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Pacific Southwest
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July 2005



Fire in the Forest

**A History of
Forest Fire Control on the
National Forests in California,
1898 - 1956**

By Robert W. Cermak

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California

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Acknowledgements

In May 1986 the first seven chapters of this history were submitted as a thesis in partial fulfillment of a master of history degree at California State University, Chico. My thanks to Professor emeritus C. H. Peterson, and to the late Professors Clarence McIntosh and W. H. Hutchinson, for their help and support in that effort. The narrative of the thesis ended in 1919, but research had extended for several years beyond that point. The story of the U.S. Army Air Patrol, which continued until 1923, and other landmark events such as the national fire conference at Mather Field in 1921 inspired the writer to continue the story of fire control in the California national forests. The writing was as much for personal pleasure as it was to provide a foundation for further research into the subject. Many people contributed to the research and review of the drafts, and many of those contributors are no longer with us. For that reason alone the history seems worthwhile, for their stories are already largely forgotten.

However, there had to be an end to the story because trying to penetrate the intricacies of today's firefighting world was far beyond my meager means and abilities. The history ends as the 1955 fire season comes to a close. This was a bad fire season, one that featured use of helicopters, the first use of aerial tankers on a fire, national attention to fire behavior, fire research's Operation Firestop, and a strong movement toward cooperative fire management in California among federal, state and local agencies. From this point forward, a new age had begun, and the dreams of better, easier and cheaper ways to fight fire seemed to be about to come true. How those dreams were resolved is the subject of another history yet to be written. The writing ended in 1988, and efforts to publish all or parts of the history were not successful. This was disappointing but certainly not unheard of in the world of writing. At any event, the text uses 1988 as an ending reference point, even though publication is much later in time. Many changes in fire control have occurred between that date and the date of publication, and in order to link the text to the present a brief epilogue is added.

Some of the same material found in the thesis and in this manuscript were used in an article about the Army Air Patrol in the Fall 1991 issue of *California History* and an article about emigrants and miners in the Winter 2001/2002 issue of *Overland Journal*.

It would have been impossible to gather data for this history without the help of employees from every Region 5 national forest including Rick

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Many changes have taken place since this history was begun and most of those listed above or cited in the text have retired; some are no longer with us. I hope in some way that part of their legacy lives on in this history. Thanks also to Mim Eisenberg for advice and editing of a work made difficult by spanning many decades both in history and in writing. In the regional office thanks are due to Daniel J. Spring who took some old maps and made them new and interesting, and to Mario Chocooj who searched and researched many files for photos. Also, to Donna Dell'Ario

who shepherded the whole, sometimes unruly, flock of projects into one publication. Special thanks to Steve Dunsky for his patience and guidance in this, at times, frustrating effort. The 100th anniversary of the establishment of the U.S. Forest Service seemed to be an appropriate time to publish this history, and for that I thank Regional Forester Jack Blackwell and especially my old friend and former regional forester, Doug Leisz.

Finally, thanks go to my wife Ethel, who drafted the maps and charts for the thesis and always supported me throughout the last fifty-two years, whether I fought fire or the word processor. The interpretation of events and any errors that may exist are my responsibility.

DEDICATION

To those who protected the forests of California between
1898 and 1956,
“their like shall not be seen again.”

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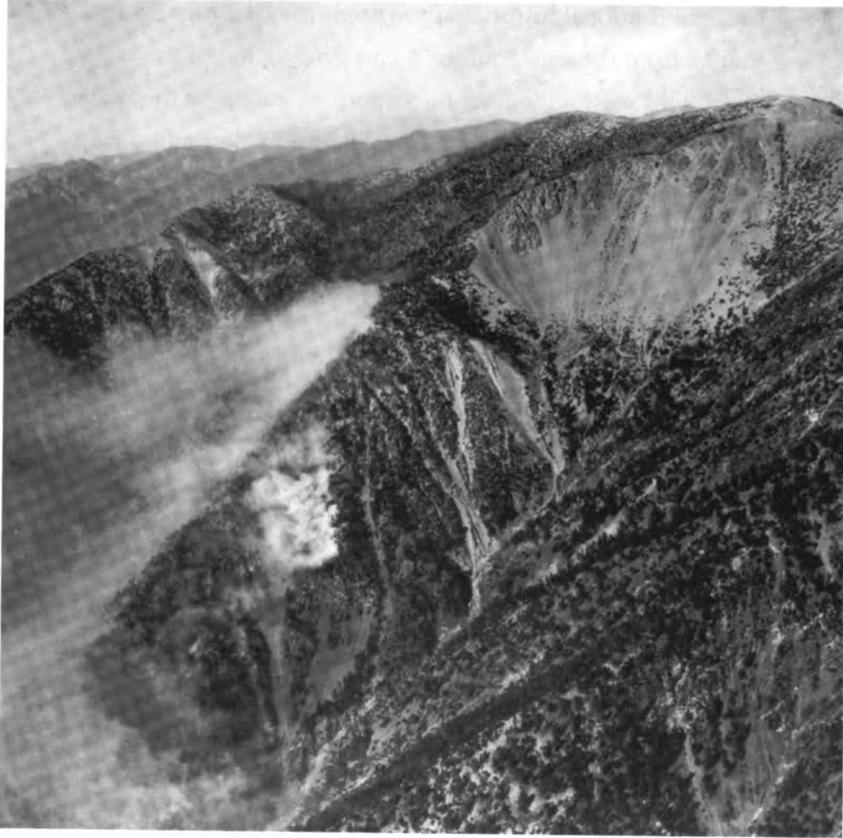
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Introduction

Most organizational histories are written from the top down; that is, from the viewpoint of the upper echelon of the organization. This method focuses on important leaders of the agency and on national, or in this case, regional policy, direction, mistakes and successes. However, it fails to provide a sense of the nuts-and-bolts difficulties of accomplishing the work on the ground. The Forest Service of this period (1905-1955) was highly decentralized, with considerable authority and responsibility delegated to forest supervisors, district rangers and even district staff and field supervisors. The fire organization reflected this philosophy to the extent that eventually people at the field level could and did supervise higher-grade personnel on large fires because they were better qualified as firemen. Every employee was expected to take part in a fire emergency. By the 1950s many of the better firemen in the region were not part of the regular fire organization. Each forest, and indeed each district, was expected to handle fires occurring on the unit to the extent of their experience and resources.

Yet this history is not told from the bottom up because nationally important policy and direction emerged from the California Region, and these events must be reflected in any fire history of the time. The attempt here is to provide the viewpoint from the top (region) with the corresponding effect of regional decisions at the other levels. More than any other resource activity, fire control was about what happened on the ground, so many notable fires are described, a few in detail. The Region 5 fire organization evolved over fifty years of trial and error until by 1955 it had reached a high level of effectiveness and efficiency. This history tries to trace the path by which this occurred and the ups and downs along the way.

It also tries to place the story of fire control in California in the context of the times. The Forest Service and fire control were not immune to national and international events that surrounded them. In fact, these events often dictated the course of fire control at the regional and local levels. In the final analysis, it was how Forest Service people responded to the changes caused by these events that dictated results on the ground.



Steep terrain, dry climate, and Santa Ana winds contribute to a long history of fire in the Southern California forests. Mt Baldy 1948

California's climate is justly famous. Robert Frost wrote about it in this way:

I met a Californian who would
Talk California - a state so blessed,
He said, in climate, none had ever died there
A natural death.¹

This booster's claim is perhaps exaggerated, but it cannot be denied that many immigrants and tourists were attracted by the state's climate. It is said that the climate breeds an attitude of freedom and creativity and that California is on the "cutting edge" of progress in the United States. Be that as it may, California also leads the country in wildfires, and the primary reason is its climate.

Space forbids a detailed discussion of climate, but fortunately one word describes California's climate: Mediterranean. The word conjures up visions of blue seas crashing against rocky headlands, wide beaches of white sand and a backdrop of green hills and blue mountains. The classic Mediterranean climate is found only along California's south coast, but climatologists tell us that most of the state has some form of Mediterranean climate. Indeed, during the real estate boom days of the early 1900s, even Orland, an inland Sacramento Valley town, claimed the climatic wonders of Italy.²

What is a Mediterranean climate? It is rainy winters, it is marine air influence, it is warm to hot summers, and it is extended sunny weather. These four characteristics are found wherever this climate exists: southwest South Africa, in southwest Australia, in Chile and, of course, along the Mediterranean Sea. They describe all of California's sub-climates with certain exceptions: a narrow strip along the north coast, the Modoc plateau, some of the Great Valley, the deserts and the higher mountain slopes.³

The popular song of some years ago told us, "It Never Rains in Southern California."⁴ There are years, however, when el Niño or other unknown phenomena create long, very wet winters that often cause flooding in the lowlands and huge accumulations of snow in the mountains. This is not generally a factor in wildfire control except in southern California, where torrential rains on burned slopes may result in disastrous floods. It was this sequence of events that put southern Californians in the forefront of early efforts to protect watersheds. The danger to watersheds is emphasized in the San Gabriel and San Bernardino mountains, which

have great potential for torrential precipitation for periods of 12 hours or longer. (See Table 1.)⁵

Place	Date	Time	Amount
Hoegge's Camp Angeles National Forest, 2,750 ft. elev.	1/22/1943	24 hours	25.83 inches
Campo San Diego County 2,590 ft. elev.	8/21/1891	2 hours	16.10 inches
Ord's Camp Angeles National Forest, 4,254 ft. elev.	4/5/1926	1 minute	0.65 inches

Table 1:
Precipitation Extremes
in Southern California

Source: *Climate of the States*,
Vol. 2 (Port Washington, NT:
NOAA, U.S. Department of
Commerce, 1974)

This demonstrates that a general climatic regime may have many sub-climates that differ drastically from one another. Average annual precipitation in California varies from 90 or more inches in the northern mountains to 25 inches in the southern mountains and only 10 to 15 inches along much of the south and central coast and in the Great Valley. Most of the precipitation arrives in the winter and moves with storms from north to south. It is quite possible to have an average fire season in the north while the south experiences a severe fire season.⁶

Truly wet winters are the exception. Most California winters have periods of warm, dry weather, and many have subnormal precipitation. When dry winters occur, especially in succession, California is subject to yearlong drought, usually resulting in severe fire seasons. However, in weather, as in most things, timing is everything. A wet spring can delay the onset of dry conditions and postpone or moderate an otherwise severe fire season.

During the long summer, both live and dead vegetation lose moisture until they become highly flammable. Summertime precipitation seldom occurs, so marine air becomes the major moderating element for much of California. On many summer days, marine air influence is significant even at locations far inland. In southern California the sea breeze may penetrate eighty miles across the coastal hills to the San Bernardino Mountains and flow up slope with normal air movement. In the north the Delta breeze often funnels through the Sacramento Delta and spreads north and south, cooling the foothills and mountains of the Sierra Nevada and Coast Ranges for fifty or more miles in each direction.

In most of California the summer is hot, dry, and long, as befits a Mediterranean climate, and this is most critical from the standpoint of wildfires. By mid-summer, as California wildland vegetation dries and dead materials lose moisture, the state is in fact undergoing drought. It is a drought that occurs every year, varying only in its intensity and length.

Severe wildfires occur throughout the rest of the United States but generally only during drought conditions. Through most of the country, frequent summer rains and/or high humidity ensure that droughts are rare. Why do severe wildfires occur during droughts? Because all vegetation is fuel. Think about green forests, brush-covered hills, orchards with glistening fruit, flowering shrubs, colorful gardens. All of this is fuel that can burn when conditions are right. California's annual drought brings about these conditions every summer.

Annual drought is an important aspect of California's wildfire climate, but it is usually tolerable. When it is combined with low winter rainfall and subsequent yearlong drought, it becomes a fearsome force. Two other weather conditions add even more danger to an already explosive combination. These are north or east winds, and heat waves. In the fall of most years, southern California news media can be expected to tell stories about the "Santa Anas." These fierce fire winds are found wherever the Mediterranean climate exists and are called by different names, such as the sirocco in North Africa and the mistral of southern France. It is a situation created by differences in atmospheric pressure. Water flows from a higher level to a lower, and so does air. (See Map 1.)

When a high-pressure system shifts into the Great Basin and a low-pressure area appears off the California coast, air flows from the high to the low, heating by friction and drying as it travels down the mountains toward the sea. The stage is set for Santa Anas: high velocity, hot, dry winds accompanied by low humidity. Fires break out, hundreds of homes are destroyed and tens of thousands of acres are burned. Southern California is noted for this wildfire wind, but it occurs over much of the state.

The three fall months are usually without rain in southern California, and fuels are at their driest. These are usually the months of the Santa Anas and the most severe wildfires. There are many examples to choose from, but one of the worst burning periods in California history came between September 25 and October 4, 1970, during a time of extended Santa Ana winds. More than one half million acres were burned, 722

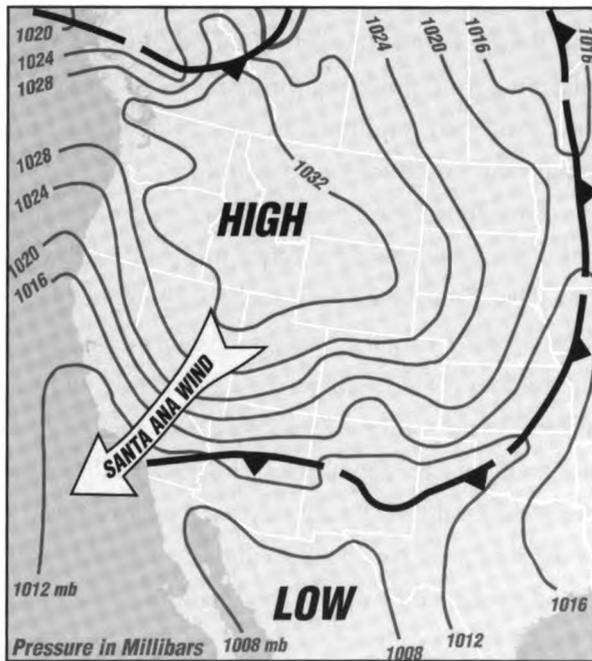
homes were destroyed and 19 lives were lost in southern California. Firefighting costs and fire damages exceeded \$233 million. Two of these fires, the Laguna and Newhall, consumed vegetation on 282,000 acres.⁷

The same basic weather conditions exist when north or east winds blow in northern California except that the two pressure centers are farther north. The first California conflagration to destroy hundreds of homes occurred on September 17, 1923, when a hot, dry northeast wind carried a small fire from the east side of the Berkeley Hills to the west side.

The fire ignited a eucalyptus grove, sending firebrands into the wind. A house caught fire at 2:20 p.m., and two hours later 584 houses and other structures lay in ashes.⁸

The other condition that creates extreme fire danger seems almost innocuous. It occurs every summer, and

people complain but often do not realize how much danger there is in the "heat wave." So why is a heat wave a problem? The most obvious problem is discomfort and soaring air conditioning bills, but to the wildland manager it means the most dangerous time of the fire season. Several times every summer a large dome of atmospheric high pressure will move over the state. It squats overhead, pushing down, heating the air near the surface to more than 100 degrees, squeezing the moisture from the air until relative humidity drops to 10% or less. The clockwise circulation of air around the high causes offshore winds to replace the sea breeze, and even coastal regions suffer from the heat. Sometimes the southwest monsoon or remnants of tropical hurricanes are caught up in the air flow and create humid conditions and thunderstorms. Lightning strikes from



Map 1:
Surface weather,
4 A.M. PST
September 25, 1970
Santa Ana winds
flow from high to
low atmospheric
pressure.

USDA Forest Service,
Proceedings of the
*Symposium on the
Environmental
Consequences of Fire
and Fuel Management
in Mediterranean
Ecosystems*,
1977

these storms may cause small wildfires that often spread rapidly under heat wave conditions and can quickly reach the disaster stage.

One of many examples of heat wave induced fire disasters occurred in late July 1977. California sweltered under a heat wave while circulation around a high-pressure area brought in moist tropical air and thunderstorms that traveled the state from Mexico to Oregon. Lightning strikes ignited the Marble Cone Fire on the Los Padres National Forest, the Hog Fire on the Klamath National Forest, the Scarface Fire on the Modoc National Forest and many smaller blazes. The three larger fires burned a total of 317,000 acres in a seven-day period. The 1977 fires came after two years of drought had dried wildland fuels to the point that fire control became very difficult.⁹

Vegetation

Vegetation is fuel and since they can't do anything about the weather, wildland managers have given new emphasis to management of fuels. Fire requires oxygen, an ignition source and fuel, the one element of the fire equation that can be manipulated to manage fire. In 1910, when official controversy over the best way to manage wildfire began, some said reduce fuels, others said put out fires. After protracted, often bitter dispute, the latter view won out, and for decades fire suppression was the main solution to wildfire protection. Then in the 1940s new attempts to reduce fuels began, and by the 1970s fuels management had become accepted as a supplement to fire suppression.

However, expansion of timber cutting after World War II resulted in most forests (fuels) in the state being cut over, some several times. The forests of large, tall, old trees that were better able to resist ground fires were almost cut over. Since "nature abhors a vacuum,"¹⁰ their place has been taken by new growth of trees and brush. This is an entirely natural event, but it introduces large quantities of green fuel and also a fire ladder to remaining taller trees, thus creating potential for intense fires. Meanwhile, vastly increased population in California has created severe air pollution infringing on the use of prescribed fire to reduce fuel. Millions of people now live in the wildland "interface," a zone wherein homes are the most dangerous fuel of all. Fuels and how to manage them are the central dilemma in wildland fire protection.¹¹

Despite worries over fuel and “unhealthy” forests, historically climate and weather were the dominant forces affecting wildfires. After all, climate is also the major factor in determining the kinds and amount of vegetation that wildfires burn. Some of the vegetation that grows in Mediterranean climates has adapted to hot, dry summers and mild winters. For instance, the typical vegetation of most of southern California is dormant in late summer and fall and becomes active in winter and spring. This vegetation is low growing, has high concentrations of oils and waxes in its leaves, produces seeds that often require high heat or charring before they can germinate and sprouts from root crowns, all adaptations to climate and to fire. Worldwide, each area with a Mediterranean climate has its own name for this kind of vegetation. In California it is called “chaparral.”

This plant community grows at elevations between 500 feet and 3,000 feet in the north and between 1,000 feet and 5,000 feet in the south. One of the signals that fire season is underway in California occurs when the moisture content of chaparral drops as the plants prepare for summer dormancy. Typically chaparral grows in large, continuous, essentially even-aged stands that are of about the same height. In many cases, chaparral does not live beyond forty years, not necessarily because it cannot, but because it usually burns before it reaches that age. Continuous expanses of chamise, manzanita and/or scrub oak flow for miles over rugged hills and mountains and in and out of deep canyons. There it is the climax vegetation, fated to burn, and regenerate, and burn again, as it has for many thousands of years.¹²

Chaparral is the characteristic vegetation on most of the southern California national forests, but in the wildlands of the Sierra-Cascade and Klamath and other northern mountains, chaparral is generally found at elevations below national forest land. A notable exception is the Mendocino National Forest, that includes large expanses of chamise. During establishment of the national forests in the northern mountains, large tracts of chaparral were excluded from forest boundaries. Later boundary adjustments excluded most of the remaining chaparral.

In the mountains of California, vegetation changes with elevation. Ponderosa pine is usually the first conifer found above the chaparral or the blue oak-gray pine of the foothills in the northern mountains. It is a species valuable for timber, and it grows vigorously in pure stands or mixed with other conifer species. Summer drought, high temperature and

low humidity and its location make ponderosa pine more fire prone than any other commercial timber species in California.

Ponderosa pine is supplanted at higher elevations by mixed conifers in the Sierra-Cascades and by Douglas-fir in the mountains of northwestern California. Mixed conifers include two or more of several species: ponderosa pine, sugar pine, Douglas-fir, white fir, red fir and incense cedar. At even higher elevations, mixed conifers and Douglas-fir give way to true firs (red and white fir), and they, in turn, to sub-alpine and alpine species. In the mountains of southern California other forest species are found along with the forest types named above. All forest types share their space with an assortment of hardwood trees, brush and grass species that varies in extent and density. Every vegetative type will burn under certain conditions, but since the establishment of the national forests in 1905, most major fires within their boundaries have been within the chaparral, ponderosa pine, Douglas-fir and mixed conifer types.

Another effect of the long, hot, dry summer is that relative humidity readings are often below the 20 percent level needed for decay fungi to function in woody material found on the forest floor. The result often is a buildup of dead fuel.¹³ Thus, discussion of forest fire in California ultimately returns to climate or weather and their effects. In the chapters that follow, climate or weather will prove to have been the deciding factor in setting fire control policy, in controversies over wildfire, in the bad fires and bad fire seasons, and in the tragedies that sometimes resulted from them. These chapters will also show that extreme fire weather occurred during every fire season in the period under consideration. Sometimes prolonged, very hot, dry and windy weather resulted in season-long high fire danger. However, a comparatively few years can be designated as bad fire years because in other years an effective fire organization, and a measure of good luck, kept fires within reasonable limits.



A red fir
forest in the
northern Sierra
Nevada.

Source:
Robert W. Cermak

Early fire control efforts in California were often frustrated by settlers who had a long history of deliberate or careless use of fire. Some of these settlers came from parts of the United States where fire was a long-established means of eliminating unwanted brush or trees. Others pointed to evidence of burning by Native Americans as a reason for their own firing of the woods. Native American burning became a symbol for those who believed the best way to protect the forests was to burn them often enough to prevent accumulation of fuels. Thus, the extent and frequency of Native American burning became an important issue in the development of fire control in California.

There is ample evidence that Native Americans in California used fire to encourage favored seed-bearing plants, plants used in basket weaving and other domestic activities, and to drive animals during hunts and for other purposes. These activities were reported primarily from coastal, Great Central Valley and foothill locations. Some authorities cite evidence that fires purposefully set by Native Americans were common and resulted in park-like forest conditions at the time the first Americans settlers arrived.¹ They base their beliefs primarily on analyses of tree rings and traditions of burning recounted by tribal members and their descendants. Other investigators doubt frequent, widespread burning by Native Americans in the California mountains.² Their opinions depend primarily on written accounts by Spanish, British and American explorers, and by early emigrants, miners and settlers in California.

L. T. Burcham analyzed diaries of Spanish explorers and British trappers who traveled through California before the American conquest in 1846. He concluded that Native American burning was not practiced throughout California and that the prehistoric forest landscape was not greatly different from the old-growth forest of his day.³ His viewpoint is supported by many diaries and reports, ranging in time from John Charles Fremont's second and third expeditions (1843-1846) to William Brewer's account of the first California geological survey (1861-1864).⁴ Many overland travelers to California kept diaries during the Gold Rush period (1848-1855) and later years resulting in hundreds of descriptions of forests, wildlife, and scenery. Most of these accounts came from the gold country in the Sierra north of the American River, the foothills and lower mountain slopes of the central Sierra as far south as Mariposa, and the Klamath and Trinity Rivers.

These accounts most often described forest conditions as “dark,” “dense,” or “thick,” rather than “open” or “park-like.” Perhaps the best description by a forty-niner was by J. Goldsborough Bruff, who traveled the western slopes of the Feather River drainage between 1849 and 1851.⁵ He kept a detailed diary and clearly distinguished



A grove of giant sugar and ponderosa pine similar to those seen by the first travelers in the Sierra Nevada

Source:
Yuba-Feather
Historical Association

between open and dense forest conditions. He recorded the latter six times more often than the former. One thread common to most accounts was awe at the immensity and grandeur of the trees in the forest, especially the sugar pines. Accounts by the first explorers of the upper slopes of the central Sierra and southern Sierra reported more open forests than in the north, but brush and smaller trees were often found under the large trees. John Muir described open forests of ponderosa pine but also found brush and small trees to be an integral part of most of the central and southern Sierra forests he traversed in the period 1869-1875.

Henry T. Lewis used some accounts by Spanish explorers to support his belief in widespread Native American burning. However, his main evidence was that of oral interviews by ethnographers with Native Americans.⁶ In some parts of California the Native American tradition of burning is firmly established, while in other areas, especially the mountains, the evidence is less convincing, as Lewis admits.

Supplemental to the early traditional Native American accounts are analyses of tree rings conducted in various parts of California beginning about 1917. Early studies done by Stuart Bevier (S. B.) Show and others were aimed at supporting contemporary fire protection policy or for disease research.⁷ Tree ring analysis for fire history purposes in California

was done by several investigators, notably Wagener in 1961 and Kilgore in 1973.⁸ Most of this work took place in national parks as part of a program to introduce "natural" fire conditions. Researchers came to believe that lightning fires were not frequent enough to account for the number of fires indicated by the tree ring analyses. In combination with local Native American traditions they concluded that there was regular Native American burning in these localities resulting in open forests. Other studies have added to the number and distribution of tree ring analyses in the central and southern Sierra. However, the lack of tree ring studies, and the wealth of historical evidence in northern forests suggest generally denser forest conditions there. Nevertheless, the concept of open forest conditions in the Sierra when the first emigrants arrived has been widely accepted in the fire control community.

Changes in climate were bound to have affected fire occurrence and severity, but the extent of such effects is not known. Given the history of high fire danger in every fire season and bad fire seasons every few years, natural ignitions could have resulted in widespread forest and brush fires. In particular, the regular occurrence of heat waves often accompanied by lightning storms could have caused large fires such as those that destroyed more than 340,000 acres of forest and brush in 1977 and more than 600,000 acres in 1987. Even after a heat wave subsided, fires ignited by lightning could have continued as creeping fires burning all summer long and covering extremely large areas. It is not known how long lightning fires at middle and lower elevations would last under natural conditions. Given favorable burning conditions, it is possible that such fires spread much farther than is commonly supposed.⁹

While some Native American fires were no doubt set for various purposes, other fires were probably caused by Native American carelessness. These accidental fires could have occurred during severe fire conditions, when a mere spark might start a fire. Such fires easily could have burned very large areas of forest or brushland. At any rate, Native American burning had little effect on California's forests compared to the repeated, widespread burning of forests and brushlands practiced by miners, lumbermen, stockmen, settlers, and others during the last half of the nineteenth century.

Attitudes toward Fire

Many mountain residents of the 19th century were accustomed, even indifferent, to forest fire. Some of them burned the woods for practical reasons; others, because they just liked to see fire burn. Perhaps this was a legacy from some of the first emigrants. Many of them seemed to have a fascination with fire, its beauty and its destructive power. Louise Clappe, of *The Shirley Letters* fame, wrote to her sister about a trip from American Valley to Rich Bar: "We stopped at the top of the hill, and set fire to some fir trees. Oh, how splendidly they looked, with the flames leaping and curling amid the dark green foliage like a golden snake, fiercely beautiful."¹⁰

William Downie, founder of Downieville, recalled, "Camped in such places, the 'boys' generally invented some kind of sport as a divertissement [sic], and it was a common thing to see them set fire to the moss on the bark of trees and watch the blaze run up to the top of the mighty trunk."¹¹

The deliberate destruction of forests, which the emigrants themselves saw as awe-inspiring, is remarkable. However, it was not unusual, as attested by observant travelers. In 1849 the Lassen Trail was marked by a swath of fire and smoke. As J. Goldsborough Bruff passed along the trail south of Big Valley (Modoc County) on October 11 he noted in his diary, "...the woods alight and crackling with the many fires, burning the huge dry pines." Five days later he skirted the magnificent Big Meadows of the Feather River (now Lake Almanor) and wrote, "Many fires burning along the route." In July 1850 while in search of the fabled Gold Lake, he camped near Rich Bar on the East Branch of the North Fork of the Feather River and wrote in his diary, "Fallen pines afire near us, we passed numerous fires of this kind, and the hills are alight with them."¹²

However, as with the Native Americans, many fires probably resulted from sheer carelessness. Bruff, William Brewer and Mark Twain all wrote about campfires they allowed to escape. In late August 1861 Twain described the perfect clarity of Lake Tahoe and its inspiring surroundings. Nonchalantly, he went on to tell of his escaped cooking fire and the spectacle it created. A "tempest of flame," "surging up ridges," until after four hours the "...conflagration had traveled beyond our range of vision."¹³ When Bruff, Brewer and Twain described their escaped campfires they apparently were concerned with the danger to their camp duffel or the scenic effect of the fire but not with the damage done to the forest and its beauty.

Carelessness caused many forest fires then, as it does now. However, most fires in the forests were deliberately set for very practical reasons. Prospectors in the rugged Klamath Mountains were said to burn brush cover to expose underlying strata.¹⁴ Such fires often continued up slope into the timber. Cattlemen burned in the foothills of the state to reduce brush and improve grass conditions. These fires also commonly continued up slope. Most of the lumbermen came from the Great Lakes states or other areas where fire was commonly used to burn slash (debris left after logging). Under California conditions, these fires often spread beyond the logging site.¹⁵ Since the lumber industry did not get into high gear in California until after 1900, escaped fires were usually localized rather than the mass fires experienced in the Great Lakes states.¹⁶ However, there was one group of forest users that used fire in much of the mountain area of the state. These were the sheepherders.

The heyday of the sheepmen in California was from about 1870 to 1890, a period when as many as seven million sheep were pastured in the state. Rising prices for wool produced high profits in sheep grazing, and, in the custom of California farm operations, it became big business. A relatively few operators owned a large proportion of the sheep and reaped large profits by grazing public lands without fee. Use of mountain forage began after the drought of 1862-1864 forced some sheepmen into the mountains in search of pasture. Annually afterwards, increasing numbers of sheep were driven to the mountains. By the late 1870s large flocks crowded mountain pastures throughout the state.¹⁷

Burning the woods was a practical and efficient way to improve sheep grazing. Fires set in the fall left a residue of ash and available minerals that improved growth of forage plants in the spring. Burning eliminated brush and small trees, making way for more forage plants. It also destroyed logs and other obstacles to the passage of sheep. Control of bands of a thousand or more sheep was thus made easier for the herder.

Burning by sheepherders became so common from the 1870s through 1900 that the newspapers often printed stories about smoky fall days. In 1889 C. M. Dabney of Fresno made a plea for control of sheep grazing and sheepherder fires. He claimed, "There seems to be a combination of sheepmen...who pay no taxes, have no homes, defy our laws, and who say they do not understand English, to burn these magnificent forests as they go along."¹⁸

P. Y. Lewis herded sheep in the upper Mokelumne River drainage in 1876-1877. His account described how sheepherders burned the woods as they came out of the mountains in the fall: "We started setting fires and continued setting them until we reached the foothills. We burned everything that would burn."¹⁹ John Muir, who once worked with sheepmen, passionately denounced sheepherder fires, writing in part, "The entire forest belt is thus swept and devastated from one extremity of the range to the other."²⁰

In the summer of 1900 George B. Sudworth of the U.S. Division of Forestry studied the southern Sierra Nevada for the U.S. Geological Survey. His survey covered the large area south of Yosemite National Park, and his report included dozens of photographs and descriptions of what he saw. In Mono Creek and Rock Creek he found, "The entire valley timber and slopes are fire marked, as a probable result of grazing. No reproduction." About the Middle Fork of the Kings River he recorded, "Note fire markings, common throughout region. A sheep grazed region." Of the Kern River Canyon he wrote, "No reproduction, heavily grazed for years and burned over." He also cited many instances of large sequoia trees completely or partly burned as a result of stockmen fires. Other technical reports written about 1900 for the U.S. Geological Survey are unanimous in citing sheepmen as the most common cause of forest and brush fires throughout the state.²¹

By 1900 many mountain grazing lands were greatly depleted, and some counties had begun to tax sheep and limit their movement. Rangers on the forest reserves were succeeding in efforts to exclude trespassing sheep from public forests. The boom days of sheep grazing were over, but they left behind severely damaged mountain meadows and forests.²²

As damaging as the sheepherder fires were, there is ample evidence that most other mountain residents either deliberately set fires or were frequently careless with fire. Photographs of the communities and surrounding terrain high in the mining country of the northern Sierra Nevada show vast areas of brush where vigorous forests now exist. These photographs date from 1880 through 1910, and only in the later years were the tops of trees to be seen emerging from a sea of brush.²³

Despite the annual palls of smoke and the frequent scrambles to keep fire from destroying structures, most mountain residents remained unconcerned about forest fires. A generation raised on Smokey Bear and media

reports about devastating forest fires may find this attitude hard to understand. E. W. Maslin of the foothills community of Loomis pinpointed an important reason for indifference in a speech to the Fruit Growers Convention in Fresno, November 8, 1889: "Nobody seemed to care; it was all public land, and what is everybody's business is nobody's business."²⁴

It is not so surprising that the attitude of many mountain residents toward forest fires was indifference. Fire was seen more often as a friend than an enemy. The legacy from their forebears, who settled the states east of the Mississippi River, was that wildland should be converted to farms. There was so much timber that no one could foresee a use for all of it. Travel to fires was slow, often arduous, firefighting was hard work and there was no pay. Unless a forest fire actually threatened one's farm, home or business, why worry?

In some towns near the northern mountains, "people were as unconcerned as those who lived in the mountains, believing that the sheepmen really were fine fellows who spent considerable money in town."²⁵ The cattlemen, loggers and miners were often part of the community. However, in other rural towns in southern California, the attitude was not so complacent. Increasing population and irrigated acreage at the foot of the mountains put people and property in jeopardy from forest fires and subsequent flooding. A tide of protest was rising in the towns and cities of southern California. By the early 1880s their concern was echoed by newspapers from Yreka, Marysville, Sacramento, Visalia and San Francisco calling for a halt to man-caused forest fires and reckless grazing. It was a case of closing the barn door after the team had left.

Forest Conditions in 1898

What were the conditions on the public forest lands of California in 1898 when the General Land Office began to administer the forest reserves? California in 1898 was not a frontier state. Slightly more than half the population lived in urban places. Most of the rural population lived in small towns or on farms in the Great Central Valley or southern California. Fewer than 180,000 people lived in the northern counties, which included the mountains within their boundaries, and most of them lived in towns scattered through the Great Central Valley.²⁶ Industry held sway even in valley and mountain areas, where much of the grain farming was mechanized and mining and lumbering was dominated by large

companies. Indeed, widespread burning by shearers was really a way to improve conditions for grazing huge numbers of sheep, a kind of mass production of wool and mutton. Rather than a frontier practice, it was an expression of nineteenth-century laissez-faire industrial methods in a rural setting.

Even though it was not a frontier state in the usual sense, California had intrastate frontiers where miners, stockmen, and lumbermen lived and worked on the borders of wildland. Large areas were inaccessible except by trail. The Klamath and Cascade mountains had virtually no roads. Neither did the central and southern Sierra Nevada nor the mountains of southern California. Isolated sawmills transported lumber to the Great Valley by water flume from Chico in the north to Madera in the south. The foothills throughout the state were sparsely occupied by livestock ranches. Only in the mining regions of the northern Sierra had stage roads been built to serve towns deep in the mountains. The mountains near these mining communities had been burned repeatedly.

The extent of the burned area in the northern Sierra was mapped about 1900 and described by John H. Leiberg in a U.S. Geological Survey report published in 1902. He wrote of a severely burned belt fifteen to twenty miles wide from Spanish Peak (near Quincy) across the central basins of the Feather, Yuba and American Rivers to the area west of Lake Tahoe. He

estimated 50 percent or more of the timber on 700,000 acres had been destroyed and wrote, "The most potent factor shaping the forest of this region [the northern Sierra] has been, and still is, fire."²⁷ Within the study



St. Louis, ca 1880.
A mining town in Sierra County surrounded by denuded slopes.

Source:
Edward Hayes,
Yuba-Feather
Historical Association



Area in 1960 where St. Louis once stood, now completely forested. A benefit of fire protection.

Source:
Robert W. Cermak

area he estimated more than 210,000 acres of forest soils were covered with brush.

Further north, in Shasta County, C. Hart Merriam, chief of the U.S. Division of Biological Survey, wrote of an 1898 fire that burned the same area as a devastating fire in 1872. The 1872 fire was estimated to have covered 150,000 acres and destroyed one and one-half billion board feet of timber along the Pit and McCloud rivers. Merriam described the scene after the second fire went through in 1898: "Along the railroad between the head of Sacramento Canyon and Shasta Valley one traverses desolate tracts that a few years ago were covered by a noble forest of ponderosa and sugar pines."²⁸

The summertime traveler to northern California in the 1880s and 1890s found its highly touted scenery obscured by smoke. Articles in the *Yreka Journal* illustrated the situation. On July 31, 1889, the paper reported: "If these fires in the mountains keep increasing, our farmers will be able to cure bacon and ham without the aid of a smokehouse." On September 6, 1893, the paper warned that the U.S. marshal would take action to prevent incendiary fires that "...destroy large areas of valuable timber and choke up the atmosphere with smoke." On August 28, 1896, the paper reported: "The smokey atmosphere has rendered it very close and disagreeable." Merriam also commented on the visitors' view of the mountains: "Few see more than the immediate foreground and a haze of smoke which even the strongest glass is unable to penetrate."²⁹

Newspaper and other accounts make it clear that the south Cascades and Klamath Mountains suffered many large fires after settlement took place.³⁰ Sudworth's report, quoted above, gave first-hand testimony to widespread burning of forests in the central and southern Sierra Nevada.

The tale of fires in the woods and the brushlands of the north was repeated in the mountains of southern California. U.S. Geological Survey reports for the San Jacinto, San Bernardino and San Gabriel forest reserves were issued in 1899 and 1900. The peripatetic John H. Leiberg found virtually all of the forest area of these reserves had been burned repeatedly, but in contrast to the Sierra Nevada, he found little damage from fire in most forest areas. He suggested light fire damage in pine stands was due to lack of litter and undergrowth. On the other hand, large areas of chaparral had been repeatedly burned and severe damage to soil and water holding capacity had resulted.³¹

His findings were supplemented in 1903 by U.S. Bureau of Forestry reports on the San Gabriel and San Bernardino forest reserves. For example, L. C. Miller found the quality of cover in the Tujunga watershed to be poor and brush stands much reduced by recent fires. Miller also examined the Arroyo Seco and Santa Ana drainages and found similar conditions due to large fires in 1893 and 1896.³²

These official reports of forest conditions throughout California are supported by memoirs and diaries of early-day officers of the forest reserves and by newspaper accounts of forest and brush fires. The most exhaustive record was compiled by the Works Progress Administration and Civilian Conservation Corps researchers in the late 1930s and involved review of all existing files of all California newspapers from 1849 to 1937 for mention of forestry and forest fires, the results of which are bound in sixty-nine volumes at the library of the Department of Forestry and Resource Management of the University of California at Berkeley.³³ Review of these early accounts confirms the pattern of large fires almost every year and periodic bad fire seasons.

The evidence is that the effect of forest fires, heavy grazing and sporadic logging on public lands depended on accessibility and markets for products as much as it did on the value of the resources involved. By 1898 much of the public land in the Sierra Nevada had been overgrazed and burned, but there were still large areas of original forest. Wherever settlement had existed for a long period the surrounding forest land had been cut over and, depending on the elevation, had been replaced by cultivated fields, brush and/or young timber. Some isolated sawmills were connected to the Great Valley by snake-like lumber flumes, and mines dotted the landscape in the mining country. Outdoor recreation use was increasing, especially in the national parks and Lake Tahoe. The steep and rugged northwestern forests lay as trackless as in the past except for a strip of redwood lumbering along the north coast. The southern California forests had shared in the fate of the Sierras with uncontrolled fire, logging and grazing through which they had survived despite use and misuse.

For twenty-five years after the Civil War, ordinary citizens, speculators and businessmen appropriated the rich timber, mining, grazing and agricultural resources of the West. Long-established national policy favored disposal of the public lands and resources as the primary means to settle and develop the country. Congress passed dozens of land disposal laws intended to benefit the small farmer and individual settler. However, much of the best land and resources gravitated to speculators, wealthy individuals or large companies.

Secure in the philosophy of *laissez-faire*, big and small business alike exploited the nation's natural resources. The country was growing rapidly, and lumber, minerals, meat and grain were in demand. Commodity prices were low, and customers had little hard cash to pay for careful resource management even if the techniques were available. Anyway, the forests, lodes, pastures and fields were endless, or so it seemed then. Certainly, large business had no corner on speculation and exploitation. Many a settler filed his claim just to sell it at a profit, and many a teacher or office worker took an excursion to the woods to do the same on behalf of a large lumber company.¹

Yet there were a few people who wanted a change in this attitude toward the land and its bounty. These few wrote books, gave speeches and formed action groups such as the American Forestry Association. They warned of forest fire and floods, soil erosion and drought. Slowly they made converts in the press, in legislatures and among perceptive businessmen and farmers. By the late 1880s their ideas, suggestions and proposals were beginning to jell into a new land and resource ethic.

This new land ethic called first for protection of watersheds by stopping lumbering, grazing and wildfire. There were some who wanted to apply forestry, but few knew what "forestry" meant. The emphasis seemed to be on custodial management, a caretaker status to protect watersheds and timber until more was known about managing these lands. Other groups and individuals were primarily interested in preservation of scenic beauty. They also wanted change, although their goals were different. Since private enterprise was unable or unwilling to meet their goals, the reformers sought permanent federal land ownership of certain mountain lands. They pointed to denuded pastures and devastated forests on private lands and to flood and forest fire disasters to support their thesis. They wanted an end to watershed abuse and the

careless squandering of natural resources typical of the frontier and its extractive industries.²

By the late 1880s the reformers had achieved a few isolated successes. The Yellowstone upland and Yosemite valley were reserved as public parks, and several attempts had been made to expand the reservation idea to include large areas of public forest land. However, Congress was dominated by Eastern and Midwestern representatives whose knowledge of Western conditions was limited. Land and resource values were imperfectly understood, and loosely-worded land laws were passed that invited fraud and speculation. In 1891 Congress tried to close some of the loopholes in existing law and to expand opportunities for land disposal with an omnibus bill called the General Land Law Revision Act.

In late February 1891 Congress was pushing for the annual adjournment. The General Land Law Revision Act had been much amended in both houses, and members were tired of the debate. Finally, each house sent its version to conference committee. There the differences were reconciled and a consolidated bill was sent to both houses. The act revoked some land disposal laws and expanded others. It also contained a new provision, Section 24, which authorized the president to reserve forest lands from the public domain. Members were aware of the change, but it is doubtful they realized the full implications of Section 24. Both houses passed the act, and President Benjamin Harrison signed it into law on March 3, 1891.³

This law was the major break with past land disposal policy and tradition that the reformers had wanted. It not only provided an opportunity to retain some of the nation's natural resource heritage, but it also gave impetus to the ideas of custodial management and preservation of scenic beauty. In 1892 and 1893 President Harrison made the new direction a fact by proclaiming sixteen forest reserves in the western states. Four of those reserves were in California. (See Map 2.)

California's Role in Establishment of the Reserves

Designation of three forest reserves in southern California and one in the southern Sierra Nevada illustrated the two major thrusts of the reformers in California: protection of watersheds, and preservation of scenic beauty. The latter had a strong foundation in California. Most Californians were proud of the state's spectacular natural wonders: massive sequoias,

tall redwoods, matchless Lake Tahoe, and Yosemite, "the wonder valley." Yosemite so captured the imagination that President Lincoln signed an 1864 act granting federal land in the valley and the Mariposa Big Trees to the state. Two years later the state accepted the grant and established the first state park in the United States.⁴

California's scenery and natural features were the subjects of many stories, poems and articles from the writers who gathered in San Francisco after the Gold Rush. Their work was published in magazines such as *The Golden Era*, *Hutching's Illustrated California Magazine* and *The Overland Monthly*. These writings were a major source of information and enjoyment to the reading public at a time when newspapers consisted mostly of local news and fillers. Some of the articles reflected concern about threats to California's natural wonders.

One such threat arose from the demands of the Comstock Mines for timber. The result was large-scale logging in Tahoe Basin. Forests were cut over and the scenic beauty of the basin impaired. Finally, in 1883 the California legislature passed a concurrent resolution establishing the Lake Bigler (Lake Tahoe) Forestry Commission. This was the first forestry commission in the country. Its purpose was to preserve the forests and scenery around the lake for citizens and tourists. However, the Commission's recommendation for a state park similar to Yosemite was not acted upon and the idea lapsed.⁵

San Francisco was the cultural center of the West and continued to attract writers who kept up the tradition of nature writing. After 1870, social, political and economic reformers began to include land and resource use as literary topics. Henry George, Josiah Royce and Ambrose Bierce all touched on this theme. By the eighties, Charles Howard Shinn and John Muir, among others, were attracting attention with their articles on nature and its preservation. Forty years of nature writing was bound to have some conditioning effect on its audience. Educated professionals and perceptive businessmen saw the wisdom, or the economic benefit, of the preservation of scenic beauty. Urban areas, especially the San Francisco Bay Area, became centers of an emerging belief that some federal forest lands should be reserved for their scenic values. The most prominent of many spokesmen for this viewpoint was John Muir of Martinez.

