh-looking brown cone. A sharp blow of the cone against the heel of the hand will usually dislodge a few of these tiny seeds for your examination.

Many of the seeds are consumed by squirrels, birds, and insects. Others disintegrate by decay on the ground, and only a very few ever germinate and produce seedlings. Before the seed will grow it must fall upon exposed mineral soil, and in a place fairly open and exposed to the sun. This is why you will find no seedlings beneath the shade of the heavy forest canopy, nor where the thick duff covers and protects the soil. But where an opening is made in the forest and the soil is exposed, as where a giant falls, or along road and trail cuts, new seedlings appear by the hundreds.

Most of the seedlings succumb to trampling, insects, and competition with other plants, and are thus thinned by nature. Eventually, however, one or several seedlings of a new generation persist to continue the forest.

The youth of the species is not merely a small edition of the mature giant, but is quite different in appearance and has a character of its own. Look for an evenly tapered, sharply conical tree, with thick foliage reaching down to ground level. Check your identification by examining the needles—short, sharp, somewhat awl-shaped, and overlapping like shingles around the twigs and branchlets. In their regular sharp conical form, the young sequoias are among the most beautiful of all the trees of the forest.

As the trees grow higher and higher, the lower branches, as is the case with most forest trees,

shaded from above, deprived of life-giving sunlight, lose their needles and are pruned away by the normal growth of the trunk. The effect, by the time the tree is a hundred feet high, is that of the same sharp conical youthful tree, but now carried on the top of a straight, bare trunk. The deep furrowed cinnamon red bark is not yet apparent, and these younger trees display a grayish rather stringy bark.

By the time the tree approaches its ultimate height, more of the numerous small branches of the crown are lost. Those that remain expand greatly, rebranch, and finally form the rounded crown that marks the early mature tree. This situation prevails, with the older mature trees displaying their straight, massive, red trunks, and a comparatively few heavy and rebranched limbs bearing the dense foliage of the crown.

* * * *

The Sawed Tree near Grant Grove is an example of the balance and recuperative powers of the sequoia. Cut almost all the way through by loggers, it did not fall, and stands today perfectly balanced, supporting abundant foliage and with part of the saw cut already covered with new growth.

When a sequoia falls, the sap wood is attacked by insects and is destroyed in a few score years. The heart wood may persist for many centuries without apparent decay.

A harmful practice may not show its results in the human body for a score or more years. A giant sequoia lives 50 times as long as man, and a harmful practice may require 50 score years to show its effect on the big tree. Our only safe procedure is to guard and protect the sequoia environment in every possible way.

SEQUOIA-KINGS CANYON

The Giants of Sequoia and Kings Canyon



GENERAL SHERMAN AND GENERAL GRANT

(Giant Sequoia—*Sequoia Gigantea*)

The General Sherman and the General Grant Trees are the largest of the giant Sequoias now known. Many others rank very close to these, including the Washington, Lincoln, and President Trees of Giant Forest; the Hart Tree in Redwood Canyon; the Boole Tree in Converse Basin near Grant Grove; and the Grizzly Giant in Yosemite.

It is sometimes difficult to appreciate the size of these trees because neighboring trees also are so large. Perhaps some comparisons will help in gaining a concept of their massive dimensions. Both the Sherman and Grant Trees are as tall as the average 16 story building, and the width at the base exceeds that of many city streets. At least 20 railroad cars would be required to move the trunks alone, which contain as much wood as is produced on 20 acres of average California pine forest. As far as known, the General Sherman is "the largest living thing in the world." The dimensions are:

	General Sherman	General Grant
Height above mean base	272.4 Ft.	267.4 Ft
Base circumference	101.6	107.6
Maximum base diameter	36.5	40.3
Mean base diameter	32.2	33.3
Diameter 60 feet above ground	17.5	18.8
Diameter 120 feet above ground	17.0	15.0
Diameter 180 feet above ground	14.0	12.9
Height to first large branch	130.0	129.0
Diameter of largest branch	6.8	4.5
Weight of trunk, approximate	625 Tons	565 Tons
Total volume of trunk	50,010 Cu. Ft.	45,232 Cu. Ft.

