

A Visit to the Giant Sequoias

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Introduction

RECENTLY I had the pleasant and rewarding experience of visiting Sequoia National Park in California to see at first hand and in their national habitat the wonder and splendour of the Giant Sequoias (*Sequoiadendron giganteum*) or better known in these islands as the Wellingtonias. The park is situated in central California on the western slopes of the Sierra Nevada mountains and covers 156,000 ha (386,000 acres). It is a vast region of forest, mountain, canyons, rivers, lakes and meadows. It is administered by the National Park Services of the Department of the Interior of the U.S.A. The principal reason for establishing it in 1890 was to preserve the Giant Sequoias which were subjected to heavy exploitation during the period 1862 to 1900. Two factors saved the giant trees which survive here to-day, firstly, their inaccessibility at that time and secondly, their vast size which presented logging difficulties over rough terrain.

Picturesque Setting

The park is approached from the south through fertile country. Due to its low rainfall this area is irrigated by water from the Sierra Nevadas and consequently extensive vineyards, orange groves and cherry orchards are quite common. The scene gradually changes to grassy hills studded with oaks. Beyond the confluence of three rivers is a large deer reserve where a little party of mule deer browsed contentedly as if conscious of their protection. At the entrance to the park the wooden carving of the head of an Indian Chieftain reminds one of the origin of the name "Sequoia". To the right lies the Kaweah river in a deep canyon which carries a dense thicket of broadleaf scrub while across and above loom the bare and barren Sierra Nevada mountains rising 4,420 m (14,500 ft.) and which were snowcapped at the time. On the left are limestone cliffs from which the roadway was hewn. This roadway is known as the General's Highway and winds for 46 miles through the Sequoia belt.

1. Forest and Wildlife Service, Portlaoise, Co. Laois.

Giant Forest Grove

After passing a camping and picnicing area the hard climbing begins, turning and twisting over the next five to six miles and rising to an elevation of 1500 m (5,000 ft.) before getting the first glimpse of the "Big Trees".

Here you meet Giant Forest Grove which is one of sixteen Sequoia groves within the park. It lies astride the highway and extends over 1,000 ha (2,400 acres) and is at an elevation of between 1,500 and 2,000 m (5,000-7,000 ft). It is considered the largest and finest forest of giant Sequoias in the world. As the highway goes through the grove, visitors are afforded a magnificent view of the trees even while driving. First impression of the trees is one of awesome wonder, even disbelief of their size and grandeur. Their towering majesty is difficult to comprehend, and the Douglas fir which are growing in association with them, though large by Irish standards (25-27 m high, 50-60 cm dbh) are mere dwarfs in comparison. The beautiful red-brown bark which may be over 30 cm thick on the older trees is fluted in long vertical plates which gives the tree a columnar appearance. They seem to show very little taper from above the large buttresses to the first branches which may be 30 m or more above ground. Indeed it is little wonder that some confusion arose when their size was reported by the "Fortyniners" who came across this mountain range, when it was thought that inches were meant instead of feet. Three years later, however, in 1852 when miner A. T. Dowd reported on the stupendous trees in Calaveras Grove botanists and plant-collectors pursued his findings.²

Composition of the Grove

Within the grove the Sequoias are more closely spaced and the deep shade cast by them excludes their earlier associates of Douglas fir, sugar pine and white fir (*Abies concolor*) and suppresses natural regeneration which may occur. One circular group of four trees stood virtually adjacent to each other. It is surely amazing that such massive trees had lived so harmoniously as near neighbours for up to 3,000 years.

A notable feature is the big number of trees bearing fire scars which vary from basal burns to longitudinal streaks for 15 or 20 m up the trunks and which reach deep into the heartwood in some cases. Most of the larger scars are at the base and frequently on opposing faces of two trees standing close together, presumably, the deep forest litter and reflected heat from one to the other sus-

tained the fire. Despite the destruction of large areas of the Cambium layer and resultant retardation, the trees exhibit extraordinary recuperative powers because the scars are slowly closing over.