Muir became known for his emotional descriptions of the Sierra Nevada and his thrilling experiences there. A series of articles for *The*

Century Magazine in 1889 and 1890 gave him a national reputation and probably helped assure passage of two acts designating Yosemite and Sequoia as national parks in 1890.⁶ Muir's ability to evoke word pictures of the "Range of Light" was widely acclaimed especially in East Coast cultural centers and in the Bay Area. He supplemented his writing ability by sincere and convincing dialogues with national leaders, usually on his home ground in Yosemite.

Muir's goal was preservation of natural beauty for its own sake and for the enjoyment of others. To this end, he and other prominent California preservationists founded the Sierra Club on June 4, 1892. One of the purposes of the Club was "to enlist the support and cooperation of the people and the government in preserving the forests and other natural features of the Sierra Nevada."⁷ John Muir and other preservationists were persuasive, but Congress was unwilling to do more than grant them a few exceptions to its traditional view of public land disposal.

Basic change in Congressional and public attitudes toward public land disposal required other reasons than the preservation of scenic beauty. The broader appeal came from the pragmatic desire of farmers, especially irrigators, to be free from flood damage and to have a more dependable water supply. The momentum for watershed protection came from southern California, even though the cause celebre of watershed misuse and consequent farmland damage was in the lower Sacramento Valley.

Hydraulic mining began in the watersheds of the Feather, Yuba, Bear and American rivers in the 1850s. Disposal of mining debris was not a serious problem until the great floods of 1861-1862, which deposited silt and mine tailings on valley farmlands. Hydraulic mining slumped after the Comstock Lode discovery, but the 1870s brought a large-scale expansion in the industry. This boom depended on wholesale dumping of mining debris into streams and rivers. Each winter the rivers carried an increasing load of tailings out to valley farmlands. Protests by individual farmers went unheeded until the city of Marysville was flooded in January 1875. This event convinced valley farmers and businessmen that action was imperative. A series of lawsuits beginning in 1876 came to a successful conclusion with Federal Judge Lorenzo Sawyer's decision of January 7, 1884, which halted hydraulic mining on major Sacramento River tributaries. The decision was seen in valley towns and San Fran-

cisco as a victory of the farmer over the miner. It was also the beginning of controls over the use of natural resources in the mountains.⁸

The Sawyer decision may have heartened southern California farmers, who had their own serious problems with debris floods from the mountains. Substantial population growth following the land boom of the eighties was directly related to availability of agricultural land.⁹ The population of Los Angeles County, for example, tripled to 101,454 in the decade between 1880 and 1890.¹⁰ The newcomers hailed from the Midwest, lured by low rail fares, cheap land and exciting descriptions of climate and agriculture. Left behind were the bitterly cold, long, snowy winters and violent spring weather of Illinois, Iowa, Kansas and Minnesota. To their dismay, the newcomers found that even "Lotus Land" had its drawbacks.

Farmers complained that normal summer streamflow diminished or stopped following brush fires in the tributary mountains. Others saw their fields and orchards inundated with silt, mud, boulders and other debris after fires in the brushy hillsides.¹¹ Concern over watershed conditions grew as more people settled near the mountains. However, there was no leadership to organize and carry out a campaign for change until 1880.

That year young Abbott Kinney stopped in San Francisco on his way to Florida for his health. While in the city, he heard of the Sierra Madre Colony in southern California. He visited the colony for several weeks and decided to stay. He found a piece of foothill land, bought it and picked up an adjacent 160 acres after foreclosing a mortgage note. There he built Kinneloa, an estate with surrounding citrus groves.¹²

Kinney (1850-1920) was related to Ralph Waldo Emerson and Oliver Wendell Holmes. He was well educated and had special interests in law, medicine and botany. A world traveler, he had lived in Europe, Asia and Africa. His family was in the tobacco business and marketed Sweet Caporal cigarettes. He soon established himself in real estate and is remembered as the developer and promoter of Ocean Park and Venice. Kinney was dynamic, energetic and interested in causes. In 1883 he was named Commissioner for the California Mission Indians along with Helen Hunt Jackson; in 1886 he became the chairman of the State Board of Forestry; he was active in the Fruit Growers Association and other state and local agricultural groups. It did not take long for him to become convinced that fire and overgrazing in the mountains led to floods and water shortages in

the fields and orchards. Soon he was an outspoken advocate of land-use controls in the San Gabriel Mountains. He contributed a long article on the subject to the first report of the State Board of Forestry in 1886. He summarized his beliefs when he wrote, "The interests of the plain are entwined with those of the mountain, and without forests we may also be without farms."¹³

Kinney was a tireless organizer, writer and speaker. He wrote articles after articles about the need for watershed protection for agricultural trade journals, newspapers and magazines. His book, *Forests and Water*, outlined his philosophy of resource management and proposed fire suppression measures that were years ahead of their time. His position as chairman of the State Board of Forestry gave him a platform to expand his crusade and link it to the national efforts already described.

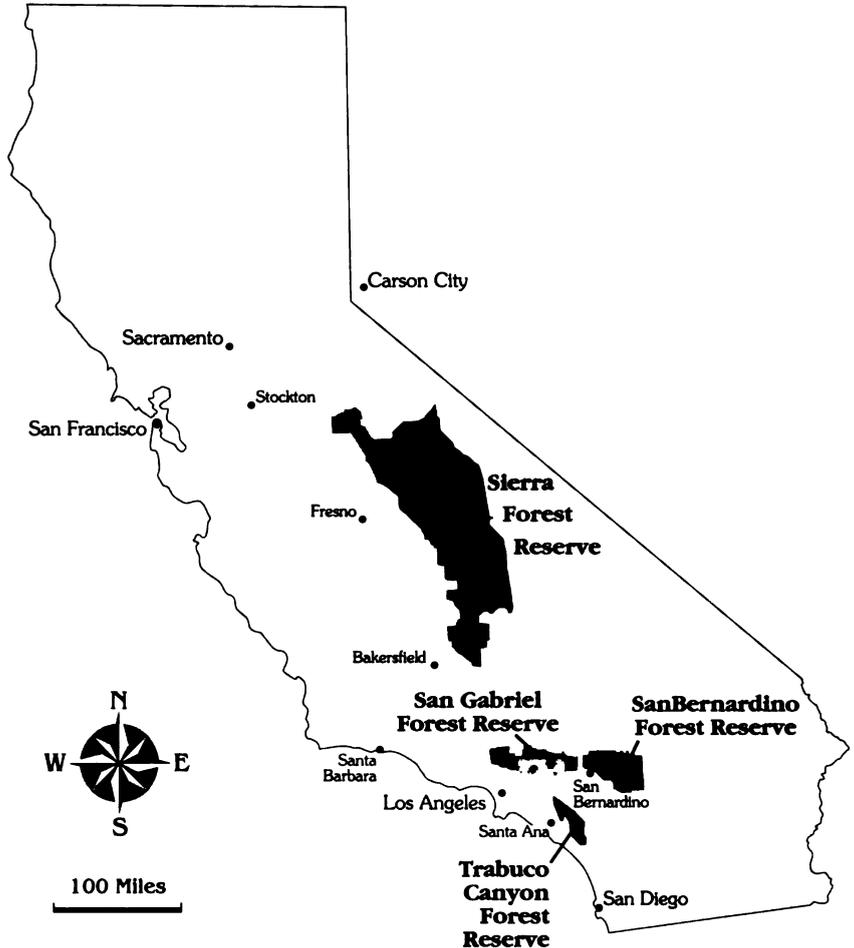
Probably at his instigation, the board passed a resolution in 1887 signed by many prominent residents of southern California, asking Congress for watershed protection. The board also resolved in a memorial to the American Forest Congress in 1887 that timber on public lands should be sold separately from the land. Kinney influenced agricultural associations to send other memorials to Congress requesting reservation of federal forest lands. During 1887 and in later years, he also fostered bills in Congress to establish federal forest reserves. Abbott Kinney and his associates established a tradition in southern California of lobbying for federal rather than state assistance in water-related problems. The tradition continued and was expanded in later years to include development and transportation of water, flood control and expanded fire control.

It is notable that most of the pressure for forest reserves in California came from urban centers. The cause was also supported by farmers living near the foothills, especially those in southern California. Opposition came from those living in or near the mountains, who feared their livelihood would be threatened by reserves or who wanted to acquire public lands. The prevailing feeling among mountain residents was that the flatlanders had had their chance at the public lands and resources years before. Now when it was the mountaineers' turn, the flatlanders wanted to deny them a similar opportunity.¹⁴

This attitude in the mountains of the north was one reason why the first forest reserves were established in southern California and the southern Sierra. Few people lived in the southern California mountains,

and there was solid support for the reserves among those who lived in the lowlands. This support and the work of Kinney, Muir and others led to the establishment of the San Gabriel Forest Reserve on December 20, 1892, which was the first reserve in California and the eighth nationwide. In February 1893, six weeks after creation of the San Gabriel, President Harrison proclaimed the establishment of the Sierra, San Bernardino and Trabuco Canyon Forest Reserves.¹⁵

Map 2:
Forest Reserves
in California,
1893



Congress Provides for Management of the Reserves

Complaints from westerners about the reserves grew in volume after 1892. There was no provision in Section 24 of the 1891 act for their use. Indeed custodial management seems to have been the objective of its authors.¹⁶ The General Land Office did little to administer the reserves, and legislative proposals to govern them failed repeatedly. In 1896 the

Forestry Commission of the National Academy of Sciences recommended to President Grover Cleveland that thirteen new forest reserves be established. Cleveland had previously refused to create new reserves until legislation was passed to protect existing reserves. However, the commission convinced him otherwise, and in one of his last official acts as president he created thirteen new forest reserves on February 22, 1897. Two of the new reserves were in California, the Stanislaus Forest Reserve north of Yosemite National Park, and the San Jacinto Forest Reserve east of Riverside.¹⁷

Cleveland's last-minute action raised a storm of protest from some western states, especially Colorado. Existing proposals to regulate the reserves were resurrected. Within four months Congress sent the new President, William G. McKinley, a Sundry Civil Appropriations Bill with a rider declaring the purpose of the forest reserves and providing authority for their use, management and protection. McKinley signed the bill into law on June 4, 1897.

The 1897 act suspended Cleveland's last-minute reserves for nine months, pending review of western complaints. McKinley's Secretary of Interior, Cornelius Bliss, appointed Gifford Pinchot of New York City as "confidential forest agent" to investigate the reserves and report back. Pinchot, who had been an active member



Gifford Pinchot, first American forester, friend of Theodore Roosevelt, dynamic and controversial first Chief Forester of the U.S. Forest Service, 1905-1910

of the Forestry Commission, had been trained as a forester in France, had been forester for the Vanderbilt estate at Asheville, North Carolina, and was then a consulting forester. He was convinced that forestry should be applied to both public and private forest lands.¹⁸

Pinchot reported that protest against the reserves had subsided and at Bliss's request made suggestions for managing the reserves. In 1898, when a replacement for Bernhard E. Fernow, chief of the Division of Forestry (U.S. Department of Agriculture) was needed, he was the logical choice. He took charge of the division on July 1, 1898.¹⁹

Pinchot had little respect for the General Land Office and its management of the forest reserves. He believed the reserves should be managed

by the professional foresters in the Division of Forestry. Achieving this goal would take time; meanwhile he built up the division and increased its expertise. Doing this meant increasing budget and staff, encouraging forestry on private lands, informing the public about forestry and reducing losses from forest fires.

He assembled a group of associates who were as imbued with the ideals of forestry as Pinchot himself. Henry S. Graves, Overton W. Price, Raphael Zon and others were the heart of a competent and hard-working staff. In 1899 the division began hiring forestry students for summer help. This successful program recruited three hundred young men as future leaders and indoctrinated them with the message of forestry.²⁰

Men from the division went far afield, developing management plans for private landowners, writing technical papers and investigating the forest reserves. In 1901 a formal agreement between the General Land Office and the Division of Forestry specified that the General Land Office would patrol and enforce the law in the reserves while the division would provide forestry services. Pinchot's men wrote directives, including fire control instructions, that were signed by the General Land Office commissioner, and probably wrote the *Forest Reserve Manual* published in 1902. Even after the General Land Office created its own Forestry Division (Division R, further described below) in February 1902, Pinchot continued to control most policy and direction concerning the reserves. However, the forest reserves remained under the jurisdiction of the Department of Interior.²¹

Fire Control in the Reserves: 1898-1905

On July 1, 1898, a year after passage of the 1897 act, the General Land Office commissioner established an organization to protect and manage the forest reserves. The organization had three levels in the field: a superintendent in charge of several small reserves, a supervisor in charge of each reserve and a group of rangers who did the field work.²² The Sierra Forest Reserve was an exception. It was so large (more than four million acres) that it had a superintendent supported by head rangers for each of the two divisions, north and south. The east side (now the Inyo National Forest) was directed from the North Sierra Forest Reserve but was almost autonomous. Each head ranger supervised several rangers.

The first rangers to patrol the California forest reserves were handicapped in several ways. Possibly the most perplexing problem was the lack of a sense of purpose for the reserves. One early-day ranger found everyone from stockmen to settlers to visitors from the valley asking the same question, "What's this thing [forest reserve] anyhow?" His only answer was, "[I] don't rightly know." It was not until a chance meeting with a Sierra Club group when the ranger heard about "conservation" that he began to understand. The impression of many rangers was that "everybody thought a 'Reserve' meant something selfish, useless, locked up, taken from the community and the people."²³

Lack of purpose was accompanied by poor direction and an uneven quality of leadership. All forest reserve positions were political appointments. In 1899 the superintendent of the Sierra Reserve was Charles S. Newhall, a retired Congregational minister with no outdoors experience. He hired mostly local men, experienced with livestock and the mountains—and good Republicans. R. L. P. Bigelow was one such recruit who began working on June 1, 1902, in the Sierra Forest Reserve. He stayed on with the Forest Service and retired many years later as Supervisor of the Tahoe National Forest.²⁴ A sample of Superintendent Newhall's direction was, "Put out the fires with the tools you have. Keep it in the brush all you can. The cattlemen tell me that fires improve next year's grazing, so I suppose it is pretty good either way."²⁵

Sheepmen continued setting fires when they left the high country as late as 1901 in the Sierra Reserve. Rangers in the Sierra, in the first years after 1898, were simply directed to put out fires and keep trespassing sheep off the reserve.

Ranger Bigelow had a typical assignment in the Kings River country. He spent much of his time patrolling, tacking up fire notices printed on cloth, suppressing small fires, talking to visitors and building firebreaks and trails. Fresno County and the Sierra Club contributed money for trail construction. Two men from Fresno County helped Bigelow build trail until scared off by rattlesnakes. No wonder they quit! Bigelow recorded twenty-seven dead rattlers along just one half mile of trail. In September 1903, he was put in charge of the east side of the Sierra Forest Reserve. Like many other early-day rangers he built his own ranger station, at Wells Meadow (Inyo County). After he was transferred, Head Ranger Charles H. Shinn remarked that "Bigelow was a fine ranger but a poor carpenter."²⁶

Under Head Ranger Shinn, the men of the North Sierra Reserve harried the sheepmen, using fair means and foul, to keep the sheep off the reserve. One result was an immediate reduction in sheepherder-set fires. Another was lifelong enmity on the part of some stockmen and, in the minds of some rangers, doubts about Shinn's methods and knowledge. One of Shinn's rangers thought "he was a brilliant literary man but absolutely impractical as to field management."²⁷

Personal accounts of pioneer Sierra rangers agree that most rangers were faithful and honest. Not everyone wanted such a job. The pay (sixty dollars a month) was not bad for the times, but much was expected. In addition to lack of purpose, direction and leadership, the rangers often contended with poor communications, conflicting orders, lack of tools, slow travel time and underlying antagonism from local people and forest users.

In southern California, protection of the reserves was also hampered by lack of an overall mission, but Superintendent B. F. Allen was more energetic than most administrators. From his headquarters in Los Angeles, he administered all four reserves in southern California. When Allen arrived in 1898 he thought he could handle the job with no assistance except that from the local water companies. He soon changed his mind and by October 1898 had hired thirty-six rangers. When challenged about his hiring practices, he admitted that he had been guilty of hiring two Democrats. He defended himself by stating that he had fired both of them, since one was unreliable and the other a drunk. One of the first rangers hired was Everett B. Thomas, who was elevated to supervisor of the San Gabriel Forest Reserve in 1901.²⁸

Thomas was forceful, opinionated and something of a martinet. By mid-1901 he had outfitted all of his rangers in uniforms. Considering the characters who made up the ranger force, this was no mean achievement. A strong administrator, Thomas was very concerned with fire control. He organized fire brigades among foothill water companies and continued a system of firebreaks begun by private citizens. Apparently he was also careless with money, for in 1905 he was tried for misappropriation of funds, convicted and sent to prison.²⁹

In recognition of the high fire hazard and the political influence of its constituents, the San Gabriel Reserve was allocated more men (sixteen rangers by late 1901) than most reserves, most of whom were woodsmen

who lived on claims within the wild back country. One of them, "Bare-foot Tom" Lucas, was one of the most celebrated early-day rangers. "The most colorful character to roam the big Tujunga country,"³⁰ Lucas wore deerskins, had a beard to the waist and toted a shotgun. He and other San Gabriel rangers had as many encounters with grizzly bears as they had with fires. One she-bear broke free from a trap, charged Rangers Jess Sevier and Bill Bacon, and took nine bullets before she finally dropped dead. She weighed 1,300 pounds.

Another San Gabriel ranger, Louis Newcomb, built the first ranger station in California (second in the United States) on the West Fork of the San Gabriel River in 1900. Newcomb and three other rangers built the station of logs, for a total outlay of seventy dollars. The old building survived many fires and floods, and was moved and rebuilt at Chilao Visitor Center in May 1983. Other rangers were building roads and trails, and by 1904 five miles of road and forty-three miles of trail had been built. Telephone lines were strung also, until by the end of 1904 sixty miles of line were connected to private lines outside the reserve. Perhaps the first significant use of telephone on a major fire took place in San Gabriel Canyon on July 29, 1903. Supervisor Thomas's wife dispatched men and supplies from Los Angeles to the fire via a private telephone line built from Palmdale to the Bighorn Mine. Thomas believed the telephone had prevented a major disaster.³¹

Rangers did all of the fire control jobs. They patrolled to prevent fire, climbed to high points to detect fires, suppressed fires, and arrested fire violators when they could find them. On bad fires they had help from fire brigades, crews of men sent by water companies or associations of ranchers or farmers. They also built firebreaks along the ridgetops and trails for access into the trackless back country.³²

As mentioned above, on November 15, 1901, the General Land Office commissioner established Division R in his office to administer the forest reserves. Division R was influenced and assisted by Pinchot's Division of Forestry. One of its first products was a *Forest Reserve Manual* probably written by some of Pinchot's men. The instructions in the manual for fire protection were simple and straightforward. They placed considerable emphasis on fire prevention, suggesting, "Forest officers should inform transients and others concerning the rules and regulations. This must be done cheerfully and politely. A Forest officer

must be able to handle the public without losing his temper or using improper language.”³³

These instructions must have been more than a little amusing to rangers dealing with rough-hewn miners, tough sheepherders and suspicious cattlemen. The attempts were not always successful, as Ranger George Naylor found out while trying to get a Basque sheepman to leave the east side of the Sierra Forest Reserve. The two had words, then resorted to pistols. The herder got the worst of the affair and Naylor was adjudged to have acted in self-defense.³⁴

The manual gave some advice on the relative difficulty of fighting fire in brush, timber and saplings, and suggested firefighting tactics: “Crests of ridges and the bottoms of canyons...are the best lines of attack,” it ruled. The best tools were the shovel, axe and mattock. Back fires were all right in the woods, but firefighters must be careful with them. Lacking precise information, the writers fell back on common sense. Every fire situation is different, they stated, and “the experience and good judgement [sic] of the ranger mean everything,” advice that would be valid for several decades.³⁵

By 1903 the effects of professional direction from the Division of Forestry and Division R were reaching the field. Rangers sensed a purpose in their work, and leadership improved. Some vigorous and practical administrators like Charles H. Shinn (1852-1924) were appointed and soon made their presence felt. Shinn was an inspector of experiment stations for the University of California before joining the Forest Reserve Service in 1901. He was also a well-known author, having written many poems and nature articles beginning in 1884. He was best known for books on mining and mining camp law, and his sister Millicent was editor of the noted *Overland Monthly* magazine.³⁶

Shinn was a friend of Gifford Pinchot and later served as supervisor of the Sierra National Forest until his retirement in 1911. He and his wife Julia lived near North Fork (Madera County) at the home they called Peace Cabin. They kept open house and entertained local men, young professionals and visiting firemen from San Francisco and Washington. Many of the future leaders of the California District began their careers on the Sierra under Shinn. He believed that control of forest users was the first requirement; that is, protection of resources came before management. This belief and his long background of activism on behalf

of forest protection helped explain his zealous efforts to rid the Sierra Reserve of forest fires and trespassing sheep.

Forest fire control at the turn of the nineteenth century was usually accomplished by a few men. The local ranger would round up a small crew who took their tools, blankets and a day's grub with them. They often "cold trailed" the fire; that is, worked the burned-out or smoldering edges, until eventually a control line encircled the fire. The same methods were followed on forest lands outside the reserves. George Nelson, a lifelong resident of the Klamath River country near Happy Camp, fought fire before the forest reserve was established there. He recalled that the neighbors would grab tools, some food and a blanket and ride or hike to the fire. At the fire they sized it up and agreed on how to attack it. Each man then would go to work independently. The crew lived on the fireline and depended on their wives to bring additional food. The women might stay to cook for them and even help fight the fire until it was controlled.³⁷

Sometimes major fires threatened communities, mine buildings, ranches or farms. On these occasions groups of citizens turned out to protect improvements. In July 1887, fires along the Central Pacific Railroad tracks near Sisson, Shasta County, were attacked by "gangs of men." Farmers near Etna in Scott Valley banded together to save each other's houses from fire in September 1898. There were many similar examples across the state almost every year. In one of the first attempts to organize fire protection, Central Pacific Railroad agent W. H. Mello formed a mounted fire patrol of three hundred men in 1896. Its purpose was to "patrol, discover and suppress any fire threatening [the] big timber district in the McCloud Valley."³⁸

At Chico during late 1903, Diamond Match Corporation hired Jack Lynch as a full-time fire warden. Diamond also entered into a cooperative agreement with the U.S. Bureau of Forestry (successor to the Division of Forestry in 1901) to provide a management plan for company lands. E. A. Sterling of the Bureau prepared a fire protection and timber harvest plan based on field work done in late 1903. The company followed up its commitment to long-term forest management in January 1904 by hiring Harvey C. Stiles, probably the first industrial forester on the Pacific Coast. Stiles soon began a fire protection program that will be discussed later.³⁹ Even though many individuals and companies fought forest fires in various parts of the state during the 1890s, their efforts were not coordinated.

The state assumed no leadership until about the turn of the century, when there was an upsurge in concern over forest fires. The Progressive movement was gathering momentum at that time, and forestry rolled in with the tide. The election of Governor George C. Pardee, who served from 1903 to 1907, was tainted by support from the Southern Pacific Railroad, but Pardee proved to be independent, especially in natural resource matters. Pardee, one of Pinchot's many friends, concentrated on forestry in his inaugural address. He pushed a balky legislature hard for forestry reform. His first success was an act authorizing a joint survey between the state and the Bureau of Forestry. The survey was to concentrate on six areas: preventing loss by forest fire, improvement of forests following logging, reforesting parts of southern California, regulating grazing, producing a vegetation type map and a plan to administer forest lands.⁴⁰

This act was followed by others, including three in 1905 that became building blocks for the future. One law made landowners liable for triple damages if a fire they had set escaped to a neighbor's land. A second provided authority for the counties to use appropriated funds for fire control and forestry on federal lands. The third and most important was the Forest Protection Act signed by Governor Pardee on March 18, 1905. This was the basic law that eventually resulted in the State of California's modern forestry and wildfire protection program.

The Forest Protection Act provided for a State Board of Forestry, a state forester, fire districts, voluntary fire wardens, cooperation with counties, and fire patrols during periods of high fire danger, and also required that citizens fight wildfire when asked.

The historian of state and private forestry in California, C. Raymond Clar, called the act "a great milestone in the progress of forest conservation in California...."⁴¹ Despite its good features, the act did not go far enough, as it left fire protection to the counties and did not provide enough men and money to make forest fire control on state and private lands a reality until twenty years later.

While Pardee was working for resource protection at the state level, Pinchot continued his efforts to bring professional foresters and the forest reserves together. He made an inspection tour of California in August 1903 and renewed his friendship with Pardee. He recognized the importance of California in the forestry picture by providing seventeen men for California's cooperative survey. In 1901 the Division of Forestry

was elevated to bureau status, but the forest reserves were still beyond Pinchot's grasp.

Pinchot was convinced that the reserves would never reach their potential under the General Land Office. His view of that office as politicized and corrupt was supported by a long history of red tape, connivance at fraud and outright theft. An awakened public was scandalized by the Oregon Land Frauds of 1900 to 1905. When Theodore Roosevelt won a landslide election in 1904, the time was right for the transfer of the forest reserves to the Department of Agriculture. With the president's help, a Transfer Act was passed by Congress on February 1, 1905 to take effect July 1, 1905. The Bureau of Forestry and Division R were consolidated, and the U.S. Forest Service was created.⁴²

In October 1904 the forest reserves in California covered about eleven million acres of public land concentrated in southern California and the Sierra Nevada south of Sacramento. This distribution reflected the dichotomy in cultural and economic interests within the state. People in the rural and frontier north either were uninterested in or actively opposed to reserves. In contrast, there was solid support for reserves in urban areas, especially southern California. Abbott Kinney, Theodore P. Lukens and other prominent advocates from southern California wanted more reserves. Lukens was especially interested in converting part of the brushy San Gabriel Mountains to trees.

Lukens was a former nurseryman from Illinois who moved to Pasadena in 1880. His first jobs as ditch tender and orchardist got him interested in the San Gabriels, which he often explored. He became the town's first realtor and wrote its first booster leaflet during the passenger rate war of 1886 between the Southern Pacific and Santa Fe railroads. Later he entered local politics and was Pasadena's unofficial mayor in 1890-1892. Lukens was fascinated with Yosemite National Park. He met John Muir there in 1895 and began a long friendship with him. Lukens started planting trees in the San Gabriels in 1892, and this remained his passion the rest of his life. In 1897 he became very active in watershed protection, and two years later Muir recommended him to Gifford Pinchot for a forest supervisor position. Pinchot took Lukens on as a "collaborator," in effect, a low-paid volunteer. He advanced in the Division of Forestry despite his rather prickly nature and a penchant for going around the chain of command to influential friends and politicians. He was made acting supervisor of the San Gabriel-San Bernardino Forest Reserves in January 1906 but resigned in August after disagreeing with Pinchot over reductions in the reserve's fire control budget.¹

Lukens, Kinney and other well-known southern Californians organized the Water Association of Los Angeles in May 1899. In San Francisco in November 1899, they took part in a statewide flood storage convention which sponsored the California Water and Forest Association and resolved that the reserves should be extended, forests should be preserved and denuded areas reforested. The association included 5,000 of the most prominent businessmen, professional men, politicians and academics in the state. The influence of the association and its leaders probably resulted in State Senate Resolution Number 6 of January 23,

1901, that asked Congress to provide funds to build roads and introduce forestry into the California forest reserves.

One of the primary arguments for extending the reserves was the need to control forest fires. General sentiment for control of forest fires began to build in the 1880s, and by the late 1890s this viewpoint was prevalent in many newspapers. In 1898 the State Board of Trade resolved that forest fires should be stopped and arsonists punished. The next year, the California Society for Conserving Waters and Protecting Forests was formed in San Francisco. The ever-present Abbott Kinney was one of the vice presidents. This organization also campaigned for fire control.²

Late in 1902 the California Miners Association, in convention at San Francisco, resolved that the state should begin fire patrols. They also favored more forest reserves but not in northern California. Lumbermen also favored fire control, fearing their valuable standing timber would be lost. E. A. Sterling of the Bureau of Forestry wrote, "The general attitude of lumbermen toward forest fires is one of hopelessness coupled with indifference."³ The problem seemed too big for them to handle.

Lack of progress in watershed protection was a major concern to Kinney, Lukens and other reformers. Lukens was not impressed by the personnel on the forest reserves calling them "indolent."⁴ Coert DuBois (1882-1960), an agent of the Bureau of Forestry, believed that "most of the Supervisors and Inspectors didn't know a pine tree from a pack horse."⁵ L. A. Barrett, Douglas Robinson, R. L. P. Bigelow and other early-day rangers documented the ineptitude of some superintendents and supervisors. The reformers wanted more reserves. They also wanted new management.

Gifford Pinchot was an important factor in promoting change in California. His wide circle of acquaintances included John Muir, Governor George Pardee and a host of other noted Californians. Pinchot visited California in August 1903 to lecture at the University in Berkeley and to discuss a forestry program with the State Board of Forestry. Fire control was the first item discussed with the board, but Pinchot also took the opportunity to campaign for transfer of the forest reserves to the U.S. Department of Agriculture. His Bureau of Forestry employees performed the cooperative survey for the state in a professional and efficient manner, lending support to his campaign.⁶

If there was pressure in urban areas to expand the reserves, there was indifference to the idea in many rural areas and outright opposition in some mountain communities. The *Sacramento Union* of June 23, 1903, reported that many people in northern California did not want reserves. The California Miners Association, that approved reserves in principle, opposed the proposed Plumas, Diamond Mountain, Lassen Peak, Klamath and Shasta Forest reserves. When L. A. Barrett reminisced, he thought most of the people around Quincy were opposed to the new Plumas Forest Reserve when he arrived in 1905.⁷

People in the small towns of the northern Sierra and southern Cascades were suspicious of the reserves. They believed their free access to resources on the public lands would be restricted and their opportunity to acquire public lands would end. Organization of large lumber companies in Siskiyou, Butte and Lassen counties resulted in increasing timber values, and speculators saw a chance for profit. As a result, many invalid mining claims and fraudulent Timber and Stone Act claims were filed. In one series of claims, that proved to be fraudulent, the Northern California Mining Company tried to acquire 265,000 acres of timberland. Reserve status would interfere with these opportunities, so speculators also opposed the reserves.⁸

Further north, in the Klamath Mountains, feelings about the reserves varied. Apparently there was a local Forest Reserve Committee in Yreka on hand to greet Bureau of Forestry boundary surveyors in 1903. But the proclamation of the Klamath Forest Reserve in 1905 apparently did not rate a mention in the *Yreka Journal*. The most significant opposition to the reserve came from sheepmen, but the miners and loggers of the Salmon River country also objected. Ranger Frank Harley reported in February 1907:

You cannot expect the people of the Salmon River Country to help in the least, in regards to Reserve Regulations, and they are not backward in expressing their opinion, which is no Forest Reserve for them; they consider they are unjustly taxed to pay the salary of Rangers, and receive no returns. If Jesus Christ was Supervisor, and he had his deciples [sic] for Forest Rangers it would be the same thing.⁹

However, the best opportunities for mining in the remote deep canyons of the Klamath, Trinity and Siskiyou mountains were along the streams. Most of these mountains rose quickly in steep, inaccessible slopes

that were not attractive for other land claims. Valuable lands were already claimed and there was little interest in steep inaccessible timberland.

By November 1904 Pinchot had prepared new proposals for forest reserves throughout the West. He had fostered support for expansion of the reserves and was willing to risk opposition, counting on new management to overcome it. Therefore, in just one year beginning November 29, 1904, nine new reserves were proclaimed in California. These new additions increased the total of reserves in the state from eleven million acres to nineteen million acres, a 70 percent increase. All of the new reserves were in northern California. (See Table 2.) Thus, 1905 became a turning point; the forest reserves in California were nearly doubled in size and their administration was shifted to a new agency.

Name	Proclamation	Acres (in thousands)	Counties
Modoc	11/29/1904	290	Modoc
Warner Mts.	11/29/1904	310	Modoc
Diamond Mts.	2/14/1905	630	Plumas/Lassen
Plumas	2/27/1905	580	Butte/Sierra/Plumas/Lassen
Trinity	4/26/1905	1,240	Trinity/Humboldt
Klamath	5/6/1905	1,900	Siskiyou/Del Norte/Humboldt
Lassen Peak	6/2/1905	900	Lassen/Butte
Shasta	10/3/1905	1,380	Shasta/Trinity
Yuba	11/11/1905	520	Yuba/Nevada
Total		7,750	

Table 2:
Forest Reserves Created
1904-1905

Source: USDA Forest Service,
The Use of the National Forests
(Washington, D.C.: Government
Printing Office, 1907)

When the Forest Service came into being on July 1, 1905, it faced major obstacles in California. Millions of acres of new forest reserves had to be organized, manned and put into operation. In the north, an indifferent, even hostile, population had to be convinced that the old days of license and carelessness were over. In the south, skeptical supporters waited to see if this Forest Service was any different than the old General Land Office. Somehow order and control had to be established on the forest reserves or the cattle and sheep would be driven onto public land, the loggers would cut government timber and the fires would burn out of control.

Pinchot's Management Philosophy

The Forest Service was born during a period of reform that swept the country in the early 1900s. The reformers wanted change. Among their more important themes were "Belief in scientific organization; technical competence; non-partisan good government; [and] support of the average citizen against big business."¹⁰ These themes shaped the fledgling agency. The operations of the Forest Service over the following fifty years were rooted in the management fundamentals instilled in its first five years. Fire control was the ultimate expression of those management fundamentals. Understanding the development of Forest Service fire control policies, procedures and attitudes must begin with the management philosophy, methods and visions of its first chief, Gifford Pinchot.

The new agency was shaped by Pinchot, a man who insisted that his title be "The Forester" in recognition of his profession. At age 39, Pinchot was full of energy, a man who literally could not sit still. Son of a wealthy New York City businessman, he was at ease with many influential Americans and used to the benefits of wealth. He was also an enthusiastic outdoorsman who liked testing his physical endurance with trips to the mountains of the West. Pinchot could be charming, but his competitive instincts and his drive for control of the reserves earned him as many enemies as it did friends. To the rank and file of the new Forest Service he was a dynamic leader. But to some people and groups in the West he was only a wealthy Easterner, the overlord of their mountains. Pinchot was a practical crusader who knew that the keys to success were support from influential groups, commitment from powerful politicians, and an organization that produced results.¹¹

The foundation of the Forest Service organization was the forest ranger, who was responsible for a large area of forest called a ranger district and who was assisted in administering the district by one or more forest guards. Each forest reserve had several rangers who reported to the forest supervisor in charge of the reserve. The forest supervisor was directly responsible to Pinchot and his Washington office. Pinchot had a staff who helped him supervise and inspect the reserves and carry out other specialized duties. (See Chart 1.)

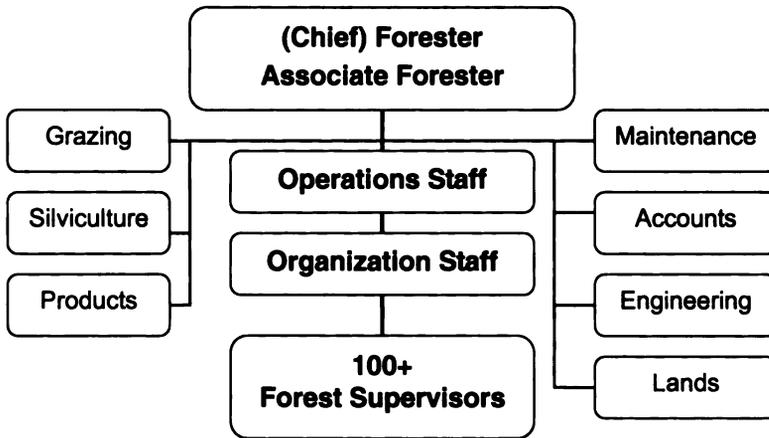


Chart 1.
Organization of the
Forest Service
1907

Adapted from: *Report of
the Forester, 1907*

Any effective organization must have a reason for being; that is, a mission, or a transcendent goal. Pinchot's mission and that of the new-born Forest Service was something that came to be called "conservation." This was a word with many meanings. John Muir interpreted it as preservation, while some enlightened lumbermen viewed it as careful logging. Pinchot's short definition was "wise use." He dismissed out of hand the notion of "custodial management" that was largely responsible for the establishment of the early forest reserves. Pinchot enclosed the idea of wise use in a righteous cloak of resource protection. He built a belief in an idea until it permeated the whole organization. And those who did not believe or would not perform, he fired!¹²

While Pinchot provided the inspiration, his associate chief, Overton W. Price, is believed to have developed the structure of the new organization.¹³ Pinchot and Price set forth principles of management that were unique for their day and not duplicated to a large extent in American government and business until after World War II. The keystone was a decentralized organization. This concept recognized three important facts: the forest reserves differed widely from one another in resources, problems and opportunities; administration of the forest reserves had to be responsive to local needs for both practical and political reasons, and people work best when given responsibility for a job and the authority needed to get the job done.

A second major principle was to hire the best people available. Experienced local woodsmen were hired to administer the reserves, men who had good standing in their communities. These sourdoughs were leavened with a sprinkling of professional foresters; some were formerly

forestry students hired seasonally by the old Bureau of Forestry. The Forest Service was placed under Civil Service rules from the beginning, and there were no more political appointees. A policy of promotion from within strengthened the organization. Forest Service employees knew their careers would not be short-circuited by candidates for jobs from outside the organization.¹⁴

Accomplishment was not left to chance. The third principle was to provide controls over field operations. A decentralized organization can degenerate unless controls are set up to keep it headed toward its mission. Pinchot achieved control by transmitting his deep belief in forestry and conservation to the organization, by an inspection arm, and through a service-wide manual.

This manual was written by a group headed by F. E. Olmsted and was titled, *The Use of the National Forest Reserves*, or simply, *The Use Book*. The manual combined a number of old and new policies and procedures with a new outlook. Written in a positive tone, perhaps a first for a government manual, it was brief, pocket-sized and meant for field use. Accordingly, Pinchot had it in his rangers' hands soon after the Forest Service officially began on July 1, 1905. The emphasis was on service to the public. The chief duties of a forest officer were "To protect the Reserves against fire, assist the people in their use and see that they were properly used."¹⁵ A simplified edition of the manual entitled, *The Use of the National Forests*, spread the gospel of fire control and forestry directly to the public. This and other booklets dovetailed with a comprehensive public relations program that aimed at getting popular support for the reserves.¹⁶

The Use Book gave general guidance, but specific instructions and follow-up were needed to see that work met standards. At first this was accomplished by an inspection branch with headquarters in Washington. By 1906 the reserves had grown so large that six field inspection districts were set up, with a chief inspector in charge of each. Under this arrangement several inspectors made their rounds in California and reported to a chief inspector in San Francisco, who reported to Pinchot in Washington.¹⁷

The next step proved to be the most important for the Forest Service and completed the basic design of decentralization. On December 1, 1908, the inspection districts were converted into administrative districts with a district forester in charge of each.¹⁸ This established an intermediate level of authority, with the supervisor responsible to the district

forester instead of Pinchot. The California District, or District 5, was born, and problems specific to forest reserves of California then began to receive the attention they deserved. "It was the first, and one of the most successful, moves in this direction by the federal government."¹⁹ (See Chart 2.) When the name of the forest reserves was changed to national forests on March 4, 1907, the last association with the discredited General Land Office was ended.

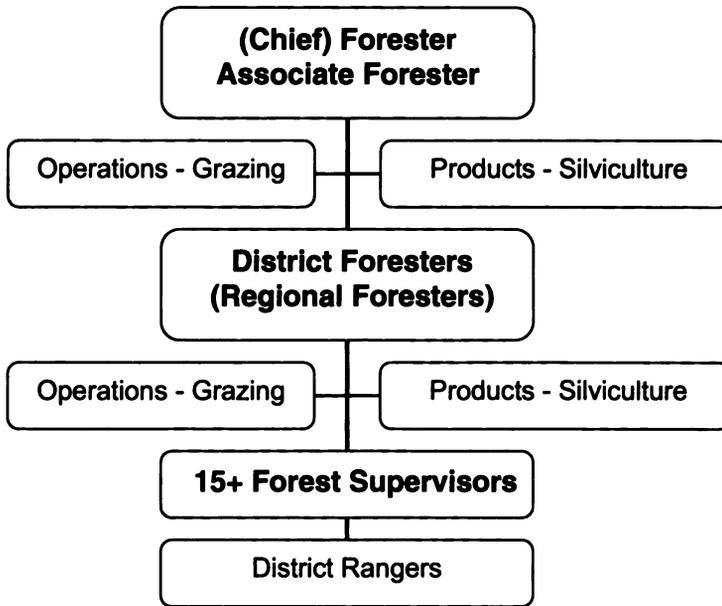


Chart 2.
Organization of the
Forest Service
1909

Adapted from: *Report of
the Forester, 1909*

While these changes were taking place, Pinchot continued to help orchestrate the larger conservation movement. He had wide-ranging interests, and his friendship with President Theodore Roosevelt developed into close teamwork. They were so close that Roosevelt later said that Pinchot was the "best" of all his associates. However, these activities involved Pinchot in commissions, speech-making and many trips. During these absences his associate, Overton W. Price, ran the organization.²⁰

Despite the aura of "scientific management," everything did not always run smoothly. The Forest Service was an organization of strong individuals with strong viewpoints. Pinchot was a crusader, and crusaders can be arrogant, overbearing and too intense at times. He was no exception. Constantly on the go, seldom bearing down fully on the job of administration, he sometimes lost touch with realities and expected too much. His wide interests and high standards sometimes caused the

Forest Service to attempt too much or try to do things too well. Field men also complained about paperwork and too many reports. Some wag in the field saw the supervisor's response to Pinchot's directives in the following way:

He (the Supervisor) tells the ranger to do this, And do it very soon.
And please report on Bill Smith's claim, And how far to the moon.
The Supervisor supes around, He supes most every day,
He supes around the office, And then he draws his pay.²¹

Despite its shortcomings, the Forest Service in 1909 was considered by many to be a model federal agency.

When President William Howard Taft assumed his office in March 1909, Pinchot was at the peak of his influence. "The Golden Era in American Conservation history" seemed to be in full swing. President Theodore Roosevelt had made conservation "a great national cause," with the assistance of Pinchot and a few other associates. The Forest Service had benefited because "[i]t never hurt the foresters that, in their formative years, their leader was the President's best friend."²²

But reaction was growing. Pinchot soon found he could not run high, wide and handsome in the Taft administration. Undaunted, he intervened in a Department of Interior case involving questionable coal claims in Alaska. The case escalated into a confrontation with Interior Secretary Richard A. Ballinger. It appears that Pinchot wanted to be fired, to go out in a blaze of glory. If so, he got his wish and was fired in January 1910. The whole affair was messy, to say the least. The controversy created suspicion of the Forest Service within the Taft administration, damaged cooperative relationships with Interior, and gave the agency's enemies in Congress a chance to get even for Pinchot's past actions.²³

As 1910 came to a close, an era in the life of the young Forest Service ended. Pinchot and Overton W. Price had been fired, and the service was under onerous restrictions from the Secretary of Agriculture because of Pinchot's activities. The turbulent Pinchot years were a time of rapid organizational change and great expansion of the public forests. Although Pinchot's firing created problems for the Forest Service, his leadership created a lasting belief in his goals within the organization. His successors perpetuated his principles that guided management and protection of the national forests for many years to come.

Gaining Control of the Forest Reserves

The first requisite in administering the forest reserves was to establish the Forest Service as the agent in control, not the user. Pinchot was jubilant with the passage of the Transfer Act for now “on the Forest Reserves we could say, and we did say, ‘Do this,’ and ‘Don’t do that.’”²⁴ Yet the Transfer Act itself did not provide all the authority needed to enforce the laws and regulations. This was conferred by the Act of March 3, 1905, which authorized forest officers to arrest violators of forest reserve rules and regulations. Then on May 31, 1905, the attorney general gave an opinion that the U.S. Department of Agriculture had a right to charge for use and occupancy of the reserves, an opinion that subsequently was upheld by the U.S. Supreme Court. Armed with legal authority and moral conviction, the Forest Service was fully equipped to administer the reserves.