The large branch growing from the south side of the General Sherman trunk, 130 feet above the base, is 6.8 feet in diameter, and is 140 feet tall. This branch itself is larger and taller than most Eastern forest trees.

The size of these trees is no less impressive than their great age. Any one of the largest of these giant sequoias may claim title to "the oldest living thing in the world", for the age of these massive trees cannot be readily determined while they are still standing.* The coring instruments now used to tell the age of lesser trees will not penetrate to the heart of of the giant sequoia. The ages of these trees can be estimated only on the basis of size in comparison with tree ring counts made on fallen trees. Those who have studied these trees estimate that trees the size of the General Sherman and General Grant may be from 3000 to 4000 years old. During this time they have withstood the ravages of countless fires, and though damaged, have continued to flourish, and today produce thousands of cones bearing fertile seeds from which many young trees may be grown. The oldest sequoia known had

3,126 annual rings, but John Muir reported one tree stomp in Converse Basin which was 4000 years old.

*The bristlecone pines, found near 10,000 feet in the White Mountains of California, are the oldest known living things. One of these gnarled trees is over 4,600 years old.



The General Grant Tree Photo by Howard R. Stagner, National Park Service

[<<< Previous](#)

[<<< Contents >>>](#)

[Next >>>](#)

SEQUOIA-KINGS CANYON

The Giants of Sequoia and Kings Canyon



GIANT SEQUOIA'S NATURAL ENEMIES

Accidents happen to trees, and the older a tree the more occasion there has been for damage. Lightning, fire and other injuries have left their marks in broken tops, black scars, and temporary loss of symmetry.

Doubtless many Sequoias have been struck by lightning. Crowns have been damaged, branches broken away, and sections split from the trunks, but occasions when a giant sequoia has been killed outright or severely damaged by lightning are extremely rare. The greatest damage has not been from lightning but by fires set elsewhere in the forest by lightning. The abundant blackened scars, and charcoal-lined cavities and hollow trees, as well as many snag tops are eloquent evidence of this fact.

It was not a *single* fire, blazing and roaring through the forest, that produced the numerous black scars and cavities, but numerous fires which burned during the remote past. No fire of consequence has occurred in the Giant Forest or Grant Grove during white man's regime, and the most recent destructive fires were from one to three hundred years ago. How is this known? The conclusion is partly from direct evidence of tree rings, and partly from inference.

To begin with, we must keep in mind that the thick, fibrous, non-resinous bark is very resistant to fire. It will burn when shredded, but the thick bark at the base of a tree merely chars on the outside when subjected to a hot fire. If there is sufficient fuel piled up at the base—dead branches, fallen trees, etc—to keep a fire going for several days, the bark may char through, or heat may penetrate to the cambium layer and kill this portion of the tree. Years later a second fire may take advantage of this weakened place, and here find an entry into the wood itself, burning out a deep cavity, or hollowing the entire trunk.

Fires which were hot enough and sufficiently long burning to thus damage the mature sequoias, must have been hot enough to destroy completely the firs, pines, cedars, or young sequoias of the same forest. Today, when we see a one hundred fifty year old sugar pine growing beside a deeply fire-scarred sequoia, we conclude that the latest fire occurred before that pine began to grow.

There is more direct evidence, however. We had opportunity to examine the cross section of a fallen sequoia in Giant Forest in 1950. A comparatively small fire scar was fully exposed, but that one fire scar represented the total damage of at least four separate fires.

After each fire, new wood grew outward to cover part of the scar. Each successive fire destroyed part of the new growth, and burned deeper into the tree. Thus, a cross section of the scar today shows layers of charred wood alternating with new growth, and reveals a fairly complete record of the fires. There well may have been more fires for some may have destroyed completely the record of earlier ones. This tree records the following fires:

The first fire occurred 489 years ago, about 1465.

The second fire occurred 91 years later, about 1556.

The third fire occurred 89 years later, about 1645.
The last fire occurred 148 years later, about 1802.