Stability of Trees

While the trees have withstood gales and storms over the centuries those that have succumbed may have been weakened by either fire, soil erosion or waterlogging. Mitchell has shown how wind firm the tree is in these islands insofar as it has never been known to blow down.³ Over the years it is inevitable that changes occur in the local physiographic conditions. Streams from melting snows may gradually erode the supporting soil with the result that the trees fall or lean. This can create a dam which can cause waterlogging up-stream, thus leaving the trees vulnerable to wind-throw. For some unknown reason but probably due to internal stresses large trees fall with a great roar on still days during late summer or in winter.¹

Fallen trees, some of which have lain for centuries, illustrate the disease resistance of the trees. The good condition of the logs testifies to the ability of the species to resist both fungal decay and insect attack. Sequoiadendron wood is durable with a high tannin content.

Root System

The Giant Sequoia tree has a relatively small root system in proportion to its trunk size. It has no permanent tap root but a closely matted adventitious root system which lies close to the soil surface. Single roots are known to grow 60 to 90 m towards a water supply.¹ On fallen trees the roots appear to break off close to the base of the tree.

General Sherman

Mid-way in the grove and a short distance from the road stands the well known General Sherman tree, which is the largest (though not the tallest) and perhaps the oldest living thing. Some vital statistics of both this tree and the General Grant tree (second largest) which occurs in the adjoining Kings Canyon National Park convey some idea of their size. (Table 1).

A ring count on felled neighbouring trees estimates the age of the Sherman to be 4,000 years.² The enormous size of the tree

TABLE 1

Name of tree	Height	Basal	Mean diameter in ft.		Volume Hoppus ft.
			at 60 ft.	at 120 ft.	
Sherman General	272 ft. (83m)	30.7	17.5	17.0	40,000 (1,444 m ³)
Grant General	267 ft. (82m)	33.3	16.3	15.0	34,500 (1,242 m ³)

is illustrated by a branch which arises from the trunk at 130 ft. above ground, having a diameter of 6.75 ft. and growing upwards for 150 ft. It is larger than most Irish trees yet it is an inconspicuous part of the tree. Some die-back of the crown is evident in both the Sherman tree and some of the older trees. It is suggested that a number of factors may give rise to this phenomenon e.g. fire damage, lightning, lack of water or nutrients, increased root competition or the inability of the older roots to function normally.

Dimensions of other notable trees also to be found within this grove are given in Table 2.

TABLE 2

Name of tree	Height	Basal Diameter
The Lincoln	78.9 m (259 ft.)	9.4 m (31 ft.)
The President	76.2 m (250 ft.)	8.8 m (29 ft.)
The McKinley	88.7 m (291 ft.)	8.5 m (28 ft.)

Animal Ecology and Forest Management

As a result of the strict protective policy applied by management over the years, some problems have arisen. With the elimination of the grizzly bear and the suppression of the cougar or mountain lion there has been a build up of mule deer. They have caused the depletion in some areas of some plants such as the snowbush and bitter cherry. Extermination of the rattle-snake has in turn increased the ground squirrel population. Control of forest fires has brought about the accumulation of deep forest litter which is hindering the regeneration of the Sequoias while, outside the grove, dense impenetrable thickets of pines, fir and incense cedar have been established. It is against this background that ecologists and managers are researching with the aim of finding the corrective measures to apply.

Facilities in the Park

The park offers hundreds of miles of trails, including self-guided nature trails, to the visitor. There are log-cabins, lodges and motel type rooms available for renting. Areas are designated for camping. There are food stores and rental equipment is available for ski-ing, pony trekking and fishing. Guided walks and campfire programmes are conducted during the summer months. Ranger stations are located at strategic points throughout the park.

Departure

As the road climbs and winds its way to almost 2,500 m (8,000 ft.) O.D. before turning west for the great expanse of the rich San Joaquin Valley below, there is a great sense of peace and tranquility. With snow to a depth of 60 cm in the forest, the panorama was reminiscent of Christmas card scenes. The Sequoias, Douglas-fir and White fir give way to interior type sugar pine (*Pinus lambertiana*), ponderosa pine, dogwood, alder and willow. Lower down small groves of Sequoias were passed and to the right lies Kings Canyon National Park which is famous for mountain wilderness, deep canyons and cedar groves, finally departing through Big Stump grove which has a remnant of one of the largest trees ever felled. With such abiding memories of these mammoth trees, it is easy to understand why they are one of the seven wonders of the modern world.

REFERENCES

1. Cook, L. F. The Giant Sequoias of California, 1961.
2. Edlin, H. L. Quarterly Journal of Forestry. Vol. LX, No. 2.
3. Mitchell, A. F. Irish Forestry, Vol. 26, No. 1.