However, the first priority in California was assimilation of the personnel of the old Forest Reserve Service and the organization of new reserves. In keeping with Pinchot’s philosophy, the emphasis was on finding the right man for the job. In some cases, this meant harsh methods, as L. A. Barrett found out in January 1905, when he was ordered to Santa Barbara to suspend the forest supervisor and take charge of the Santa Barbara Forest Reserve. Several other superintendents and supervisors were asked to resign or were fired. However, most of the rangers and supervisors were retained, and some advanced quickly in the new organization.²⁵

Once these shake-ups were complete, the most pressing need was to fill positions in several new forest reserves. This was done through ranger examinations. These examinations emphasized practical skills needed by a man expected to be “...forester, cowman, sheepman, surveyor, lumberjack and woods patrolman, rolled into one.”²⁶

Supervisors also used personal judgment in their selections. Roy Boothe was hired as a forest guard in April 1907, after Ranger Joe Westfall introduced him to Supervisor Charles H. Shinn. Westfall wanted “Roy” for his district, but Shinn sent him to Kings River, where he said, “... no one knows him. They will call him ‘Boothe’ down there.” In July “Boothe” took the ranger’s examination and passed. It was the start of a long career with the Service.²⁷

Recruitment of new men was followed by visits from inspectors from San Francisco and Pinchot’s assistants from Washington, sometimes

Charles H. Shinn,
author, conservationist
and first supervisor of the
Sierra National Forest,
1905-1911



Source:
Special Collections Library,
California State University,
Fresno

by "G. P." himself. These visits provided continuity with national direction and standards. Soon there was a sense of mission among field men. The feeling was that "... there's something big, I don't know what, coming out of all this."²⁸ The inspections were followed by the first forest supervisor's meeting at North Fork (Madera County) on October 3-9th, 1906. Eleven

supervisors attended, together with representatives from San Francisco and Washington. It was a chance to exchange ideas, review policies and procedures and discuss workloads and funding. Ranger meetings were held on most reserves the following spring, and the organization began to solidify.²⁹

The next step in gaining control of the reserves was to set priorities on fieldwork and to get results that were visible to users and the public. In most California forest reserves this meant issuing or confirming permits for the primary user, the stockman. This policy enlisted the stable livestock permittee on the side of the Forest Service in preventing sheep and cattle trespass. In turn, this meant reduction in fires set to improve grazing and also provided a nucleus of firefighters out in the woods. Young Supervisor William B. Greeley of the South Sierra Forest Reserve helped end widespread livestock trespass on the California reserves. In 1907 he prepared a trap for suspected sheep trespassers. His men caught the herders driving sheep onto the reserve and cited them. The resulting court case eventually ended in a Supreme Court decision upholding the right of the secretary of agriculture to make rules and regulations for the forest reserves and to enforce them. This and other favorable court decisions were basic to future protection and management of the reserves.³⁰

The most important decision in establishing Forest Service control of the reserves was to employ respected local men as rangers and guards. Men like Roy Boothe, R. L. P. Bigelow, Joe Westfall, William Hotelling, Jacinto D. Reyes and J. A. Biddison knew how to get along with local people and yet were not afraid to enforce the rules. Most of these early-day rangers and guards loved the woods. Since the main thrust of the early Forest Service was protection of natural resources, it did not take much to convince them of their duty. Successful results came from patient, persistent repetition of the rules. The majority of the users and residents of the reserves came to accept the rules so long as they were applied fairly and uniformly.³¹

Because his role touched the lives of most mountain people, the effective ranger became a "sort of human clearing house,"³² the man to see when emergencies came up, a man who came to be respected as time went on. Of course, human nature being what it is, this was not always true. In some cases, arbitrary or arrogant forest officers generated discontent and deliberate violation of the rules, or even incendiary fires on the reserves. Usually these reactions resulted in a transfer of the ranger to a less sensitive job or his discharge from the service.

Educating users and the public about the new rules was important. Enforcing those rules was just as important. Every mountain community had a number of outlaws. So long as the outlaws were free to do as they chose, the rest of the community looked the other way, either from fear or disinterest. Early-day rangers and supervisors were practical in their approach to law enforcement. Wherever possible they took violators to court. If they had



District Ranger
Bill Hayes,
Plumas National Forest,
at Mt. Fillmore Lookout,
1907

Source:
Edward Hayes

a sympathetic magistrate, they were in business. L. A. Barrett was lucky in this regard. Pat Mellager, the justice of the peace in Quincy, told him, "...you bring them in and I'll soak them." In other cases the ranger or supervisor appropriated illegally cut shakes or lumber to use in the forest reserve building program.³³

By 1910 it was clear to all but the diehard frontiersmen that the public forest lands were there to stay. Use of them was encouraged (and local residents had priority in that use), but livestock trespass, fraudulent claims and incendiary fires would not be tolerated.

Fire Control in the "Early Days"

The new Forest Service owed much of its support to believers in forest fire control. The concern over uncontrolled woods fires in California was increased by news of great conflagrations of 1894 in the Great Lakes states and 1902 in the Pacific Northwest. Furthermore, most Forest Service people from "G. P." on down, really believed that fire was the "archenemy of the woods" so the first listed purpose of National Forest administration in *The Forester's Report* for 1908 was "Protection against fire and trespass." *The Use Book* also identified fire control as a primary purpose.³⁴

In the first few years there were many good ideas about fire control floating about California, but there was no single person to give these ideas undivided attention and bring them together. The major problem was organizational. Until December 1908 all supervisors reported directly to Washington. Each supervisor was on his own, and coordination with other reserves in California was minimal. In addition, most people thought that fire was an emergency situation to be responded to only after it happened. Nationally, the emphasis of the Forest Service was on revenue production from grazing and timber sales. Pinchot and his successor, Henry S. Graves, felt strong pressure to make the national forests a paying proposition.³⁵

Interpretation of fire control policy varied according to the unit and its situation. The big problem in the northwest mountains was lack of roads and trails. The only roads that gave access to the Klamath Reserve ran from Scott Valley to Forks of Salmon, Callahan and the Klamath River; down the Klamath to Happy Camp, and from Yreka to Walker on the Klamath River. Except for a few short spurs off these roads, all other travel on the Klamath was by trail or across country. Travel on the

Trinity, California and Shasta forest reserves was also restricted by lack of roads.³⁶

On the Plumas and Lassen reserves, L. A. Barrett had a better network of roads and trails but did not have many fires. He was not alone. Roy Boothe's memoirs of his early years on the North Sierra Reserve are remarkable because he seldom mentioned fires. On the other hand, Supervisor William B. Greeley said his first priority on the South Sierra Reserve was to "tighten up action on forest and brush fires all along the line."³⁷ Meanwhile on the San Gabriel and San Bernardino Forest Reserves, Supervisor R. H. Charlton was busy building his fire organization and establishing cooperation with counties and local associations. Pressure from the California Water and Forest Association, local governments and water companies had led to passage of bills to protect watersheds in southern California. In 1907, the state legislature provided funds for cooperation in fire control between counties and the Forest Service. Charlton was able to use part of a \$5,000 appropriation to build firebreaks in the San Bernardino Mountains. These special funds were appropriated annually for many years, yet the legislature consistently refused to recognize fire control as a state responsibility.

There were large privately-owned tracts within forest reserve boundaries that had to be protected to prevent fires from escaping to adjacent public lands. In the absence of state fire protection the Forest Service was able to convince some of the landowners, principally lumbermen, that they should pay a fee for fire protection by the service.³⁸

The lumber industry developed two notable instances of effective fire control. The McCloud River Lumber Company followed a plan, developed with the Bureau of Forestry, that called for firebreaks in slash, fire patrols, telephone communication, caches of fire tools, and fire prevention signs. After a successful 1905 fire season, the company extended its programs.³⁹ Another example was the Diamond Match Corporation, whose fire planning was based on a report by E. A. Sterling of the Bureau of Forestry. The planning was done by company forester, Harvey C. Stiles. Stiles erected the first fire lookout in California on Bald Mountain near Stirling City in 1904. This lookout was the center of a web of telephone lines connected to patrol stations within company lands. A fire crew was hired, fire tool caches were set up, and machinery used in the woods was equipped with spark arresters.⁴⁰

Supervisor Bill Greeley also believed that cooperation was the best way to reduce fires on the South Sierra Reserve. Lacking lookouts and telephone lines, he organized groups of grazing permittees as "minute-men." He talked to bosses at mines, sawmills and cow camps and got them to stock fire tools. He hounded his rangers to build more trails, more telephone lines and more guard stations and badgered his superiors for more money and men.⁴¹

Men were in short supply. When L. A. Barrett began his first season as supervisor of the Plumas and Lassen reserves, he had ten summer guards and one full-time assistant supervisor. This force was augmented by eight full-time rangers the following winter. In 1906, the entire force of the two-million-acre Klamath Forest Reserve was sixteen men. As late as 1911, the Inyo Forest had only fourteen men on its rolls. Perhaps the best manned forests were the San Bernardino and San Gabriel, with thirty-two men. The higher level of manning acknowledged the severe fire situation on these units.⁴²

Most supervisors placed great emphasis on developing facilities for administration of the reserves. Four kinds of facilities were needed: roads and trails; buildings for guards, lookouts and rangers; telephone lines, and firebreaks. The pressure to get the job done resulted in many ingenious applications and the development of a tradition of making do with whatever was available.

L. A. Barrett and crew salvaged some old mine buildings and built a lookout station on Claremont Peak above Quincy in 1908. One of Barrett's rangers, George Chamberlain, was in dire need of a building to replace his tent headquarters on Little Grizzly Creek. Chamberlain was a good "rustler" and when he found a cache of illegally made shakes he set to work with his boss. They made a cabin and a horse shelter out of logs and shakes and traded the rest of the shakes for doors, windows, nails and finish lumber. Presto! A ranger station was born.⁴³

Roy Boothe spent his first winter (1907-1908) in the service at North Fork, where Sierra Forest personnel lived while building nearby ranger stations. Much of his first few seasons was spent supervising crews and working with them in building telephone lines, trails and cabins. In 1910 he and his assistant, Hugh Downey, built their district headquarters at Dinky Creek with an allotment of five dollars from Supervisor Shinn. It was a log cabin with shake roof and homemade fireplace. The cash went

for nails to fasten the floors, walls and ceilings, which were made from boards salvaged from an old logging camp.⁴⁴

Telephone lines were vital to the firefighting job. The Forest Service rapidly expanded the lines built under the auspices of the General Land Office, and they tapped into commercial lines wherever possible. Most of the technology came from American Telephone and Telegraph



Typical early lookout station on the Stanislaus National Forest. Transportation by horse, communication by telephone and heliograph with canvas for shade

Company. Early Forest Service telephone lines were usually one-wire grounded circuits, although two-wire metallic circuits were also used. The lines provided telephone service to isolated mines, sawmills, cow camps, ranches and residences in exchange for agreements to report fires or take action on forest fires.⁴⁵

An experienced crew could build many miles of line in a summer. In 1908, T. A. Day's crew spanned one hundred miles of the Plumas Forest from Quincy to Milford at a cost of thirty-five dollars a mile. When Forest Service administrators took over the San Gabriel Forest Reserve in 1905, they inherited sixty miles of telephone line built at an average cost of about eleven dollars a mile.⁴⁶

Wes Hotelling remembered that his father William's first job with the Forest Service was hanging a telephone line from Forks of Salmon to Orleans in the spring of 1906. William Hotelling received his assistant ranger's appointment in November 1906, and like most early day forest officers, built his station at Orleans, the first on the Klamath Reserve. Coincidentally, his son Wes Hotelling's first job with the Forest Service in 1917 was stringing telephone wire from Orleans to Somes Bar.⁴⁷

In all of the accounts of fire facility development during the first five years of the Forest Service in California, there is little mention of

long-range planning. Given the Forest Service experience in planning and the organization's penchant for plans, the lack of fire control plans seems remarkable. However, there was no coordinating office in California until December 1908. The typical supervisor struggled to gain control of vast roadless areas with only a few men and must have thought that plans were a luxury he could not afford. As a result, guard and ranger stations were built and later abandoned, lookouts were selected for the amount of country they could see rather than for the high fire hazard area that could be seen, and telephone lines and trails were sometimes built in the wrong places.

It was a time when labor was cheap and much of the building material came from the forest. It was also a hit-or-miss period, with the emphasis on getting the job done even if it was sometimes the wrong job or the wrong place for the job. Of course, as commercial telephone lines spread from the valleys up into the mountains, what had once been a logical location for a Forest Service telephone line sometimes became illogical. The changing transportation scene also resulted in some ranger stations being bypassed soon after they were built.

One of the most important fire control problems was lack of road access to large areas of forest. Travel by trail was so slow that fires could become very large before firefighters arrived on the scene. Even though a California Department of Highways was created in 1897, the state highway system was not begun until 1910. Each county built roads as necessary to facilitate local needs. It was not until 1910 that a statewide referendum authorized \$18 million in bonds for state highway construction. Long-distance travel through the state was by train. Railroads provided good service between the two urban centers, to towns in the Great Valley and over the Sierra by way of Donner Summit. There were branch lines into the Modoc country, Owens Valley and the North Coast. Getting to the railhead was mostly a matter of riding horseback or buggy. Of course, travel in the national forests was almost entirely by horseback, buggy or on foot.

The Bureau of Public Roads began planning a road system for the Klamath Forest in August 1908, but road construction was slow to materialize. L. A. Barrett recalled that in 1910 and for years afterward it took five days on horseback to reach the west side of the Klamath. In his nearly five years in the Plumas Forest, Barrett recorded more than 9,000 miles of horse and buggy travel and 3,500 miles on foot. Horseback trips of forty miles in a day were not uncommon for him.⁴⁸

In its first five years, the Forest Service in California fought fire pretty much according to directions in *The Use Book*. This direction borrowed largely from the old *Forest Reserve Manual* (see Chapter II), in many cases word for word. There were no such things as fire plans, planned lookout systems, fire crews or fire organization. Perhaps the most advanced proposal for fire control was in Abbott Kinney's book, *Forests and Water*, which called for, among other ideas, full-time fire crews and lookouts.

Each national forest was on its own; furthermore, each ranger fought fires on his district without help from other rangers unless he had an especially large fire. The usual fire suppression routine was to pick up a few local men, willing or not, go to the fire, and stay there until it was out. L. A. Barrett remembered one fire that lasted five days. He and four other firefighters had one blanket between them, and when grub ran out they shot a deer and ate venison.⁴⁹

Firefighting in the "early days" was even more demanding than it is today. Ranger W. B. Taylor's experience on the Devil's Gulch Fire was another example of how exhausting, dirty and thirsty the work can be. The Devil's Gulch Fire started in Yosemite National Park on August 15, 1905, but did not cross over into the North Sierra Reserve until the 29th. Taylor and twelve other men went to work. Building a narrow or "scratch" line, they worked without let-up for eighty-four hours until they had a line around the fire. It was rough, dry country, and after hours without water, their tongues began to swell. Finally they completed twelve miles of fireline. On their way to get water they found the fire had jumped the line. It took thirteen more hours of scraping line down steep slopes and past rocky bluffs before they completed a new fireline into Devil's Gulch. Most early-day fires were not so tough, but it was the tough fires the fireman remembered best.⁵⁰

Much depended on the supervisor's own ingenuity. Some, such as Bill Greeley emphasized cooperation from permittees. Others, such as R. H. Charlton, had sympathetic constituents who not only provided fire crews but also put up money for firebreaks, trails and fire prevention. But L. A. Barrett sometimes had to borrow from the Quincy bank to pay firefighters their twenty-five-cent hourly wages. The Plumas rangers were notable scroungers; they built ranger stations and lookouts out of scrap and collected tools castoff from construction of the Western Pacific Railroad.

Recruiting fire crews was a challenge. Most people, then and now, are not much interested in a job that offers hard work, danger and low pay. Ranger Frank Smith of the Plumas had no trouble recruiting, however. Smith was 6 feet 8 inches tall, weighed 225 pounds and could handle his fists and a pistol. He had a recruiting message that never failed: "Well, boys, you can either fight fire or fight me." Invariably, the "boys" fought fire.⁵¹

Although records are spotty, indications are that from 1905 through 1909 forest fires were not a major problem for most national forests in California. There were exceptions, especially in 1908. However, these were wet winters in most of the state with record rainfall at several northern California stations in the 1903-1904, 1906-1907 and 1908-1909 seasons. Major floods occurred along the Sacramento and Feather Rivers in 1904, 1907 and 1909. District 5 fire records began in 1908 and showed 158,000 acres burned in 1908 and 83,000 acres burned in 1909.⁵²

These figures were supported by memoirs of early forest officers. Barrett recorded only 135 fires in his five seasons in the Plumas Reserve. The largest fire he could recall burned one thousand acres. In 1906 R. L. P. Bigelow was supervisor of the Klamath, Trinity and Shasta reserves. He reported only thirty-four fires and 2,300 acres burned during 1906 in that huge area. Roy Boothe mentioned few fires in his first few years in the North Sierra. Some early rangers thought the reasons for low fire incidence were favorable weather and widespread burning of the woods before 1900, which reduced forest fuels. Many fires, especially those caused by lightning, went out by themselves, were put out by local residents or were simply never reported. Despite the relatively easy fire seasons of this period, however, there were a few large fires every year. The 1908 fire season was hot for some forests; more than 25,000 acres burned in the Klamath, and the Sierra lost over 23,000 acres to fire that year.⁵³

Fires were supposed to be reported on Form 944, a monthly fire report to be submitted by each ranger. Through the 1910 fire season, poor reporting handicapped District 5 by giving an incomplete picture of fire occurrence. This, in turn, sometimes resulted in guard stations, lookouts, telephone lines and trails being built in areas of low fire occurrence.⁵⁴

Change was needed if the Forest Service was to meet its primary obligation of protecting the national forests of California. The turning point for fire control in California came about with the creation of the District

5 office in San Francisco on December 1, 1908. The first district forester was F. E. "Fritz" Olmsted, a Pinchot disciple and principal author of *The Use Book*. Olmsted (1872-1925) was born in 1872 at Hartford, Connecticut. After attendance at Sheffield Scientific School, he met Pinchot at Biltmore Forest and decided to become a forester. He studied forestry in Europe, then joined the U.S. Division of Forestry in 1901. Olmsted's energetic associate was Coert DuBois, an experienced forest inspector. From this point on, there would be new emphasis on coordination between national forests and on uniform policy and procedure molded to fit California conditions.⁵⁵

Luckily 1909 was another average fire season, but with 1910 the lucky streak came to an end—with a vengeance. Fires raged on both public and private lands until by season's end more than 519,000 acres had been scorched. National Forest burned acreage rose from 93,000 acres in 1909 to more than 320,000 acres in 1910. Given the poor quality of reporting even this huge total may have been an understatement. The 1910 fire season compared in severity to the 1977 fire season, which was among the worst in recent years. In 1977, 350,000 acres of national forest resources went up in smoke. The fires of the 1910 season burned nearly three times the long-term annual average of national forest acres burned (112,000 acres as of 1979).⁵⁶

A disastrous fire season was a new experience for most of the top managers of District 5. That summer Associate District Forester DuBois arrived in Oakland fresh from an idyllic honeymoon and was greeted at the railroad station by District Forester Olmsted with orders to the California National Forest at Willows. A fire on Stony Creek was running wild. Olmsted then headed for Lake Tahoe, where several large fires were burning. DuBois took charge of the Stony Creek Fire, which had several hundred men on the firelines. He and Supervisor Madison Elliot rode for a day and a night before they encircled the twenty-mile perimeter of the fire. It was two weeks before DuBois saw his bride again. This fire was pivotal in the history of fire control in District 5, for it made DuBois aware of the urgent need for a more systematic approach to fire control.⁵⁷

Even the old-timers found 1910 to be the worst fire season they could remember. Ranger Robert H. Abbey recalled that it sometimes took a day or more to get to fires in the Lassen National Forest. In the dry east side country, food was scarce and water, even more so. He

remembered, "The men...went without washing their hands and faces for days at a time."⁵⁸ Transients had to be used as firefighters and getting them to work was almost as difficult as fighting the fire. The Klamath Forest had only sixty-nine fires in 1910, but they burned 35,400 acres. Of this total, thirty fires set by arsonists burned 31,700 acres. The Sierra National Forest lost 10,364 acres to fire in 1910, not good, but better than many forests in District 5.⁵⁹

Harried supervisors and rangers knew there had to be a better way. Massive fires in Idaho, other large fires in Oregon, Washington and South Dakota, as well as the California fires, focused national attention on forest fire control. The fire losses of 1910 were shocking and created doubts about the ability of the Forest Service to control fires. Some critics asked why so many acres were burned. Others wanted a return to burning the woods to reduce fuel accumulations. Supervisors and rangers, worn down by the hard fire season, had no ready answers. The winter of 1910 was a time for soul searching, from the chief forester in Washington, D.C., on down to the seasonal fire guard.

District Forester F. E. Olmsted spoke to the group at the first forest supervisor's meeting under the new District 5 organization saying,

Let us face conditions squarely. The Service in this District is sick in more ways than one. If one-hundreth [sic] of our damage from fire this past summer had occurred in any German State, the whole forest force would have been dismissed. Something is wrong...what is it and how can we cure it?¹

The meeting was in San Francisco, and it was December 1910. All present were relieved that the worst fire season they had ever experienced was over. Olmsted began the morning, as all such meetings began in years to follow, with a pep talk about conservation, the job and its bright future. He ended with the sobering truth: District 5 had failed to meet the challenge of its first severe fire season.

Two days later, when fire control appeared on the program, Associate District Forester Coert DuBois lashed the supervisors again. He read the record: 278 fires, more than 320,000 acres burned. Then he said, "I want you men to see the utter seriousness of it! It amounts to simply this... unless we can handle fire on the Forests entrusted to our care, we cannot practice forestry."² In one sentence DuBois captured the essence of the District 5 fire mission from then on. He admonished the supervisors against feeling good about preventing larger losses. Trying to protect the forests was not good enough. "It's time we got war-like," he said.³

DuBois challenged the group, asking how many had planned for fire emergencies. He said they were like a tribe of farmers who did not get serious about fire until the alarm went off. Then he produced a fire plan for a ranger district on the Stanislaus National Forest. He, Supervisor Ayres and Ranger Brownlow had put the plan together earlier that fall. The plan had three objectives: to control incendiarism, to develop a patrol and lookout organization, and to develop ways that ensured that the ranger got the patrol job done.⁴

The plan stimulated discussion, and ideas came pouring from the supervisors: pay a trained fire crew to be ready (stand by) in case of fire, give the ranger a fire assistant, urge the state to require burning permits during fire season, require campfire permits and develop forest maps with fire prevention messages printed on them. These ideas and others showed that the supervisors wanted solutions to fire control problems.

Proponents of fuel reduction by use of frequent, low-intensity fires in timber stands called their method "light burning," a method that worried the supervisors. During and after the bad fire season of 1910, critics of the Forest Service "fire exclusion" policy pointed to the accumulation of fuels as the prime reason for large, high-intensity fires that killed timber outright.

Feelings about light burning were mixed. Supervisor E. W. Kelley of the Eldorado National Forest said people in his area favored light burning. He suggested a test area be set up to try out the proposal, but his fellow supervisors were reluctant to add another job to their workload. While there was not complete agreement, the consensus condemned light burning. Supervisor W. B. Rider of the Klamath Forest made the most important point regarding the issue, "keep the press with us as much as possible."⁵ Success in controlling fire was dependent on how the public reacted, and the press was the critical factor in public opinion.

At that moment, fire control was much on the minds of Forest Service people everywhere, especially in the Washington office. The 1910 fire season created havoc over much of the West, but in Idaho it was an unmitigated disaster. Stewart Holbrook called it "the Milestone Blaze" for its effect on public consciousness.⁶ The Idaho fires took the lives of eighty-five people, seventy-two of them firefighters. They burned more than three million acres, two-and-a-half million acres of which were national forest lands, and they destroyed as much as eight billion board feet of timber. Leaders of the Forest Service resolved that such a disaster must never happen again.⁷

The 1910 fire season put fire control firmly into a high-priority position for the leadership of the Forest Service. Fighting the 1910 fires also created what was then a huge deficit, \$1.1 million. Congress paid the bill under terms of the Agricultural Appropriations Act of May 23, 1908, which provided for use of any Forest Service funds for emergency firefighting. In so doing, Congress gave its blessing to future deficit financing for firefighting. The Forest Service was quick to recognize the significance of this rare authority, and the Fighting Forest Fires or FFF Appropriation was used with great discretion in succeeding years.⁸ Another lasting legacy of the 1910 fires was their influence on passage of the Weeks Act of March 1, 1911. "Perhaps the most significant forestry legislation ever written," the Weeks Act provided for purchase of water-

shed lands in the East and for cooperation in fire control between federal and state fire authorities.⁹

Out of the disasters of 1910 had come new resolve, authorization for deficit funding of emergency firefighting, the first cooperative fire law and the beginning of fire planning. The DuBois fire plan was a tiny nucleus, and from that a comprehensive fire control system would crystallize and grow until it encompassed District 5, and eventually the entire Forest Service.

Fire Planning and “Systematic Fire Protection”

The disastrous 1910 fire season came after the firing of Gifford Pinchot, founder of the Forest Service. Pinchot’s dismissal was followed by restrictions on Forest Service privileges by Secretary of Agriculture James Wilson. As a result, morale in the Forest Service slipped, and its enemies in Congress rejoiced that the “pet of USDA” had fallen into disfavor. They took advantage of the loss in leadership to impose new restrictions on the Service. Perhaps the most onerous and vindictive action was a freeze on pay rates. Some legislators also proposed that the national forests be turned over to the states. Newly appointed Forester Henry S. Graves had his work cut out to regain lost ground with Secretary Wilson and Congress.¹⁰

Henry S. Graves
Chief Forester of
the Forest Service
1910-1920



Graves was a very different personality from Pinchot, comparatively low key but strong willed and competent. One of the first Americans to be trained as a forester and dean of the forestry school at Yale University, Graves was both well qualified and not entangled with Forest Service controversy. After the giant steps of the Pinchot era, shorter strides were needed to consolidate the gains and ward off attacks by enemies, old and new. A more

in-depth look was called for, a return to the old planning techniques of the Bureau of Forestry. Fortunately for District 5, Coert DuBois saw the need for planning in fire control and set to work immediately.

District Forester Olmsted resigned from the Forest Service in mid-1911, and DuBois succeeded him. DuBois attended Biltmore Forestry School under Professor Carl A. Schenck for one year before beginning his forestry career with the Division of Forestry in 1900. He was one of many "old guard" student employees who rose to prominence in the Forest Service. His career with the Division and Bureau of Forestry involved surveys, plans and inspection. He was sometimes impatient and irreverent, and his appointment as district forester was held up for weeks, apparently because a caustic remark he made about Secretary Wilson got back to that old gentleman. His contributions to fire control in the space of a few years as district forester in California were unsurpassed.¹¹



Coert DuBois
District Forester
1911-1919,
author of *Systematic
Fire Protection in the
California National
Forests*

Shocked by the inadequacies on the Stony Creek Fire, DuBois thought the Forest Service should secure "knowledge of all conditions that make fire danger in each district, study them, plan a regular systematic campaign using to the full every means of prevention."¹² Taking the suggestions and recommendations of the December 1910 Forest Supervisor's meeting, DuBois incorporated them with field data into a fire plan for the Stanislaus National Forest in January 1911. The plan included fire history, hazard surveys, location of proposed facilities, maps and a proposed fire suppression organization for each ranger district.¹³

DuBois expounded his planning ideas in an eight-page booklet titled "Fire Protection Plans" published in August 1911. He likened fighting forest fire to a military operation and advocated adoption of U.S. Army methods of communication, supply and transportation in firefighting. He saw the regular Forest Service employees as a cadre that could be expanded with volunteer firefighters, but the first requirement was a plan¹⁴ which he thought should be by ranger district and should identify two danger zones: one, areas where fire risk was high; and two, areas where high values were involved. He thought that the plan should be based on an analysis of all fires for the previous five-year period and should provide for

a list of fire prevention contacts, for hazard reduction around use areas, and for a patrol system. Patrolmen were the heart of fire prevention, and good communications were vital to ensure fast initial attack on fires.

DuBois's paper called for maps showing transportation systems, telephones, location of residents and tool caches. Cost was an important element. He reasoned that a cost per acre for protection could be derived from the plan. This cost could be used to compare ranger districts, allot funds, and compute a charge to private landowners for fire protection provided by the Service. The study should show how best to use limited funds and help the ranger and supervisor realize the importance of fire control planning. After ranger district plans were done they would be combined into a forest plan. The time for "spur of the moment" firefighting was over.¹⁵

The need for planning was emphasized again by the Waterman Canyon Fire, which burned 13,000 acres in the San Bernardino National Forest between July 25 and August 4, 1911. The fire control effort was not well coordinated. After a backfire, set by citizens, spread in the wrong direction, local newspapers severely criticized the handling of the fire. These criticisms must have convinced DuBois that quick action was needed.¹⁶

The entire California District soon knew how strongly DuBois felt about fire protection. He sent a copy of his Stanislaus Fire Plan around to the supervisors for comment. There are no records of the response, but it can be guessed that while most supervisors agreed with the method, they wondered how they would find time to do the job. Apparently they did enough by June 1911 for DuBois to express "delight" over progress and announce prizes for fire prevention and suppression. The forests were divided into three classes based on past fire history. The prize for each class, respectively, was a gilded shovel, hoe, and axe with the forest name engraved upon it. These prizes were awarded annually, with some variations, until 1917.¹⁷

After the hell of 1910, the weather in northern California returned to a more normal pattern. In fact, the winter of 1910-1911 brought heavy January rains in the mountains and record floods to the Sacramento Valley. Relatively mild summers and normal fire seasons were the rule on most forests from 1911 through 1915, although there were some large fires each season. Better fire weather gave most forests a breathing spell and time to assimilate the new fire policy. Improved fire reporting was a

basic need. Supervisor W. B. Rider's letter of July 31, 1911, to rangers of the Klamath Forest stressed good reporting because "it not only shows our fire risk and enables us to get larger allotments, but also assists in showing the friendly attitude of the public, in case we are given any voluntary assistance."¹⁸ The promise of increased allotments was powerful stuff, and from 1911 on, reports improved.

The fire planning approach continued to spread, and the influence of the district office continued to grow. In June 1912, DuBois required regular reports of fire activities from all national forests. He also established a method to employ emergency firefighters from the Fighting Forest Fires Appropriation. DuBois's insistence on planning and cooperative effort was changing the attitude of District 5 people toward fire control.¹⁹

Meanwhile the day-to-day work on the forests continued. In the field the new fire plans were expressed by the development of new trails and roads, telephone lines, guard stations, lookouts and firebreaks. The humdrum work of stringing wire, cutting right-of-way for roads, installing signs and posters, and lopping brush from trails went on. Now and then there was a new lookout or station to construct that a man could point to and say, "I built that!"

Roy Boothe must have felt that way when he and two other rangers built the Old Baldy Lookout on the Sierra Forest in June 1911. Using a four-horse team and wagon, they hauled the building materials as close to the site as they could get by wagon road. Then, using the front wheels of the wagon to keep the lumber off the ground, they skidded it to the peak.²⁰

Building a lookout was one thing; manning it was something else. In late 1912 the fire lookout's job had been in existence only four years (eight years on Diamond Match Company land). Already it was recognized as a demanding job that required special qualifications. In 1914, Coert DuBois wrote, "The mental or psychological phase of lookout service is immensely important."²¹ Mental stability was certainly an important qualification, but at Sawyer's Bar Ranger Station on the Klamath, beggars could not be choosers.

Even in 1955 Sawyer's Bar was regarded as the most remote ranger station in the California national forests. In 1912 it was back of beyond—and then some. So when the man at Eddy's Gulch Lookout Station declined to return for the 1913 season, Ranger W. H. McCarthy of Sawyer's Bar Ranger Station was desperate. After reviewing the

qualifications of two unsavory local characters, McCarthy wrote to Supervisor W. B. Rider about the third application, "It may take your breath away and I hope your heart is strong enough to stand the shock." The third application was from a young woman, Hallie Morse Daggett. A woman? Applying for a field job with the Forest Service where even strong, experienced woodsmen failed the test? McCarthy hopefully listed her qualifications: "ardent advocate of the Forest Service, ...not afraid of anything that walks, creeps or flies, ...and a perfect lady."²²

It is not recorded, but McCarthy must have had an anxious few days before Miss Daggett's application was returned from Yreka—approved. Hallie Daggett was appointed as a forest guard at a salary of \$840 per year. She began work on June 1, 1913, and was on the job each June for the succeeding fourteen years. In her first season she reported forty fires, setting a standard that led McCarthy to declare, "The first woman guardian of the National Forests is one big, glorious success." Harriet Kelley of the Tahoe Forest and Mollie Ingoldsby of the Plumas joined Hallie Daggett as lookouts in 1918. Daggett, Kelley and Ingoldsby led the way for a host of later woman lookouts and convinced many firemen that women, as a rule, made better lookouts than men.

Hallie Daggett,
first woman
lookout in
Region 5, served
on the Eddy's Gulch
Lookout of the
Klamath National
Forest from
1913 to 1927.
Her starting
salary was \$840
per year.



Maintaining the quality of fire lookouts was only a small part of the fire problem. DuBois's planning and the 1910 Supervisors' meeting got everyone in District 5 into the fire planning game, especially the supervisors and rangers, but there were as many questions asked as there were

answers provided. Then on March 17, 1913, DuBois sent out an outline for a "Systematic Fire Study" of fire protection, with twenty assignments for selected forest officers. DuBois followed up with field trips to get ideas and add his personal emphasis to the project. During 1913, fire control in District 5 was analyzed and re-analyzed, studies were made and statistics compiled.²³

Roy Headley, District 5 operations chief, made the first fire case study when he reviewed the 1911 Waterman Canyon Fire. He also examined fire suppression costs and fire damage. His dogged insistence on the importance of minimizing fire suppression costs would later prove to be a two-edged sword. Supervisors Paul G. Redington of the Sierra Forest, R. W. Ayres of the Stanislaus and R. H. Charlton of the Angeles all made large contributions in fire prevention studies. Supervisors E. W. Kelley of the Eldorado National Forest and W. P. Rider of the Klamath studied fire organization, while David P. Godwin of the California Forest analyzed fire detection and J. D. Coffman of the Trinity provided data on fire causes.²⁴ DuBois drove his men on the fire control issue. He rejected the defeatist attitude of some of them that fires were "Acts of God—unfortunate but unpreventable."²⁵ His energy and enthusiasm were infectious. The studies, analyses and missionary zeal of DuBois began to bear fruit at a forest supervisors' meeting December 4-6, 1913, in San Francisco.²⁶

At this meeting the supervisors reported the results of their studies. Never before had the whole realm of fire control been brought together in one place. DuBois took the results and holed up in a room. After weeks of effort, he completed a monograph titled, *Systematic Fire Protection in the California Forests*. He admitted that this was "the hardest mental work I ever did," and "the most important contribution to the public I ever made."²⁷ It was a distillation of ideas from all of District 5, as DuBois acknowledged, but it was his concept and his drive that made it happen. Probably the most influential single document in United States forest fire control history, it was termed "his masterpiece" and "brilliant" by fire historian Stephen J. Pyne.²⁸

DuBois saw the booklet as a manual that should be amended as new information was learned. It was in two parts: (I) Finance and Indirect Control, and (II) Direct Control. Part I identified fire control objectives, standards and problems and set fire control policy for District 5. Soil was

identified as the "forest capital," and the goal of fire control was to get the utmost of forest products from the soil. DuBois realized it was impossible to reach this goal under California conditions, so he set fire control standards expressed as loss of acreage per fire, not more than ten acres in timber or one hundred acres in brush or grass. He analyzed weather, vegetation and fire history to develop District 5 "norms."

Using this data he listed the elements of fire danger so as to identify a "normal" fire season. Once the normal season was set, the abnormal season could be predicted. Part I also established coordination of effort as the main purpose of District 5 fire policy. There was to be a district-wide attack on fire, an end to the old "go it alone policy." Financial and personnel directives were the powerful tools used to enforce this policy. Of the twelve policies listed, all but one concerned finances or personnel, and DuBois controlled both of those.²⁹

DuBois covered fire cooperation and fire prevention in Part I. He wrote that education could be used to change the minds of the careless and of misguided woods burners. As far as those he termed "irresponsible incendiaries"; that is, "drunks, idiots and lunatics, ...little can be done about them except to shut them up."³⁰ One assumes that he meant lock them up. A discussion about reaching the public and making the public aware of the danger of forest fires was borrowed from psychologist William James. It reads remarkably like a program for a modern political campaign. DuBois ended Part I with an outline of law enforcement priorities, procedures and policies.

The real, down-to-earth stuff of fire control was contained in Part II, "Direct Control." Two-thirds of the monograph's ninety-five pages were devoted to the details of planning, organizing, and supervising fire control activities. "First, find the right man," Pinchot had declared, and DuBois echoed his old boss's belief: "The success of protection work depends, first, last, and all of the time on the men who compose the rank and file of the control force."³¹ This philosophy became a rule for future fire control leaders in District 5. DuBois suggested several ways to get and keep good men, including higher pay and incentives as well as personal consultation by the forest supervisor.

Accountability for fire control was made explicit: "The district forester and the forester are going to hold him [the forest supervisor] accountable for the season's record."³² Forest protection plans and an emergency

mobilization plan were required of each supervisor. The mobilization plan included a list of total forces available, advance agreements with co-operators, and written plans for all men and stations. Here was planning with a vengeance, and it must have come as a shock to weary supervisors already burdened with timber, grazing and land adjustment plans.

DuBois provided fifteen detailed pages on fire detection, laying down basic definitions and policy on everything from the role of detection to the use of field glasses and goggles. Elapsed time standards of eight minutes from fire start until discovery and an accuracy of plus or minus three-eighths of a mile in locating a fire were expected. The burden of life on a lookout could be eased by "playing music over the telephone," or by the ranger who could "tell them the gossip of the day." Perhaps this was more of William James's teachings at work.³³

The section on communication discussed telephones, and sound and light signals. Telephones were the mainstay, but District 5 was afflicted with several different wire sizes and installations. That would cease! Standards were set for new lines and equipment to be used henceforth. *The Telephone Construction Manual* by R. B. Adams of District 1 (Northern Rocky Mountains) was named as the standard for future telephone line construction. Gunshot signals and heliographs were also discussed and illustrated. DuBois went on to discuss fire tools and their use in detail.

Light burning, as a means of hazard reduction, was discussed but dismissed as too damaging to young growth. Firebreaks, brush disposal and snag disposal were approved as ways to remove hazards or keep fire from hazards. The manual ended with a discussion of fire emergencies. Five situations were identified as emergencies: subnormal spring or fall precipitation, high winds, extended hot spells, hazy atmospheric conditions, and an increase in the number of fires over the norm for a ten-day period. The key to success was to anticipate emergencies, plan for them and then use the plan. When emergencies occurred, the district forester would take charge in the district office, and all other jobs would be subject to emergency needs. This was the policy that gave fire emergencies first priority in District 5. The manual ended on this note of anticipation, planning, personal responsibility and priorities.

Systematic Fire Protection was a fire control manual that set policy and procedure for District 5. It also set a standard for district fire

manuals throughout the Forest Service and strongly influenced national fire control policy and procedure. There was something else implied in *Systematic Fire Protection*, something that DuBois stated in so many words at the December 1910, forest supervisors' meeting: that fire control in District 5 was the top-priority job. Otherwise the boss would not have spent a month writing a manual on the subject. It also defined roles in fire control. Each ranger was responsible for fire control on his own unit, each supervisor on his forest, and the district forester would coordinate forest efforts and be in charge during emergencies.

The lasting benefit of DuBois's work was its emphasis on plans and systems as the starting point for fire control. This reflected the influence of the "scientific management" ideal prevalent during the progressive period. DuBois used Frederick Taylor's work measurement methods, but added practical human relations when he made the project a joint effort by all District 5 supervisors and many rangers. When it was completed, it was their product and they were committed to its use.

Variations on a Theme

DuBois's enthusiasm for better fire control stimulated a wave of innovation in District 5. People at every level of the organization proposed new tools, new methods or the use of new technology for fire control, and, for the first time, proven procedures were put in writing. Some of the ideas worked well, were accepted, and came into general use. Others seemed to be certain of success, only to fail. The Angeles National Forest goat experiment fell into the latter category.

Supervisor R. H. Charlton of the Angeles was the happy beneficiary of cooperative funds from local counties. These funds were used to build firebreaks in the San Gabriel and San Bernardino Mountains. By 1915 there were nearly two hundred miles of firebreaks snaking up and down the ridges and hogbacks of the Angeles front country. Charlton was glad to have the breaks and wanted more, but chaparral sprouts on the clearings were growing faster than he could cut them. It occurred to Charlton and his men that if goats would graze the sprouts, maintenance costs would decline drastically.

He fell afoul of grazing regulations, however, and it was 1912 before he could get permission from the secretary of agriculture to authorize free grazing of goats on firebreaks. He negotiated a deal with Meyer

Brinkerhoff, a goat herder, who brought more than seven hundred goats from Arizona for the experiment. Now, it is said that goats are almost as independent as mules. When turned loose on the firebreaks they ate the chaparral sprouts, but if a fancy took them, they would wander off and eat whatever else appealed to them. Charlton did not want them all over the mountain, but it was a trial for the best herders to keep them on the breaks. Finally, after three seasons, Charlton gave up. Even rangers were easier to handle than goats.³⁴

The extensive use of firebreaks in southern California national forests was watched with interest by people in the Sierra National Forest and in the district office. The Sierra and Sequoia forests included perhaps 100,000 acres of brushy foothill land within their western boundaries. Ranchers living in or adjacent to these lands were inveterate brush burners. A good share of the two forests' annual burn was in the brush and woodlands of these hills. After discussion with Coert DuBois and his assistant, Roy Headley, agreement was reached on construction of a firebreak along the lower limit of ponderosa pine.

DuBois and Headley met Supervisor Paul G. Redington of the Sierra at Mariposa in November 1913 and agreed upon objectives, construction methods and crew organization. On January 3, 1914, twenty men from other forests in District 5 arrived. With the addition of four men from the Sierra, two twelve-man crews were formed. One crew began near Auberry, the other near Jerseydale, and by February 24, 1914, they had completed 110 miles of firebreak at a cost of fifty-four dollars per mile. The location of the break took advantage of roads, railroads, and natural breaks including streams. The crews continued on to the front of the Sequoia and Kern Forests.³⁵

The firebreak soon proved its worth. Fires ravaged 125,000 acres along the Sierra front country in the 1915 fire season, but the new firebreak held fast. Backfires set along ten miles of the break on the Mariposa Ranger District stopped "flames which came up against the forest boundary in a solid front."³⁶ The success of the firebreak along the lower limit of ponderosa pine planted an idea that grew into the much grander Ponderosa Way of the 1930s.

L. A. Barrett was a shrewd and practical man. His field experience was of great value in his job as lands assistant to District Forester DuBois. He reasoned if the Forest Service could not convert

hazardous chaparral to safer vegetation, or if it could not stop careless and deliberate burning of these brushy areas, then one solution was to eliminate them from within national forest boundaries. District 5 identified the problem areas such as the Sierra-Sequoia front country and the Angeles front, and between 1915 and 1918 eliminated hundreds of thousands of acres of chaparral from national forest status. The fire record improved dramatically.

A time-tested way to reduce fires was through regular patrols, and many innovations were tried in this field. On July 4, 1910, the Tahoe National Forest floated the Ranger, a gasoline powered launch, twenty-six feet long with a maximum speed of nine miles per hour. The boat was stationed at Kent Ranger Station near Tahoe Tavern on the northwest shore of Lake Tahoe. The Ranger patrolled the northern end of the lake each year from June 15 until end of fire season. The mission of the "Seagoing Fire Patrol" was to "Show the Flag" but when a fire was spotted, the boat put ashore, picked up a few men and attacked the fire. Within a few years after 1910, Lake Tahoe became a mecca for tourists and roads reached around the lake. Eldorado Forest Supervisor E. W. Kelley inspected the Tahoe National Forest fire facilities in 1915. He recommended that the launch patrol be terminated. "The automobile's popularity has swung the tide of travel about Lake Tahoe to land," he wrote.³⁷ His advice was finally acted upon in 1918 and the fire-boat patrol of Lake Tahoe ended.³⁸

Not to be outdone in unusual patrol vehicles, the Sierra Forest took advantage of the San Joaquin and Eastern Railroad tracks to introduce a Ford Model T "runabout" equipped with railroad wheels. The vehicle got its first trial July 23, 1913, and climbed "the heaviest grade with ease."³⁹ The Sierra also used motorcycle patrolmen as early as 1912 and believed they could cover three times the territory patrolled on horseback.⁴⁰ These examples show the eagerness of firemen to adapt motorized transport to fire uses. Naturally, improvements in aviation caused many to speculate on aerial fire control. A few even experimented with aircraft.