RECOVERY

The ability of the tree to persist in spite of severe damage, and to cover fire scars and injuries with new bark and new wood is truly remarkable. No matter how severely the tree may be damaged by lightning or fire, as long as a thin band of live bark remains to provide communication between roots and foliage, the tree continues to live and to grow. A most remarkable example of this is the Black Chamber on the Crescent Meadow road in Giant Forest. This very large tree, severely damaged by fire, has only a few feet of live bark left, yet it not only supports live foliage and branches, but is growing new bark to cover the edges of the burn. One marvels at such persistence, and wonders if in time this tree might heal itself completely.

Such evidence is seen throughout the groves, and the new bark is easily recognized around the border of most fire scars by its lighter color, smoother texture, and a rather silvery sheen in contrast to the rough and duller old bark. The rate of healing over must vary a great deal, but is often sufficiently rapid to be noticeable within a few years. Comparisons of General Sherman tree today with early photos show that its fire scars have been very much reduced in size within the past 60 years. We know of one tree in Giant Forest where the lateral growth of new bark to cover a burn has been about an inch a year for the past 25 years, but the most spectacular examples are found in the stumps of trees logged off in the early days. In these stumps there are often masses of bark, and areas of charred wood, entirely enclosed within the completely restored trunks. Some stumps in Big Stump Basin or Converse Basin show evidence of a dozen or more fire injuries, each followed by complete healing and full restoration of the trunks. Before these trees were cut down, there could have been no sign of fire damage, so complete was the self-restoration of the tree. Usually one or more branches will turn upward to replace a damaged crown.

SEQUOIA SELDOM DIES ON ITS FEET

No one knows how long a sequoia might live. The oldest tree of authentic record was 3124 years old when cut down in Converse Basin, and John Muir reported a stump with 4,000 annual rings. The General Sherman and General Grant trees are perhaps 3500 years old, but it is entirely possible that they are even older. Yet none of these trees shows evidence of approaching old age; each is vigorous and virile. Insects, disease, fire, and lightning, common enemies of most forests, seldom kill the giant sequoia outright. Why, then, should not the sequoia live for 5000 or 10,000 years, or more? Perhaps it could, except for one thing—itsself.

In one sense, the giant sequoia is its own worst enemy. The tremendous weight of the mature tree makes it sensitive to any change in the stability of the ground upon which it stands. It has no tap root. Its massive but shallow roots, like its wood of trunk and limbs are brittle and without great strength. Balance, and weight distributed upon a broad base, rather than strong roots, keep the tree erect. As ground conditions and drainage conditions change, as stream erosion cuts away the soil from one side of a tree, as the soil is softened by changes in underground drainage perhaps even as outward growth of the tree expands its base over less stable soil, the balance of the tree is threatened.

Once a giant sequoia loses its balance, rarely is that balance restored. Sometimes the lean of

the tree may be arrested, but usually loss of balance is followed by an increasing degree of tilting until finally the giant, its roots unable to hold against the tremendous leverage, crashes to earth. This is not a sudden process, but, in scale with the long life expectancy of the tree, may require several score years. Toward the last, the accelerated rate of lean can be observed, and actual measurements of the tilting give reasonable warning of the impending fall.

Falling sequoias are not a common occurrence by any means. If fall is the only important cause of death in a forest of 3000 trees, and if each can be expected to live 3000 years, then you may expect an average of one to fall a year. This seems to be in accord with events. For example, only ten sequoias of moderate to large size have been known to fall in the Giant Forest area within the past 13 years. The fall of one of these trees was witnessed, and the crash of one other which fell in the Hazelwood area during the summer of 1947 was heard by hundreds of people, but most of the others fell during winter and early spring. At such times the ground is wet from melting snows, the crown may be heavily burdened with snow, and occasional winds may provide the final push that overbalances the tree.

There are leaning trees in some of the groves today. Sometimes we are asked why we do not prop up these trees, and prevent their eventual fall. In the National Parks, one of the things we strive to preserve is the naturalness of the scene. Trees, other than sequoias, eventually die, usually by insect and disease after they have been weakened by old age. It happens that a very common way for a sequoia to die is by falling down. The falling of a giant opens up new ground so that new seedlings may plant themselves, and a new generation come into being. In this, as in most circumstances where the preservation of a natural environment is the objective, nature will better accomplish our ends and her objectives the less we interfere.