Possibly the first air patrol was conducted by Ranger S. V. Parnay of the Angeles. He rode with pilot Howard Gill in the summer of 1913 and observed a series of test fires on a twenty-mile flight along the San Gabriel front. Supervisor Charlton favored balloons over fixed-wing aircraft. He ascended in a balloon in 1916 from Arcadia, drifting along

Parnay's route but without spectacular results. Apparently these exploits went unreported to the district office, since Roy Headley wrote the Washington office in 1919 that he knew of no attempts at air patrol in District 5. Of course, forest supervisors do not tell the boss everything especially when the results are less than expected.⁴¹

Some forest officers only dreamed of aerial fire control, a panacea that would relieve them of the labor and danger of the job. Ranger John M. Farley of the Sierra was one such dreamer who expressed his hopes in a poem, titled, "Tomorrow's Forest Fire" printed in the February 1, 1912, issue of *The Sierra Ranger*,

A strange craft leaves the ground and soars
With the grace of a bird of prey,
With speed unrivaled by birds of the air,
Toward the glorious sun of day.
'Tis a fireoplane of our Forest land,
Manned by a driver bold:

A wireless message from Signal Peak
Has reached the airship stand.
It warns: "A fire near Bear Creek Knoll."
From my point of view I see
The smoke, for the fire is near at hand.
The air-craft's flight I plainly note,
And watch the strange craft's plane
As it reaches the rim of a hazy cloud
Its speed is checked, it dips
And is hid from view as in a shroud.
Then with shifted planes it cushions the air
Now tips, now hangs for a moment there.
The manouver [sic] is repeated once again,
The smoke abates in a trice
Compounded of chemicals (the fireoplane
is a trick of the Chemical Age)
Compressed in chambers the birdman drops
As the "bird" glides over the flames.
The action of heat soon shatters the globe
And a vapor envelopes the flame,
And after that no "burnt over" to note,

No dead-tired ranger to blame.

But, compared with what the old vets know

It's awfully, awfully tame. ⁴²

Farley probably won no medals for poetry, but it is hard to fault his imagination.

On a more prosaic note, Julia Tyler Shinn, chief clerk of the Sierra National Forest, outlined the basic food supplies needed for small fires. She wrote, "The kyaks [sic] must be packed in readiness for instant use, and the question arises, what shall be put into them?"⁴³ She identified four attributes of firefighter food: it must be quickly prepared, easily digested, not too salty (to avoid aggravating thirst) and it must have good keeping qualities. Food must be packed to avoid breakage and spillage. She devised a menu for three meals for five men. It included "Crescent" sardines, dried apricots and a pound of forty-cent coffee, which she declared went twice as far as the twenty-five cent kind.

Julia Tyler Shinn,
known to the first
generation of District
5 forest officers as
"the Mother of the
Sierra." Chief clerk,
Sierra National Forest,
1905-1923



Source:
Special Collections
Library, California
State University,
Fresno

Mrs. Shinn was one of many Forest Service wives who contributed to firefighting in District 5. Sometimes their efforts were for pay, but more often the wives volunteered because they wanted to share in what their husbands did. Julia T. Shinn continued as a chief clerk for the Sierra until 1923, even though her husband Charles retired in 1911. Mrs. Shinn was the friend of everybody on the Sierra. She understood field problems so well, and was so practical, that when

rangers had a problem they usually asked for her rather than Supervisor Shinn. When Mr. Shinn retired, the new supervisor had to ask the rangers to consult him first but admitted he might have to seek help from Mrs. Shinn.

The wives of other Sierra men, such as Constance T. Mainwaring, Mrs. Mal McLeod, Rose Boothe, Mrs. Chester Jordan, Clara Benedict and Mrs. Frank Price served as dispatchers, cooks, telephone operators, typists and confidants on many occasions. Some women served

on lookouts, or in offices and sometimes as fire camp cooks. A few even fought fire. A 1915 photograph from the California National Forest shows two Forest Service women dressed for the fireline in black bloomers, white middie blouses with black neck scarves and canvas leggings. Women were not hired again for fireline duty until thirty years later.⁴⁴

In the days before women firefighters and organized crews, most of the labor force for large fires was picked up at the nearest town: hence the name "pickups" for such labor. Usually pickups were itinerant laborers or drifters and they were hard to supervise. Tahoe Forest Supervisor R. L. P. Bigelow asked for soldiers during the disastrous 1910 fire season. Two large fires were burning near Foresthill, and all of his forces were committed to other fires. Two companies of the U.S. Coast Artillery (180 officers and men) were sent. Bigelow found them enthusiastic and effective. They communicated with each other by bugle call and patrolled the fireline on horseback. But when Bigelow proposed a permanent camp of soldiers on the Tahoe, the secretary of war turned thumbs down.⁴⁵

Tourism increased rapidly around Lake Tahoe and in other parts of the California District after 1910. The Angeles National Forest attracted upwards of one-half million visitors each year by 1915. The flood of recreationists brought along a rise in numbers of man-caused fires. In 1914, eighty-seven of 153 fires were caused by recreational visitors. Supervisor R. H. Charlton decided it was time to act.⁴⁶

Rushton H. Charlton was from Lebanon, Ohio. A Cornell forestry graduate, he was all the things a Angeles National Forest supervisor should be "[a] capable business manager, hustler and good mixer ...A press agent of the first order."⁴⁷ He became forest supervisor when he was twenty-six years of age in 1905 and served in that capacity until 1925 with time off to serve as supervisor of all the southern California forests in 1920.⁴⁸ He began a tradition of long tenure for Angeles National Forest supervisors.

Charlton had been promoting campfire permits since before the December 1910, forest supervisors' meeting. He suggested campfire permits at that meeting but other supervisors were not ready to accept them. Increased visitation accompanied by increased fires caused by recreationists gave him a good basis for a strong appeal after the 1914 fire season. His proposal was approved, and in 1915 the Angeles became

the first national forest to require campfire permits. By 1920 all southern California forests were requiring campfire permits and their use on northern forests was optional.⁴⁹

Charlton was also responsible for a fire that brought him more embarrassment than renown. During the hotly contested presidential election of 1916, Charlton arranged to have two large brush piles atop Mt. Wilson in full view of the Los Angeles basin. He put chemicals in each pile to produce a green fire if Woodrow Wilson won or a red fire if Charles Evans Hughes won. California was the last major state to vote, and the race was not decided until early morning after election day. Charlton received a premature message and lit the red bonfire, thus sending word to all of Los Angeles that Charles Evans Hughes was the next president. As the day dawned he learned the truth, and must have felt like radio commentator H. V. Kaltenborn did the morning after he proclaimed Thomas E. Dewey the winner over Harry S. Truman in 1948.⁵⁰

The Sierra Forest also got more than local notoriety when the first motion picture of fire control was made there in October 1913. The filming was done by Thomas A. Edison, Inc. and the picture was titled, *A Forest Fire and How It Is Fought*. A small fire was lit on October 7th, and the crew filmed the fire, fire suppression and the Shuteye Lookout. The film was shown at major theaters in Europe and the United States.⁵¹

The Sierra was also home to Ranger Mal McLeod and C. W. Gray, who developed the McLeod tool, which is a combination fire tool with a wide hoe blade on one side and a rake with deep, wide-spaced teeth on the other. It was designed for scraping line through pine needles and duff and for light chopping. It is still used today. In 1911 the Sierra also experimented with light plows, fire extinguishers and spray pumps. Ranger McLeod tried the first backpack pump in District 5 while DuBois and other dignitaries watched. A light plow designed by Ranger J. E. Elliott of the Stanislaus National Forest was also tried on the fireline. Supervisor William G. "Bill" Durbin of the Lassen Forest actually established a horse and plow unit that went to fires on a truck.⁵²

A more comprehensive and important development involved fire weather forecasting by the U.S. Weather Bureau. During 1913 the bureau began special forecasts for high winds in District 6 (Pacific

Northwest). The same year, District 5 agreed to install anemometers at five stations in northern California in cooperation with the bureau. The purpose was to monitor north and east winds. The bureau believed these drying winds were the critical factor in forest fires. The bureau extended its fire weather forecasts to California in 1914 and began investigation of lightning as a fire cause.⁵³

Fire research in California originated in a simmering controversy that the disastrous 1910 fire season brought to a boil. Fire control as practiced by the Forest Reserve Service and the Forest Service through 1910 could hardly have been called effective, yet the mere establishment of fire control laws and regulations aided by generally favorable weather had combined until 1910 to reduce fire losses from those of the smoky 1890s.

Many mountain residents, miners, stockmen and lumbermen were not convinced that protection from fire was the best way to prevent severe forest fire damage. They supported "light burning" as the way to prevent catastrophic losses of timber. The theory of light burning depended on three assumptions: fire cannot be kept out of the woods; fire will burn only surface fuels under proper conditions; and fire intensity depends on the volume of fuel on the ground.¹ The leading supporters of light burning in 1910 were lumbermen with large holdings of old-growth timber.

Most prominent among them was T. B. Walker, owner of the Red River Lumber Company, which held vast areas of timberland in Lassen, Modoc and Shasta counties. In 1904 Walker carried out a planned burning program with the objective of protecting valuable old-growth timber. The method was to clear around the trunks of large trees, pile dirt around them, and broadcast burn after the first rains in the fall. Unfortunately, the burns were erratic and did not cover the area completely. Because of this and the labor of clearing around individual trees the costs were high—thirty to fifty cents per acre depending on who calculated them.²

Walker described his experiences in the *Report of the National Conservation Commission* in 1909. His article was followed by another in the August 1910 issue of *Sunset* magazine written by G. L. Hoxie of Anderson, Shasta County. Hoxie advocated light burning for all forest properties in California. The timing of his article could hardly have been worse, for it appeared just as the nation's attention was riveted on the great Idaho fires. The emphasis in the newspapers was on suppressing fires, not starting them. California forests were also ablaze. In July 1910 the public had read about the Widow Valley Fire in Modoc County in which 33,140 acres of Walker-owned lands burned after a light burn spread out of control.³ Under the circumstances, little public support was gained by the light burners.

The following year Chief Forester Graves took advantage of Walker's interest in fire, and his pocketbook, by asking him to endow a fire protec-

tion position at Yale Forest School. Perhaps as a *quid pro quo*, Graves authorized a study of light burning and its effects on forest reproduction. The study was to be conducted by S. B. Show, forest examiner of the Shasta National Forest. Earlier Graves had expressed dismay at the whole idea of light burning but may have seen the Walker experiment as a way to lay the idea to rest. If so, he selected the right man for the job. Stuart Bevier Show (rhymes with cow) became a pioneer in California fire research and the acknowledged leader in California fire control for the following thirty years. He also became the foremost opponent of light burning. However, Show's first progress report in January 1912 found that reproduction was not severely affected by light burns on Walker lands but operational costs were high: fifty cents per acre compared to one cent per acre for full fire protection.⁴

Meanwhile District Forester Olmsted got into the act with a Forest Service publication titled "Light Burning in California Forests." The circular left no doubt that Olmsted saw light burning as heretical forestry. Olmsted also wrote an article in 1911 for the *Sierra Club Bulletin* on the subject, stressing the high costs of light burning. He claimed that the Forest Service was practicing a form of light burning by piling and burning slash on timber sales, which was the only way to protect reproduction and remove fire hazard, in his opinion. Rangers such as Roy Boothe of the Sierra Forest were also concerned. Boothe acknowledged that the 1910 fires had improved grazing in the brushy low country. But he attributed some of the floods of 1911 to burned watersheds and could not reconcile the small value of improved grazing with heavy damage to flooded farmlands in the valley. Supervisors also noticed the resurgence of conifer seedlings when fire was excluded.⁵

The light burning issue was confused by variable terminology. Show thought light burning aimed only at saving valuable timber and was not to be confused with "promiscuous burning," which destroyed timber and brush in order to facilitate grazing, prospecting or hunting. That was Show's interpretation and may have been Walker's, but others were convinced that light burning covered all kinds of woods and brush burning. Other names applied to light burning were "surface burning," "Indian burning" and "Paiute forestry," a derisive term applied by Graves and other Forest Service leaders.⁶

New District Forester Coert DuBois was faced with a dilemma. He firmly believed that the forests of the future depended on excluding fire from the forests of the present, but there were voices among his own supervisors and rangers, among timberland owners, mountain residents and the press who disputed this stand. The west side of the Klamath National Forest, including Humboldt County and the Salmon River country, was literally a hotbed of protest against fire control. Sixty percent of the 1915 fires on the Klamath were set by incendiaries. People living in or near the Sierra and California national forests were also vocal in favor of burning. Consequently DuBois sought a middle ground on light burning even while he was producing the definitive statement on systematic fire protection.⁷

On November 11, 1915, DuBois sent a proposal to Graves for “cooperative brush burning.” He wrote that something was needed to stop unauthorized burning, especially on the Sierra and California national forests. His premise was that the Forest Service’s first duty was to protect the future forest of seedlings and saplings, but it also had a duty to help develop local communities. He stated what is still the central paradox for a decentralized national forest system: “It is entirely possible that what is clearly for the general public good might conflict in some instances with the local public interest.”⁸ Light burning was just such an instance, in his opinion.

DuBois’s proposal rehearsed all of the current arguments for light burning and disposed of each. He concluded by suggesting that District 5 agree to “controlled burns” for three purposes: protecting homes and property, improving grazing and prospecting, and clearing agricultural land. In turn, mountain residents would agree to help fight forest fires. Controlled burns would have to be applied for in writing, and the proposed burn area would be examined by a forest officer who would prepare a burning plan to be reviewed by the supervisor and approved by the district forester. If the burn was approved, the applicant would have to sign an agreement to abide by the plan. DuBois added that District 5 would not permit “general burning”; that is, burning to open the country or to destroy cover for animals deemed to be varmints.

Graves did not answer DuBois’s proposal until January 14, 1916, when he suggested that DuBois go slowly. District 6 (Pacific Northwest) had its own light burning problems and premature action by District 5

might aggravate them. He then cautioned that the Forest Service must not appear to "have executed an about-face and thrown over our old principles." Instead of a district-wide policy, he proposed to DuBois that he try the idea in a few specific cases to see how it worked. DuBois was impressed with the response, noting on the margin, "A corking letter."⁹ DuBois followed Graves's advice. Letters to supervisors of the Monterey and Shasta forests in mid-1916 discussed controlled burning proposals. The Shasta burns were to take place on the McCloud River and North Fork of Squaw Creek in brush-covered areas of mixed ownership with Southern Pacific Railroad Company. The purpose was to improve forage for livestock use. More than 15,000 acres were involved. DuBois conditionally approved the projects, asking that S. B. Show inspect the area before work began. By late 1916 the controlled burning policy had spread throughout the district.¹⁰

In 1915 DuBois also established a companion policy on "regulated brush burning," that applied to private lands outside and adjacent to national forest boundaries, a policy that involved cooperative efforts between associations of landowners and the Forest Service. Four associations were formed on the Sierra National Forest front country and one along the borders of the California Forest. There seemed to be less incendiarism after this policy went into effect.¹¹

Despite these actions, the controversy over light burning remained alive, so in July 1915, DuBois assigned Show to the Feather River Experiment Station near Quincy, to begin fire research studies. The selection of projects illustrated the priorities of the time. Show was to study fire spread, fire damage and light burning. He was convinced that light burning was unacceptable when he began the Feather River experiments. In addition to his analysis of the Walker burns in 1912, Show had made other tests between 1911 and 1913 near Castle Rock on the Shasta Forest. What he lacked was a controlled, objective trial of light burning. His boss, DuBois, needed hard information. He was conducting a balancing act, permitting controlled burns on one hand and trying to justify a fire exclusion policy on the other. As it turned out, DuBois was never to make the choice, for world events intervened. World War I and consequent shortage of funds cut short Show's experiments, and DuBois joined the U.S. Army in 1917.¹²

While District 5 experimented with better ways to fight fire and tried to convince its mountain neighbors that fire must be controlled, the Washington office made some important moves. In June 1915 research was given new stature by the creation of a new research branch equal to and independent of the administrative branches. Research was not new in the Forest Service, for that had been a basic mission of its predecessors, the Division and Bureau of Forestry. However, most of the research done before 1915 would be more accurately labeled administrative studies. Pinchot, for example, ordered investigations of fire effects in southern California in 1898, 1899 and 1904. Like the work done by DuBois and others, these studies tended to be observations of existing conditions and practices rather than controlled experiments. In any case, after 1915 research was on a new footing and, technically at least, was independent of district foresters. The new status gave researchers more time and credibility to do their job as independent observers.¹³

Down on the forest the rangers were trying to apply systematic fire protection and still meet the demands of local people. The forester in Washington and the district forester in San Francisco proclaimed their policies, but it was the ranger and his men who had to make them work. Everything depended on common-sense application of policy. Some relatively good fire weather didn't hurt. Moisture was at or above normal at most weather stations in northern California from 1911 through 1915. While total 1912 rainfall was subnormal in southern California, ample spring rains eased the fire situation. There were a few large fires every year, but the average annual burn for all the northern California forests during the period 1911-1915 was a comparatively low 45,000 acres.¹⁴

Systematic fire protection seemed to be working. In March 1916, forest examiner W. H. Galleher thought it was "good business" and also that "during the last ten years (1905-1915) the National Forests made a rapid recovery from their former rundown condition."¹⁵ Not everyone agreed with Galleher. Some saw the increasing growth of seedlings and saplings as a hazard. According to author Stewart Edward White, keeping fire out of the woods also favored spread of the western pine bark beetle. White, a friend of Pinchot and Theodore Roosevelt, was a writer who wrote popular novels about California and the West. He also wrote about the outdoors and enjoyed living in the ponderosa pine belt of the Sierra National Forest.¹⁶

White also owned timberland and a sawmill. He was friendly with local residents of the Sierra Forest, some of whom were confirmed woods burners. The Forest Service withdrew the western boundary of the Sierra National Forest in 1915, thus eliminating 77,000 acres of brushland from the forest jurisdiction. The stockmen who persistently burned this area for range improvement were mollified, but White and his supporters were not. He discounted the technical foresters as tending to become "hidebound and bureaucratic" and relied on woodsmen who harked back to "the old days."

This viewpoint was encouraged by one wing of the lumber industry. Forest fires reached an all-time high of 1,862 in 1917. Fear of sabotage during wartime and a desire to reduce the number of fires led to the formation of a Forest Industries Committee. The Committee polled pine lumbermen for ways to reduce fire in the woods. Inquiries sent out in January 1918 generated eight responses, mostly favoring light burning.¹⁷

Meanwhile, Forest Examiners (research) S. B. Show and Duncan Dunning proposed a light burning experiment near Snake Lake in the Plumas National Forest. The experiment, on two hundred acres, was designed to duplicate methods proposed by light burning advocates in a controlled situation. Burning was attempted in 1919, but Show and Dunning found getting fires to burn under safe conditions was not easy. After burning was completed, the results suggested that light burning created more fuel than it consumed by killing, but not completely burning, brush and young growth. It also damaged large trees by burning "cat faces" (large basal fire scars) into large valuable butt logs. It felled already weakened standing trees, killed natural reproduction and was costly. Show and Dunning summarized their experiments by stating that light burning cost too much to apply as a regular forest practice.¹⁸

White challenged Forest Service fire control with an article in the March 1920 *Sunset* magazine. He cast doubt on Forest Service contentions about light burning, timber stocking and control of pine bark beetles. Give "surface burning" a try, he urged, and quoted Joseph A. Kitts, an experienced light burner from the Nevada City area. The gauntlet was down and Chief Forester Graves was quick to pick it up. He responded in the following issue of *Sunset*, taking up White's ideas point by point and emphasizing the need to produce future crops of timber.

Unconvinced, White came back in the May issue of *Sunset*. Graves had said nothing new, he wrote. He did not expect to change the "fire exclusion" policy but only hoped for a fair trial of light burning, he wrote. The protracted exchange ended in the June issue with a rejoinder by new District Forester Paul G. Redington, which specifically rejected some of White's later charges and emphasized that fire damage and not light burning was the real issue. He also described a meeting with White and lumbermen and an agreement to try a light burning experiment.¹⁹

Through 1919 and 1920 the controversy raged almost as hot as the fires of the severe 1919 fire season. Those fires may have sparked the renewal of the controversy. Articles by Graves and Greeley in *The Timberman* magazine were countered by light burner Joseph A. Kitts in the same magazine. The Society of American Foresters sponsored two public meetings on the subject in the winter of 1919-1920. Show was the star performer for the Forest Service, and White represented the light burners. The upshot was the formation of a California Forestry Committee made up of industry, the state forester, and Forest Service and University of California representatives. The committee investigated in the field, and the majority reported to the State Board of Forestry on October 14, 1920, that light burning was destructive. All they saw was how not to use fire. Committeeman H. A. McAllaster of the Southern Pacific Land Company disagreed and generated further reviews and field tests. The committee concluded that there was no way to incorporate light burning into a fire protection system and disbanded on January 5, 1923. Then on August 18, 1924, the State Board of Forestry endorsed "fire exclusion" and slash burning, thus ending the official debate over light burning.²⁰

The issue came up periodically during the bad fire seasons of the twenties. When White suggested the Forest Service might be hidebound and afraid of change, he had some basis for his comment. Ashley Schiff made a good case for Forest Service rigidity and slowness to approve prescribed burning in the pine forests of the southern coastal plain.²¹ But California forests were not like the pine stands of the South. California's climate, vegetation and terrain permitted only short periods when burning conditions were relatively safe, and little was known about how to predict safe burning conditions.

From a silvicultural standpoint, natural reproduction of trees had to be protected because it was not known how to plant trees successfully on a large scale in California.²² Furthermore, the essence of control of the national forests by the Forest Service was its ability to protect the land from unwanted fire and trespass. If the Forest Service burned over large areas of national forest, why should not its neighbors do likewise? What happened if a light burn on a national forest escaped to private land or from private land onto the national forest? Cost was very much on the minds of Forest Service leaders. Congress wanted more revenue from the national forests, and it wanted costs held down. A light burning program would require large outlays for burning, and at least initially, a costly fire organization would also be needed to fight unplanned fires.

Forest Service people agreed that there was a continuing build-up of fuel, but much of that fuel was in young trees that filled holes in poorly stocked stands. They vowed that these stands should be protected until maturity. All their arguments were logical and hard to refute. The light burners had only sketchy evidence and strong feelings about the place of fire in the woods. They persisted because of their feelings that fire was a natural part of the forest and should remain so. Feelings that open stands of timber were more pleasing esthetically and psychologically were deep rooted.²³

If the light burners had been content to seek permission for burning their own lands under controlled conditions they might have been successful, but when they campaigned for light burning on all wildlands and all ownerships, so much opposition was aroused that light burning and its successor, "controlled burning," were virtually banned for many years.

The Sisson Fire and "Economic Fire Protection"

By the start of the 1914 fire season, the personnel of District 5 were accustomed to fire planning and to increasing control from the district office. The forests had more fire people available than ever before. In 1912 there had been 279 forest guards in the district. By 1914 there were 395. A greater emphasis on fire was added when David P. Godwin, supervisor of the California National Forest, was named district "fire chief" under Roy Headley, assistant district forester for operations.²⁴ Favorable fire seasons, improved communications, better road and trail access and new permanent lookouts led to confidence that fire plans were paying off.

DuBois's manual was a District 5 production, and supervisors and rangers alike took pride in it. Its major flaw was the failure to address large fire organization and fire emergencies in detail.

"The best-laid schemes o' mice an' men Gang aft a-gley," wrote Bobby Burns.²⁵ This memorable line was telescoped by the legendary Murphy into, "If anything can go wrong, it will." Fire planning was no exception. The fire emergency section of DuBois's manual was tested by a fire at the town of Sisson (now Mt. Shasta City) in the summer of 1914, and true to Murphy's Law, things went wrong. It was not an especially large fire, and it was not even in the Shasta National Forest. Located in a brushfield between Sisson and Mt. Shasta, the fire was a potential threat to both town and forest. As the day went on, the fire grew until finally the supervisor called the district office for help. The office set the emergency plan in motion, and all hell broke loose.²⁶

Trainloads of transients picked up in the Great Valley as firefighters were rushed north. Forest officers from other northern California forests were hurried to the scene to supervise crews. When they arrived at Sisson they found a mob of seven hundred "pickups" milling around with no one in charge. Supervision was nearly impossible since there was only one forest officer for every seventy laborers. There was not enough food or blankets for the hundreds of men in camp, and getting them on the fireline and working was a major effort. Eventually the fire was controlled. Immediately thereafter, arguments over wages and hours worked broke out, and a small riot ensued. When it was all over, District 5 had spent many thousands of dollars to put out a routine brush fire, and in doing so, proved that words alone do not make an emergency plan.

This embarrassing episode was an opportunity for Roy Headley to urge fundamental change in fire policy. He and DuBois didn't always see eye-to-eye on priorities in fire control, as evidenced by marginal notes on their correspondence. DuBois envisioned firefighting as "a game they [firemen] have agreed to play," whereas Headley wrote, "Forget the conception of fighting a fire. Think of it as a job of constructing and patrolling control line."²⁷

Roy Headley was born in Sangamon, Illinois, in 1878. He worked twelve years as a timber cruiser, scaler and logger before joining the Forest Service in 1907. Headley had no formal training in college but was intelligent and ambitious. His first job was as ranger in the Coeur

d'Alene Forest in Idaho. Before his first year was out, he was promoted to supervisor of the Cabinet National Forest in Montana. Less than a year after that, he was promoted to assistant district forester for operations in San Francisco. This was the most important staff job in District 5 and was responsible for finances, personnel and fire among other jobs. Show said that Headley had great physical and mental energy and wanted "the public to get its money's worth from the Forest Service."²⁸

Headley's desire was to reduce damage and suppression costs. To that end he proposed what came to be known as a "let burn" policy. His idea was to sacrifice low-value lands if control lines could be more cheaply built to exclude them, but he warned that the policy had to be used with caution during periods of high fire danger. Headley also advocated letting fires in brushfields burn, and so-called "loose herding" of late fall and early spring fires. "Loose herding" meant allowing low-intensity fires to spread unless they threatened high-value timber or improvements. He excluded southern California national forests from these proposals because of the high watershed values involved.²⁹



Chief Forester
W.B. Greeley
and Staff,
Washington D.C.
March 1924.
(standing L-R)
W.C. Barnes, T.W.
Norcross, H.A. Smith,
F.W. Reed, L.F. Kneipp,
H.I. Loving, E.H. Clapp.
(seated L-R)
R.H. Headley, Col. W.B.
Greeley, Mrs. Crocker,
E.A. Sherman, Miss More,
E.E. Carter.

The Sisson Fire came at a time when the Forest Service was under continuing pressure to cut costs and increase revenues. District 5 was also being pressed by light burning advocates. All of these influences made DuBois and his staff take a second look at fire control policy. Despite DuBois's misgivings, Headley prevailed. On May 1, 1915, before the fire season began, DuBois sent out new policy to his supervisors. Henceforth, economy would rule. They must send enough men, but not too many,

to each fire. The value of the resources involved must guide the suppression effort. In June, DuBois followed up with instructions to supervisors to let low value areas burn. Concurrently, he was about to propose his "controlled burning" policy to Graves.³⁰

The "let burn" policy seemed to be a good idea, at least at first. In November 1915, Eldorado Forest Supervisor E. W. Kelley recommended to Supervisor R. L. P. Bigelow of the adjoining Tahoe that low-value lands near Iowa Hill and land along the north bank of the Middle Fork American River be ignored. "You can let them go for luck to play with," he remarked.³¹ Because other low-elevation areas in several forests were proposed for elimination from national forest status, supervisors were reluctant to spend fire protection money and effort on them.

In March 1916, DuBois began the "controlled burning" policy (discussed earlier) on a case-by-case basis. In May, Headley issued a supplement to *Systematic Fire Protection* titled *Fire Suppression*. This supplement did not duplicate DuBois's work but focused on large-fire organization, fire control procedure and firefighting tactics. Specifics of preparing for fires and small-fire suppression were also covered. Interspersed through the text were tidbits of policy on "let burn," "loose herding" and other items that could be summed up as the suppression of fires to the extent that suppression costs will be less than the values that are endangered. S. B. Show later called this the "economic theory of fire protection."³²

Reading Headley's handbook gives one a sense of his business-like attitude. "Excitement is the enemy of effectiveness," he wrote, and "[a] panicky state of mind frequently expresses itself by piling in abnormal numbers of men" He believed that "fires should be suppressed by work economically and effectively applied rather than by men, money and loss of sleep."³³ Headley brought together many known procedures and wrote them down for the first time in a district fire handbook. A large-fire organization was outlined, including fire boss, quartermaster, division bosses, patrol bosses and crew bosses. He described the duties of each position and stated what became a prerequisite for the district ranger's job in District 5: "The district ranger should be the most effective Fire Boss in his District."³⁴ He also laid down another enduring rule: No matter what his position in the regular organization, the fire boss was supreme on the fire.

He emphasized the need to preserve evidence of the fire's cause, and he set forth rules for fireline safety. He also expressed for the first time a time objective for fire suppression, setting a standard of eight hours from beginning of suppression until control. This was a forerunner of the better known 10 a.m. Policy of the future, a policy Headley was to oppose. Headley's handbook may not have been inspiring, but it was an important set of guidelines upon which to build better fire control.³⁵

War with Germany was declared April 6, 1917, and District Forester DuBois was infected with patriotic fervor along with many other Forest Service men. Within a few weeks he left for the U.S. Army. The loss of DuBois and other top men from District 5 had a depressing effect on morale at the forest level. DuBois was a dynamic, forward-thinking man of action. His mistakes were forgiven as errors of commission, and he was genuinely liked by Forest Service people in California. During his absence Roy Headley became acting district forester. Headley was not a flamboyant type. He believed in efficiency and economy. The new fire policy was largely his, and his new role gave him a chance to see it through.

Fire weather and burning conditions during the 1915 fire season was relatively mild, but 1916 was drier than normal. The district's burned acreage record in 1915 was close to the previous five-year average of 45,000 acres, but when the figures were in for 1916, the first full year of the "let burn" policy, the district's burned acreage jumped to 110,000. Then in 1917 precipitation fell to two-thirds of normal, and the first bad fire season since 1910 threatened.³⁶

It is not clear how much of the burned acreage in 1917 was attributable to the "let burn" policy, but during that year



In September 1916, a fire burned 16,000 acres near Sierra Forest headquarters at North Fork. Everyone, including these two rangers' wives, helped fight the fire.

413,000 acres burned on the northern California forests where the policy was in effect. This was a new record for burned acreage in the district. The season was notable for the first great lightning storms since District 5 began operations in 1908. On July 16th, probably during a heat wave, a storm struck, and many large fires resulted. In addition to this problem, incendiaries set a record number of fires (335) during the 1917 season. The total number of 1,573 fires was also a new record for the northern forests. Nearly a third of these fires exceeded one hundred acres in size. Fire suppression costs went down during the first year under the new policy (1915), but in 1917 costs quadrupled the average of the previous six years. Some of the poor showing was due to World War I and its drain on skilled firefighters, but clearly something else was wrong.³⁷

The situation was confused, to say the least. The Forest Service was disputing with Stewart Edward White and lumbermen over the merits of light burning, while at the same time permitting "controlled burns" on national forest lands and not controlling some forest fires at all. The public was bewildered, the forestry profession perplexed, and Forest Service field employees were unhappy. Many thought it was all due to "the dollar policy" as Forest Supervisor Ayres called it with barely concealed disdain. Most field men wanted a return to a simple, straight-forward policy: Put out all fires.³⁸

No one really knew what the situation was until after S. B. Show completed a comprehensive review and analysis of fires on northern California forests. He began the review in 1917 and completed it in time for a forest supervisors meeting at Davis, in February 1919. Show found two outstanding problems: Fires occurring in the early and late part of the fire season were not being detected and became large before they were attacked, and fires were undermanned leading to larger fires with high suppression costs and high fire damages. The "let burn" and "loose herding" policies too often resulted in small fires becoming large and threatening valuable resources. When these fires had to be put out, suppression costs and damages soared.

The Davis meeting became a confrontation between Show and the forest supervisors on the one hand and Headley on the other. DuBois sat by and listened intently to the discussion. As Show remembered it, "I decided I might as well be hung for a sheep as a lamb." He plunged ahead and demolished Headley's "economic theory" with facts and figures.

Headley challenged Show repeatedly. Show wrote, "Boy, it got hot!"³⁹ The upshot was that DuBois was convinced by Show and the supervisors, Headley was transferred to the Washington office, and Show made a career-long enemy in Headley.

On March 15, 1919, DuBois sent a message to supervisors: Attack all fires when small, even those on private land. No fires would be allowed to burn without the supervisor's okay. The ranks had closed again. A united front against permissive fire control and light burning was once again in place, but the experience had not been in vain. Headley's insistence on better organization, better tactics and more attention to suppression costs were needed in the years just ahead. Just as the Sisson Fire demonstrated a lack of large-fire organization, so did the four years of "let burn" policy demonstrate a lack of knowledge of fire behavior and the potential for fire damage when fires went uncontrolled.

Building Cooperative Fire Control

From its beginning in California, the Forest Service found the presence of large areas of private land within national forest boundaries a perplexing problem. It was realized that all private land inside and some outside the forest boundaries would have to be protected or fire from these lands could reach public lands. This fact placed great emphasis on the need for cooperation with adjacent private landowners.

Influential groups and agencies, including the users of the forest, the residents in and near the forests, and state and local governments demanded cooperation. Pinchot's philosophy placed great emphasis on cooperative forestry and public information and education as means to sell forestry and conservation. *The Use Book, Systematic Fire Protection* and other publications made these points over and over again. The message was clear to Forest Service people, but the major cooperators, the state and the lumber industry lagged behind.

Under the prodding of Governor George C. Pardee, a series of conservation laws were passed, including the Forest Protection Act of 1905. This was the basic forestry legislation for California and provided for a Board of Forestry, fire districts, voluntary fire wardens, and a State Forester. E. T. Allen of the Bureau of Forestry was selected as the first state forester in July 1905.⁴⁰

California Governor
George C. Pardee,
1903-1907,
conservationist and
strong supporter
of forestry and
fire control



Allen immediately began a vigorous campaign to enlist volunteer fire wardens and to solicit the help of industries and the public in preventing wildfires. He established strong cooperative relations with the Forest Service but was hampered by the prevailing attitude in state government that fire protection was a local responsibility. Allen left after only

one year to become district forester for the Forest Service in the Pacific Northwest. In 1909 he began a long tenure as manager of the Western Forestry and Conservation Association. While in that post he became one of the most potent forces for improved state and federal cooperation in fire control. He was replaced as state forester in 1906 by G. B. Lull of the Forest Service.

Governor Pardee was defeated in his bid for a second term, and state interest in fire protection languished after he left office. Little was accomplished in fire protection for years after Pardee's term. An exception was the enactment on March 11, 1907, of a bill, authored by Senator Miguel Estudillo of Riverside, to fund cooperative firebreak projects in San Bernardino National Forest. This bill, sponsored by the Tri-Counties Reforestation Committee was the first of several bills aimed at protecting southern California watersheds from fire. These bills were strongly backed by conservation groups and were passed annually until 1930.⁴¹

When the District 5 office was created in 1908, private land protection was high on the list of problems needing solution. Southern California was in comparatively good shape, but the northern forests included hundreds of thousands of acres of private forest-industry lands, which complicated fire protection. There was no law compelling the landowners to provide protection, so supervisors were directed to get voluntary contributions based on actual Forest Service expenditures per acre of land protected. This effort was only partly successful and was frustrated to some extent by the belief in light burning on the part of some industry leaders.

In 1909 Lull was replaced as state forester by G. M. Homans, who began a twelve-year term in that office. Homans soon called together a

group of lumbermen and Forest Service officials to discuss fire protection. The California Forest Protective Association was born in the meeting but did not accomplish much at first and was not incorporated until April 1912. In later years, the association became a major factor in achieving improved fire protection and better cooperation between government and forest landowners. The 1909 meeting and other meetings with lumbermen covered the topic of separate cooperative fire agreements between the Forest Service and lumber companies. The severe 1910 fire season made believers out of some companies, and the area covered by cooperative agreements increased.⁴²

The wide variety of conditions in California created problems in determining charges for fire protection. Generally, the charges were based on a cost per acre derived from total annual administrative and suppression costs divided by the acreage protected. This figure was allocated to private landowners based on their percentage of the total land included in the forest protection area. Protection costs varied considerably between national forests; that is, the Modoc had lower costs than the Sierra due to differences in terrain, vegetation, weather and risk.

In 1916 District Forester DuBois was dissatisfied with the contributions made by private landowners. He calculated that 37 percent (5,900,000 acres) of the 16,392,000 acres in northern California national forests was private land, yet only seven percent of the private land was paying its way. The cost of protection was running \$207,000 annually or about one and one-quarter cents per acre. The potential share owed by private landowners was nearly \$74,000 each year. "Isn't this worth going after?" he asked Headley.⁴³ His proposal was to use a flat rate throughout northern California and to use the proceeds to improve the fire organization.

Headley protested that there should be more than one rate depending on local conditions, but the economies of the flat-rate approach and its simplicity won out. The district office began a campaign in early 1917 to secure new cooperative agreements with major landowners. The campaign brought forth a fussy letter from the Washington office criticizing methods, but the program successfully raised cooperative acreage from 1,040,000 acres in 1918 to 1,765,000 acres in 1920 and income from \$13,322 in 1918 to \$26,014 in 1920.⁴⁴

For years the state of California failed to take advantage of cooperative federal fire control funds available under the Weeks Act of 1911. This law provided matching funds to states that protected privately-owned lands in watersheds of navigable rivers. The reformers had broken the power of the Southern Pacific Railroad and elected Hiram Johnson Governor in 1910, but his priorities were in political and social reform, not conservation. Local governments recognized the need for fire protection and began forming forest fire districts, the first being the Mt. Tamalpais Forest Fire District with the former District Forester F. E. Olmsted as its first forester.⁴⁵

Attempts to create a state forestry organization were repeatedly frustrated in the legislature or were vetoed by unsympathetic governors. World War I gave rise to fears of sabotage by fire, and State Forester Homans used this leverage to get counties to allot funds for four hundred rural fire companies. Cooperation between the Forest Service and counties in southern California flourished.

One example was in San Diego County, where the supervisor of the Cleveland National Forest was also the county fire control officer supervising six county fire wardens. Costs were shared between the county and the forest. Riverside County appointed a county fire warden and enlisted ten rural fire crews. Los Angeles County supervisors allotted \$610,000 for use within the Angeles Forest during fiscal 1918-1919. Santa Barbara County cooperated with the local forest supervisor in organizing fire crews. Further north, other counties concentrated fire protection on farm and grazing lands at low elevations. Some counties, on the other hand, did little to use their firefighting authority. The result by late 1918 was a network of firefighting resources covering only part of the state and loosely coordinated by the state forester.⁴⁶

The breakthrough in state fire law came in May 1919 when Governor William D. Stephens signed acts that created new criteria for Board of Forestry members, authorized the state forester to organize a state fire protection force that would cooperate directly with others in fire protection, and recognized state responsibility for part of fire-protection costs. Almost as important was the appointment of George C. Pardee as chairman of the Board of Forestry. Pardee's aggressive leadership ensured a new role for the state in fire control.⁴⁷ The Board invited newly-appointed Chief Forester William B. Greeley to speak to them. His speech, delivered on July 14, 1920, opened with these words: "The first

point upon which we should all concentrate is fire.”⁴⁸ His declaration was received with hearty agreement by the board. Changes in law and leadership coincided with the severe 1919 fire season and the need for more fire protection funds. One result was a more vigorous attempt to secure Weeks Act cooperative fire funds. This succeeded in 1920, and in later years California became a major recipient. With new legislation, a revitalized Board of Forestry, strong leadership and active cooperation with the Forest Service, the State of California entered the 1920s committed to a larger role in fire control.

The First World War directly affected Forest Service fire control in California. Patriotic young men, including District Forester DuBois, left for the U.S. Army or other armed service. In many cases they were not replaced, so the organization tightened its belt and went on as best it could. Likewise, the supply of seasonal and volunteer firefighters shrank. Often the available seasonal men were inexperienced and needed training. Because Congress was concentrating on the war effort, other programs were cut to make way for soaring War and Navy Department needs. The protection force for the northern California forests, which had reached a peak of 563 men in 1914, sagged to 365 in 1917 and 313 in 1918. The war also excited fears of sabotage. Concern for rangelands, grain and other crops led counties to form rural fire companies in the agricultural valleys.¹

One of the most depressing aspects of wartime to the average Forest Service employee was the rapid inflation of living costs. Wages of rangers in 1910 were \$1,100 per year, and those of forest supervisors were \$2,000 to \$2,500 annually, well below comparable jobs throughout the war years and the early 1920s. The Cost of Living Index more than doubled between 1910 and 1920. Each Forest Service job and its pay were listed in the "statutory roll" and were part of the annual appropriations acts. The roll, and thus Forest Service pay, remained unchanged from 1910 to 1924, and by 1920 many forest officers were unable to live on their salary and had resigned.²

In addition to their economic troubles, Forest Service field men had mixed feelings about the "dollar policy" on fire protection and "controlled burning" by forest residents. The old sense of strong commitment and individual accountability seemed to be blurred by anxieties created by the war, the loss of inspirational leaders such as DuBois, low wages and a vacillating fire control policy. When precipitation in 1917 fell one-third below normal over the state and a hard fire season was in prospect, morale could not have been at fever pitch, but good firefighters are noted for a dogged determination to persist in spite of adversity. This was never demonstrated better than on the Tea Creek. Fire, which began with a lightning strike in the Klamath National Forest on July 19, 1917.

Twenty-year-old Forest Guard Henry Erhart made the initial attack with his two teenage brothers. They each had an axe and the head of a hoe, whose handles they made from a tree branch, after arriving at the fire.

Camping near the fireline, they worked four days before help arrived. Reinforcements came, but soon afterward the fire crowned in the tall timber, "with a great roar something like a thunderstorm."³ The fire raged across ridge after ridge dropping finally into the large Ukonom Creek drainage. More reinforcements came and the firefighters stayed with the fire. The work had no glamour or thrill to it. The firefighters were up at dawn, had coffee, ate bacon and beans and trudged off to the fireline. Scraping duff, moving logs, cutting limbs and felling snags, they plugged away day after day, week after week with only a blanket, dirt for a mattress, no bath, no shave, their clothes in rags. Yet they stayed with the fire. A pack train brought supplies into the fire each week until August 14, when it was finally controlled. More than 9,600 acres burned in twenty-seven days of fire. A crew of sixty-eight men had suppressed the fire at a cost of \$3,101.17.

The Klamath was beset by fire in 1917. Lightning caused 126 fires, a new record. Man-caused fires increased to 103 and burned nearly 50,000 acres. Manpower was in short supply. Indeed, no fire had more than one hundred firefighters at one time; even a 78,400 acre blaze in the Shasta Forest was undermanned. The latter fire burned in lava-bed country and probably grew large because of the "let burn" policy.⁴

The Santa Barbara National Forest also suffered in 1917. The Matilija-Wheeler Springs Fire began in June and burned for five days. More than 30,000 acres and several homes, barns and other buildings were destroyed in and near the town of Ojai. This fire was also the scene of Ranger Jacinto D. Reyes's dramatic rescue of thirty-two men trapped by the flames. A legend in the Cuyama District, Reyes served as ranger there for thirty-one years and performed many feats of endurance and heroism.⁵

The 1917 fire season was shorter than the average (158 days compared to the average of 169 days), but the number of fires was the highest recorded to that date, and the 413,000 acres burned exceeded the landmark year of 1910.⁶ Many of the 1917 fires were man-caused. In fact, the total of man-caused fires rose steadily from 1912 through 1915, after that man-caused fires averaged more than 900 per year. Incendiary fires almost doubled (an average of 214 per year) in the same period. Acting District Forester Roy Headley was alarmed by this development, which threatened to upset his economic theory of fire protection. Investigation

of man-caused fires and subsequent law enforcement were part of DuBois's systematic fire protection program in 1914, but had not been emphasized. Headley wanted more effective law enforcement.

His first step was to assign the job to Carey L. Hill, who immediately started an aggressive campaign to improve law enforcement. After a district-wide conference on law enforcement in April 1918, a training program began that resulted in an "arson squad" on each forest. A manual on fire investigation was published in 1918, which included sections on law enforcement standards and methods. Permanent leadership of the law enforcement program was then given to Charles V. Brereton of the California National Forest, who was named chief investigator in July 1918 and assigned to the district office. The law enforcement program began to pay off in the 1918 season, when the number of man-caused fires dropped sharply.⁷

However, the 1918 fire season was short and relatively easy for most forests. Precipitation for the winter of 1917-1918 was normal or above except north of Sacramento. The Klamath Forest again suffered through a hard fire season. The Klamath firefighters were plagued by lightning fires, sixteen of which exceeded six hundred acres in size. In June, fifty-nine lightning fires burned more than 40,000 acres. The largest of these fires burned 26,000 acres near Ash Creek Butte. There were just not enough men in or near the forest to handle the constant barrage of lightning fires. Apparently the District 5 emergency plan was not put into effect in this situation since the Klamath did the job on its own. That year it was not uncommon for a crew of twenty men to "loose herd" a fire of 2,000 or more acres for two weeks until they finally "corralled" it.⁸

Even though most of District 5 made it through the 1918 fire season without many severe fires, more than 300,000 acres burned that year. The high total reflected Headley's let burn and loose herding policies. In total, man-caused fires subsided to a number well below average, and lightning fires were only half of the record set in 1917. One disturbing statistic was that 32 percent of all fires exceeded one hundred acres in size, a new record. This fact also reflected the let burn and loose herding policies and the shortage of manpower more than it did fire-season severity. When the 1918 fire season ended in October, the war was nearly over. The armistice on November 11, 1918, was cause for celebration of the war's end and

hope in California for a return to a more stable fire control situation.⁹

This hope was bolstered by the return of District Forester DuBois and the results of the February 1919 forest supervisors' meeting in Davis. At this meeting, S. B. Show demonstrated the weakness of economic fire protection, and DuBois quickly returned to a policy of attacking all fires while they were still small. It was prudent that he did so, for 1919 became the longest and most severe fire season in the short history of District 5, especially in southern California.

The fire season began early in May after a winter of precipitation below normal in the north and much below normal in southern California. Fortunately, lightning fires, the major cause of fires in northern California, were at a ten-year low. However, man-caused fires climbed to prewar levels, and burned acreage began to accumulate as the season dragged on. Still, the record was acceptable as District 5 headed into September.

The season blew up with a Santa Ana wind on the Angeles National Forest. A miner started a fire near Camp Bonita in San Gabriel Canyon on September 12, 1919. Crews soon had a line around the fire and were patrolling it until about noon on September 14th, when a tree fell across the line. Under a strong southwest wind, the fire burst out of San Gabriel Canyon over the divide into Coldwater Canyon. At this point, about six hundred acres had burned and control appeared to be likely. However, the fire crossed to the west side of San Gabriel Canyon about 1:04 p.m. on the 16th. The fire spread quickly to the north and west. Fire crews put up a dogged fight, taking advantage of lulls in the wind to encircle the fire. Ranger Bill Mendenhall was optimistic that control would come on the night of September 18th. It was not to be. A Santa Ana wind set in at 6:30 a.m., blowing up to 30 miles per hour. Suddenly, the back of the fire became the front and then switched again as winds swirled in the deep canyon.¹⁰

On the 19th, word came from Supervisor R. H. Charlton that the Ravenna Fire, which started September 15th in Big Tujunga Canyon, had crossed into Pacoima Canyon and blown up. The Santa Anas let up, came on again, then let up once more, only to return with fury on the 22nd. Mendenhall described the fire as it burned across the San Gabriel River traveling downhill "with as much speed as any fire I ever saw burning uphill." The fire "was going at such a speed that we could not get near

it.”¹¹ Flames spread south to Dalton Ranger Station and the outskirts of San Dimas and LaVerne. Finally, the winds slackened on September 24th, and by the 25th the fire was almost contained. Rains began on the 26th, and the fire was controlled. More than 135,000 acres had been blackened in the two fires. Supervisor R. H. Charlton said, “The greatest fire we have ever known in southern California has destroyed the Pacoima watershed and caused tremendous damage to the Tujunga, San Gabriel and San Dimas watersheds.”¹² The 1919 fire season finally ended in mid-November. Weary firefighters realized that despite all of the lessons learned over the previous nine fire seasons, they could not stop a wind-driven fire in southern California chaparral. (See Map 3.)

The big Angeles fires attracted national attention. F. E. Bonner, an engineer from the Washington office, was assigned to observe the fire and fire suppression effort. He must have seen the shortcomings in District 5 large fire planning and suppression. The occurrence of two huge fires on the same forest at the same time stretched District 5 resources beyond their limits. There were many problems coordinating crews from various water companies and local government. Cooperation with the newly established Los Angeles County Fire Department was minimal. Serious communications problems were caused by repeated shifting of fire camps to escape the erratic fire, by the large scope of the fires and by having two large fires going at once. At the peak of the San Gabriel Fire Mendenhall reported, “I could not get in very close touch with just what action was being taken over there [San Dimas and Dalton areas].”¹³ His U.S. Army radio operator could hear Charlton talking in an airplane but could not make out the words. Supplying six fire camps on the San Gabriel Fire alone was beyond previous experience. It took all the available pack strings working twenty-three hours a day to do the job.

The 1919 Angeles fires were another landmark in District 5 fire control history. Men from twelve other forests, the district office and Washington, D.C. helped fight these fires, but it was a change in weather that was the critical factor in their control. These fires established in the minds of the firefighters from District 5 and Washington the view that southern California national forests had a special fire problem that required special fire control measures.

The Army Air Patrol

The 1919 fire season was a landmark in fire control in District 5 because of its severity and because of the initiation of the U.S. Army Air Service Forest Patrol. The patrol's two-seater Curtiss JN4H (Jenny) biplanes became a common sight over the forests and valleys of California, and the excitement they caused was a phenomenon. The rapid advance of aviation was one of the few silver linings in the black clouds of World War I. People all over the world thrilled to the exploits of the aces battling in the skies high above the muddy trenches of the Western Front. Perhaps even the wonder of the space-vehicle launches of the late 1950s could not compare to seeing an airplane in 1919. Unlike a space ship on television, the Jenny was there. You could touch it, you could dream about flying in it. Despite its novelty, the idea of flying forest fire patrol was not new; it had originated at least ten years before.

William Cox, a former Bureau of Forestry employee, saw a Wright Brothers aircraft fly in 1909 and reported on its potential for fire control.¹⁴ His report was read with interest, but flying was in its infancy. Most foresters could see no immediate use for flying machines. The forest supervisors of District 3 (Arizona-New Mexico) thought otherwise. At their first annual meeting November 9-14, 1911, in El Paso, Texas, they resolved "that the use of aeroplanes for fire patrol be given consideration, since it appears they will be of value in that work."¹⁵ Well and good, but who was going to risk his rickety "aeroplane" and his neck flying over mountains in 1911? There were not very many aircraft; those available had poor capability and were not very reliable. No matter, there were sure to be some daredevils who would give it a try. As we have seen in Chapter V, pilot Howard Gill and Ranger S. V. Parnay seem to have been the first of this hardy breed.

Even though the Gill-Parnay exploit was not followed up, interest did not die. On June 3, 1915, E. L. Scott, acting forest supervisor of the Eldorado Forest, wrote the district forester asking if the Forest Service had considered use of "aeroplanes" or dirigibles to fight fire. Roy Headley sent Scott's letter on to Washington, D.C., with a comment that he had never heard of its being done. The forester's office replied on June 23 that they thought airships would eventually be used for fire control, but they had not heard of any such use. It would probably be too expensive anyway, they concluded. Then on July 20 the Washington office wrote again

and referred to a news clipping telling of an air patrol by the Wisconsin Forestry Department.

District Forester Coert DuBois wrote to Wisconsin and discovered that the air patrol was a voluntary effort carried on by L. A. Vilas. A letter to Vilas on August 11, 1915, brought a reply on August 26. Vilas used a Curtiss flying boat because of the numerous lakes in the Wisconsin forests. He expanded upon the advantages of air patrol and speculated that it could be used in California. Vilas demonstrated that regular air patrol was feasible, but he was ahead of his time. World War I put an end to air patrol experiments.¹⁶

When war was declared by the United States in 1917, the Army had only thirty-five pilots. By agreement with the Allies, the United States began all-out aviation development. By war's end the country had forty-five squadrons with 740 airplanes and seventy-seven balloons on the Western Front. There were 95,000 men in the Army Air Service. After the armistice, Congress drastically reduced all of the armed forces. By 1920 there were only 896 flying officers and 8,000 enlisted men left in the once great Army Air Service. After further Army reorganization in 1920, there were just twenty-seven squadrons, nineteen of which were observation-reconnaissance outfits.¹⁷

The handwriting was on the wall early in 1919. Reductions were coming. The Air Service was looking for some way to maintain public awareness of its pilots and airplanes. The Forest Service, mindful of the giant steps taken by aviation since 1915, was alert to the potential of aircraft use in fire control. In fact, Forester Graves wrote a letter on the subject to *Aviation and Aeronautical Engineering* magazine in December 1916.¹⁸

On March 3, 1919, in Washington, D.C., representatives of the Army Air Service and the Forest Service met to discuss aerial fire detection. The meeting was followed by a letter from Graves to General William L. Kenly, director of the Army Air Service, suggesting a modest beginning, probably in California. He attached a copy of a request for air patrol from the secretary of agriculture to the secretary of war. Meanwhile in San Francisco, recently discharged Major DuBois struck up a conversation with Major Henry H. "Hap" Arnold of the Army Air Service in a bar. They discovered a mutual interest in aviation and fire control and agreed to do something about it. It isn't clear which event came first, but DuBois was notified of the impending program on March 31, 1919, and immediately began preparing for it.¹⁹

On April 28 DuBois reported to Graves that an observation balloon would be stationed at 3,000 feet elevation at the Army Balloon School in Arcadia. An observer would be on duty daily from 7:00 a.m. until 2:30 p.m. and would report any fires seen on the Angeles National Forest. Two air patrol routes were laid out, one from March Field (Riverside County) over the Angeles National Forest and one over the Cleveland from Rockwell Field in San Diego. Service was to begin on June 1st. DuBois reported that Mather Field near Sacramento was not ready to participate.²⁰

In the midst of this hurry-up program, the Air Service was struggling to establish a regional organization for California with headquarters at San Francisco. Major Arnold expected to be in charge but until then DuBois had to deal with each individual field commander. On May 7th he reached agreement with Colonel Watson at Mather Field for two patrols covering parts of the Eldorado, Tahoe, Plumas and Stanislaus Forests. A trial patrol was flown May 6th and results were good.²¹

Army
Air Patrol
flight ready
for takeoff.
Dangerous work
that began the
era of flight
in fire control



Initially the airmen flew in Curtiss JN4H or JN4D training aircraft, flimsy and unreliable airplanes with a short range and a low ceiling. Communication to the ground was by radio-telegraph in the JN4H, but the JN4D had to land and telephone, use carrier pigeons or drop messages. The opening of the August deer season and a heat wave caused District 5 to request extension of the air patrol. The Air Service responded by establishing a base at Red Bluff to fly over the California, Trinity, Shasta, Lassen, Modoc and Klamath National Forests beginning August 31st, and another at Fresno beginning August 28th to cover the Sierra

and Sequoia forests. Unsatisfactory experience with the Jennies led Major Arnold to replace them during the week of September 1, 1919, with DeHavilland DH4 aircraft. The DH4 was equipped with a more powerful 400 horsepower engine, giving it longer range, higher ceiling and more speed than the Jenny. Unfortunately, the DH4 was not equipped with radio-telegraph.²²

Air patrol was hazardous work. Flying over deep canyons and sheer peaks was new to most fliers, and it was scary. A. O. Waha of District 6 was a passenger on June 11th on a trip from Mather Field to Chinese Camp near Sonora. The engine threw a fine spray of gasoline and water back into his face, but the view was "wonderful." A tense moment came when the pilot doubted if he could clear telephone lines at the end of the landing strip. He said to Waha, "If we hit the wire we would tear through them, but if not, it [is] not much of a drop anyway." Waha was not comforted by this news. The engine noise was so great that upon landing Waha heard nothing but buzzing and ringing in his ears. He thought radio telephones and photographic maps were necessities for the observer. Waha came away convinced that helium filled dirigibles were more practical than airplanes because they could hover near a fire and let down firefighters or even pump water and chemicals onto a fire from above. He concluded that "an aviator is taking his life in his hands in every flight he makes."²³

Unfortunately, this was true for Lt. Everett S. Wisdom. His first flight from Rockwell Field to Warner's Springs to begin air patrol was his last. Wisdom lost his way in a fog and crashed his JN4H into a mountainside, killing himself and injuring his observer. The Forest Service report for the 1919 air patrol listed eight major crashes and one fatality that occurred in Oregon. Wisdom's death was not counted because he was on his way to his patrol station when he crashed.²⁴

Nevertheless, in many ways the 1919 Air Patrol was a great success. The sight of regular air patrols was of more benefit to the fire prevention program than anything the Forest Service had ever done. Supervisors were convinced that incendiarism had dropped as a result of the flights. Virtually everyone in the mountain and valley towns and communities were captivated by the sight of airplanes on a regular basis. Businessmen and boosters were not slow to see the advantage of an airfield for the patrol. Towns up and down the Great Valley began grading fields and installing landing "Ts" and windsocks. Visalia and Orland used volunteers

to build their facilities, including barracks for the fliers. Competition was keen, but only a few airfields were chosen for air patrol bases. However, emergency airfields were an absolute necessity for the safety of the aviators, and towns all over the state built their first airfields for this purpose.²⁵

When it came to the primary mission of detecting and reporting forest fires, the results of the 1919 air patrol were inconclusive. It was certain that in haze or smoke the aircraft were superior to lookouts. But in fact, most of the fires discovered from the air had already been detected by fixed lookouts. On top of this, the reporting of fires from the air patrol could only be called "unsatisfactory." Landing to report by telephone was far too slow, carrier pigeons were erratic and costly to train and support, message drops were often inaccurate, and the use of wireless telegraph suffered from poor operators and lack of ground receiving stations.²⁶

However, what had been regarded as a secondary mission was a great success. On September 15, 1919, the great San Gabriel and Ravenna fires on the Angeles Forest were in their early stages. The fires were in roadless country, the lookouts were smoked in and the flames were spreading rapidly. The fire perimeter was moving too fast to locate from the ground. Then Supervisor R. H. Charlton remembered the air patrol. He called March Field and arranged for a aircraft and pilot to fly him over the fires. Every morning until the fires were controlled, Charlton or District Forester DuBois flew over the fires charting their location and rate of spread. This appears to have been the first time aircraft were used to scout a major forest fire.²⁷

Despite inconclusive results, the Forest Service report for the 1919 air patrol season recommended expansion of the program. A long list of proposals for 1920 was attached to the report, including the following: at least eighteen aircraft, a photo reconnaissance group, wireless telephone or telegraph on each aircraft, more ground radio stations and some portable stations for use on large fires, hangars to shelter aircraft, more emergency landing fields, better maps, and painted identification of major landmarks such as lookouts. The Army Air Service was expected to supply most of this long list. Indeed, one gets the feeling that the Forest Service had found a prize cow and was milking it to the limit. Apparently, Supervisors R. W. Ayres and J. O. Wulff thought so too. In a letter to DuBois on June 1, 1919, they suggested the Army Air Service was "making the Forest Service look like a piker," and that "[w]e had better get busy and give the subject the attention it deserves."²⁸

One of the biggest problems for the air patrol was the lack of good maps. District 5 was responsible for this phase of the program. For one reason or another the maps were not satisfactory until after the 1920 program began. The air patrol observers were all Army Air Service men, but few had received training at the Air Service Observation School at Ft. Sill, Oklahoma. The combination of inadequate maps and untrained observers who were not familiar with the country made inconclusive results understandable. However, in the final analysis, it was the enthusiasm and cooperative spirit of the Air Service men that made the first year a success. Major Arnold was the sparkplug, but he had full support from base commanders, pilots and ground crews. On its part, the Air Service was pleased with the wide publicity given the air patrol and the opportunity to train pilots and observers in action closely resembling combat.

After the 1919 season, the program was analyzed, planned and systematized. By April of 1920, a *Manual of Instructions for Airplane Forest Patrol Units* had been issued. The result of experience, training and written instructions was better performance, more realistic assessment of costs and benefits and a gradual loss of the glamour and excitement that surrounded the first year of operation.

The first sign of the changing order was a school for pilots, observers, radiomen and Forest Service liaison personnel. The school was held at March Field in February 1920 and covered fundamentals of flying, the use of radio and maps and the basics of fire suppression. Only ten men from District 5 were selected to attend. One of them was Roy Boothe, ranger on the Sierra Forest.²⁹ Boothe was designated liaison officer and flew with pilots out of Fresno airfield to make them familiar with landmarks on the patrol routes. He found the radio telegraph unreliable and learned to drop messages with fair accuracy.

The euphoria of the 1919 air patrol wore thin in 1920, and signs of friction between the two agencies appeared. The purpose of the patrol was to observe and report, but most of the observers were enlisted men without special training in either activity. Observing can be pretty dull work when done on a regular basis, and some of the observers made plain their preference by stating, "We joined the Army to learn to fly." Sloppy work and lack of first reports on fires caused supervisors and rangers to doubt the worth of the air patrol. Liaison officer H. F. Wilcox, on duty at Mather Field, was disgusted with some observers. He reported that they threw

away fire reports rather than fill them out and then claimed the wind blew them from the cockpit. After flying every day through the summer of 1920, most pilots and observers were exhausted. The two air patrol squadrons were accounting for more than a third of the flying time of the entire Air Service and its twenty-seven squadrons. Continual flying at altitudes over 8,000 feet contributed to fatigue. In addition, postwar reductions in budget and personnel caused rapid turnover and considerable anxiety for Air Service men. It may have seemed to them that they were doing the work, while the Forest Service was doing the complaining.³⁰

Predictably, there were more accidents in 1920. There were thirty-six forced landings, and at one time seven damaged aircraft littered the airfield at Alturas. It was near this same field that the 1920 season's only fatalities occurred on July 10, 1920. A DH4 with three Air Service men aboard left Alturas and climbed to 500 feet altitude when the engine failed. The aircraft plunged to the ground, bursting into flames upon impact and killing all three men aboard.³¹

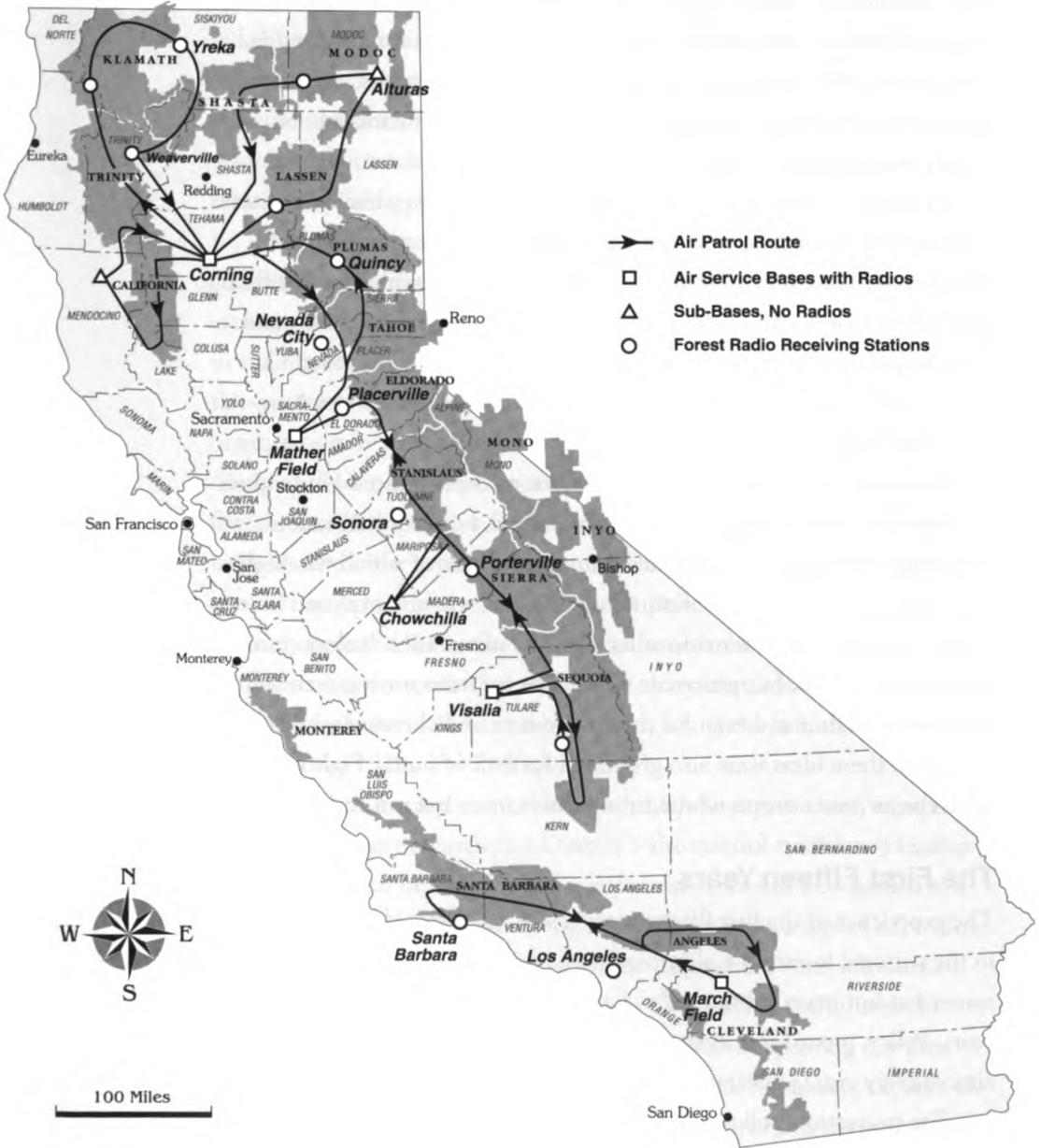
The report of the 1920 season showed improvement in "first" sightings of fires, but communications remained a problem. Among forest officers a conviction was growing that a regular air patrol had as many problems as it offered solutions. On the other hand, reconnaissance of going fires was again an unqualified success. On the Palm Canyon Fire (Cleveland National Forest) Supervisor Stephen A. "Gus" Nash-Boulden flew over the fire, making observations that changed the whole strategy of the fire fight. Reconnaissance flights were also used on large fires burning in the Klamath, Shasta, Sierra, and Trinity forests. The Plumas used air patrols immediately after a lightning storm to spot fires successfully.

In the Lassen Forest, the Mill Creek Fire burned 12,000 acres in rugged terrain. A radio operator and radio station were sent to fire camp, where they relayed reports from a scout plane each day. The plane even patrolled one section of rugged fireline each day until the fire was controlled. Airplanes were also first used in 1920 to transport supervisory personnel or "overhead" from one forest to another. In August Deputy Forest Supervisor Joe Elliott and another man were flown from Sonora to help fight lightning fires in the Lassen National Forest. They returned a few days later when a large fire broke out in the Stanislaus Forest.³² It was in 1920 that some of the modern uses of aircraft in fire control were first attempted.

Plans were made to continue the air patrol in 1921 despite rumblings from Congress, which was drawing its purse strings tighter. The 1920 patrol had been possible only because of a special \$60,000 appropriation passed principally through the efforts of E. T. Allen of the Western Forestry and Conservation Association and Senator Charles L. McNary of Oregon. The struggle for funds in 1921 was more difficult. Air patrol supporters enlisted Senator McNary again, and the California Board of Forestry also helped. Influence was needed because the Army was in an increasing bind for manpower and money. The Air Service was reduced from 18,000 men to 11,500, and money for supplies was tight. Nevertheless, the Army agreed to provide three squadrons for the 1921 air patrol on the West Coast.³³

The 1921 season showed improvement over the preceding year. A shortage of funds for gasoline purchase delayed the start of regular patrols, but the season was completed in routine fashion. All aircraft were equipped with wireless transmitters (SOR 67 and SOR 68 radios), and District 5 maintained receiving stations at all forest headquarters. These stations were manned mostly by young radio enthusiasts hired by the Forest Service for the season. Observation continued to be performed by Air Service men except for flights after lightning storms and large-fire reconnaissance, when Forest Service observers took over. An interesting addition to the 1921 program was the "nerve" camp at Gold Lake, Sierra County. Exhausted airmen were sent there under orders to hunt, fish, camp and read—no women or drinks allowed. Even "shop talk" was banned. At the end of their stay, their "nerves" recovered, the airmen returned to duty.³⁴

A request for comments on the air patrol was made of supervisors by the district forester on October 5, 1921. Almost to a man, they replied that the air patrol was not worth the cost from strictly a fire detection standpoint. Supervisor Wulff of the Stanislaus National Forest wrote that he would trade his share of the air patrol for an extra forest guard. However, Wulff and other supervisors also praised the airplane as unmatched for special reconnaissance after lightning storms, to check doubtful fire locations, for fire detection on hazy or smoky days and for large fire scouting. The use of aircraft for transporting overhead to and from large fires was also commended. All supervisors agreed that the value of the air patrol for fire prevention was high. In total, their attitude was: If the air patrol was continued at no cost, okay; otherwise, forget it!³⁵



Map 4. Air Patrol routes season 1921

The Army Air Service reached a similar conclusion but for different reasons. Major Arnold transferred to Washington, D.C. and his replacement, Colonel Gilmore, was not impressed with the results of the 1921 season. When attempts to get another special Congressional appropriation for air patrol failed, the program was doomed. The great air patrol experiment was over. It had promised much and delivered much, but not exactly what had been expected.

The Air Service had received widespread favorable publicity. Officers and men had gained valuable experience in flying over mountainous terrain, in landing on all kinds of airfields and in observing under difficult conditions. Communications equipment was given a rigorous test, and organizing and supplying the air patrol was good practice for men like Major Arnold and Major Carl Spatz, who became leaders of the Army Air Corps during World War II.

Airplanes were shown to be valuable for reconnaissance of individual fires and for transporting supervisory personnel, but they had serious limitations in everyday aerial detection, not the least of which was high cost. The use of U.S. Navy blimps and dirigibles was also explored in 1921. No actual use was made other than the observation balloon raised at Arcadia in 1919, but proposals were made for transporting men and equipment to fires and even for dropping water and chemicals. Like the air patrol, these ideas were also grounded for lack of funds. Fighting fire from the air was a dream whose time would come, but not in 1921.³⁶

The First Fifteen Years

The experience of the first fifteen years (1905-1920) molded fire control in the national forests of California into a basic form that would be altered somewhat but never substantially changed over the following thirty-five years. Policy, procedures, even the use of equipment were improved on almost every year. Appearances changed, but the basic form remained.

Fire protection policy developed around the theme of fire control, not fire exclusion. During the peak of the light burning controversy the Forest Service required piling and burning of slash in its timber sales, and DuBois defined fire protection standards in terms of allowable acreage burned. The Forest Service leadership knew that it was impossible to exclude fire, that fire was a useful tool. Moreover, in the real world of establishing control over the national forests and living within

Congressional budgets, fire control was the only option they could select. Indeed, District 5 gave a four-year trial to an explicitly flexible fire suppression policy aimed at reducing costs and damages, only to see it fail. The light burning controversy was valuable because it made District 5 seriously consider the use of fire as a hazard reduction tool. The controversy also helped confirm the national leadership of the Forest Service in unqualified opposition to the use of light burning, a position that later created problems, especially in the South.

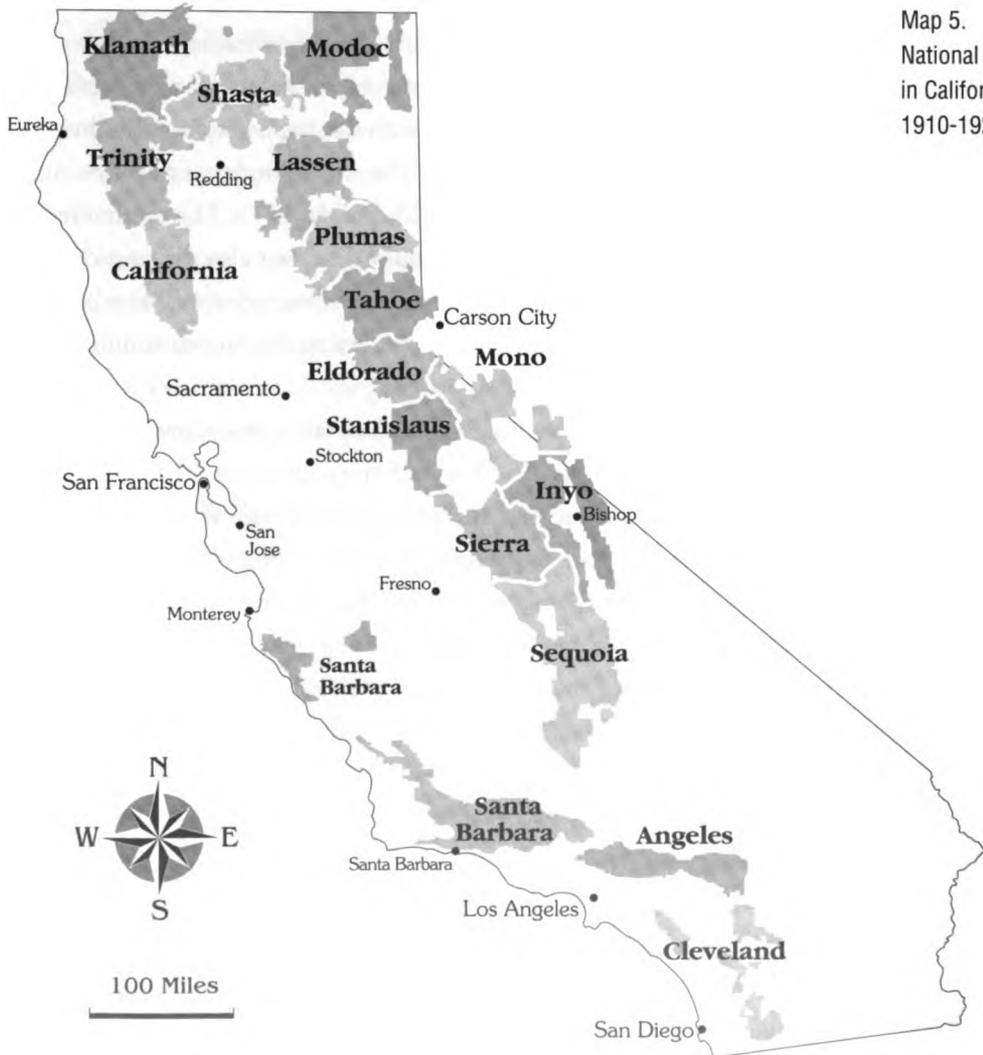
DuBois's manual and Headley's handbook were landmarks in the codification of fire control in the California national forests. Some of their assumptions and procedures were dropped, but the nucleus still remained in the fire control handbooks forty years later. The fire control organization metamorphosed into more elaborate forms, but the basic small-fire organization in 1955 was the same as described by Headley in 1916. Many of the modern aspects of fire control had their roots in those first fifteen years. Cooperative fire control with the state, counties, lumber industry and other groups was begun. The development of new fire control equipment was stimulated by DuBois in 1911. The results were not only new and better fire control equipment, but also the start of a tradition of experimentation that led to many later advances. Fire control research was born in 1912 and prospered, laying the foundation for great strides in the 1920s and 1930s.

Perhaps more important than all of the policy, procedure, equipment and research was the birth of a District 5 fire control tradition. Headley was correct when he urged that fire suppression should be regarded as a job, but who among veteran firefighters did not feel a surge of adrenaline, an instinctive lift of excitement when the dispatcher's voice announced a "smoke" and sent him on initial attack? What made firefighters like Mal McLeod, Henry Erhart and Bill Mendenhall keep going day after day, week after week— exhausted, thirsty, injured, but always capable of one more swing of the shovel? The frequency of fires and the scarcity of manpower meant that everyone in the California District was involved in fire suppression. It may not have been a "war," as DuBois suggested it should be, but forest fire suppression was close to combat in its demands on the ability to think and act quickly, on leadership and on courage.

The development of camaraderie and close personal relationships is a well-known outgrowth of most combat experience. So it was with fire

suppression in the California national forests between 1905 and 1924. Men lived and worked together under difficult, often dangerous conditions, but they operated as a team. They aimed at a short-term objective that they and the general public thought was good. When they attained it, they felt good, they felt close to each other, and thus fire suppression became and remained the most important unifying force for the men and women of District 5. This feeling grew stronger over the years and was commented on by people from other districts and the Washington office.

On the whole, it was this esprit de corps, this feeling of being the best, that might have been the most important factor responsible for fire control accomplishments and the growing strength of fire control in the national forests of California.



Map 5.
National Forests
in California
1910-1920

Every great war in American history has been followed by profound changes in the social and economic life of the nation. World War I resulted in such changes. After it, the United States was in a unique position among the great nations of the world. The country had vastly increased its productive capacity to supply the Allied war effort, yet had not suffered the devastation of war felt by mainland Europe. Of all the great powers, the United States alone was able to enter the twenties with its strength undiminished.

The twenties were an era of business expansion, when conservative Republican administrations cleared the way for businessmen to practice their art with minimum interference. A wave of prosperity was built on mass production of affordable automobiles, the rapid rise of chain stores, the spread of installment buying, real estate sales and building construction, the expansion of public utilities and the growth of the stock market.¹ It was the automobile, however, that best characterized the twenties. The growth of the automobile and related industries was so great and pervasive that some historians characterized the twenties as the "Age of Ford" or "the Rise of the Automobile." Undoubtedly the automobile led the way, but there was a general surge of prosperity that brought higher wages to most employees and greater profits to most businessmen. There were exceptions; most farmers and some industries suffered from low prices or changing technology.²

California was the *ne plus ultra* of the automobile age. It rode the crest of the twenties wave with phenomenal growth in population: a 65.7% increase in the decade to a total of 5.6 million people in 1930.³ This massive increase came from a complex set of factors both in and out of the state. Foremost among them was climate. Amateur boosterism was turned into the selling of southern California by the founding of the San Diego, California Club in 1919 and the All-Year Club of Southern California in 1921. These professional booster groups were joined by the Automobile Club of Southern California, the Southern Pacific Railroad, and chambers of commerce and realtors. They produced a barrage of propaganda urging people to play and stay in southern California.⁴ Added to these promotions was the more subtle effect of the growing cinema industry.

World War I virtually eliminated foreign movie competition and, as a result, Hollywood prospered. By 1923 film-making accounted for 20 percent of the value of manufactured products in California. Weekly atten-

dance at movies increased nationwide from forty million in 1922 to ninety million in 1930. Moviegoers saw California portrayed as a dream world; many of them longed to travel to this mythical land of milk and honey.⁵

Their longings were transformed into reality by the amazing advance of the automobile. Sheer production was not the whole story, even though it nearly tripled between 1919 and 1929. The swift change from "open autos" with wood and canvas tops to "closed autos" with steel upper bodies made long trips more feasible. Auto prices were within reach for many Americans; the Ford Model T sedan sold for \$595 in 1922 and the Chevrolet four-door "closed" sedan sold for \$860 in 1923. Installment buying made autos available to those without the cash price. One result of the availability of autos and the selling of southern California was a flood of more than 1.8 million new residents to California during the twenties.⁶

Although most of California grew in population during that decade, the center of growth was southern California, whose eight counties grew by 118% in those ten years to a total of nearly three million people, which was 70 percent of the state's population growth. Feeding off the rush of new residents, the real estate boom of the twenties began in 1920, when \$60 million worth of building permits were issued in Los Angeles County. By 1923 the value of permits had risen to \$200 million. The next year, the Los Angeles Planning Department was approving up to forty new subdivisions each week.⁷ The boom peaked in 1924-1925, after which sales leveled off. While many subdivisions were never built until the World War II boom, the real estate boom of the twenties resulted in a great expansion of cities and towns in southern California.

Initially, the boom spread along the tracks of the Pacific Electric and Los Angeles Electric Railways. These fine transit systems provided fast and reliable service between towns and cities and even to the mountains and beaches. But it was not enough. Southern Californians wanted the freedom to live and travel when and where they chose. By 1920 buses and autos provided serious competition to the transit systems. Besides, gasoline was plentiful and cheap. Southern Californians and the automobile seemed made for each other. Per capita ownership of autos in the United States in 1929 was one per seven people; in California it was one per four people; in Los Angeles it was one per two and a quarter people.⁸

The explosive growth of the oil industry was an important factor

in the changing southern California scene. New fields at Signal Hill, Santa Fe Springs, Huntington Beach and in the San Joaquin Valley made California the top oil producer in the world during the twenties. The concentration of automobiles in California led to rapid expansion of paved highways and the now familiar automobile-oriented economy. Gasoline stations, auto courts, roadside cafes, garages and auto supply stores appeared in increasing numbers.⁹

In the twenties, increased use of national forest resources, especially water and timber, increased outdoor recreation activity and invasion of new housing into dangerous fuel types, had a substantial effect on the state's national forests, especially in southern California. These changes made life more difficult for fire control organizations. Increased logging in public forests meant increased fire hazard from logging slash. Development of hydroelectric power and water supplies often resulted in forest fires from reservoir or power line clearing operations. The spread of autos and highways led to increased roadside fires, and greater numbers of outdoor recreationists increased the risk of fires caused by careless visitors. In southern California, construction of subdivisions on or near brushy slopes resulted in loss of homes during critical fire conditions, a new problem for forest firefighters. The twenties required new knowledge, better organization and more sophistication in forest fire control in order to meet the challenges of a rapidly changing society. New men with new ideas were needed.

The Changing of the Guard

The new men and new ideas arrived with the opening of the twenties, a period that gave rise to remarkable Forest Service leadership both in Washington and San Francisco. The renewal began with Chief Forester Henry S. Graves, who had endured the backlash of Pinchot's dismissal, an often hostile Congress, indifferent administrations and a world war. After ten stressful years he was tired and not well. Despite his condition Graves wanted to be sure that his replacement would respond to changing conditions. He found the man he sought in William B. Greeley, who became chief forester in April 1920.¹⁰

Greeley was born in 1879 and graduated from the University of California at Berkeley in 1901. He received a master's degree in forestry from Yale University in 1904, promptly joined the U.S. Bureau of

Forestry, and was sent to California as a roving timber inspector in 1905. He met many lumbermen in his travels and developed an understanding of them and their problems. These relationships helped shape his forestry philosophy and ultimately the future of the Forest Service, for Greeley was clearly marked for better things. By 1906 he was supervisor of the Sierra South Forest Reserve (Sequoia National Forest). Greeley was energetic and pushed the construction of trails, buildings and telephone lines. Despite his timber management background, he was firmly convinced that fire control was first priority in forestry.¹¹

Good men moved fast in those days, so in 1908 Greeley became the first district forester of District 1 (Montana and northern Idaho). His belief in the priority of controlling fire was fully justified when three million acres burned during the great Idaho fires of August 1910. His efforts to stop the great fires led to his promotion to assistant chief in charge of silviculture (timber management) in the fall of 1910. Few men have had such a rapid rise in the Forest Service: from junior assistant in 1904 to assistant chief in 1910 at the age of thirty-one. Greeley was intelligent, a quick learner and assertive, if not aggressive. He soon became a powerful force within the chief forester's staff. He successfully met several challenges in his timber management job and in supervising lumber production in France during World War I.¹²

Greeley's accession as chief in 1920 signaled major changes in the direction of Forest Service policy. In his field and Washington office experience, he had become convinced that the future of forestry lay in cooperation between the lumber industry and the Forest Service. His experience, with foresters and lumbermen in the Tenth and Twentieth Regiments in France further confirmed these beliefs. A second, and equally important, belief was that fire control was essential to forestry. He made this clear soon after his appointment as chief, in a talk to the California State Board of Forestry on July 20, 1920. His proposal for a four-point state forestry program began



William B. Greeley, Chief Forester 1920-1928, had a District 5 background, was a strong supporter of fire protection and initiated state and private forestry in the Forest Service.

with control of forest fires. In the same talk, he also emphasized the need for cooperative effort between federal, state and private forces in fighting forest fires.¹³

He told a group of foresters, lumbermen and representatives of forest protective associations in 1920 that the first point of an eight-point forestry program must be "on fire prevention, as the most important single step."¹⁴ In 1923 he told Senator Charles L. McNary the first priority was "Stop the fires."¹⁵ Improving cooperation in forestry between the federal, state and private sectors, and control of forest fires were the major themes of Greeley's administration. While he was Chief, Greeley made the decisions on fire protection, but he relied on Roy Headley, his assistant chief for operation, to carry out the fire control mission. The operation job included fire control, budgeting, personnel and other activities.

Headley transferred to Washington from San Francisco in December 1919 and took along his ideas of efficiency, economy and the view that firefighting was a job, not a contest. His handbook, *Fire Suppression*, issued in 1916, was an important step in codifying fire control policy and methods. Headley wrote other papers on fire control policy and administration and maintained an intense interest in fire control despite many other duties. He had strong opinions and was quick to spot weak arguments or inadequate reporting. The decade of the twenties was a period of slow budgetary growth for the Forest Service. Perhaps it was fortunate that Headley was on hand to keep a tight rein on fire control expenditures, but District 5 was restive under his financial rules.

Headley remained at his post for more than twenty years, through the administration of several chief foresters, giving stability and continuity to the fire control function for most of that tenure. He was especially interested in the technology of fire control and encouraged development of lightweight radios, the bulldozer and other mechanical aids. However, Headley's insistence on economy and efficiency at times grated on other fire control leaders, who saw them as barriers to risk taking. His experience in District 5 gave him enough knowledge of California fire conditions to serve as a devil's advocate when new proposals were advanced from that district.¹⁶ Headley's long tenure could have been crucial in resolving into a national policy the different fire control ideologies that arose in Districts 1, 5, 6 and 8. Whether it helped or hindered is open to debate.

While Greeley and Headley were directing national fire control policy, changes were also taking place in California. Coert DuBois left the Forest Service in November 1919 to begin a new career in the U.S. Consular Service. His replacement was Paul G. Redington, who last appeared in this history as supervisor of the Sierra National Forest. Redington served five years as supervisor and was then promoted to district forester of District 3 (Arizona and New Mexico) in 1916.

Redington was a vigorous administrator who believed in closely following the regulations. While supervisor, he emphasized fire control but was involved in timber management, grazing and water power development. He started the employee newsletter, *The Sierra Ranger*, and worked hard to improve relations with the public. Redington was rather austere and it took some time before his rangers were comfortable enough to call him "P.G." or "Red." He had a passion for the Sierra backcountry and loved fly fishing. His writings and accounts of him by associates describe a nervous, very intense man who was subject to the stresses of his job.¹⁷ His selection as district forester was amply justified by his service in District 5 and his experience as district forester in District 3. Redington was on the job only a month when Roy Headley, his assistant for operation, was transferred to Washington. Don Johnson filled in for several months but was replaced by Robert L. Deering from District 3 in 1920. He was the first of a new team brought in by Redington.

The operations assistant was the executive officer of the district. He controlled budgets, personnel and fire control and was the voice of District 5 in the absence of the district forester. District 5 was fortunate in the selection of Deering as number two man in the district. Deering became a rock upon whom all could rely. This did not mean that everyone agreed with him, but all respected him and his opinions. Like most strong men, Deering had strong opinions and was not loathe to express them. He was born in Minnesota in 1887 and attended the University of Minnesota, where he earned the first master's degree in forestry granted there in 1910. He began his Forest Service career in the Datil National Forest in New Mexico soon after graduation. After other assignments in New Mexico, he was transferred to the District 3 office in Albuquerque and was there when war broke out in 1917. After service in the Tenth Engineers he returned to the Prescott National Forest in Arizona in 1919 and was posted to San Francisco in 1920.¹⁸

Deering gave fire control in District 5 a long period of continuity, much like his counterpart in Washington, Roy Headley. Deering served until 1948 and except for the years 1930 to 1936, when fire control was a separate staff group, exercised general supervision over fire control in District 5. He was a hard worker, positive, optimistic and an able administrator. In later years he described his philosophy by saying, "I believe in getting things done and in finishing up a job."¹⁹

Within two years, Redington recruited several other men to assist Deering, and all of them would influence District 5 fire control. Edward I. Kotok, supervisor of the Eldorado National Forest, was selected to head fire control and cooperative relations with the state. Kotok was a close associate of S. B. Show and within a few years would go on to greater responsibilities. Paul P. Pitchlynn was another new face in San Francisco. He too, was brought from District 3, where he had been a ranger and forest supervisor. Pitchlynn's first responsibility was as general inspector for District 5. His thorough inspections disclosed some common failings among California national forests: low morale, poor recruiting practices, lack of training and sloppy management practices. His job also included personnel management. This task soon became predominant and later included management improvement.

"Pitch" became noted for development of the Feather River Ranger School and other training programs for fire control personnel, but he was not popular with some supervisors, possibly because he was a tough inspector and personnel manager. Deering's third new assistant was Wallace I. Hutchinson, who moved from the Washington office in 1922 to take charge of public relations. "Hutch" was experienced and energetic. His presence was needed for Redington did not get on well with the press. Hutchinson's biggest job was preventing forest fires. He readily made friends with the press and adopted the methods of some of his friends in advertising. His predecessor, R. F. Hammatt, had made a good start, which "Hutch" expanded upon and improved.²⁰

One other change took place in the San Francisco office that may have been the most important of all. Stuart Bevier Show was named to head a separate staff in charge of research. Show's collaboration with Kotok in fire control research studies became the cornerstone of national fire control policy for the twenties and thirties. Show became the most influential individual in fire control over the following twenty years, and

these men were the glue that stuck the District 5 fire control program together during that time. As the years went by, each of Deering's assistants became independent in their specialties, but the old ties remained. Redington, Show and Deering and his crew forged a fire control tradition in District 5 that became a solid foundation for future developments in the art and science of fighting forest fires.