Kaweah Indians who inhabited Kaweah valley visited the Giant Forest annually to gather acorns and to hunt. Apparently they had no important traditions associated with the giant sequoias, nor is there any evidence that they set the fires which produced the burn scars.

* * * *

An Austrian botanist, Stephen Endlicher, is believed to have named the Sequoia genus in honor of Chief Sequoyah, a Cherokee Indian, who devised a phonetic alphabet that enabled his people to learn to read and to write within a few weeks' time.

* * * *

Range of the **Sequoia gigantea**:

Highest elevation: 8800 feet, Atwell Grove, Sequoia National Park.

Lowest elevation: 2900 feet, near Clough Cave, Sequoia National Park.

Northernmost: 6 standing trees in Placer County, Middle Fork American River.

Southernmost: A grove of 31 trees, Deer Creek (Tule River), southern Tulare County.

* * * *

A purple powder is produced with the seeds in the cones. This cone pigment is largely tannin, is soluble in water, and in solution has been used experimentally as ink and wood stain. Tannin is believed to be the factor which gives

the giant sequoia such remarkable resistance to attack by insects and disease.

* * * *

When we say that the General Sherman Tree is the largest living thing, we must remember that most of the trunk is really dead wood. One living portion of the trunk is light cream in color and lies just beneath the bark. This includes a layer of cells which grow and divide, forming new wood on the inside and new bark on the outside. In the sapwood water and minerals from the soil flow upward to the foliage. Just outside the layer of dividing cells the food materials manufactured in the leaves flow downward, nourishing the growing cells of trunk and roots.

The remainder of the trunk is dead tissue, functioning only to give strength to the trunk. This heartwood is bright pink in color when first exposed but soon turns to a dark brown or black.

[<<< **Previous**](#)[<<< **Contents**>>>](#)[Next >>>](#)

SEQUOIA-KINGS CANYON

The Giants of Sequoia and Kings Canyon



THESE YOU WILL WANT TO SEE

FOUR GUARDSMEN: On the approach to Giant Forest from Ash Mountain these four giants form the gateway to Giant Forest.

SENTINEL TREE and *COLONNADE TREES:* These are good photographic subjects in the Giant Forest village area.

AUTO LOG: A fallen monarch so situated along the Moro Rock-Crescent Meadow road that you can drive your car along its trunk.

THE THREE GRACES are near the Auto Log.

MORO ROCK gives you a panoramic view across the tops of giant sequoias and the associated forest trees.

THE PARKER GROUP: A typical, closely spaced group on the Crescent Meadow road well situated for photographs.

TUNNEL LOG: A tree which fell across the road in 1937, and has been tunneled through for the Crescent Meadow road.

BLACK CHAMBER: A most remarkable example of survival and recuperation after severe fire damage. Located along the Moro Rock-Crescent Meadow road.

CRESCENT MEADOW; ROUND MEADOW, etc.—Examples of meadows probably formed by fallen sequoias. Now they are flower fields fringed by giant sequoias. Deer commonly feed here in the evenings.

THARP LOG: A 20 minute stroll from Crescent Meadow. A fire hollowed log used as a summer cabin by Hale Tharp, discoverer of Giant Forest.

YOUNG SEQUOIAS: Along the highway between Giant Forest and General Sherman Tree, on the grounds of the Giant Forest Lodge, and the museum; in the Grant Grove area, and many other places.

GENERAL SHERMAN TREE: Near the Generals Highway, 2 miles north of Giant Forest village. Start of the Trail of the Sequoias.

CONGRESS GROVE: A two mile stroll will take you to the Senate and House Groups, the President Tree, McKinley Tree, and the General Lee Tree. A short distance in addition will add the Cloister Group, Founders Grove, Lincoln and Washington trees, as well as many other giants with special characteristics. This is the heart of the Giant Forest, and here the sequoias of the Sierra Nevada reach their climax in beauty and in numbers. Some rival the General Grant and the General Sherman in size. Obtain a map of the Giant Forest free of charge at the museum to aid you in locating the important features along the many trails

through the forest.

LOST GROVE: Along the Generals Highway, mid-way between Giant Forest and Grant Grove. Stately red columns create an atmosphere of restfulness and grandeur, and the effective natural lighting is unequalled.