In 1922 these men, in Washington and San Francisco, were young, full of energy and ideas, and ready to change the old order. Greeley led the way. He was concerned about the uneven progress of fire control in the agency. Some districts were forging ahead in communications, others in law enforcement, while still others concentrated on small fire suppression. There were no service-wide fire control standards and the coordination between districts was inadequate. Greeley determined to remedy this situation and called for a conference of fire control experts from all districts to meet at Mather Field, near Sacramento, on November 14-27, 1921.

The Mather Field Conference

It was significant that the California District was selected to host the first national conference on fire control. The district had taken some of the most important steps in the development of fire control theory and practice. However, District 5 also displayed many of the problems that were evident on a national scale. Fire control policy had vacillated from aggressive attack to "let burn" and back to aggressive attack. So-called "fire exclusion" was still controversial, and the Forest Service had yet to convince light burning proponents of its merits. The State of California was slow to assume responsibility for forest fires on private land, and there had been limited success in stopping large fires in the California national forests.

Chief Forester William B. Greeley had already taken steps to emphasize fire control in February 1921. He directed assignment of protective assistants to district rangers with severe fire control problems, and authorized centralized dispatching for forests with a heavy fire workload. In July 1921 he asked forest officers to voluntarily stop smoking in the woods except in safe places, to provide an example to tourists and forest users.²¹

The fire control meeting was the first national conference of the Forest Service on any subject, and Greeley's attendance provided a sense of high priority to the proceedings. The conference met at Mather Field,

an Army Air Service base near Sacramento, California. A photograph of the group included forty-five men, most of whom were included on seven committees of six or seven men each. In most cases, the committees had representatives from each of the seven Forest Service districts.²²

It was a mixed group, consisting of six district foresters and six forest supervisors, including M. A. Benedict of the Sierra National Forest; four rangers, including Henry Kloppenburg of the Plumas National Forest; a variety of district office and Washington office people, and even a forest clerk. Other District 5 men in attendance were, S. B. Show, E. I. Kotok, R. L. Deering, R. H. Charlton and Paul P. Pitchlynn. District 5 men were prominent on every committee and chaired two of the committees. Many of the most noted men in the fire control field were present including Greeley, Show, Kotok, W. B. Osborne Jr., Headley and Evan Kelley of the Washington office. All but Osborne had experience in the California District.²³

Conference members wrote ninety-five original papers on various subjects in preparation for the meeting. The agenda included sixty-eight topics that could be roughly grouped into eight major areas: administration, personnel, fire planning, fire detection, fire prevention, fire readiness, fire suppression and fire research. Discussion covered such prosaic items as the type of beds supplied in guard stations, and such broad policies as the role of the district forester in fire control.²⁴

The most important results of the conference were to establish the priority of forest fire control over other activities, set national forest fire control standards and provide for cooperation in forest fire control between districts. Several major thrusts emerged. The need for more and better forest fire research was supported by new national standards for fire reporting, fire atlases and fire terminology. This reflected Show's strong belief that fire research had to be based on experience. Fire control planning was emphasized, and the roles and responsibilities of forest officers from district forester to forest guard were discussed at length. Accountability for results was a strong theme, with "elapsed time" as an important means of measuring unit and individual accomplishment in fire control. Elapsed time was the time from the fire started to the moment work began on the fire. Fire prevention received a strong endorsement as a separate method to control forest fires. A vigorous attempt was made to standardize fire tools and their use within each district.²⁵

The committees consolidated some of the topics and submitted fifty-seven recommendations. Each committee report was reviewed personally by Greeley and approved or rejected, usually with a pungent comment or two. For instance, he suggested, "The difficulties of night travel should be judged from the standpoint of a woodsman not from the standpoint of what President Roosevelt would have called a 'mollycoddle'." Commenting on an outline of written instructions for forest guards he wrote, "keep the issue clear. Fire control is his big job."²⁶

The Mather Field Conference was a milestone in national forest fire control history. It produced written policy and standards and brought together the leaders of forest fire control, set the stage for exchange of ideas and methods and established new friendships and cemented old ones. It could be said that forest fire control as a profession was born at Mather Field in November 1921.

Even though the conference was a turning point in national forest fire control history, it probably had less direct effect on District 5 than on other districts because most of the recommendations were already supposed to be standard practice in the California national forests. Standards were not always being met, however. A critical inspection of the Klamath Forest in the summer of 1920 by Pitchlynn indicated that not all forests were meeting district fire control standards.²⁷ Despite the fact that many of the Mather Field recommendations were not new, there were important indirect benefits to District 5 from the conference. It was generally accepted that District 5 would be the site of fire control research. Perhaps the most important benefit was the recognition of District 5 preeminence in the field of forest fire control. This is not to say that the California District led in all aspects of forest fire control; other districts, especially the Northwest (District 6) and the Northern (District 1) were leaders in small-fire suppression, communications and other fields.

Although District 5 was a leader in forest fire control, there existed basic differences between the Washington office led by Roy Headley, who still held to his "economic" theory, and the district, whose viewpoint depended heavily on DuBois's and Show's work. Added to the differing philosophy was the natural suspicion that often exists between levels of a decentralized organization. District 5 sometimes resented advice or direction from Washington about situations they knew more about, and Washington sometimes felt District 5 was too big for its britches.

Aggressive leadership in District 5 forest fire control was sometimes met by unyielding direction from Washington. This relationship ebbed and flowed with changes in personnel but remained as an irritant for many years. While there were misunderstandings and lost opportunities due to this tension there were also gains that came from competition and conflict.

The Southern California Difference

When the year 1920 opened in southern California it brought with it an atmosphere of anticipation of great things to come. Tourists and immigrants were flocking to the area, land was selling, oil was flowing, the sun was shining, and there was money to be made. The spreading rural expanses of the Los Angeles and San Bernardino basins awaited an eager population. Forgotten were the clouds of smoke that blanketed the land from the great forest fires of 1919. To the south, San Diego's population swelled by 60 percent between 1920 and 1923. Bypassed by the transcontinental railroads, San Diego determined to become the center of aviation on the West Coast.²⁸

Meanwhile, north of Los Angeles, the coastal strip was also developing. The pace was less frenetic than elsewhere in southern California because land for development was at a premium. Only a narrow belt of level and gently sloping land separated the Pacific Ocean from the steeply rising Santa Ynez Mountains. Although many California cities from Venice to Orland claimed to be the capital of the Riviera of the West, the prize in that contest clearly belonged to Santa Barbara. The blue ocean, white surf and green mountainsides blending into the purple of far-away peaks seemed to be a dreamland. And so it was, until the heat waves moved in or the Santa Ana winds began to blow.

The greatest unbroken expanses of chaparral in California grew in the coast ranges from Ventura north to Monterey. Millions of acres of rugged terrain were roadless. The men of the Santa Barbara National Forest labored to build trails into wild country with romantic sounding names such as the Sespe, the Madulce, the Matilija, the Piru, the Refugio, the La Pancha and the Ventana, areas so vast and remote that each was a world in itself. All were to become storied in the history of fire control in California. This was a land whose periodic rejuvenation was by fire, fire on a scale and frequency probably unmatched by any area of its size in the United States.²⁹

The terrain, vegetative fuels, difficulty of access and climatic effects resulted in large fires in the Santa Barbara National Forest. Fires over 1,000 acres were almost common. During the twenties the forest averaged nearly seven fires over 1,000 acres each year. But it was the great fires that swept whole mountain ranges and large stream drainages that made the Santa Barbara dreaded among firefighters. This reputation for conflagrations probably began in 1917, when on June 15 the Carpenteria and Matilija-Wheeler Springs fires broke out on the same day. The Carpenteria Fire burned 20,000 acres, while the Matilija-Wheeler Springs Fire blackened 28,420 acres and destroyed most of the town of Ojai.³⁰ Of the latter fire, veteran ranger J. D. Reyes wrote, "With 200 men we worked like demons for five days and five nights before we got the best of that blaze."³¹ Perhaps the old ranger was referring to his division of the fire, for a fire of that size would take many more firefighters and much more time to control under today's conditions. Yet old fire records show that, time and again, a small force of men was able to control a large fire by stubbornly hanging on to its flanks until the weather changed.

The decade of the twenties in the Santa Barbara country began with the easiest fire season in years. Only 1,488 acres of national forest land burned in 1920. Then 1921 initiated a series of years that resulted in one fire disaster after another. The Creston Fire burned 69,720 acres in the San Luis Obispo Division. While the largest of the 1921 season, it was not the most difficult, according to Ranger Reyes. He recalled spending thirty-five consecutive days fighting fire on the Big Pine and Branch Canyon Fires, which burned, in total, "only" 13,480 acres.

The twenties were, in fact, a trial by fire for the men and women of the Santa Barbara Forest. During the first four years of the decade, a staggering 47 percent of all the national forest land burned in California was burned on the Santa Barbara; this amounted to 247,653 acres and did not count many thousands of acres of private land burned by the same fires. For the decade 437,061 acres burned in the forest, which was 25 percent of the total for District 5.³²

In 1922 it was the Monterey Division's turn to host the conflagrations, when on September 11th the Sycamore Fire started and ultimately burned 26,560 acres. The Kelly Canyon Fire followed just three days later and swept over 59,600 acres. Ranger Reyes spent thirty-one consecutive days fighting this fire. Then in 1923 the Sweetwater Canyon Fire began

on August 2nd and in three weeks burned 27,000 acres. One of the largest fires of the decade started September 1st that year. The Oso Canyon Fire was located east of Goleta and over the main ridge of the Santa Ynez Mountains near Los Prietos. It was a problem from the first. Eight men attacked the fire within ten minutes of its start, but strong winds and low humidity soon spread the fire out of control. The Oso Canyon Fire destroyed timber, brush and grass on 70,000 acres and was fought by men from all over District 5. Roy Boothe was one of these men.³³

Boothe, then assistant supervisor of the Sierra National Forest, reported for fire duty to the Santa Barbara office. Forest Supervisor Chester E. Jordan and Ed Kotok of the district office assigned Boothe a crew of thirty men picked up from the streets and saloons of Santa Barbara. They were sent to a fire camp in Santa Cruz Canyon. Boothe and his crew spent the next nineteen days alternately cold-trailing the fire and running from it as erratic winds drove the fire in several different directions. The winds were so strong one night that Boothe had to place large rocks on the corners of his quilt (his camp bed was one quilt) to prevent the wind from blowing it away. Before the fire was over, Boothe and his crew had been in seven different fire camps. On one occasion, he reported to Supervisor Jordan that the fire, that had been burning to the east of fire camp, was now burning to the west of camp. Jordan accused Boothe of being "fire drunk" and seeing fire where it wasn't, but after looking for himself, Jordan reluctantly agreed they had a whole new fire to fight. When Boothe was finally released from the fire he was physically spent, the new denims he had bought when he arrived at the fire were in rags, and he had been without a bath or shave for three weeks. He looked so disreputable that he hesitated to enter his hotel to retrieve his uniform.³⁴

The Oso Canyon Fire made a deep impression on Boothe. He remembered a phenomenon that others have commented on, "the excitement...of a fire spreading rapidly through the brush or timber country seems to have the effect of exciting men to do superhuman things, and... to continue to work for long periods without rest or food and...even [with] insufficient water. They hate to give up and acknowledge defeat."³⁵

Forest Supervisor Chester E. Jordan of the Santa Barbara National Forest was such a man. During his tenure from 1922 to 1925 he may have literally worn himself out fighting forest fires. Jordan was a big man, and strong, but in his brief tenure 114 fires burned more than 270,000

acres of the Santa Barbara Forest, and they must have exacted a toll from him. Some of his friends believed Jordan's death in 1936 was due to overwork on forest fires.³⁶

While the Santa Barbara went through a continuing ordeal by fire from 1920 through 1923, the Cleveland and Angeles National Forests experienced relatively easy fire seasons. The Angeles was a very large forest created in 1908 when the San Gabriel and San Bernardino National Forests were combined. Despite its size, the Angeles experienced only a few fires more than 1,000 acres and just one large fire in the early twenties. This was the Helluva Fire in fire-prone Waterman Canyon in the San Bernardino Mountains. The Helluva Fire started October 21, 1922, and burned 18,550 acres. This fire alarmed the members of the water districts and watershed associations in the Los Angeles-San Bernardino basins. Even smaller fires could be serious if they denuded watersheds above towns, orchards or other crops. Rapidly expanding real estate developments were often populated by newcomers to southern California who had little appreciation of the dangers of forest fire and subsequent flooding.³⁷

The Tri-Counties Reforestation Committee, the Water Conservation Association of Riverside, the Angeles Protective Association of Pasadena and the Los Angeles County Farm Bureau were among the most prominent organizations concerned about the threat of forest fires in the mountains of southern California. The tradition of involvement by local interest groups in the affairs of the Angeles National Forest went back to the establishment of the forest in 1892. However, one element that was present in the 1890s was lacking in the 1920s: strong leadership. Each organization made its own way, with little coordination with the others except that provided by the Angeles Forest and Los Angeles County Forester S. J. Flintham.

The weather was enough to worry government officials and private citizens alike. January 1923 was warm and dry, as were February and March. Only April rains interrupted a long procession of dry, hot and windy weather right through the end of the year. In Los Angeles, 1923 was the driest year since 1898. R. H. Charlton remembered 1910 and 1919. He knew the Angeles was headed for disaster unless extra measures were taken to alert the public and to prepare for the inevitable forest fires. The first step was for District Forester P. G. Redington to call a fire protection conference in Los Angeles on October 30, 1923.³⁸

Included in the conference were the above-named organizations, the supervisors of the Angeles, Cleveland and Santa Barbara National Forests, Los Angeles County Forester S. J. Flintham, State Forester M. B. Pratt, Los Angeles City Fire Chief Ralph Scott, Francis Cuttle (soon to be a member of the State Board of Forestry), several county farm agents, and representatives from chambers of commerce, watershed associations and conservation groups. Redington opened the meeting with a statement that fire protection on all ownerships was the problem and cooperation was the means toward the solution. He noted the high values at stake in agriculture and water conservation and said that the southern California mountains attracted some of the most intensive outdoor recreation use in the nation. Redington emphasized that a only few large forest fires had created most of the fire damage in recent years. Human carelessness was the cause of these and most other forest fires in southern California. The district forester made a plea for improved fire control legislation, more money to do the fire control job, hazard reduction especially along public roads, better law enforcement and improved cooperation between fire control agencies and between the agencies and interested public groups.³⁹

State Forester Pratt supported Redington's statement and went further, suggesting closure of the hunting season on all or part of the Angeles National Forest. He cited the critical need for road access to the Angeles backcountry to improve the chances for fire control. Pratt made a prediction that was to come true a year later, "In the Angeles Forest you are bound to have large fires; we have to prepare for that uncontrollable fire when it comes."⁴⁰ He referred to cooperation between the Angeles and Los Angeles County Forestry and Fire Department and turned the rostrum over to County Forester Flintham.

The major point Flintham made was the need for public support. He said the groups at the meeting could rally strong public sentiment in favor of better forest fire protection. After considerable discussion and exchange of firefighting stories, the group agreed to appoint a joint committee representing all of the organizations in southern California that were interested in forest fire protection. This committee would select ten men to represent the larger group. Despite all of the talk, however, there still seemed to be a lack of a framework within that to fit public support. Public support of what? There was no solid outline of actions to be taken

and insufficient attention to responsibilities. The impression was left that each fire agency was still proceeding on its own without a genuine commitment to cooperative effort. There were some good reasons for lack of cooperation: the state was just developing its organization, the Forest Service may have adopted a "big brother" attitude toward the county and state, and finally, there was that lack of an overall scheme. Perhaps the public and its leaders could sense this lack of genuine coordination and withheld full support until after disaster struck. Successful and complete cooperation between southern California fire agencies was not to be achieved for decades to come.

The situation in the Los Angeles-San Bernardino basins demanded shrewd leadership and a willingness to become part of the local power structure without abandoning the larger goals of the national forests. R. H. Charlton had been supervisor of the Angeles National Forest since 1905. The phenomenal growth of the area was reflected by increasing pressures on the organization of the Angeles and on its supervisor. Until 1925, the Angeles was organized in two divisions, at Pasadena and San Bernardino, that roughly corresponded to today's Angeles and San Bernardino National Forests.⁴¹ The Pasadena Division included eight ranger districts, while the San Bernardino Division had ten. It was just too much territory for one supervisor to cover effectively, even though there was a deputy supervisor in charge of each division. There is evidence that Charlton was having difficulty supervising the divisions because his public relations duties took so much of his time, a situation that may have contributed to the San Gabriel Fire disaster within the Angeles in 1924.⁴²

The Cleveland National Forest (including the San Jacinto Mountains) was under the direction of Stephen A. Nash-Boulden, a rugged individual who reached the top forest job after starting as a forest guard in 1913. Nash-Boulden was a no-nonsense supervisor who worked hard and expected the same kind of performance from his employees. His position did not demand the same level of public relations that was required of Charlton because the Cleveland was located away from the only large urban center, San Diego. That was the way Nash-Boulden liked it; he preferred to be in the field with his rangers rather than jawing with local politicians. He will be heard from again.⁴³

Chet Jordan occupied a midway position between Charlton and Nash-Boulden with respect to public relations. Although the Santa

Barbara Forest bordered several small cities, there was not the large population and consequent political pressures associated with the Los Angeles-San Bernardino basins.

By the early twenties the similarities in the southern California national forest fire control problems (fuel and climate) were being overshadowed by the differences caused by the location of population and agriculture with respect to forest boundaries. These differences began to widen as the twenties wore on. The remote and trackless country of the Santa Barbara continued to spawn huge fires, forest fires in the Angeles became more and more of a threat to towns and farms of the Los Angeles-San Bernardino basins and occasional very large fires continued to surprise the complacent populations around the Cleveland.

A Season of Disaster

The drought of 1923 continued into January 1924, through February and even March. The rainy season was virtually over and only in southern California during March was precipitation near normal. Almost every month brought another record for drought, heat, wind or all three. The Sacramento River dropped to its lowest level on record in June 1924. Most weather stations in California recorded less than half a normal year's precipitation for the 1923-1924 rainy season. In recent years only the 1976-1977 drought matched the drought of 1923-1924.⁴⁴

Forest guard on fire prevention duty in the Stanislaus National Forest during the severe 1924 season



By March it was clear to Redington, Deering and Kotok in the San Francisco office that 1924 was shaping into one of the worst fire seasons in California history. They began preparations immediately. Redington signed personal letters to heads of others agencies, user groups and associations interested in forest fire protection. Lumber companies, livestock associations, conservation groups and large firms such as Shell Oil

Company and Pacific Telephone and Telegraph Company pledged their help. Booklets were provided to more than three thousand schools, and forest officers made the rounds warning children about playing with matches. During Fire Protection Week (April 21-27, 1924) a blizzard of 90,000 pieces of fire prevention material was sent out. Cartoons, editorials, films, lantern slides, even talks broadcast over the newest fad, radio, were used to sell the message. In northern California 107 additional guards were hired with emergency funds.⁴⁵

The situation was so serious that Governor Friend W. Richardson called another fire protection conference in Los Angeles on March 24th. The conference was chaired by State Forester M. B. Pratt and attended by R. H. Charlton, Bob Deering and members of the Southern California Conservation Association, which was formed from the joint fire prevention committee of the October 1923 conference.⁴⁶

The March conference produced several interesting resolutions. One advocated clearing hazardous fuels from public highway rights-of-way; another called for state legislation requiring ashtrays in vehicles and prohibiting throwing of lighted material from a moving vehicle. The most controversial resolution proposed that 500 federal troops be requested for patrol duty in southern California national forests. Redington responded to the resolutions with approval, although he doubted he could secure the federal troops. He was right, at least at first. His request to the chief forester for troops was coldly received, and rejected. Greeley's response of March 28, 1924, took Redington to task for not considering other alternatives, such as prohibiting smoking, camping, and hiking on national forest land except at designated places (preferably developed campgrounds); prohibiting matches and firearms in national forests; suspending hunting season and securing help from local water and irrigation companies with a stake in fire prevention. Although signed by Greeley, this letter was in the blunt, uncompromising style favored by Roy Headley. Greeley's letter also expressed doubt over the effectiveness of federal troops.⁴⁷

Supervisor R. H. Charlton had problems with Greeley's suggestions, although he agreed with them in principle. He wrote to Redington that there were few developed campground or other safe "designated areas" in the Angeles and no time or money to build them. Hunting was supposedly prohibited on 600,000 acres of the Angeles, which was included in a

state game refuge, but Charlton doubted that the prohibition of firearms would prevent fires. He wanted legislation to curb smokers' fires because 60 percent of the Angeles fires in 1922 and 1923 were due to this cause. He pointed out that he already had seventeen fire guards paid from cooperative funds deposited by local water companies but agreed to try for more. He stayed out of the argument over use of federal troops.⁴⁸

Although it was not apparent then, the conference crystallized some thinking and resulted in the introduction of legislation into the state legislature to prohibit throwing burning materials from moving vehicles and also a dozen other acts that could result in forest fire. This bill was signed into law on May 1, 1925. Rights-of-way clearing began on public highways within national forests, and the ideas of restrictions on public use and closures of part of national forests were adopted in a number of different forms. The supporters of federal troops for patrol duty in the forests counted on the prestige of the U.S. Army to impress fire prevention on the public. Apparently they reasoned the Army had nothing better to do. Their opponents believed forest officers were doing well enough; there just needed to be more of them. This hullabaloo distracted from efforts to prepare for the fire season. Army troops, like other units, had shown themselves to be good firefighters when well led, but they had their own mission to perform. At any rate, troops from Fort MacArthur near San Pedro were eventually sent to the Angeles in August. Apparently their performance was satisfactory.⁴⁹

The Southern California Conservation Association was unable to generate much support or public interest in fire protection during the first six months of 1924. Despite a reorganization, the hiring of a paid secretary-manager and an ambitious program, the association failed to generate much interest. Redington sent W. I. Hutchinson to Los Angeles in June to give them a push. "Hutch" went with association leaders when they laid their case before Harry Chandler, general manager of the *Los Angeles Times* and one of the most influential men in southern California. Chandler was not impressed. He advised them to get leaders of the Los Angeles Chamber of Commerce together with the most prominent men in Los Angeles and have a dynamic speaker give them a sales pitch about the need for expanded fire protection. Chandler disagreed with the association's plan to depend on private subscriptions. Fire protection was a public responsibility, in his opinion. Chandler's advice was not taken,

mostly because of the rivalries between the smaller towns in the Los Angeles basin and the Los Angeles Chamber of Commerce. The association limped along through 1924 unable to generate public interest until after disaster had made their case for them.⁵⁰

While all these and other fire prevention efforts were underway, the forest fires were burning, some starting as early as February. By June 1, 1924, burning conditions approximated those normally experienced in late August. For the next three-and-a-half months, large fires burned almost every day somewhere in California.

Because of the very dry fuels, fires ignited more easily, started earlier in the season, and spread with a speed that surprised even the most seasoned firemen. The Klamath, Shasta and Plumas National Forests recorded nearly 900 fires among them during 1924. The twelve northern California forests had 1,672 fires in 1924, compared to a ten-year average of 1,005. It seemed almost impossible to stop a fire once it was well established. Fires spread up to a mile ahead when burning brands were carried by wind or convection columns. Barriers were ineffective, and fires spread over firebreaks, roads, even in the moss on cliffs. Fires burned on the ground underneath the canopy of brush or timber then turned around and burned back through the canopy.⁵¹

In the far north of California, the Klamath National Forest's fire season began in March and continued into October; 322 fires burned 20,694 acres of national forest land. The largest fire burned "only" 6,960 acres at Crystal Creek. In May lightning set seventy-five fires in a few days, but these statistics do not tell the whole story. Large fires during July and August burned much of Scott Valley and its surroundings. Crops, barns, outbuildings and homes went up in smoke. Although the lands outside the forest boundary were technically the state ranger's responsibility, he and his few volunteer fire wardens could not handle the crisis. The result was that Forest Service crews fought any fire that might reach national forest lands. More than 30,000 acres of privately-owned land within and adjacent to the Klamath burned that summer of 1924.⁵²

Bad fire weather always brought out the incendiaries, the arsonists or, as DuBois called them, "the drunks, idiots and lunatics." In fact, arson was the leading cause of man-caused fires in northern California during the 1924 season. The Klamath had forty-five incendiary fires, some of those were probably set by cattlemen. The light burning issue was

brought to the fore again by local cattlemen's associations, and they were supported by a resolution favoring light burning passed by the Siskiyou County Supervisors on August 7, 1924. This relapse was more than offset by a visit in mid-August from District Forester Redington and Chief Forester Greeley who encouraged the firefighters while they inspected the fire areas and the Klamath River highway, then under construction.⁵³

The last major outbreak of forest fire in the Klamath was in September. Ninety-three fires were controlled in the first ten days of the month, but the Horn Creek Fire, which began September 1st, had to be put out twice. After it escaped control, high winds drove the fire until the 23rd when a light rain enabled weary firemen to gain final control.

Felling snags (dead trees) was the most dangerous job on the fire line, in this case extremely dangerous. When on fire, snags cast flaming material thus spreading the fire.



The fires of 1924 were also devastating to the big timber country of the Sierra Nevada. Of the six forests in the Sierra, only the Eldorado escaped with fewer than 25,000 acres of national forest land burned. More than 35,000 acres burned on each of the Plumas and Sierra forests, and the total acreage burned for the six forests was 160,894

acres of national forest land, 40 percent of the total burned in the California District.⁵⁴

Forest Supervisor R. L. P. Bigelow of the Tahoe National Forest recorded a typical Sierra Nevada summer of 1924 in his diary. His fire siege began on June 3rd, after which he recorded fire duty every week until October 5th, when rains closed the fire season. At times he was fighting fire for days on end. One spell lasted from June 15th until June 28th. Bigelow went to Lake Tahoe on July 4th to check on fire preparations for the holiday weekend. While visiting Tahoe Tavern, a popular resort on the northwest shore, he met the movie star, Tom Mix, who

had played in a film involving a forest fire. Bigelow offered Mix a chance to "get into a real forest fire if he wanted to." Maybe Mix's horse wasn't handy because Bigelow didn't wait for him. He was off to the Sattley Fire the same day.

Bigelow left the Sattley Fire on July 11th en route to the Deadwood Fire, which was burning in rough mountainous country. On July 14th "[the] line broke at Main Top and the fire swept through to Pioneer Mine and Humbug Creek." Despite help from the district office and other northern California forests, the fire crossed the Middle Fork of the American River and entered the Eldorado Forest. It was finally controlled on July 21st. Then on July 28th Bigelow went to the Mammoth Springs Fire near Alleghany. This fire was controlled August 5th, allowing him to catch his breath until August 13th, when the Verdi Fire ran wild. Bigelow met Redington and Greeley at Truckee on the 16th and took them to the fire. The next day, he wrote, "While the Forester and I were eating our lunch about 2 p.m., all the tin dishes on the table blew off." The forester was getting an eyeful, and he must have believed it was 1910 all over again. More fires broke out on August 28th, September 5th and September 11th. Finally, on October 5th a general storm brought heavy rains to the Tahoe. The season was over.⁵⁵

Most people in California accepted the daily reports of forest fires in their newspapers, even the sight of huge columns of smoke, as of only passing interest. Newspaper headlines that summer were mostly concerned with the conventions of the Republican and Democratic parties, and the sensational murder trial of Nathan Leopold and Richard Loeb. Even in the mountains, the sense of danger was not real until fire reached the outskirts of town, as it did in Sattley, Verdi, Susanville, Ft. Jones, Aetna, Alleghany, Quincy and other mountain communities. Folks in Quincy were so rattled when a fire swept over Cemetery Hill east of town that they built a firebreak completely around the community. In the Bay Area, fires in Marin County and the Berkeley Fire of 1923 made believers of some people, but it was remarkable how quickly people recovered from disaster and how soon they forgot its cause.⁵⁶

Los Angeles and environs added many new citizens between 1919 and 1924. Most of them knew nothing about forest fire danger. Even veterans of five or ten years' residency tended to forget the 1919 fires. It took only one match to wake them up. Andrew Gunsalaus, his wife and children

and his brother went for a camping trip on Sunday, August 31, 1924, near the mouth of San Gabriel Canyon. They were just getting settled when, at 12:15 p.m., Gunsalaus lit a cigarette. The dire predictions about forest fire hadn't sunk in on Mr. Gunsalaus, for he threw the lighted match aside—into a pile of grass and brush. The brush exploded in flames, and the hapless Gunsalaus had no chance to remedy his error, only time for him and his family to run for their lives. Thus began the San Gabriel Fire, the largest and most significant fire of the disastrous 1924 fire season.⁵⁷

The fire had potential for disaster and was quickly attacked. After a hard struggle, control was established on September 3rd. Routine patrol and mop-up (extinguishing burning materials inside the fireline) began. The next day the fire broke over a section of line near Silver Peak and began a long run up the main ridge between the West Fork of the San Gabriel River and the Los Angeles plain.

Firefighters dug in along existing firebreaks and hastily constructed firelines between Pine Mountain and Monrovia Peak. The fire breached the line, and one front swept downhill toward the towns of Duarte and Monrovia, while another moved steadily toward the West Fork.⁵⁸ More than 2,000 men fought the fire, including fifteen from District 3. One of these men, Deputy Forest Supervisor F. L. Kirby of the Tonto National Forest, nearly lost his life when he was trapped in Roberts Canyon while looking for his crew. Kirby found enough air at the only waterhole in the canyon and escaped suffocation. His survival was termed a “miracle.”⁵⁹

Tired fire crews fell back to the west and built line to protect world-famous Mt. Wilson Observatory with its associated tramway and recreation areas. Other crews stopped the spread of the fire at the base of the mountains, saving housing developments from further danger. Meanwhile the north front of the fire continued downslope and crossed the West Fork, surging into Bear Creek and Devils Canyon on September 12th. At that time only a few trails crisscrossed this vast area. This area is still among the most rugged and inaccessible in southern California. Heavy smoke made it difficult to locate the fire edge, and firefighters were slow to arrive on the scene. It was September 17th before effective control work began in the area. Fortunately, a dramatic rise in relative humidity to 42 percent occurred on the 18th. Los Angeles County sent 250 men to the Devils Canyon sector. By the 24th, they had a control line on the fire. The line was turned over to the Forest Service for patrol.

Either the mop-up by county crews or Forest Service patrol was inadequate, or both, because on the 26th flames again went over the fireline in Devils Canyon. Soon afterwards final control was achieved and damage assessment began.⁶⁰

The burned area resembled Great Britain in shape. The fire burned fifteen miles north from the town of Duarte reaching the summit of the main San Gabriel range. Thirty-five square miles of mountains south of the West Fork was blackened. Most of Devils Canyon was a wasteland of brush stubs, ash and smoking trees. Charlton Flat and Chilao barely escaped destruction. About 50,280 acres burned over a period of a month. A mere list of acres and burned topography gives little measure of the immensity and the raw power of such a conflagration in chaparral. The low-growing vegetation became a backdrop for the flames. The fire was not hidden by treetops, but out in the open, a red tide sweeping over the mountain slopes. The sight of the great fire created a feeling of awe at the vast energy being expended. One observer saw the San Gabriel Fire while flames were advancing on a front five miles wide. He wrote, "... a mountain range on fire, with hissing flames leaping skywards as though thrown with fury from the bowels of the earth."⁶¹ Melodramatic? Maybe, but the sight of a great chaparral fire often struck men dumb or made them spout purple prose.

While the San Gabriel Fire wore on, Greeley visited the Cleveland, where he found that Supervisor Stephen A. "Gus" Nash-Boulden had closed the forest to visitors. Nash-Boulden recalled his conversation with Greeley this way:

He said, "I understand you closed the Cleveland while the fire was going on in the Angeles?"

I said, "Yes, We didn't have any men."

He said, "How did you do that?"

I said, "I just closed it."

He said, "That's the regional [sic] forester's responsibility, isn't it?"

I said, "I don't know."

He said, "Did you read the regulations?"

I said, "Yes, I just read it could be closed. I didn't read further."

He laughed and said, "You are a direct actionist. I wonder why they didn't close the Angeles."

I said, "I don't know. Maybe they read the regulations too far."

He laughed. Anyway, he sent me a letter afterward, commending me on quick action.⁶²

Nash-Boulden's closures must have come to Greeley as a ray of light through the smoke of 1924. There were still some men who didn't wait for approval but acted on their own initiative and stood ready to accept the consequences.

As the San Gabriel Fire grudgingly submitted to control efforts, the 1924 fire season came to a close. Rains in late September and early October put a finish to forest fire except in the Cleveland Forest, which had fires into November. It had been a bad fire season throughout the West, but California suffered the most. Just under a million acres burned state-wide, of which 401,221 acres were national forest land and 361,931 acres were privately-owned lands within or adjacent to national forests. Almost every forest in California recorded one of the worst fire seasons to date. The Angeles and Santa Barbara each had more than 60,000 acres burned, and ten forests recorded more than 20,000 acres burned during the season.⁶³

Thus 1924 became a landmark year in the history of fire control in California, just as 1910 was a landmark for the northern Rocky Mountains. The 1924 fire season in California was a product of two years of drought. The extremely dry conditions resulted in rapid fire spread and multiple large fires from May through September. The topography in California did not lend itself to the massive fires that burned nearly three million acres in Idaho during August 1910. At the time the Idaho conflagrations began, there were estimated to be more than 1,700 fires burning within the state, 85 percent of which were man-caused. That kind of situation did not exist in California in 1924 and probably had not existed since the advent of the Forest Service. The similarity between the two periods was in the relentless character of the fire seasons. Day after day, week after week, month after month, the same men went to the firelines.⁶⁴

The season took its toll on men as well as natural resources. The death of Shasta National Forest Ranger L. E. Overmeyer resulted from overexertion on fires, and many other men were broken down by months of hard, hard work. Four firefighters were killed while on the fireline, one by rolling rock and three by falling trees.⁶⁵ In mid-August Chief Forester W. B. Greeley told the press, "Many of the Forest Service and State Rangers have been fighting forest fires with only occasional breathing

spells since the first of May, and the stress they have been under can only be compared with that of men at the front in time of war.”⁶⁶

When it was all over, R. W. “Bummer” Ayres summed it up with bit of doggerel. The following excerpt is taken from this verse titled, “The Summer of Twenty-four.”

Smoke and dust, fever and sweat,
The damndest [sic] season I've put in yet;
All you can hear, or think, or do,
Is fighting fire the season through.
All other work has gone to pot,
Our working plans are completely “shot.”
(Suffering cats, will it never rain?)
My heart has a knock, my nerves are frayed,
My stomach's gone, my feet are splayed.
My eyes are dimmed from the backfire smoke,
My lungs are sore, and my back is broke...
A holiday for me would be.
On a southern isle in a balmy sea,
Where I could sleep, and eat and shave,
And bathe myself in the purple wave.
In its tropical rains with its glad downpour,
I'd dream of the summer of twenty-four.⁶⁷

The 1924 fire season was the catalyst for major change in fire control policy and methods in District 5. The means to identify needed change was probably devised in the summer of 1924 as Chief Forester Greeley made the rounds of the forests in the district. Greeley was fresh from his triumph in Congress, where he had seen the Clarke-McNary Act passed. He had every reason to celebrate when the act became law on June 7, 1924, for he had been the driving force behind its passage. The law provided for cooperation among the federal government, the states and private parties in fire protection for forested or cut-over lands. The Clarke-McNary Law also provided federal matching funds up to 50 percent of those spent by the state for fire protection.¹

Greeley's field trip to California in 1924 was extraordinary. He spent more than two months visiting fifteen different forests in the district and seeing at first hand the firefighters' torment.² Greeley was in southern California for several weeks talking to political and economic leaders and observing while the Angeles firefighters tried repeatedly to control the San Gabriel Fire. The soundness of his concerns about fire control and cooperative effort were never better demonstrated than by this fire. A critique of the San Gabriel Fire, as well as the entire 1924 fire season in California was needed. The critiques took shape as Boards of Fire Review, a format that became familiar to later generations of California firefighters, sometimes to their discomfort.

The first board met in mid-October to consider the actions of northern California forests, with special emphasis on the Shasta, Plumas, Tahoe and Sierra. The board members were Redington, Deering, Kotok, Show, and Jay Price of the district office, Inspector Evan W. Kelley from the Washington office and Dave Rogers, supervisor of the Plumas. Objectives of the review were to determine the effectiveness of each forest organization and its response to the 1924 fire season, to seek ways to improve performance and to list problems that needed solutions. The report of the board went into detail about what to do and, in some cases, how to do it. The major themes of the report were just two: fire prevention and readiness for fires. Fire prevention issues such as fire closures, new fire prevention rules for logging operations, public relations, road rights-of-way clearing, campground development and law enforcement were discussed and recommendations made, but there were too many issues listed. The result was lack of focus on a few high-priority issues.

The report also dealt at length with fire readiness. Weaknesses were identified in several areas, but many appeared to stem from mediocre management and poor leadership throughout the District 5 organization. Shortcomings in recruitment, training, supervision and work planning were described. The board believed that improvement was needed all along the line, from the forest supervisor on down to the pickup firefighter. Large-fire organization was thoroughly reviewed, and a glaring weakness came to light: the supply service was abominable, especially in the fire camps. Food was bad, water was chronically short on the fireline, fire camp discipline was terrible, timekeeping was inadequate, tools were constantly being lost, beds were primitive and communication was often nonexistent. A few rays of light gleamed through the dark record. Certain tools, especially Evinrude portable pumps and backfire torches had worked well. Fire trucks offered great possibilities, and experiments with tractors pulling graders or drags were suggested as a means of building firelines. The overriding message of the fire readiness theme was that the large-fire organization scheme needed overhaul.



Tollhouse
fire camp,
Sierra
National Forest
1931

This board of review revealed many weaknesses, but it was essentially an organizational self-analysis that did not subject individuals to the searching criticism that occurred in later years. After all of the analyses were done, the report still lacked a written action plan to carry out the recommendations, but some important results came from the review. A general meeting of rangers, supervisors and other forest officers was held at Ft. Miley in San Francisco during February 1925. All of the forest

officers in California were given the new fire control policies at the same time, and this message was driven home by a series of field problems. Also in 1925, the Feather River Ranger School held its first session. This school was the brainchild of Paul P. Pitchlynn and was aimed at bringing District 5 rangers and other forest officers to a higher level of professionalism. The importance of the ranger's role in fire control and general administration was stressed. Ultimately, the result of the schooling was a stronger corps of rangers and supervisors.³

The Southern California Board of Fire Review purportedly reviewed the fire record of all three southern California national forests in 1924, but its real focus was on the Angeles National Forest and the San Gabriel Fire. The northern California review was an in-house critique, but in southern California the review was conducted by the Washington office, and full public exposure was invited.

The panel in southern California was chaired by E. A. Sherman, Greeley's deputy, and included District Forester F. C. W. Pooler, of District 3, Evan W. Kelley, inspector from Washington, District Forester Redington and two members of the public, G. C. Dunwoody, president of the Southern California Conservation Association and Francis Cuttle, president of the Riverside Water Company and member of the State Board of Forestry. The review had two stated purposes: to determine the efficiency of the Angeles National Forest as a firefighting unit and assign responsibility for its results, and to determine how best to provide fire protection for the forest. The board held ten meetings, all but one of those were open to the public. The public was invited to participate in three of the meetings, and eighty witnesses testified before the panel.⁴

The report of the board's review identified many of the same problems found in the northern California review. With regard to the San Gabriel Fire, two points stood out: a lack of adequate mop-up and patrol caused the fire to escape control, and after the fire escaped on September 7th the control efforts were ineffective until the 12th. Elsewhere, the board found that fire closures were inconsistent and poorly enforced and that cooperation with Los Angeles County Forestry and Fire Department had been inadequate. The report included a lengthy discussion of the values at stake in the Los Angeles-San Bernardino basins. The recommendations of the board were in four major areas: protective improvements, legislation, future administration and public relations.

According to the board, a primary consideration in fire protection for the Angeles was "the protection of private values in the form of water and dependent land and other property" that were endangered by forest fires and subsequent flooding. The board recommended that fire protection costs should be shared between federal and local interests, with the local interests paying for protection beyond what was normal for a national forest with a heavy fire and recreation workload. After making this logical assessment of the roles of federal and local governments, the board seemed to contradict itself. The board proposed a special authorization by Congress of one million dollars to be spent to protect the Angeles forest from fire and proposed that southern California chaparral be qualified for matching funds under terms of the new Clarke-McNary Act. This was the first time that the Forest Service proposed special consideration for fire protection of the Angeles and other southern California forests. From this time forward, fire control in southern California forests was recognized as a problem with national implications.

In its recommendations, the board proposed a major road construction program into the high country of the Angeles "to get people out of the canyons," and a major extension of the firebreak system. Proposed changes in administration included a rearrangement of the southern California forests. A new San Bernardino National Forest was to be created. Most of the proposed new forest was taken from the Angeles and included public lands in the San Bernardino Mountains, the Lytle Creek area in the San Gabriel Mountains and the San Jacinto Mountains (from the Cleveland Forest). The Angeles National Forest was to receive the Saugus Ranger District (more than 270,000 acres) from the Santa Barbara Forest.

The Cleveland and Santa Barbara Forests lost area under the proposal, but in each case the forest was made more compact and easier to administer. The board recommended that the Angeles prepare a fire hazard survey and a comprehensive recreation plan and directed the Angeles to establish much closer cooperative relations with the Los Angeles County Forestry and Fire Department. The report concluded by pointing out that the Angeles had "the greatest opportunity for public relations work in the western United States."⁵ The board declared, "The Supervisor of the Angeles National Forest should occupy a position of prominence in southern California."⁶

The review stimulated action on several fronts. The Clarke-McNary Act was amended to include watershed lands on March 3, 1925. A "million-dollar appropriation" for southern California forest fire protection was submitted to Congress but failed in the House of Representatives after passing the Senate. Instead, funding for southern California fire protection was increased by \$100,000.⁷ A road-building program was begun in the Angeles, but this was a mixed blessing. The high country was made accessible for tourists, and most of the forest eventually came within reach of fire crews. The new roads left permanent scars on the land, however, and old-timers knew that "the San Gabriels would never be quite the same again."⁸ The new San Bernardino National Forest was created in 1925, and other boundary changes were made as suggested in the report.

Along with the new forests came new forest supervisors. R. H. Charlton was not formally censured in the Angeles review report, but the unwritten message was that new leadership was needed. Charlton had pleaded the case for increased fire protection in the Angeles for years. He had done most of the things the board said should be done, but apparently he had not done enough. The old Angeles was too big. On the one hand, he seemed to be a victim of circumstances. On the other, rapid change had occurred during his long tenure, and he may not have kept pace with the growth of people and problems in the Los Angeles-San Bernardino basins. At any rate, Charlton was replaced in 1925 by George H. Cecil, who came down a notch from his position as district forester in District 6. Cecil resigned his position in 1928 to become Executive Vice President of the Los Angeles County Conservation Association.⁹

The new San Bernardino Forest was headed by Stephen A. "Gus" Nash-Boulden, who moved from the Cleveland. Born in 1886 in England, Nash-Boulden lived as a boy in Wisconsin and moved to San Diego in 1901. He ranched with his father until 1913, when he began his Forest Service career as a guard in the Cleveland National Forest. Nash-Boulden agreed to take on the San Bernardino and clean up its personnel problems if he could get an assignment of his choice after his chore was done. The deal was struck, and Nash-Boulden went at his job like Hercules in the Augean stables. He fired four of his seven rangers, "got rid" of the deputy forest supervisor and generally shook up the outfit until it responded to his style. Nash-Boulden stayed only until 1929 when he

was transferred to Santa Barbara, where he remained as supervisor of the Santa Barbara (Los Padres) National Forest until his retirement in 1948.¹⁰

Nash-Boulden's place in the Cleveland was taken by J. E. "Young Joe" Elliott, Sr., a native of Grizzly Flats, Eldorado County. Born in 1885, Elliott was a woodsman with a wealth of varied experience behind him when he joined the Stanislaus National Forest on September 1, 1908. Elliott was a wiry six-footer with great energy and stamina. His school-teacher wife helped him overcome a lack of formal education. Elliott was called "Young Joe" to distinguish him from "Uncle Joe" Elliott (no relation), who worked out of timber management in the district office. After Nash-Boulden left the San Bernardino for Santa Barbara in 1929, Elliott succeeded him and remained in San Bernardino as supervisor until 1935, when he went to the Sequoia.

Few forest supervisors were able to survive very long in the demanding fire control climate of southern California. One who could was William V. "Bill" Mendenhall. He began as a packer in the Angeles, rose through the ranks to ranger, then deputy supervisor and then to supervisor of the Santa Barbara in 1925. He succeeded Cecil as supervisor of the Angeles in 1929, where he remained for more than twenty years. Mendenhall was of middle height, with reddish hair. He was an energetic and effective manager who was also an able public speaker. He, Elliott and Nash-Boulden laid the foundation for southern California fire control through World War II.¹¹

The Southern California Board of Fire Review's report resulted in a rejuvenation of fire control in southern California. Wide publicity of the report helped generate public support. Los Angeles area watershed and conservation groups and congressmen, assisted by state officials turned that support into action. Greeley provided personal emphasis to the recommendations, and drastic changes were made in the southern California national forests and their leadership.

Ups and Downs in Cooperative Fire Control

The State of California's fire control program seemed to be on the uptrend after 1919. For the first time that year, new state laws provided State Forester G. M. Homans with authority to establish cooperative fire protection projects and a fire protection budget. Now the state could take part in the federal Weeks Act program, which provided matching

funds to states for protection of the watersheds of navigable streams. The year 1919 was also notable because the first four state rangers were hired that summer. Until then Homans had to depend on voluntary fire wardens to carry out state fire control programs. The new rangers were called "Weeks Act patrolmen" recognizing that half of their salaries was paid by the Forest Service under terms of the Weeks Act. About three million acres of privately-owned land between the Feather River and the Stanislaus River were to be "protected" by the four rangers. It was a small start, but one that eventually grew into the largest state fire control organization in the nation.¹²

Cooperative fire control was also gaining headway in southern California. About \$80,000 a year was being contributed by counties and water companies toward construction and maintenance of firebreaks, to hire fire guards and for other purposes in the national forests there. Los Angeles County was fast becoming a leader in rural fire control. By 1920 County Forester Stuart J. Flintham had two full-time assistants and one hundred part-time deputies. In northern California the Forest Service continued its cooperative fire control program with private landowners within national forest boundaries. More than three million acres of these lands were being protected by 1920 at a cost to the landowners of \$737,714.¹³

The situation changed in 1921, when State Forester Homans died of the after-effects of a automobile accident. His deputy, Merritt B. Pratt, succeeded him. Pratt was born in Illinois in 1878. He attended the University of Chicago and Yale Forest School, from which he received a master's degree in 1905. He joined the Forest Service and was assigned to California. Pratt eventually became deputy forest supervisor of the Tahoe Forest before resigning in 1914 to join the faculty of the new forestry department at the University of California in Berkeley. He left the university to become deputy state forester in 1918 and served as state forester from 1921 until the end of 1944. Pratt was neither a vigorous administrator nor a bold leader. The fledgling state fire organization had trouble maturing under Pratt's benevolent neglect.¹⁴

Perhaps it was just as well that Pratt was an easy-going "Christian gentleman" because a fiery leader might have been squelched by the cold logic of California's new Governor Friend W. Richardson (1923-1926), who was a fiscal conservative whose penurious budgets made President

Calvin Coolidge look like a free spender. He slashed through budget proposals from state agencies like a crusader among the infidels. No agency budget was free from his sharp blue pencil, but the Board of Forestry under the old firebrand (and former governor) George C. Pardee, was especially hard hit. The board's two-year budget proposal of \$187,000 was chopped to \$34,000. The cuts were especially hard to bear because the board was just getting on its feet after a long period of neglect. Pardee was outraged by Richardson's actions and resigned his position, trumpeting bitter blasts at the governor that were published far and wide.¹⁵

Truly, the governor's budget slashes were not well considered. The cuts were made with no advance notice and would have sacrificed matching funds from federal and county sources. Richardson provoked criticism from District Forester Redington, Chief Forester Greeley, the American Forestry Association and newspaper editors around the state. Richardson finally relented under pressure and added enough funding to bring the budget back to \$117,000. It is noteworthy that the separate "Firebreaks and Trails" appropriations that had been allotted to counties for many years were approved for a total of \$23,800 that year. Most of this money was to be spent in the Angeles National Forest.

Richardson's budget cutting was in tune with the times but not with the rapid expansion of tourists and homebuilders into California forest and brushlands. Ignoring the anguished cries from irrigators, conservationists and the Forest Service, the governor held fast to the reduced budget. Richardson's next step was to appoint a new Board of Forestry. Except for activist Francis Cuttle of Riverside, the board was the willing instrument of Richardson's policy of doing nothing that cost tax dollars. But 1923 was a year of drought in that 750,000 acres of land outside the national forests went up in smoke. When a northeast wind carried fire into Berkeley on September 17th and destroyed \$10 million in property within three hours, even the fiscal conservatives became uneasy.¹⁶ This conflagration was followed by the season-long disaster of 1924, capped by the San Gabriel Fire of September 1924. Despite these events, the biennial budget for 1925-1927 remained about the same as the previous budget. Instead of higher budgets, the fire control deficits were met by allotting \$60,000 to the state forester from emergency funds, thus avoiding the publicity of an increased budget.¹⁷

Despite the parsimony of the Richardson regime and the lackluster Board of Forestry, there were some important advances in the state's fire control program between 1922 and 1926. One board member, Francis Cuttle, was involved in many of these advances. Cuttle mobilized influential watershed and agricultural interests behind fire prevention legislation. Cuttle was a veteran of the southern California fire control scene. He moved to Riverside, California, in 1881 and went to work for the Riverside Water Company. By 1904 he was president of the company and an important figure among supporters of watershed protection. In 1907 he helped found the Tri-Counties Reforestation Committee and was its first chairman. The successor to this committee, the Watershed Fire Council of Southern California, continues its work to this day, and has been an important force shaping fire control policy in southern California, and the rest of the state.¹⁸

Cuttle pressured the legislature for passage of the catch-all fire prevention bill mentioned in the preceding chapter. This bill penalized throwing lighted materials from a moving vehicle among other misdemeanors. Another important act was the Compulsory Patrol Act signed into law on June 6, 1923, which compelled owners of forest land to provide "adequate fire patrol" during the fire season. Those not complying were required to pay a fee of two cents per acre to the state forester so that he could do the job. While the law was cumbersome to administer and resented by many smaller landowners, it brought in about \$40,000 in fees each to the state forester and the Forest Service. Fire control agencies were happy to get funding from any source.¹⁹

Another important event in 1923 was the publication on January 13th of a report about California watersheds written by Edward N. Munns. Munns, a watershed scientist on loan to the state from the Forest Service, believed that 85 percent of the serious soil damage in California resulted from unplanned forest and range fires.

One of the problems Munns dealt with was disposal of logging debris or slash. For generations loggers either walked off and left logging debris or set it afire, destroying all remaining trees and often burning unlogged stands. Gifford Pinchot had led a vigorous attack on the lumber industry in the late teens and early twenties, charging them with abuse after abuse. His solution was to regulate logging on private land by the federal government, and he had many supporters. Pinchot fostered the Capper bill in

Congress that aimed at federal regulation of logging on private lands. Greeley rejected Pinchot's solution and influenced passage of the Clarke-McNary Act as an alternative to Pinchot's program, but the new law did not solve the slash problem. Criticism of logging practices, increasing fire control costs and a shaky lumber market lent urgency to the search for better ways to treat slash.²⁰

The Forest Service continued to require loggers to pile and burn slash in its timber sale areas. Even this method was unsatisfactory unless carefully supervised. Munns suggested that slash could be left to rot if special fire prevention measures were instituted, the most important of which was to surround the cut-over area with firebreaks. Further subdivision of the hazardous slash area could be accomplished through use of roads and skid trails within the cut-over area. In addition, Munns proposed that the cut-over area be patrolled to prevent fires and that much stiffer fire prevention rules be enforced in logging operations. Assistant State Forester William B. Rider had made many of the same suggestions after an assessment of slash disposal in 1921.

The Stanislaus National Forest put these suggestions into effect in 1923 in a timber sale area operated by Standard Lumber Company. This experiment required the company to deposit funds and the Forest Service to do the work. This trial was the forerunner of what became the accepted method of mitigating slash hazard by substituting fire prevention for actual disposal of the debris, a method that became known as "extra protection." Because the state did not have control of privately-owned timber lands, the best that could be done outside of the national forests was to urge use of "spot" burning of large debris piles rather than broadcast burning.²¹

These events and the approval of the Clarke-McNary Act on June 7, 1924, set the stage for a rejuvenation of cooperative fire control under the administration of Governor C. C. Young (1927-1930). Young was a progressive Republican but a conservative in financial affairs and an excellent administrator. His first move was to reorganize state government. Young signed legislation on April 13, 1927, that created a Department of Natural Resources. This department included a new agency to manage forestry and fire control, the Division of Forestry, headed by the state forester. The Board of Forestry was reconstituted with seven members representing timber, grazing, water, agricultural interests and the public.

Thus the state forester became an agency head responsible to the director of the Department of Natural Resources.²²

State budgets were restrained under Governor Young except for fire protection, which received large increases. The Board of Forestry budget for 1927-1928 expanded to \$361,000, including \$120,000 allotted to counties and fire districts. Young then prevailed on the old warrior, George C. Pardee, to return to the Board of Forestry. Pardee agreed to make an effort despite his age and declining physical state. The change in organization and attitude at the top put state and other cooperative fire control into an upswing. Budgets continued to climb through 1929, and more and more permanent men were hired by the Division of Forestry.²³

Federal aid was an important source of income, and its distribution was controversial both between the states and within California. By 1929 \$90,000 of Clarke-McNary funds were being allotted to California, based on a formula that in turn was based on the estimated cost of fire protection for a given state. Munns's watershed report served as a basis for California's share, and the share was large because California had a large fire problem.²⁴

Within the state, strong forces pulled and tugged at the Clarke-McNary funds. The California Forest Protective Association represented owners of several million acres of forest land and in 1927 claimed the landowners had spent \$84,000 for fire protection, and wanted reimbursement. Counties in southern California continued to assume fire protection responsibilities. By 1929 Kern, Ventura, Santa Barbara and Los Angeles Counties had county fire departments. Under George H. Cecil the Los Angeles County Conservation Association insisted on a large share of Clarke-McNary funds for Los Angeles County. Cecil claimed the county was spending \$200,000 each year for fire protection. The tug-of-war over federal aid funds went on for years, and District 5 was in the middle of it. Ed Kotok and Jay Price were the District 5 representatives who had to certify to the secretary of agriculture that qualified lands were being protected with federal funds.²⁵

Perhaps one of the most important effects of the Clarke-McNary Act was that it forced closer coordination between the Forest Service, the state, the counties, landowner associations and forest industry. The law stimulated increased and expanded fire protection for forest and brushlands, but it also complicated life. Letters, plans, reports and other

paperwork became a necessary response to keep the funds flowing. The role of the staff assistant in the district office and the division office became more important and more powerful.

Show and Kotok

While the state of California was struggling to find its place in the field of fire control, changes were occurring in District 5. The 1925 fire season was an easy one, a breathing spell from fire. California national forests needed a break to catch up on other work and to absorb new fire control policies and procedures resulting from reviews of the 1924 season. It was also a time for reorganization of forest boundaries in southern California and for new leadership. So it was that in early 1926 District Forester P. G. Redington was transferred to the Washington office and replaced by S. B. Show. The naming of Show as district forester was out of the ordinary. His entire background was in research, he had no administrative experience, and he was somewhat of a maverick. Yet Greeley selected Show, perhaps because of these perceived shortcomings.

Stuart Bevier Show or "Bevier," as he wanted to be known, was born in Nebraska in 1886. When Bevier was still a child, his father, A. B. Show, moved the family to Palo Alto, California, where he became the first professor of history at a struggling institution known as Leland Stanford, Junior University. The pay for Stanford professors in the 1890s was low, and the family sometimes found itself in economic straits. Fortunately, Professor Show was a outdoorsman who loved to hunt, fish and camp. Duck, geese and trout made welcome additions to the family fare. The professor transmitted his love of nature to his son, Bevier, who became an enthusiastic bird hunter and fisherman. Bevier was not satisfied with the surface delights of the natural world. He dug deeper. He learned to tie dry flies; he made an outstanding butterfly collection, all properly classified; he extended his collections to bird skins that were properly treated, preserved and classified. He learned to



S. B. Show,
District (Regional)
Forester
1926-1946.
First to do fire
research in
District 5.
Authored many
bulletins and
histories.
Innovative and
strong advocate
of fire control
in California.

pack horses and camp on trips to Lake Tahoe. But his interests were not one-dimensional, for he also played chess, collected stamps, and learned to play the piano. He was a very bright youngster, with an orderly and inquisitive mind. He seems to have been rather solitary, not anti-social but not needing other people to be content.²⁶

Young Show entered Stanford University in 1905 with no real career goal in mind. That winter he attended a lecture by Gifford Pinchot. During the question-and-answer session after the talk, Show asked Pinchot, "What do I do to become a forester?" Pinchot answered, "Quite simple, you get your degree here at Stanford, come to Yale for a master's in forestry, and then join me."²⁷ Show did just that, completing a degree in botany at Stanford in 1908 and a master's in forestry at Yale in 1910.

Show worked as a day laborer during the summer of 1907 in the Shasta National Forest, and the work confirmed his desire to become a forester. Following graduation at Yale in 1910, he was hired by the Forest Service and sent to District 5 headquarters in San Francisco. There he was taken to lunch by District Forester Olmsted and his staff and then sent on to the Shasta headquarters at Sisson, California. His boss was Forest Supervisor R. F. "Dick" Hammatt, a "veteran" of four years' service.

Show tracked down timber thieves with Edward N. Munns and John Coffman, fought fire, planted trees and did whatever else was wanted. That December he traveled to Everett, Washington, married his girl friend and brought her back to Sisson to live. When they returned he had just five dollars left from his wedding fund. Sisson was a two-season town of four hundred in the summer that grew to seven hundred in winter when the loggers came back to roost for the winter. Its streets were lined with saloons and bordellos, not the best environment for a young bride. Show recalled his wife's initiation to Forest Service life:

I installed her in a chilly, and far from elegant house... showed her the wood supply, introduced her to the grocer; the butcher and milkman, gave her the five bucks and my comprehensive power of attorney...and (left) for several months of winter reconnaissance.²⁸

The following spring, part of his crew was transferred and were replaced by Raymond Tillotson and "a queer character, wearing a hard-boiled hat and choker collar, named Edward I. Kotok."²⁹ Here was another man who had become infected with the forestry virus after listening to Pinchot speak. Forestry was the only fact in common in the lives of Show and

Kotok until that day in 1911 when Kotok showed up for work looking like the Russian immigrant that he was.

Kotok was born “somewhere between the Crimea and Ukraine” in 1888. His father inherited wealth but left Russia partly because of his anti-Czarist politics. After brief stays in western Europe, he emigrated to New York and settled in Orange, New Jersey. Young Edward came to America at age seven and grew up in the eastern urban environment. He attended City College of New York, graduating with a chemical engineering degree in 1909. Kotok went to



Edward I. Kotok, co-author with S. B. Show of pioneering fire control bulletins. First Director, California Forest and Range Experiment Station

work for a drygoods company, but he always liked the outdoors and was restless working in a factory. He attended a lecture by Pinchot and was spellbound and decided to become a forester. Kotok earned a master’s degree in forestry at the University of Michigan in 1911, thinking he would become a chemist at the Forest Products Laboratory at Madison, Wisconsin, but first he wanted to get some field experience. After a seasonal job in Colorado during the summer of 1910, Kotok accepted a permanent job in the Shasta National Forest after graduation in 1911.³⁰

Show and Kotok were as unlikely a pair to become fast friends as could be imagined. Show was a six-footer, wiry with brownish hair and a light complexion. Kotok was medium height and medium build, with black hair and a dark complexion. Show was from California by way of Nebraska; Kotok, from New Jersey by way of Russia. Both were intelligent and well read, but Show’s strength was in the natural sciences, while Kotok was a chemist with a gift for languages; he spoke and read German, French, Spanish and English fluently. Show tended to be solitary but outspoken, while Kotok was gregarious enough to be known as “jolly Ed” in later years. Show enjoyed playing the piano and singing with family and close friends but could be relentless in his criticism of sloppy thinking or sloppy work. Kotok, a perennial Santa Claus at district office Christmas parties, was a sociable man who joined many societies and clubs, and in later years had a special knack for communicating with

young professionals. There were plenty of contrasts between them, but these were overshadowed by a common belief in forestry that was almost an obsession. The two men worked four years together in the Shasta Forest, during which time they came to know and respect each other. This bond was strengthened when Show's younger sister Ruth met Kotok while visiting her brother in Sisson. The two married, and Show and Kotok became brothers-in-law.³¹

Show left the Shasta in 1915 to take charge of research at the Feather River Experimental Forest near Quincy. There Show began the fire control experiments that soon brought him to the front rank of District 5 scientist-foresters. Meanwhile, Kotok advanced in the Shasta organization, taking charge of timber sales and research. After five years at Sisson, Kotok was promoted to forest supervisor of the Eldorado National Forest at Placerville in 1916. The two men continued to exchange ideas, and Show often asked for Kotok's help. Show did a detailed analysis of the Hams Station Fire of October 1917 in the Eldorado Forest. Kotok reviewed his report, and the interaction between the two men is apparent in his comments.³² Kotok went to the district office in December 1918 to help Show in the first of his statistical studies of fire, which was followed by the major changes of District 5 leadership in 1920. Show became assistant district forester in charge of research, and Kotok took over fire control and cooperative fire duties under Deering in the district office. Once again the two men were in a close working relationship. Over the next ten years, Show and Kotok collaborated on six of the most important publications in the history of fire control.

Most of their joint researches were based on analysis of actual fire records. Show believed strongly that analysis of past fire experience was the key to better fire control. Basic laboratory research into the chemistry and physics of fire itself would have to wait until men knew how to control fire in the woods. After Show's accession to the top research job, forest personnel were expected to keep detailed fire records in formats supplied by the research office. Fire reporting in Region 5 continued in similar formats for many years.

Individual fire reports became the basis for Show and Kotok's first major collaboration, *Forest Fires in California 1911-1920 - An Analytical Study*, which was published in 1923. This study laid the foundation for a set of fire control premises that were explored further in later publications.

Show and Kotok wrote that improved fire protection was essential if intensive forest (timber) management was to succeed. Improved fire protection meant "catching fires when they are small." This meant, in turn, having effective fire detection and locating sufficient firefighters near where fires were most likely to occur. It also meant improved fire prevention.³³

Their later publications explored the effects of weather on forest fires, especially wind and relative humidity, the influence of fire in California's pine forests, and the effect of vegetative cover types on forest fire control. From these studies, Show and Kotok established organizational concepts in two other publications about "hour control" and forest fire detection. Hour control referred to fire protection zones set up on the basis of speed of initial attack needed to control fires in the zone. For example, fires in the half-hour control zone had to be reached within one half-hour if initial attack was to be successful. Speed of attack was the central theme in these studies.³⁴

The analysis of California forest fire conditions by the Show-Kotok team stretched over a dozen years from 1919 to 1931, although one of the publications did not appear until 1937. Meanwhile both Show and Kotok were deeply involved in other duties. Kotok became immersed in cooperative fire control with the state and other cooperators, not to mention his constant comings and goings during the fire season. Show became more interested in administrative management in addition to his research work. During the winter of 1924-1925 he was assigned to the Washington office in company with Ed Munns, Don Bruce, Bill Sparhawk and Tom Gill. This group attended the weekly service meetings held by the chief forester's staff to inform the Washington office people. The five "field men" took delight in questioning some of the pontifical statements handed down from on high. Apparently Greeley watched and listened to Show and the other young "revolutionaries" and liked what he saw and heard. When a service-wide conference on organization was held at Denver in December 1925, Show was invited.³⁵

Perhaps these meetings influenced Greeley when P. G. Redington was transferred to the Washington office early in 1926, for Show was appointed district forester in February 1926. Greeley apparently saw something that convinced him that Show was the man for the job. Maybe it was because Show had definite goals in mind for District 5. He knew that the district was only as good as the quality of its men. He

began to emphasize recruitment of "technical"; that is, forestry school and other college graduates. Show did not worry too much about their lack of practical experience. He knew they could be taught forestry the District 5 way. He wanted "generalists" with good character and a flair for leadership. Show strongly supported proposals for improved administrative management. When Earl Loveridge of Headley's staff devised the first Forest Service work planning system in 1927, Show gave it his personal emphasis. He assigned Pitchlynn the task of following up to see that all rangers used the system.

Kotok's career blossomed in unison with Show's. During 1925 Senator Hiram Johnston entered a bill in Congress to establish a forest experiment station in California. The bill was approved March 3, 1925, and the new station began operation in 1926 with Kotok as its first director. The station was located on the Berkeley campus in cooperation with the University of California.³⁶

Thus the two fire research collaborators, friends and brothers-in-law assumed the two top Forest Service jobs in California. They were in position to continue their researches and to put them into effect. Their ideas would soon be put to the test, for 1926 was another severe fire season.

The Terrible Twenties Continue

Northern California national forests suffered the most during the 1926 fire season. The Klamath, Shasta, Lassen and Plumas forests lost 131,581 acres in 1926, almost 60 percent of the total burned acres in the district. The Klamath was hardest hit: 47,240 acres of national forest land burned that year in 177 fires, 50 of which were set by arsonists.³⁷

District Forester Show's fire protection circular of April 2, 1926, included a prediction for a hot, dry summer and fall. It was an accurate prediction, for May and June were above normal in temperature and below normal in precipitation; July, August and September continued hot and dry. Heat waves occurred in mid-July and the first two weeks of August. Show's circular notified the forests that there would be no increase in firefighting funds and that all forests were to require campfire permits. An air patrol was also in the works.³⁸

The fire season began in Siskiyou County in June, when fires burned large areas near Yreka. The eastern section of the Shasta National Forest was closed to public use on July 8, 1926, due to extreme fire danger. The

first heat wave struck soon afterwards and the Klamath Forest suffered 106 fires that burned nearly 40,000 acres in about two weeks. The greatest damage was caused by lightning fires, the largest of which was the Titus Ridge Fire, near Happy Camp. This fire burned 23,680 acres covered with heavy timber and consumed an estimated one and one quarter billion board feet of timber, enough to build 125,000 houses.³⁹

Even though the fire was spotted only minutes after lightning struck a tree, it took hours before the first firefighter's arrived on the scene. The regular Klamath forces were overwhelmed with other lightning fires, so three local men were dispatched to the fire on July 11, 1926. The first attack was unsuccessful, and seven additional men were sent on the 13th, then sixteen more on the 14th. An aerial patrol reported the fire was spreading in three directions so another detachment of seven men were sent to the fire. By the evening of the 14th, thirty-nine men manned the firelines, but the fire had reached 1,200 acres and was still spreading. More men arrived along with several rangers and Assistant Supervisor Perry Hill to direct the fire control action. The fire, pushed by up-canyon winds and high temperatures, spread across Elk Creek, a major tributary of the Klamath River, on July 20th.

This advance was checked as men continued to trickle into three fire camps. The camps were in steep, roadless canyons thick with virgin Douglas-fir timber. The only way to supply them was by pack string. Most of the firefighters stayed on the firelines, coming to camp occasionally for a hot meal. They slogged along for two weeks building miles of fireline with shovel, Pulaski and axe only to see their efforts frustrated on July 25th. That day, a strong west wind drove the fire across Elk Creek once more, this time on a front five miles wide. Even at this late stage there were only 150 men on the firelines. These men took the only action open to them: they used ridge tops as a defensive line and fired out the timbered canyons, finally controlling the fire on July 29th, eighteen days after its start. Every foot of fireline was constructed with hand tools.⁴⁰

The Bogus Fire also occurred in July but was remembered long after the Titus Ridge Fire was forgotten. Covering 1,984 acres of prime timberland, the Bogus burn was a perfect visual essay on forest fire. Photographs of the burn displayed thousands of dead trees, limbs still spread, bark falling away, standing stark against a backdrop of 2,000 acres of brush—a

testament to what fire could do in the forest. It became one of the most potent visual weapons in the District 5 fire prevention arsenal.⁴¹

Pack train on
the trail to the
Bluff Creek Fire



The Klamath Board of Review took the supervisor to task for failures during the 1926 fire season. Some of the same old problems identified after the 1924 season were still showing up in the Klamath. The worst faults were the lack of personal direction on the fires by rangers and the supervisor, trying to make do with resources at hand rather than calling for help. Show took a personal role in all fire reviews and would not tolerate what he believed to be incompetence or dereliction from duty. Several rangers and other forest officers in District 5 were asked to resign, accept demotion or transfer to other posts after the 1926 fire season.⁴²

The Plumas National Forest survived months of hot, dry weather in 1926 with a good record, only to be hit in late August by the Roland-Last Chance Fire that burned 21,848 acres of east-side Sierra pine and grass. Further south, the Sequoia Forest watched a late August fire burn 60,000 acres outside the forest boundary. This fire eventually reached the forest, and the Sequoia counted itself lucky to escape with only 5,000 acres burned. By the end of the fire season, the Sequoia's record of acres burned was second only to that of the Klamath. Nearly 40,000 acres had burned within forest boundaries. The Lassen and Trinity National Forests also suffered losses of more than 20,000 acres burned, and five other forests recorded burned area of ten to twenty thousand acres.⁴³

Although 1926 proved to be a bad fire season, there were some silver linings in the dark clouds of smoke. Burned acreage was down from 1924 by more than 200,000 acres. Many fires with the potential to become conflagrations were stopped within a day. Only a few large fires required a "campaign" to suppress. Southern California escaped with low burned acreage due partly to better weather conditions in the southern half of the state. Closures kept all users out of large areas, and the no-smoking rules on national forest land and similar ordinances passed by cooperating counties also helped reduce fires in the south.

Ready-to-use fire camp outfits, introduced in 1925, were improved during the 1926 season. Equipment such as folding tables, portable pumper units, cooking outfits and folding field desks complete with necessary forms underwent rapid improvement as field conditions revealed weaknesses in design. In 1925 sling psychrometers, used to measure relative humidity, were issued to fire bosses, and special forecasts about weather and burning conditions were provided. This was followed in the 1926 season by organization of the Fire Weather Service of the U.S. Weather Bureau. The state was divided into eleven fire weather districts, and weather conditions were reported from eighty-five lookout stations. This service evolved into special forecasts for individual large fires.⁴⁴

The 1926 season also resulted in several policy and organizational changes. During the 1927 season and thereafter, every auto and horseback party entering national forests was required to carry a shovel and axe for fire suppression purposes. Special fire prevention patrols during hunting season, which had been successful in several forests in 1926, became standard practice. Show also secured agreement from Greeley to use the Fighting Forest Fires appropriation (emergency funds) for fire prevention and fire readiness. These and other changes demonstrated that the new district forester intended to make use of his research knowledge to improve fire control in District 5.⁴⁵

Show had some old hands to help him in northern California, men who were just as savvy as his veteran southern California supervisors. One of the old timers was Dave Rogers, who had been supervisor of the Plumas Forest since 1909. The Plumas was the scene of large-scale lumbering operations, and some of the district's worst fires were started by loggers. Rogers was a middle-sized man with lots of energy. He was a "Pinchot man" with strong ideas about forestry and fire control. Just to

the south of the Plumas, R. L. P. Bigelow held forth on the Tahoe Forest. Bigelow was the dean of California supervisors, having started as the first supervisor of the Klamath Forest in 1905. He was tough and demanding of his men and himself. His detailed diary, kept for more than thirty years, describes a field manager, always on the go. During the day, he inspected timber sales and grazing allotments, laid out roads and trails, talked to politicians and permittees, and at night he talked forestry to any group that would listen.⁴⁶

M. A. Benedict was another of the old breed. The colorful supervisor of the Sierra National Forest at North Fork, Benedict began his career in the Plumas Forest and served in the Sierra and the California Forests before becoming supervisor of the Sierra in 1916. Benedict possessed that messianic brand of enthusiasm about forestry that marked all the old-timers. He was also interested in organizational management and was a leader in developing the first training programs in the California forests. He was an early advocate of a staff of specialists to help the supervisor run the forest. Benedict was known for getting out to work projects, sometimes when he wasn't wanted.⁴⁷

Rupert Asplund recalled one such occasion in the late twenties when he was part of a telephone line construction crew. The crew was at work when Benedict appeared on the scene dressed in work clothes and ready to hang wire. The ranger in charge of the project was not too happy to see the boss on the job and muttered something about "him looking over my shoulder." Sizing up the job ahead, the ranger called the crew together and told them he would assign them the trees they were to climb. This was fine with the crew and Benedict, so the ranger directed the crew to their trees, pointing out a bushy white fir to Benedict. For the next hour and a half, every time Benedict descended a bushy white fir, the ranger would point to another bushy white fir and say, "There's the next one." Finally, Benedict climbed down the last tree, face and arms scratched and bleeding, sticky white fir sap all over his clothes, frustrated and not a little angry. He looked toward the ranger, who pointed to another bushy white fir and said, "There's the next one." Benedict snorted and said, "To hell with you and 'the next one,' I'm going home." He turned, stomped off to his car and drove away, not to be seen on that job again.⁴⁸

Among the other long-time supervisors in northern California were J. R. Hall of the Stanislaus, J. D. Coffman of the California and William

G. "Bill" Durbin of the Lassen. Hall had been supervisor of the Santa Barbara Forest and was a veteran of the district. Coffman became chief of fire control for the National Park Service in 1928. Durbin was renowned as a capable supervisor and a real character.

Durbin was an inveterate tobacco chewer and enjoyed poking sly fun at those he considered self-important. Once he was invited on a trip with Bob Deering and Stephen T. Mather, founder and leader of the National Park Service. Then, as now, the Park Service was not averse to acquiring national forest lands for park purposes. This led to some rather strained feelings at times. Mather was a stickler for crisp, clean uniforms and well-kept equipment. He arrived all dolled-up for the trip in a dazzling uniform and driving a sparkling, shiny new Packard sedan. This may have been the first Packard Durbin ever saw, but he was not overly impressed. As junior member of the party he piled into the back seat on the right side of the car. No sooner was the trip under way than Durbin rolled down the window and let loose a spray of tobacco juice. Mather continued on his way unaware of events in the back seat. When the day was over, he got out of the car and said goodbye to Deering and Durbin. Glancing over at his Packard, he was shocked to see the entire right rear coated with tobacco juice. He was too much of a gentleman to say anything, and Durbin was satisfied, having delivered his opinion of the Park Service and Mather without saying a word.⁴⁹

Show had a salty bunch of supervisors, north and south, and needed help to keep them pulling together. When Ed Kotok left in July 1926 to become director of the experiment station in Berkeley, Show selected Jay H. Price to succeed him as chief of fire control for the district. Jay Price was born in Chico, California in 1889. He attended the University of California at Berkeley, graduating with an engineering degree in 1913. Price worked as an engineer in central America and for Diamond Match Company and served in the 10th Engineers in World War I, then joined the Forest Service in 1920 and became district logging engineer until his selection as fire chief in 1926. Price was well informed, thoughtful and soft-spoken. Associates describe him as having an "aura," an instantly likable personality. Price believed in getting out on fires, and many of the fire reports of the late twenties and thirties mention him.⁵⁰

Rupe Asplund was a young assistant ranger in the Sierra National Forest in 1929. The district office was a faraway place where the "brass"

did mysterious things, only occasionally appearing in the sight of the lowly working men. He had heard of Jay Price but had never seen him. One night, while scouting a fireline in the Sierra Forest, Asplund became disoriented and climbed up on a large boulder to rest and locate himself. After a few minutes he heard someone thrashing through the brush. A man appeared, climbed onto the boulder and asked, "Young fella, do you know where you are?" Asplund answered, "No." The man said, "Well, that makes two of us that are lost. I'm Jay Price from San Francisco." After some pleasant conversation they found the fire and went on their way. Price's natural friendliness and willingness to listen made him liked and respected by everyone in the California national forests.⁵¹

With Price and his assistants in the district office, Kotok in the experiment station and veteran supervisors in the field, Show had the men who could carry out his vision for controlling forest fires in California. Along with the leadership came the fruition of several ideas aimed at improving the efficiency and speed of fire control through use of specialized equipment.

Airplanes, Trailbuilders, Fire Trucks and Other Innovations

The Army Air Service air patrol ended in 1921, but the need for certain kinds of aerial observation continued. Greeley sought a \$50,000 appropriation for air patrol in fiscal year 1923. He was supported by C. S. Chapman of the Western Forestry and Conservation Association, who wrote to Senator McNary of Oregon in May 1922 on the subject. Neither was successful. However, the Army did provide flights on an emergency basis during the 1922 fire season. Twenty-two missions were flown, ten from Santa Barbara and twelve from Montague. One of these emergency flights speeded delivery of supplies during the Kelly Canyon Fire in the Santa Barbara National Forest in September. At about the same time, men of the California National Forest wished that the air patrol were available. The Grindstone Fire started in an area blind to lookouts and burned 37,376 acres, the largest fire on record for that forest. It was believed that the air patrol would have seen the fire when it was still small enough to handle easily.⁵²

Army budgets continued to decline until U.S. Army headquarters in Washington wrote to the secretary of agriculture late in 1922 that they could no longer fly missions for the Forest Service. They suggested the

Forest Service get a special appropriation for air patrol. The secretary replied on March 22, 1923 that the U.S. Department of Agriculture would pay for air patrol in the future. Someone from the Washington office of the Forest Service noted on the margin of the letter, "This kills the goose!" (that laid the golden egg).

Greeley continued to negotiate with General Mason B. Patrick, commanding officer of the Air Service, but only emergency flights were permitted in 1923. The potential for fire disaster in 1924 led to requests from the Secretary of Agriculture to the Secretary of War for use of the Air Service. The Army complied on a limited basis. Finally, in 1925, a \$50,000 appropriation for air patrol on the West Coast was secured.⁵³

In the meantime, the conditions of cooperation between the Army and Forest Service had changed. During the 1925 season the Forest Service hired and paid U.S. Army Reserve flying officers \$400 per month plus expenses and reserve mechanics \$200 per month plus expenses. Observers were local forest officers familiar with local conditions. The Army provided the planes and air bases at Mather Field and Griffith Park, near Los Angeles and screened the applicants to secure the best men. The 1925 air patrol season was a success, and operations set a pattern for the next few years. Flights were made only as needed, but were successful in locating lightning fires and scouting on large fires and concentrations of small fires.⁵⁴

Two new and innovative uses of aircraft were made that promised much for the future. Chet Jordan, of the Santa Barbara National Forest, needed emergency telephone wire sent over a mountain to a fire camp, but no pack stock was available. The pilot of the Griffith Park plane, Lt. James, said, "Let's put the wire over with the plane." The wire was successfully dropped, and Jordan wrote, "We demonstrated that it was possible to put into a fire camp anything that was needed in the way of supplies or equipment that could be dropped from a plane."⁵⁵

A second experiment was carried out at Mather Field on October 2, 1925, with R. L. Deering, Chet Jordan, L. W. Hess and pilot Norman W. Potter present. Two small fires were started close together. An air patrol plane piloted by Potter flew over the fires at an altitude of about 150 feet, and Hess dropped bottles of a fire retardant as close as possible to the fires. The plane flew over ten times and Hess's "bombs" landed an average of forty-nine feet from the fires. Although he came within

eight feet of the target on two occasions, the fires wouldn't have gone out because the chemical failed to work even when applied directly to the fire. The manufacturer of the chemical went away after the tests to try again. Nonetheless, the observers concluded that it was possible to slow the spread of a small fire by use of an effective fire retardant dropped from an airplane.⁵⁶

During the 1926 fire season the air patrol was operated much as it had in 1925. In both years, Army Lt. Lloyd Barnett served capably as liaison officer and helped smooth over difficulties between the services. The Army's budgets were further reduced in 1927, so it refused to provide a liaison officer or aircraft for the 1927 season. The Forest Service then secured the use of ten obsolete DeHavilland aircraft that had been declared surplus by the U.S. Post Office. The Air Service agreed to rehabilitate these planes for air patrol work, but clearly they wanted completely out of the arrangement. As early as April 1927, the Forest Service wanted to contract for air patrol services, but language in the appropriation act made it impossible. The Washington office managed to get the language changed for fiscal year 1929, and contracted air services began on July 1, 1928.⁵⁷

While the air patrol was evolving into contract services under full control of the Forest Service, another major fire suppression tool was being developed. The 1924 Northern California Board of Fire Review report suggested use of tractors and drags to cut firelines. Road construction contractors had used tractors and drags for several years. District Forester Show urged Bob Deering to pursue these suggestions. Deering gave the task to Chester Jordan who had recently transferred to the district office. Jordan was in charge of fire roads and trails and had tried tractors on firelines in the Santa Barbara Forest. A test by the Fruit Growers Supply Company of Susanville in 1926 used a Best "60" tractor towing a V-shaped drag. The drag cut a fireline three feet wide. The Caterpillar Tractor Company also worked with the district office and in 1926 tested a Russell motor grader and a V-shaped drag in the Mt. Shasta brushfields and at Barley Flats in the Angeles. Other tests were conducted in the Monterey Division of the Santa Barbara National Forest in January 1927.⁵⁸ In all cases the equipment was unsuccessful in negotiating steeper slopes and side hills. Jordan was disgusted and said, "Why not just put the damned blade on the front of the tractor?"⁵⁹

Jordan found that road construction contractors had already used a tractor with a rigid blade attached to the front to push earth. The rigid push blade was limited for fireline construction because brush or trees soon piled up in front of the machine. Jordan found that Ted Flynn, an engineer in District 6, had experimented with a front-mounted, angled blade while developing a small tractor to build trails. Meanwhile, Earl Hall and Mack Wooldridge, Cletrac Company dealers, were also experimenting with a similar device. Apparently this was an idea whose time had come, for several others were also experimenting with the same method. The breakthrough came at a demonstration of road building equipment at Santa Barbara in 1928. Flynn asked Hall and Wooldridge to demonstrate his angled blade. They did, and it was a huge success.⁶⁰

Deering and Jordan reviewed the progress of all these efforts and decided to hire Hall and Wooldridge to improve their tractor blade for fire control use. The two men devised an adjustable angled blade and added devices that allowed the operator to control the blade from his seat, which allowed the operator to move dirt to the side without changing direction. The same was true of brush, logs or small trees, so a fireline could be rapidly built even in steeper ground and on side hills. The new equipment went by several names: "backfiller," "angledozer" and "trailbuilder." Trailbuilder was the name used by most firefighters during the thirties and forties, but this name was later discarded for "bulldozer" that was shortened to "dozer." Although the dozer was developed in the late twenties, it did not come into general use on forest fires in California until ten years later.

Tanker trucks also evolved into practical firefighting equipment during the late twenties. There had been several abortive attempts to get water tanks to the firelines during the twenties. Then the automotive shop at Government Island in Alameda turned out several fire trucks during 1926 and 1927. These trucks were built on a White truck chassis and carried a 750-gallon tank and 1,000 feet of hose. The Shasta Forest took delivery of one of the trucks in the spring of 1927. In the spring of 1928 the Sierra National Forest experimented with a Fordson tractor that had been equipped with a Pacific Marine pumper and 500 feet of hose. This apparatus towed a 500-gallon tank mounted on a fifth wheel behind the tractor. Rupe Asplund took this machine to 125 fires that summer, but the equipment was not used again because it could not negotiate side hill terrain.⁶¹

The genesis of today's forest fire engine was the 1928 fire season, which devastated brush, grass and grain in the Great Valley and surrounding foothills. Governor C. C. Young appointed a Rural Fire Protection Committee, which met on September 28, 1928, and again on December 28, 1928. These meetings had three significant results: the Division of Forestry asked the State Highway Department to build four tank trucks for its use; the Board of Fire Underwriters set fire standards for rural fire districts and agreed to lower fire insurance rates where districts met standards; and the committee prepared stronger fire control laws that were passed by the 1929 state legislature.⁶²

More than 325,000 acres of state protection area burned during the 1929 fire season. Included in the burned area was the Mill Valley Fire in Marin County that destroyed 125 homes during a late June heat wave. Despite the heavy losses, the available tank trucks were a great success; they were credited with keeping losses from reaching even higher peaks. Rural Fire Institutes were held in 1929 and 1930 to demonstrate the use of tank trucks and encourage their acquisition by local fire districts. By 1933 the Division of Forestry had thirty-six tank trucks and there were more than 200 other tank trucks in use throughout California.

Probably the best of the early fire tanker trucks were built by the California Department of Highways for the Division of Forestry in 1928 and 1929. These units were built on a two-ton Moreland truck chassis and were fitted with a 225-gallon tank, a "live" reel (hose charged with water), extra hose, a Pacific Marine portable pump and fire tools. The water pump operated off the truck engine. Most of the Division of Forestry's fires were in grass and brush and gentler terrain well adapted to use of fire trucks. The result was that the Division forged ahead in development of mountain fire trucks and by the mid-thirties these trucks were standard equipment at Division fire stations. In contrast, mountain fire trucks were not in common use in District 5 until the late thirties or early forties.⁶³

The California national forests were slower to develop mountain fire trucks because of limited budgets and the prevalence of low-standard roads within the forests. The need for efficient fire suppression led to improved use of manpower. Thus the Sierra Forest established the first fire suppression crew in District 5 during 1929. These so-called "sit-tight" crews were composed of nine experienced guards and a cook. The crews had their own truck and fire tools and were "on call." Their

mission was first attack, but if reinforcements came the crew members became crew leaders.

Supervisor M. A. Benedict (and most other firefighters) believed a small crew of experienced men could out-produce two or three times their number of pickup laborers. The trial was so successful that three years later there were nine such crews in the district. Fire crews were not a new idea. Supervisor Dave Rogers of the Plumas suggested the concept at the December 1910 forest supervisors' meeting, and Los Angeles County Forestry and Fire Department had established a fire crew at San Dimas in 1928. The organization of fire crews by District 5 and the experience gained in their use and management between 1929 and 1933 proved to be invaluable after the Civilian Conservation Corps program got under way.⁶⁴

Most of the innovations of the late twenties remained in an experimental stage due to lack of funds. Trailbuilders, fire trucks and fire crews did not come into regular use on the fireline until the thirties, which was unfortunate because the 1928 fire season was one of the most damaging in the history of the California national forests.

Reprise of 1924

A return to above-normal precipitation and below-normal temperatures in 1927 gave most firefighters a rest. Like other Americans, they had a chance to thrill to the exploits of Charles A. Lindbergh and Babe Ruth as each set his own records. The people of the district also commiserated with hundreds of thousands of refugees from the great Mississippi River floods, and when Calvin Coolidge announced his retirement from politics they hoped the Forest Service would fare better under a new administration. When William B. Greeley resigned on February 4, 1928, to take charge of the West Coast Lumber Manufacturers Association, there was genuine regret among firefighters, who lost a personal champion when he left. His emphasis on fire control and cooperative effort resulted in permanent changes in American forestry. Most of all, firefighters worried about the 1928 fire season. Every even-numbered year in the twenties seemed to be jinxed.⁶⁵

They had reason to worry, for 1928 began with the driest January on record at many southern California weather stations. A few days of rain in February were followed by a wet March. The clouds came in the spring but brought little rain. The old rule that a dry April and May meant a

bad fire season was on the minds of firefighters throughout the state. District Forester Show issued the annual fire circular to the forests in May. Every dollar available was used to prevent fires and reduce fire hazards at campgrounds and along roads. Hazardous areas were closed to the public, and all of the publicity measures taken in past years were repeated again and again.⁶⁶

The fires burned regardless. It must have been frustrating to Show, who had the outline of a grand fire control plan in his mind that could prevent huge losses in timber and watershed lands, but he had neither the money nor the manpower to accomplish more than a delaying action. All he could do was hope to keep losses to a minimum.