MUIR GROVE: A three mile hike from Dorst Camp will take you into this small isolated grove. Many large trees stand amid surroundings more nearly primitive and unchanged than in any other easily accessible grove.

REDWOOD MOUNTAIN and REDWOOD CANYON GROVE: This is outstanding—a very large forest, and one which in places is nearly a pure sequoia forest. Minimum fire and other damage is seen, resulting in a beautiful stand of nearly perfect trees of all ages. A fine view over this entire forest is obtained from Redwood Mountain overlook, 5 miles south of Grant Grove on the Generals Highway. The Sugarbowl Grove and the Hart tree are here. Consult the rangers or ranger naturalists before entering this area.

GENERAL GRANT TREE: After you have visited this second largest Sequoia, go beyond the meadow to the south to get a full height photo of this tree. Also, in the General Grant Grove are:

THE CALIFORNIA TREE: One of the tallest Giant Sequoias, well situated for photographs.

THE CENTENNIAL STUMP: The tree was cut, sectioned, and reassembled at the World's Fair in Philadelphia in 1876 where it became known as a "California Hoax," by dubious easterners. This was a very old tree.

THE FALLEN MONARCH: A fire hollowed fallen sequoia, used for temporary housing by the Gamlin brothers, early settlers whose homestead cabin stands near Centennial Stump. Later the U. S. Cavalry used it as a stable while patrolling the parks during the period 1890-1914.

NORTH GROVE: Beyond Grant Grove, many large trees, many were named for the states of the union, but those names have fallen into disuse. Obtain a free map at the Ranger Station of the Grant Grove area for your guidance to the many other features of this area.

BIG STUMP BASIN: An example of the results of early day logging. Remarkably large stumps, including the famous Mark Twain stump. The growth of young sequoias is prolific in this area. Ask the ranger about other interesting trees to see nearby.

There are many other named trees and groves, and many other trees with unusual characteristics. Those mentioned above are the ones you will want to see first. If you have a little more time, let the rangers and ranger naturalists direct you to some of the others.





Photo by Howard R. Stagner, National Park Service

FOR ADDITIONAL READING

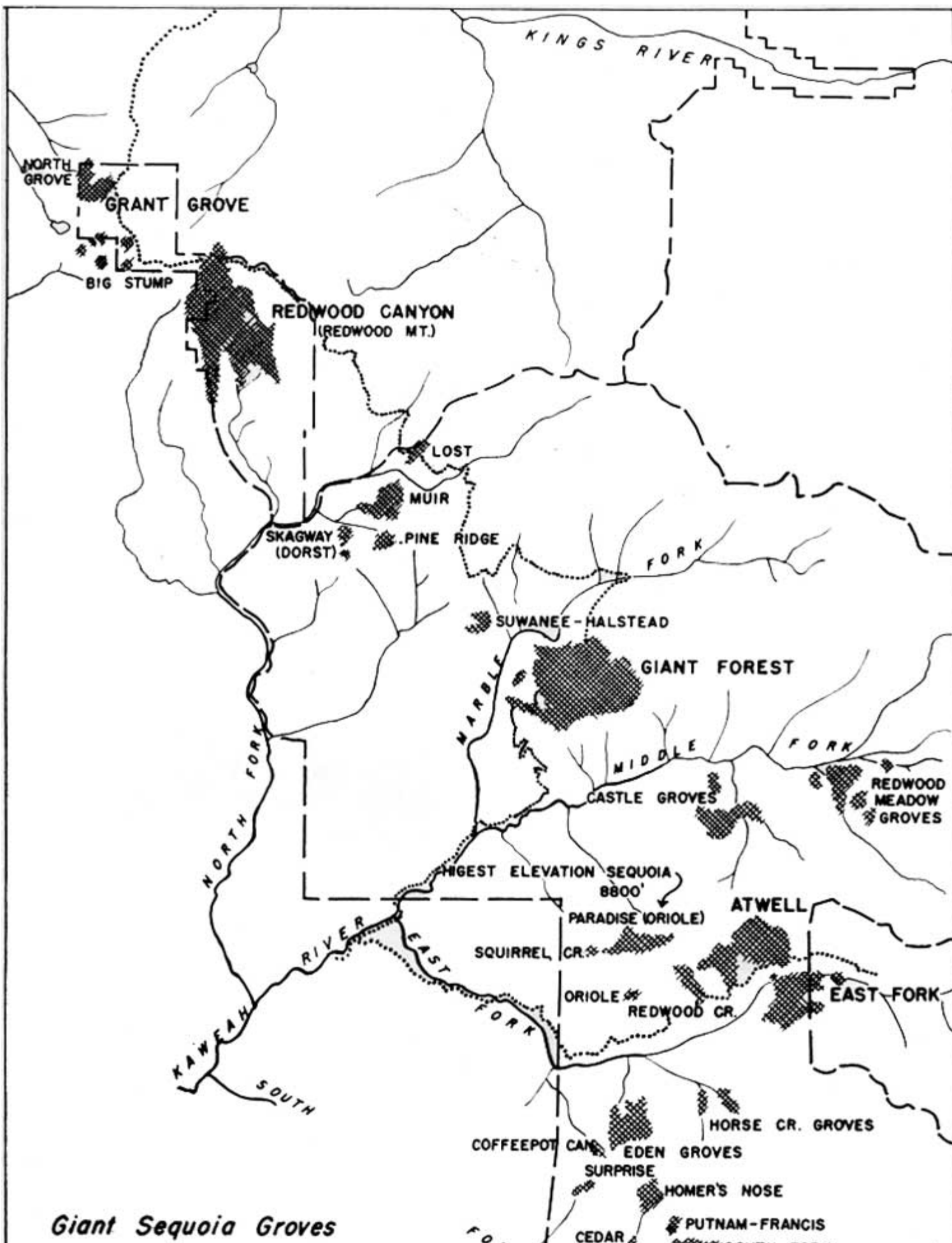
Big Trees by Fry and White
Giant Sequoias of California by Cook
Redwoods of Coast and Sierra by Shirley

Sequoia and Kings Canyon National Parks by White and Pusateri
Illustrated Guide to Sequoia and Kings Canyon by White and Pusateri
Starr's Guide to John Muir Trail and High Sierra
Mount Whitney by Clark
Forests and Trees of the National Park System by Coffman
Discovering Cone-Bearing Trees in Sequoia and Kings Canyon by Alcorn
Birds and Mammals of the Sierra Nevada by Sumner and Dixon
Seeing America's Wildlife by Butcher
Animals of Sequoia-Kings Canyon Country by Clark
Sequoia, A Geological Album by Matthes
Crystal Cave by Oberhansley

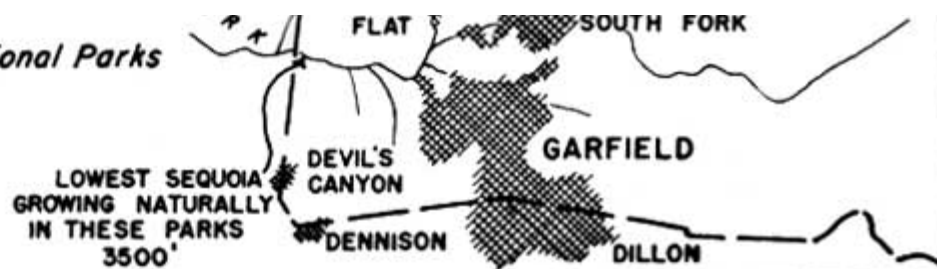
The National Parks by Tilden
Steve Mather of the National Parks by Shankland
Exploring National Parks and Monuments by Butcher

[<<< Previous](#)

[<<< Contents >>>](#)



Sequoia and Kings Canyon National Parks



NRS 1978

SEQUOIA-KINGS CANYON

The Giants of Sequoia and Kings Canyon



Sugarbowl Grove, Redwood Mountain

The Redwood Mountain—Redwood Canyon grove is in places nearly a pure sequoia forest. In the view above 20 large sequoias are visible. *Photo by Howard R. Stagner, National Park Service*



General Sherman Tree Photo by Howard R. Stagner, National Park Service



General Grant Tree Photo by Howard R. Stagner, National Park Service

<<< [Previous](#)

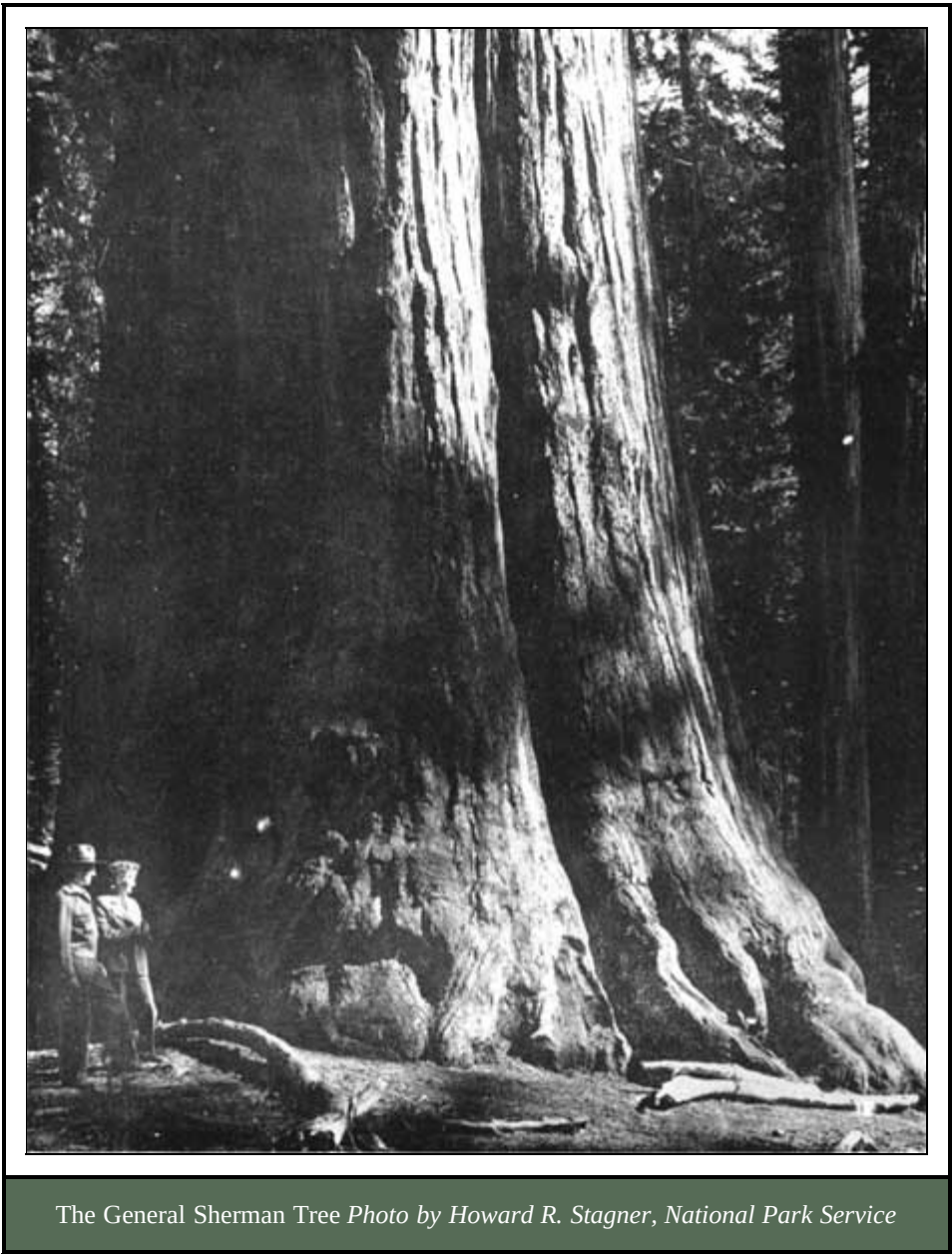
<<< [Contents](#) >>>

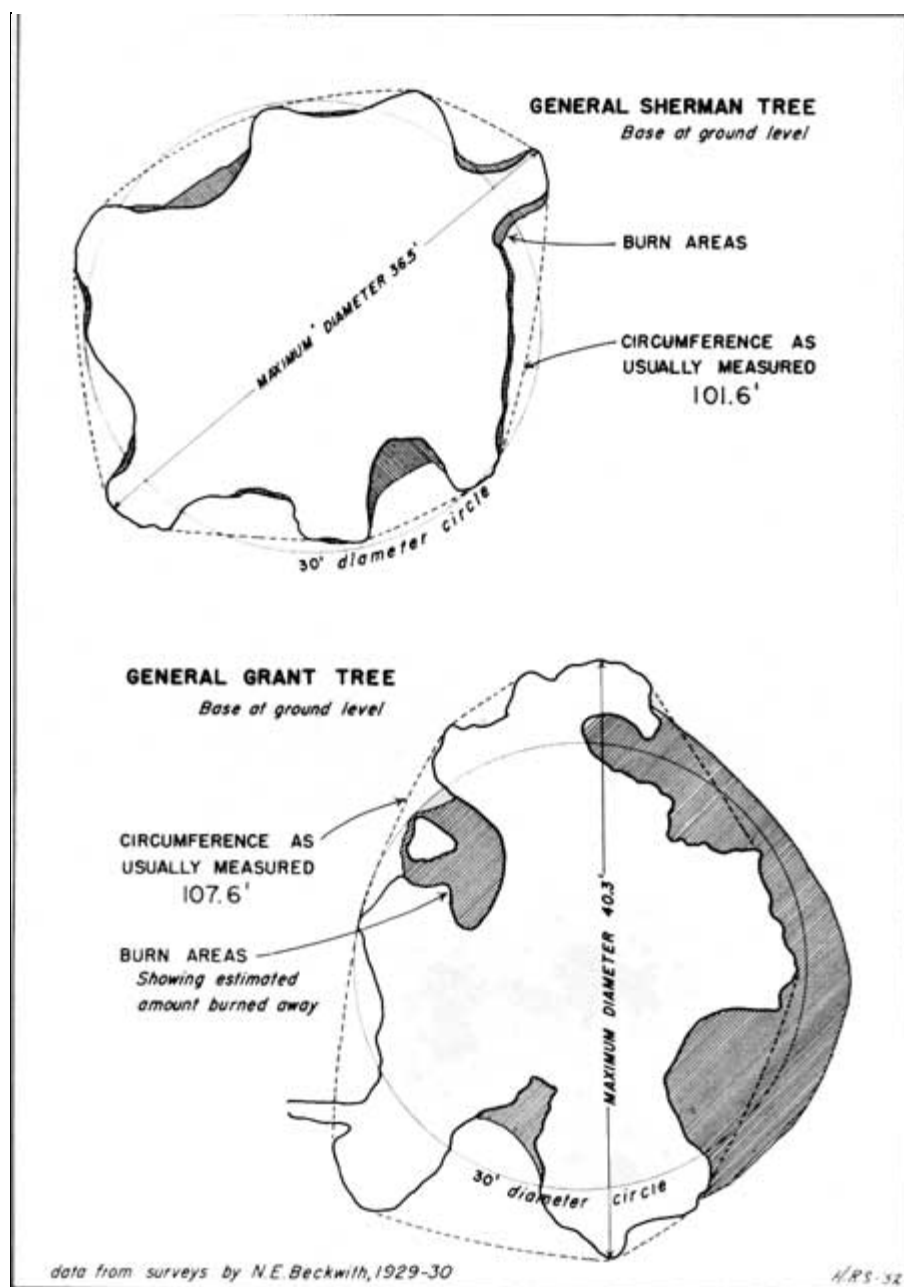
[Next](#) >>>

seki/stagner/sec3a.htm
Last Updated: 02-Feb-2007

SEQUOIA-KINGS CANYON

The Giants of Sequoia and Kings Canyon





Cross sections of the bases of General Sherman and General Grant Trees. These two largest sequoias have survived numerous fires and extensive fire damage. Despite great damage and great age, there is no indication that they are even approaching old age. The fire scars are noticeably smaller decade by decade.

[<<< Previous](#)

[<<< Contents >>>](#)

[Next >>>](#)