The statistics at the end of 1928 were depressing. Almost 300,000 acres of national forest land burned, and an additional 55,000 acres of private land inside the forest boundaries had gone up in smoke. If the season was not a disaster, it was not far from it. Thirteen forests recorded 10,000 acres or more burned in 1924; in 1928 the toll was nine forests. Seven forests recorded 30,000 or more acres burned over in 1924; in 1928 there were six.⁶⁷

The central and southern Sierra were hard hit. The Stanislaus Forest suffered 50,000 acres burned within its boundaries, and on the Sequoia more than 30,000 acres burned. One of the Sequoia's fires, the Three Rivers/Clough Cave Fire, created a minor uproar after it had burned from privately-owned land into Sequoia National Park and Sequoia National Forest. The park superintendent, John R. White, wrote a letter to the editor of the *Los Angeles Times* praising the cleansing effect of the fire. This incensed Division of Forestry and Forest Service employees who had done most of the firefighting. The result of disagreements between the agencies was the first joint-agency board of review, which was chaired by Jay Price. The board agreed that future multi-agency fires should have a general headquarters to make sure that fire suppression was coordinated. The Forest Service also made this the opportunity to send the division a bill for firefighting services rendered outside the forest boundary, the first time this was done.⁶⁸

The Sequoia Forest fought another fire that illustrated the difficulty of getting local judges to treat arson fires seriously. The Miramonte Fire was started outside the forest on August 20, 1925. Since the fire was a

threat to the forest, Sequoia firefighters helped extinguish the fire. The fire report noted the following:

Miss Luci Harlan later confessed to setting the fire, pled guilty before the local justice to malicious mischief by setting the fire, was asked by the judge how much wages she received for cooking for firefighters, answered, \$26.00 and was fined \$26.00. Justice, where art thy scales?⁶⁹

Further north, the Lassen National Forest recorded 15,000 acres burned, but the most serious fire in northern California was in the Shasta National Forest. Dry lightning started twenty-six fires in the forest on August 27th. The Stevens Pass Fire started only eight miles from Tennant, a logging camp of Long-Bell Lumber Company. The Forest Service dispatcher at McCloud asked the company to attack the fire. A man was sent on the 27th, but by 10:30 a.m. the next day heavy smoke was seen at the site. The dispatcher checked with the company and was told the fire had a good line around it. A forest guard at a nearby station was asked to check the fire that morning. He had been on another fire all night and took a nap before complying. By the time he awoke, the fire was over the line and headed northeast at a good clip.⁷⁰

Lee Morford, longtime dispatcher for the Klamath Forest, served on this fire while working for McCloud River Lumber Company. He and his crew spent a week mopping up the fire. They worked from daylight to dark, about twelve hours. Lee was paid thirty-five cents per hour and his crew were paid twenty-five cents per hour. Snowfall ended firefighting operations on October 3rd after 65,000 acres had burned.⁷¹

The 1928 fire season was one of the worst fire seasons on record, especially bad in southern California, where all four forests had several large fires during the summer. As usual, the Santa Barbara led the pack, with large fires during the summer heat waves. The Miller Canyon Fire burned more than 12,000 acres in late July in the Monterey Division. Then on the first of September the Aliso Canyon Fire, also in the Monterey Division, burned more than 29,000 acres within the forest and another 13,000 acres outside the forest. Most of the damage to southern California forests, however, came during a siege of Santa Ana winds in late September.⁷²

One of the largest fires on record in California began on September 18, 1928, in Riverside County as two fires, one in Lewis Valley, the other near Tule Peak. They burned together on the 29th and crossed

into San Diego County near Beauty Peak. At this time the fires were miles outside the forest, and a west wind was driving the fires toward the desert. Forest officers watched but were not especially worried. The morning of September 20th the fire poured over the south slopes of Beauty Peak headed for Chihuahua Valley, and Supervisor J. E. Elliott of the Cleveland became alarmed. He ordered men from the Palomar District of the Cleveland to attack the fire. About 5:00 p.m. that day a Santa Ana wind, blowing from the north, struck the fire and carried it on a fifteen-mile-wide front toward Palomar Mountain and the Cleveland Forest. By 10:00 a.m. the next morning, the fire had traveled ten miles and was entering Warner Valley. Meanwhile the same fire had entered the San Bernardino Forest, where it consumed brush and timber on 19,000 acres within the forest. This fire, called the Beauty Peak Fire in the Cleveland and the Wilson Creek Fire in the San Bernardino, burned an enormous total of 166,000 acres. Fifty thousand acres burned within the two national forests.⁷³

While this fire burned, two other large fires in the Cleveland Forest created severe problems. The San Diego River Fire was set about 10:00 p.m. on September 21st and burned 15,015 acres inside the forest and nearly 7,000 acres outside before it was controlled on the 26th. Meanwhile the Witch Creek Fire, which was set about 6:00 a.m. on the 21st, burned 17,280 acres inside the forest boundaries and 15,960 acres outside before it was controlled. These two fires, set by incendiaries, eventually burned into each other. In the space of one week, 121,165 acres had burned in San Diego County.⁷⁴

The San Bernardino National Forest had a rash of large fires during the same week. The Mill Creek Fire above Redlands was not the largest, but it was important for another reason. The fire began on September 26th and was attacked by twelve men when it was five acres in extent. The fire was in very steep country and their efforts failed. The fire spread overnight, and by 10:30 in the morning 500 men were on the firelines. The fire seemed on the way to control on the 29th when tragedy struck. Roy Boothe, from the Sierra Forest, was scouting the fireline and met a crew of seventy-five Mexican aliens who were cold trailing under supervision of three forest officers. The work proceeded routinely until about noon, when the fire flared up in the canyon below the crew. The fire crowned through the brush with a roaring sound that panicked the crew.

All but two men ran into the burned area and escaped the fire, frightened but safe. The two others ran into the unburned brush and were killed by heat and flame. The deaths of their companions so shook the rest of the crew that they had to be removed from the fireline.⁷⁵

Much of the work done on the fire was lost on October 1st, when a strong Santa Ana wind pushed the fire two miles in two hours and "burned twice as much as had been burned in the preceding seven days." The Mill Creek Fire was controlled on October 5th after having burned 6,000 acres. The faith and belief of some Forest Service firefighters in the validity of suppressing watershed brush fires at all costs was shaken by the events of this fire. The fire report noted that the pickup fire labor was very poor. Many crewmen were diseased, too old and poorly equipped. Since most Forest Service work supervisors could speak only a few words of Spanish, there was a language barrier as well. The report stated that many men were injured by falling rock because of the attempt to save valuable watersheds by building line along the edge of the fire rather than falling back to a ridgeline and backfiring. This fire may have recorded the first fireline tragedy in District 5 history. It would not be the last.⁷⁶

Altogether the southern California national forests lost 183,000 acres to fire within their boundaries, nearly half of the total for District 5. The Santa Ana winds in the south and the heat waves in the north combined to make the 1928 fire season second only to 1924 among bad fire seasons to that date.⁷⁷

After the fire season ended, Show used boards of review to identify fire control problems in the forests and propose solutions. When organizational problems were identified, such as in the Klamath in 1926 and 1927, he gave them special attention. Improvement programs were developed and closely monitored. In the Klamath's case, the situation had improved enough by 1929 to merit Show's praise. However, Show was not slow to take adverse personnel action when men did not perform up to his standards, as was demonstrated in 1926. The Shasta National Forest Board of Review for 1928 resulted in discharge of the guard who took a nap instead of checking the Stevens Pass Fire and transfer of the forest fire chief.⁷⁸

The 1928 season was severe. On the other hand, half of the forests in the district escaped with low burned area, which was encouraging and suggested that improvements made in fire control after 1924 and

1926 were bearing fruit. Of course, two of the forests with good records, the Inyo and Mono, were on the eastside of the Sierra Nevada and were considered "asbestos" forests where fire was seldom a problem.

The folks in the Inyo National Forest agreed that the 1928 season was not much of a problem. In fact, it was a big help in securing delivery of a new Ford pickup truck. The dealer promised delivery of the truck on April 20th, but July 20th rolled around, and the truck had yet to make an appearance. Tiring of the runaround, Supervisor Roy Boothe asked the district office for help. Promptly, a letter to the dealer from District Forester S. B. Show arrived, expounding at length the dangers of the fire season and the dire consequences if the Inyo National Forest did not have the truck for firefighting purposes. The new Ford truck, named "Super Elizabeth" by the forest, arrived within a week. The Inyo folks soared into the clouds with joy until someone's sober reminder brought them back to earth. They needed a fire to justify the district forester's letter. Off went Supervisor Boothe aboard Super Elizabeth in desperate search of a fire, any fire. He combed the whole Mammoth country and found not a spark. The chances for a fire seemed bleak until the skies darkened and lightning flashed. The next morning the lookout sighted a smoke at Indiana Summit. Away went Super Elizabeth in a cloud of pumice dust with Boothe, the ranger and two men aboard. The new Ford reached the fire over a road that had not been traveled in years. The fire was quickly extinguished. Super Elizabeth had passed her test, and the district forester's honor had been redeemed.⁷⁹

Boom Slides into Bust

The 1928 fire season was only an annoyance to many Californians bent on profiting from the last economic boom of the twenties. While the forest fires were burning, the stock market was heating up and continued to do so into 1929. There occurred one of those speculative fevers that has struck the American people from time to time. In the past, most of the get-rich-quick schemes involved land or mining; in the late twenties it was the stock market. There never was a large number of Americans gambling on stocks, just as in the past, most Americans had not gambled on land or mines. But most people were at least vicariously interested in the rising stock market.⁸⁰

While the nation's attention was riveted on continually rising stock prices during 1928 and early 1929, the weakness of America's economy became more evident to people in rural California. The highways and railroad tracks were sprinkled with increasing numbers of homeless men. Whenever a smoke column lifted into view, the jobless men were there looking for work. As soon as the grass and brush were dry enough to burn in the spring of 1929 a rash of incendiary fires broke out. In fact, the 1929 fire season would have been the easiest of the twenties decade were it not for fires set by desperate men wanting a job. Fifty-five percent of the acreage burned within national forests during 1929 was caused by incendiary fires. Some of these fires were set by old-time adversaries of the Forest Service, but the high level of incendiary fire losses during the period 1928-1932 pointed to the transient unemployed as the major culprits. One result of this problem was expanded use of regular fire crews in the national forests and Division of Forestry. Wherever crews were available, announcements were made that pickup labor would not be employed on fires under any circumstances. These notices probably had little effect on the actions of hungry, destitute transients.⁸¹

Several forests experienced a damaging fire season in 1929. The Trinity, Lassen, Plumas, Cleveland and Santa Barbara all suffered more than 10,000 acres burned. It was the Klamath which again topped the list with more than 40,000 acres burned within forest boundaries. In addition, nearly 47,000 acres burned outside the boundaries. Most of this burned acreage resulted from fires set by incendiaries. More than half of the burned acreage occurred between November 1st and December 8th, when the fire season finally ended.⁸²

There is a story within the story of the Klamath and the incendiary fires of 1929. Almost 24,000 acres of the incendiary fire acreage burned in the Orleans District where Ranger E. Shellenbarger was at odds with local people. Lyle Hill helped out with the fire dispatching in the Orleans District that year. He recalled, "Shelley was a pugnacious character. If he went to town in the evening, I would hear a call for help and he would be battling some of the locals. I got beat up more than once trying to rescue him."⁸³ Jim McNeill went to Orleans with his fire crew in 1929 and found the ranger incapacitated with a broken arm. The dispatcher gave Jim an "outlaw" crew made up of local men, including the man who broke the

ranger's arm. Shellenbarger was transferred after the fire season, probably for his protection as well that of the local citizens. It should be noted that Orleans was a tough assignment for rangers from 1905 to 1929 and remains so right on down to the present day. The issues have shifted from burning to timber cutting to herbicides and marijuana growing, but the antagonisms of some local people toward the Forest Service remained.⁸⁴

The great fires and bad fire seasons of the twenties forced development of fire control in the California national forests into two parallel lines. One line was development of the knowledge, tools and men needed to manage the "normal" fire season activities: maintain the roads and trails, machinery, telephone lines, lookouts and fire stations; recruit and train seasonal fire control personnel; and be in position to attack and control the vast majority of fires while they were still small. The other line was improved management of large fires. The school of experience, including hundreds of large fires, was the way District 5 people learned how to better organize suppression of large fires. The structure of large-fire organization evolved in two major elements: the fireline and the supply service. When a large fire continued for more than a few days and became a campaign fire, a third element, scouting and plans, began to function. Specialization took place within each element, until by 1929 a well-developed large-fire organization was in general use.

In addition to improved organization, District 5 began transporting, on a regular basis, fire "overhead" to large fires from adjacent forests or from District 3 (Arizona and New Mexico) by train or even aircraft. After 1928 a list of personnel qualified for specific large fire duties was kept in the district office. This was the forerunner of the "red card" fire qualification system used today. Also, District 5 made regular use of boards of review to identify problems and propose solutions to breakdowns on large fires.

The research by Show and Kotok, the fire plans, organizational improvements and development of new tools and equipment might never have occurred in California were it not for the challenges presented by the state's fire regime. If there hadn't been a "terrible twenties" the development of fire control policy and technology probably would have occurred at a different pace and in a different place. Even so, when the last of the fires of the 1929 season was controlled, most District 5 firefighters were happy to say goodbye to the twenties.

By the time the 1929 fire season ended, the collapse of the stock market was on everyone's mind. Most people recognize major changes by events in their own lives or events at the state or national level. October 24, 1929, "Black Thursday," was an event that all could recognize. There was a ten-day period before the crash when stock brokers called, without much success, for payment of the balance on accounts purchased on margin. Stocks were sold in huge blocks, and even a temporary halt in the panic selling, engineered by a group of New York bankers, could not halt the precipitous slide of the market. By Wednesday, October 30th, the collapse of the stock market was complete, and most of America was headed for a deep business depression. The Great Depression of the thirties was to have a profound impact on the country, the national forests and on fire control, although not in ways that could have been foreseen in 1929.⁸⁵

The stock market crash was like a time bomb: Its full effect was not felt for months after the event. In fact, many business leaders, and the Hoover administration, believed that the impact of the crash was overrated. However, the Little Bull Market of early 1930 was followed by further declines in stock prices, and it was soon evident that wholesale unemployment and business failures were under way. A cycle of failure ensued. As stock prices fell, business volume fell also, and employees were laid off to cut costs. Rising unemployment reduced purchasing power, leading to more cutbacks by businessmen, and so on.¹

The early thirties were years of general despair and hopelessness that have no parallel before or since. It seemed that the entire American economic system had broken down. Businessmen who had been riding high a few years before became the object of scorn. Indeed, a large share of the general negative attitude may have resulted from the contrast between depressed conditions and the flush days of the twenties. A few examples illustrate the extent and the depth of the collapse: the index of manufacturing plummeted from 127 in June 1929 to 58 in June 1930; steel production fell from 40.6 million tons in 1930, to 13.6 million tons in 1932; retail trade declined from \$8.1 billion in 1930 to \$4.2 billion in 1932, and unemployment increased from 4.3 million people in 1930 to 12 million people in 1932.²

Until mid-1932 the American public seemed apathetic in their misery. More than 86,000 businesses had failed. Many people lost their life savings and their homes and became part of a growing army of homeless, malnourished wanderers. Available factory jobs paid wages of only five to ten cents per hour or less. Many of those who were employed could no longer meet payments for appliances, cars and homes, and their living standards dropped drastically. The farm economy, which had not flourished during the prosperous twenties, grew worse. Prices fell, and farm products wasted for lack of a market. A succession of drought years added to the farmers' despair. The country was in a mess, and the Hoover administration seemed incapable of doing anything about it.³

President Herbert C. Hoover had been the star of "the business of the American people is business" tradition that arose during the twenties.⁴ In those happier days even Franklin D. Roosevelt thought that Hoover should be president. But the man who organized relief programs overseas in such spectacular fashion seemed, as president, to be shackled by his

own faith in the resilience of the business cycle. Hoover was true to his tradition and tried to reverse the Depression by counseling with business leaders and appointing a council of businessmen to encourage business stability. Only toward the end of his term did he support attempts by the federal government to restore the economy. In 1932 he urged creation of the Reconstruction Finance Corporation and took other actions to increase credit and capital, but he refused to extend direct aid to the jobless. By the summer of 1932, the national mood had changed from apathy to anger. Hoover's name became an adjective for poverty: "Hoover blankets" (newspapers), "Hoover hogs" (jackrabbits), and "Hoover flags" (pockets turned inside out), were part of the lexicon of the unfortunate. It was unjust to assign all of the blame to Hoover, but as the symbol of the discredited business tradition and as the president whose relief policies were too little and too late, Hoover personified the Great Depression to many Americans.⁵

California suffered along with the rest of the nation. Because of its mild climate and widespread rumors of available jobs, thousands of homeless single men "rode the rods" (freight trains) to the Golden State. Farm families loaded everything they owned onto their jalopies and left the drought-stricken Great Plains and headed for the promised land. Local communities and state agencies desperately tried to cope with growing numbers of homeless, hungry people.

Employees of the Forest Service also felt the effects of the Depression. Reduced federal budgets led to cuts in the number of seasonal firefighting personnel and reductions in wages for firefighters and permanent staff. Region 5 voluntarily reduced fire guard salaries and work hours in May 1932 in an effort to keep more men on the job. A presidential executive order of June 1932, which reduced all federal employee wages by 8.33 percent, created even more hardships on these men. More and more employees were laid off as lumber companies ceased operations in the national forests and budgets continued to decline. Roy Headley summed up the situation in a letter to Professor Emanuel Fritz in February 1932: "Personnel is shrinking and can be adjusted to meet varying conditions only with the greatest difficulty, if at all."⁶

The budget struggles also had internal aspects. Every regional forester was determined to do his best to hold on to the funds he had, or get more if he could. At one annual winter meeting of regional foresters, experi-

ment station directors and the chief forester, these attitudes generated what came to be known as "the Battle of the Potomac." Regional Forester Rutledge of the Intermountain Region (Region 4) made a strong case for cuts in the fire control budgets of Regions 1, 5 and 6, with the proceeds to go to the smaller regions, including his. Show and his counterparts in Regions 1 and 6 fought the proposal. There was no give on Rutledge's part, and the struggle ebbed and flowed for weeks, a kind of trench warfare among bureaucrats. Finally Rutledge relented, after that Show and Kotok drafted "The Treaty of Washington," which was signed by all those present and grudgingly presented by Rutledge to Chief Stuart.⁷

In the midst of all this misery, the 1931 fire season erupted as the worst in the brief history of the California Division of Forestry. Unemployed men were starting costly fires all over the state in hopes of getting a job fighting fire. The Division countered the rash of incendiary fires by establishing "sit tight" fire crews in twelve counties and stating that no pickup firefighters would be hired, but the fires continued. Thus, the interests of the Board of Forestry, the Department of Finance and the Department of Social Welfare began to merge. If these transients could be put to work on forestry projects, the number of incendiary fires would decrease, suppression costs would decline and the needs of these homeless men could be met.⁸

The idea was not new. In fact, it had been proposed in this very form in the mid-twenties. Discussions were held between agencies and other groups. Then, at a Board of Forestry meeting on October 10, 1931, Rexford S. Black, manager of the California Forest Protective Association, proposed that up to twenty labor camps be established in the foothills of the state. On November 16, 1931, Governor James Rolph, Jr., appointed a Labor Camp Committee with Black as chairman. Among those on the committee were Bob Deering and Chet Jordan of the Region 5 office. The committee cut through red tape, sidestepped rules and regulations, and had a report and a proposed camp program ready within two weeks. Governor Rolph approved the program on November 27th, and camp development began immediately.⁹

In most cases, camps were placed in existing buildings that were cadged, bartered for or simply appropriated. Walter D. Winters, state ranger at Madera, recalled that he was told to be ready to house, feed and work fifty men by December 15, 1931, another fifty by January 1, 1932,

and one hundred more by January 15, 1932. When he asked for funds to rent quarters, he was told there were none, that he must make do. The dauntless Winters located a camp in an old dance hall at Fresno Crossing. He traded board and tobacco to the owner for use of the hall. He set up a second camp in abandoned mine buildings at Grub Gulch.

The first few weeks at both camps were spent under primitive conditions: straw for a bed, gasoline lanterns for light, burned-out wood ranges for cooking and walls so porous that the winter wind whistled the men to sleep. Winters became an expert at trading for food and necessities. He also found carpenters, plumbers and other skilled men among the enrollees. Soon the camps were habitable, if not comfortable. The first reaction of local government to the camps was fear and suspicion. Winters' sincerity and the good conduct of the enrollees soon brought the local people around. Many individuals and businesses contributed food, supplies and building materials. Winters was proud of the enrollees and their willingness to work and to improve their camp situation. The men worked about six hours each day at hazard reduction, trail and fireline construction and other jobs in exchange for room and board and tobacco.¹⁰

During the winter of 1931-1932, there were thirty labor camps in operation, two on Division of Highway projects, nine in national forests and nineteen under supervision of the Division of Forestry. More than 3,300 men went through the camps between December 1, 1931, and April 30, 1932, at a cost to the state of less than fifty-five cents per man day. This program was a new departure for state government: relief was provided to jobless men in exchange for work. Initially, the objectives of the program probably were influenced more by the need to reduce incendiary fires and cut fire suppression costs than by humane considerations. The conservative state administration, like its counterpart in Washington, had a positive horror of "the dole"; that is, direct payments to the needy. Nonetheless, the program was a start, and a very successful one, in terms of restoring human dignity to the enrollees, in construction of much-needed fire control facilities and in teaching the Division of Forestry and Region 5 how to handle large numbers of men at isolated locations. The success was due to the spirit of the enrollees and to a cadre of truly dedicated men in the Division of Forestry and Region 5.¹¹

In the summer of 1932, Region 5 received funds from Congress to hire unemployed men for suppression crew duty. These crews varied in size

from five to fifteen men, who were each paid twenty-five dollars per month and board. The men worked a six-hour day on roads and improvement projects when not fighting fire. About two hundred men served in thirteen crews during the 1932 fire season. Federal relief funds were also provided to the Klamath National Forest in 1931 and 1932 for construction of forest roads. Rangers were required to report reductions in travel time to fires as a result of these new roads. Forest Highway construction (under the Forest Highway Act) from Weed to Klamath Falls and from McCloud toward Mt. Lassen National Park was also used to ease local unemployment.¹²

Rex Black became chairman of the Board of Forestry in July 1932, and in October of that year turned over the administration of the second state labor camp program to State Forester M. B. Pratt. By December 16, 1932, there were 2,400 men staying in thirty-one camps administered by the Division of Forestry, Region 5 and the Ventura and Los Angeles County fire departments. The second year of the labor camps was better organized and functioned much more smoothly than did the first year. Walt Winters was in the program again and found that a few simple rules, strictly and fairly enforced, were the key to a happy camp. When he found some men drunk on a foul brew of milk and gasoline, he first locked up the gasoline supply, then sent the drunks down the road. On another occasion, he confronted a belligerent worker drunk on vanilla extract, flattened him with one punch, then hauled him to the railroad depot in town. These instances were the exception, according to Winters, who found most of the men cooperative, considerate of others and optimistic that conditions would improve. As he wrote, "Those who came were American citizens. They were men who had always made their own way in life and were capable and willing to do so again."¹³

By the time the second year of labor camps ended in mid-May 1933, a large-scale systematic program was underway. The Forest Service was providing funds from the Destitution Relief Act of July 21, 1932. The U.S. Army, California National Guard, Red Cross and other agencies were supplying food, clothing, bedding and other services. Warehouses had been established to store goods and supply fifty-five camps throughout the state. Counties loaned equipment and supervision for work projects, and Region 5 supervised eighteen camps with a capacity of 1,300 men. Altogether more than 15,000 men passed through the labor camps in the second and final year of the program.¹⁴

These experiments in government work relief helped the fire control agencies get routine fire control work done but did little to alleviate a shortage of fire suppression personnel. The early thirties were drought years, worse in some ways than most of the twenties, but by luck or design, or both, the California national forests emerged from the early thirties relatively unscathed.

Fire Control in the Early Thirties

The obvious difference between easy, average and bad fire seasons is the amount of acres burned. In the end, this is the most important measure, but burned acreage does not indicate the potential severity of a fire season. Neither does it reveal the anxiety and stress of sitting through a long, hot summer and fall, waiting for a fire call. When the call came, the firefighter was glad for the break in routine but fearful of what the fire might bring. Precipitation at most California weather stations was well below normal every year from 1929 through 1934. The summer climate during three of these years, 1930, 1932 and 1934, was reminiscent of the twenties, when bad fire seasons occurred during even-numbered years. In fact, all of the early thirties were drier than the twenties except for the two drought years of 1923-1924. There were significant differences between the two periods, however.

In 1930, 1932 and 1933, cool, wet spring weather delayed the drying of the larger fuels and postponed the start of the fire season. Also, the total number of lightning fires declined sharply, to an average of only 385 per year from 1930 through 1933. On the other hand, the 1931 fire season was serious because of a dry spring and a large number of incendiary fires. A dry spring also occurred in 1934, and 790 lightning fires struck the region that summer, contributing to a severe fire season.¹⁵

Favorable spring weather moderated potentially bad fire seasons, but the effectiveness of the fire control organization also played a role. The challenges of the twenties, and the steps taken to improve organization, equipment and facilities such as lookouts, roads and telephone lines, paid off in more successful first attacks on fires. The result was fewer large fires and less burned area. In 1930, fire control was made a separate division in the regional office. Jay Price was placed in charge of the new unit. Vigorous leadership from Show, Deering, Price and the forest supervisors played an important role in improved fire control. After 1933, Civilian

Conservation Corps crews provided the manpower needed to keep fires small. Moreover, fickle Lady Luck smiled on the firefighters during the early thirties.

The results of favorable spring weather, effective organization and good luck were a succession of fire seasons with low to moderate burned area. The chain of fire disasters during even-numbered years was finally broken in 1930. Only 28,492 acres burned that year, less than many individual forests recorded during 1922, 1924, 1926 and 1928. The 1930 fire season became one of the easiest fire seasons on record.¹⁶

Yet even the easy fire seasons can leave bitter memories. All of Region 5 escaped with light fire losses in 1930 except the Klamath National Forest. A lightning storm on August 10th caused more than fifty fires in the trackless old-growth Douglas-fir forests of Elk Creek, Dillon Creek and Ukonom Creek. The Dillon Creek Fire was located in steep, rugged country twelve miles by trail from the nearest road. The fire blew up a day after it began, and it took 150 men working for weeks to control the fire at 5,500 acres. This fire was not only stubborn and wearisome to control, it was also dangerous. Of course, every fire is potentially dangerous, but on a campaign fire, exhaustion and lack of sleep often dull the senses, making men careless and forgetful. On August 30th, Roy England, of Happy Camp, was walking along the fireline when a small snag (dead tree) fell without warning and smashed him to the ground. The fire crew hastily improvised a stretcher and began the long haul out, but England died before they had moved very far. The snag was supposed to have been felled the day before the accident. The fire was finally declared out on September 9th, six weeks after lightning started it.¹⁷

National forest acreage burned during the 1931 fire season was far below the average for the twenties. Nevertheless, the 1931 season recorded the most acreage burned of the thirties decade, if the Matilija Fire is excepted. In 1931, 102,223 acres of national forest burned compared to an annual average of 52,000 acres for the decade, again if the Matilija Fire is excepted.¹⁸

Only the Trinity, Lassen, Stanislaus and Plumas national forests recorded more than 10,000 acres burned in 1931. The Plumas had the dubious honor of leading Region 5 with 23,530 acres of national forest land burned that year. It is a measure of the difference between the twenties and thirties that on only five occasions were more acres burned

in a single forest during the entire decade of the thirties. In contrast, this total was exceeded twenty-three times during the twenties. Most of the acreage burned in the Plumas in 1931 (20,511 acres) occurred in the Bonta Fire. This fire started from the logging railroad in Mapes Canyon, a mile north of the community of Beckwourth in Sierra Valley. This was the heyday of logging in the east side of the Plumas, and logging fires plagued the forest all during the twenties and thirties. The fire burned across Reconnaissance Peak and into the Little Last Chance and Frenchman Creek drainages before it was controlled.¹⁹

The 1932 season was uneventful until the first week of September. Within a few days of each other, the huge Matilija Fire burned 219,000 acres in the Santa Barbara National Forest, and the Eel River Fire burned 24,000 acres in the Mendocino Forest. These two fires accounted for nearly 90 percent of the Region 5 total of 272,000 acres of national forest burned that year. By comparison, the total burned acreage in the entire region during the next six fire seasons (1933-1938) was only 277,000 acres.²⁰

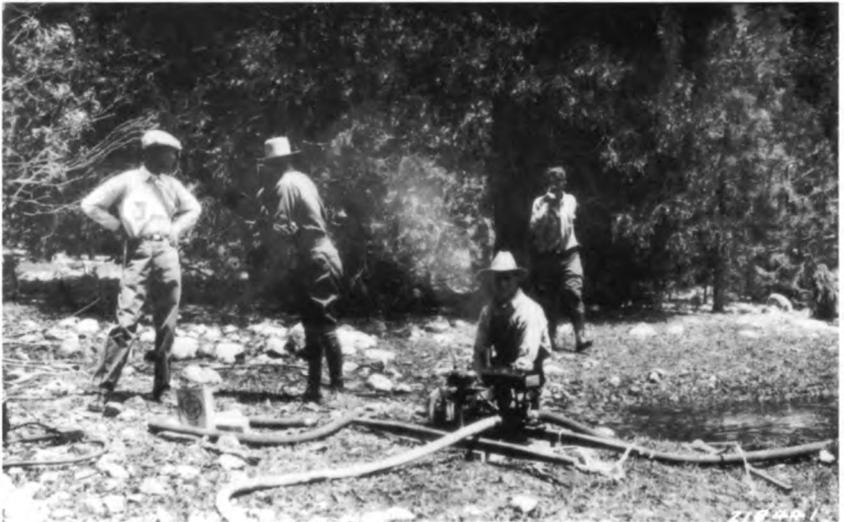
The Klamath and Trinity Forests were cursed with incendiary fires in 1932. Although neither forest suffered large losses in burned acreage, the stress of unexpected fires in unexpected places took its toll. Firemen couldn't help but sympathize with men so desperate that they would set fires to gain work. but it was a maddening effort to keep up with the firebugs. Wes Hotelling was district ranger at Weaverville in the early thirties and found incendiary fires a serious problem and dangerous to boot. He went to the Bear Creek Fire, near Canyon Creek, in 1932. With no warning, the fire leaped into the tree tops and a crown fire swept toward the crew. Hotelling and the crew ran for their lives. Hotelling escaped but "my little fire fighter was caught and burned to death." Hotelling was held responsible for the death but a board of inquiry cleared him. Upon returning to the fire area with an investigator, he saw a tree fall into a crew of 50 men who were eating lunch. He and the investigator scrambled out of the way, but several of the crew were injured. Some fires seemed to have been jinxed.²¹

The Santa Barbara Forest was again responsible for most of the burned acreage during 1933. The Black Cone Fire burned 7,423 acres in the Monterey District during early July; on August 19th, the Indian Canyon Fire began in the Santa Barbara District, blackening 30,800 acres. The next day, the Indian Valley Fire was started by an incendiary and

eventually burned 7,000 acres in the Monterey District. These three fires accounted for nearly two-thirds of the Region 5 total of burned acreage during 1933, which was 70,339 acres.²²

Three Sierra Nevada forests suffered in 1934. The Sequoia recorded more than 7,000 acres burned, but the Stanislaus had the worst record that year, with more than 19,000 acres burned. The Nelson Point Fire accounted for most of the burned Plumas acreage (about 9,500 acres). This fire began on Nelson Creek about ten miles southeast of Quincy and burned east over Eureka Ridge. Some of the brushfields originating after this fire were still being reforested fifty years later; other areas of the old burn are still covered by manzanita and whitethorn. Half of the regional total (63,006) was recorded by these three forests during the 1934 season.²³

Portable pumps became important to cope with the larger fires of the 1920s. This pump and hoselay used a small stream as a source.



This was not a severe fire season when measured against the twenties, but it was remembered because of one routine lightning fire that drove home again the lesson that any fire can be dangerous. The Shasta National Forest had a lightning “bust” on August 25th. Newly appointed Forest Supervisor John Everitt went to a fire on the south slope of Mt. Shasta. That afternoon he left the crew and scouted the west flank of the fire. The fire blew up at about 6:00 p.m., but no one was especially concerned about Everitt until he failed to show up that night. The next morning a search party discovered his body in the ashes. Everitt buried himself in an attempt to save his life but to no avail. He apparently had been caught by the blow-up the evening before. Everitt was the only forest supervisor to die on the fireline in Region 5 history.²⁴

The year 1935 was the first in seven years in which normal precipitation was recorded. Temperatures were near normal, spring precipitation was normal, and there were no heavy concentrations of lightning fires. The favorable weather, expanded fire control organization and fast attack on fires resulted in the lowest total burned acreage in Region 5 history (14,671).²⁵

Forest fires were the reason for the fire control organization, but, in the early thirties, fires were usually a break in the routine of training, patrol, maintenance of buildings and other facilities, paperwork and fire prevention. The bad fire seasons of the twenties had stimulated written fire prevention materials, radio programs, movies and other propaganda devices. Forest officers routinely gave talks to schools and clubs and made presentations at county fairs and larger events such as the National Orange Show in San Bernardino. Direct public contact seemed to work the best. Issuance of the campfire permit gave the forest officer a prime opportunity to sell fire prevention. Care was taken to select permit agents who could get the message across. Some forests registered visitors; in other cases, checking stations were used to impress users, especially hunters, with the need to be careful with fire. The conversion of fire guards, whose primary duties were fire suppression, to fire prevention patrolmen, whose job was to contact people and prevent fires, began in the early thirties.²⁶

Other fire prevention measures included restricting the public's activity and closing hazardous areas during periods of high fire danger. Smoking and campfires were regulated, and open burning required a permit. Hazard reduction was required along roads and railroads under power lines and around buildings. Specially trained law enforcement officers were assigned to fight the incendiary problems in the Klamath, Mendocino, Shasta and Trinity National Forests. The old days, when people could do as they pleased in the woods, were fast disappearing. By the early thirties, each Region 5 forest with a heavy fire workload provided each ranger with a seasonal protective assistant to handle the routine fire control work. It was not fighting fire but routine that best characterized the fire control man's day. A few excerpts from the diary of Lyle Hill, protective assistant at Scott Bar in the Klamath National Forest will illustrate this fact:

May 15. Came on duty. Worked on fire reports and bills. Went to Greenview to contact Whipple about issuing campfire permits, then to Kidder Creek to see Jack Short and Clifford Inlow about summer work. Saw Willard about campfire permits at Ft. Jones and talked to state rangers there.

Issued one burning permit and marked five cords of wood.

Installed heater and telephone in (my) tent. (Hill and his wife lived in a tent for five seasons.)

Went to Seiad and ran property lines for a new guard station (tent camp)

Maintained the Lake Mt. telephone line.

Put in eighty feet of new (water) pipe line at Spring Flat Campground and installed faucets.

Went to Oak Knoll to get mules.

Participated in guard school for three days.

Hauled tent platforms for Seiad Guard Station, installed tents and telephones.

Installed tent and telephone at Spring Flat Guard Station.

Maintained Scott Bar-Happy Camp telephone line.

Cut and split posts in Seiad Creek. Killed first rattlesnake of the season.

July 21. Went to fire at Pinkerton's with falling saw and wedges.²⁷

This was the reality of the fire control job in the early thirties.

A succession of relatively easy fire seasons in Region 5 did not lead to a sense of complacency, not with a boss like S. B. Show. Nonetheless, no firefighter in the region expected the largest fire in California history to occur in the early thirties.

The Matilija Fire

The Matilija Fire was an isolated event, but it proved the rule that a disastrous forest fire can occur in California during any fire season. The combination of a fire in an inaccessible location with a few days of heat wave or Santa Ana winds can result in a conflagration. On September 7, 1932, the Santa Barbara National Forest was headed for its easiest fire season on record. Then, at 10:00 a.m., La Cumbre Lookout reported smoke rising out of the upper end of the North Fork of the Matilija Canyon, about ten miles northwest of the town of Ojai, California. Within a minute of the report, the Ojai District Ranger, E. L. Baxter, had ordered sixty-six men and a fire camp. Four minutes later he left with

one man for the fire. It took Baxter two hours to get to the fire, traveling thirteen miles by auto and five miles on horseback. When he arrived, the fire had already covered three hundred acres. Footprints and other evidence indicated that the fire started from a hunter's campfire or cigarette.²⁸

The Santa Barbara National Forest fire control plan swung into action as soon as the fire report reached headquarters. More crews were ordered, including twenty-eight men from the Oso unemployment camp. Pack stock were assembled, loaded on trucks and started for the fire. Supervisory firemen (overhead) were ordered to the fire from stations around the forest. Emergency telephone wire was strung from the end of the road toward the fire. At 4:00 p.m., fire control efforts were proceeding normally for the expected large fire. Forest Supervisor "Gus" Nash-Boulden was hiking up Matilija Canyon from the Ortega Place with fifty reinforcements. A messenger from Ranger Baxter met them along the trail and passed the word that Baxter expected the fire to cover 600 acres by evening. He needed more men and equipment but expected to contain the fire by midnight. At this time, the temperature was 98 degrees and the relative humidity was very low at 11 percent. A wind was blowing from the northwest at about eight miles per hour.

Suddenly, at about 5:30 p.m., the fire literally exploded. Supervisor Nash-Boulden and his crew of fifty men were trapped, with fire on three sides of them. The fire exhausted most of the oxygen from the area, and the crew was close to suffocation. Nash-Boulden recalled, "The veins in my neck swelled to twice normal size."²⁹ The men were near panic when Nash-Boulden ordered them to backfire the canyon wall. The backfire rushed up the slope, bringing behind it a draft of life-saving fresh air. Nash-Boulden and crew quickly escaped down canyon, and he immediately began organizing for another of the Santa Barbara's massive fires. The explosive outbreak of fire was probably the result of strong Santa Ana winds that rose to 50 miles per hour, low humidity and a configuration of terrain that allowed gases to accumulate under the prevailing wind. When these gases were ignited, they exploded, covering hundreds of acres with waves of flame, throwing firebrands even further and setting off a firestorm that burned 20,000 acres in the succeeding twelve hours. By noon of September 8th, only eighteen hours after the fire started, 28,000 acres were burned, and the fire was wildly out of control in three directions. Despite the apparently hopeless situation, crews began "cold-trailing" the

flanks of the fire. Cold trailing is building fireline along burned-out (cold) or smoldering edges of a fire. Seldom during the thirteen days the fire burned were control lines built from which backfires could be set. So wild and unpredictable was the fire that cold-trailing was the only safe way to build final control lines. Cold-trailing was common practice in the Santa Barbara Forest. One foreman, "Cold-Trail" Powers, and his crew, built ten miles of cold-trail the first night of the Matilija Fire.

Bob Deering arrived at fire headquarters in the afternoon of the 8th and provided the regional forester's authority for ordering men and equipment. Crews and overhead came from eight forests in Region 5, the Region 5 office, the Experiment Station in Berkeley, the Division of Forestry, Ventura County and Santa Barbara County. Others were drawn to the fire, including Paul Mantz, famous for his stunt flying in several Hollywood epics. Mantz and his plane were under Forest Service contract, so Nash-Boulden asked him to scout the fire from the air, which Mantz did with skill and flair. Later, a fire camp on inaccessible Topa Topa Mountain ran out of food. Nash-Boulden asked Mantz to drop a side of beef near the fire camp. After the drop, the camp cooks reported that they never saw such tender beef.³⁰

Deering visited the fireline with Nash-Boulden near Wheeler Gorge on September 10th. While they stood watching the massive fire surge over vast areas of terrain, the earth seemed to shake. Deering said, "What's that?", thinking an earthquake had struck. Nash-Boulden reassured him that it was "just the fire." A fifty-man crew was cutting fireline into the Sespe drainage when Nash-Boulden saw the main fire explode. He sent word to the crew to make for safe ground. The crew leader sent the messenger back with a note, "We can make it!" Nash-Boulden sent the messenger in again with a peremptory order to "get out." The crew fled back down the fireline, barely escaping the onrushing flames.³¹

During the first ten days of the fire, there were repeated blow-ups. The greatest came on September 10th, in what must have been the most stupendous firestorm on record in California. As many firefighters watched in awe and disbelief, the fire swept twelve miles on a front nearly five miles wide, from Sespe Gorge to Mutau Flats in one hour. It roared up the canyons and ridges of the Sespe River to the Pine Mt ridge and on toward Devils Heart Peak. Perhaps 35,000 or more acres of brush and timber exploded in just sixty minutes. By the evening of September 10th,

the fire had blackened more than 90,000 acres, and there was no end in sight. Strong north winds buffeted the whole south coastal area, but the fire was so huge that it created its own weather. Control efforts had to be adjusted constantly because of the erratic nature of the great fire.³²

Suppression action was hampered because no part of the fire was accessible by road. Seventeen fire camps were set up; twelve of these had to be supplied by pack stock. It took fifty-eight packers with 130 pack mules and thirty horses to supply the fire camps. Bulldozers were used to drag supplies to some camps. The bulldozers also opened a few roads and built some fireline, but the rented equipment was in poor condition and proved to be a disappointment. Some early models of two-way radios were used on the fire, but as Nash-Boulden recalled, "Once in awhile you'd get a message through, but twice in awhile you wouldn't."³³ More than 3,000 men and women fought the fire, although there were never more than twelve hundred men on the firelines at one time.

Controlling a great forest fire is akin to fighting a great battle, in that each is made up of many smaller events. While a crew in one part of the fire mopped up isolated hot spots, another crew cold-trailed a smoldering fireline, while another made a successful stand against a hot front, and yet another crew ran for their lives. Between September 10th and September 18th crews were repeatedly driven away from firelines by shifting winds and fast runs of the fire. Three fire camps were destroyed by the fire, and a fourth was saved only by desperate backfiring. On the 13th, Reyes Peak Lookout burned, and on the 18th, Santa Paula Peak Lookout was saved by a backfire. There were many instances of crews being trapped by the fire.

On September 17th, Santa Barbara County Forester Emerick, sixty-five crewmen and a woman packer were trapped in the Santa Paula Peak area but managed to escape. It was remarkable that there were only two serious injuries during the fire: a broken leg and a back injury. Certainly part of the reason for the good safety record was the outstanding leadership from Nash-Boulden on down to the crew leaders. Nash-Boulden set the tone at the start, telling his camp bosses, "The first thing to do is to make yourselves safe. Nobody's going to get burned on this fire, if I have anything to say about it."³⁴ Nobody did. Another major factor in the safety record was that this was the first large fire in California where most of the firefighters were members of trained crews.³⁵

For ten days the fire ran wild, and the burned area grew from 80,000 to 120,000 to 200,000 acres. Strong winds continued to blow, and humidity remained low until September 18th, when a high fog rolled in from the Pacific Ocean. The winds shifted from northerly Santa Anas to southerly sea breezes and humidity rose to more than 30 percent. Within thirty-six hours of this weather change, the great fire was cold-trailed and controlled. More than 500 miles of fireline had been cut. The final toll of burned area was 219,254 acres, of which all but 10,700 acres was national forest land. From the town of Fillmore to the outskirts of Santa Barbara, the mountains had been blackened, an area about thirty-two miles long, averaging about eleven miles deep was a wasteland of ash, stubs of trees and brush, barren as a moonscape.

The Matilija Fire burned during the very depths of the Great Depression, so the Washington office of the Forest Service was very concerned with explaining the reasons for deficit spending of fire control funds. Region 5 provided a seventeen-page condensed log of fire operations and a summary that disclosed a total suppression cost of \$120,000. Show, Price and Deering believed the fire could have been controlled much sooner if the Santa Barbara Forest had had an expanded fixed lookout system. The fire originated in a place "blind" to existing lookouts and burned for hours before suppression forces knew it existed. Show also believed that if State Highway 399 (now State Route 33, Ventura to Maricopa) had been completed, the fire could have been stopped there, cutting its final size in half. Ironically, bids for completion of the highway were opened just two weeks after the fire was controlled.³⁶

Other lessons were learned from the huge fire. The Angeles National Forest dispatcher's office had acted as a control center for all of southern California during the fire. The office sent men, supplies and equipment, and arranged for crews from the Angeles Protective Association to fill in behind Division of Forestry and Forest Service crews that were sent to the fire. This informal control center was the forerunner of the coordinated multi-agency control center of the future. The fire also disclosed the need for more standardization of training and terminology so that firefighters from any forest or region could understand local situations. The vast size of the fire and its duration brought out the need for good record-keeping and adequate base maps of each forest.³⁷

In retrospect, the Matilija Fire had much less effect on policy and procedure than might have been expected. Part of the reason for this was that the large-fire suppression system worked well under very adverse conditions. In addition, there were few large fires in succeeding years. It was 1939 before southern California was plagued again by multiple large fires. By then, firefighting lessons from the Matilija were forgotten, and new techniques were in use, so the Matilija Fire faded into memory, the chaparral sprouted and grew again until, in July 1985, the Wheeler Gorge Fire burned 118,000 acres of the old burn. To the residents of Ojai, the 1985 fire became "the Great Fire," even though it was only half the size of the Matilija Fire.³⁸ It is unfortunate that the memorable forest fires are usually those that were marked by mismanagement or tragedy. The Matilija Fire deserves to be remembered as an event where perseverance, good management and a high order of courage won out against great odds.

California's greatest forest fire was a fitting climax to three years of misery generated by the Great Depression. The election of Franklin D. Roosevelt six weeks after the fire brought a new, more hopeful mood to many people. In the spring of 1933, the electorate was amazed to find that election-year rhetoric was being converted into action. The first one hundred days of the Roosevelt administration were to have lasting impact on the Forest Service in California and on fire control in the state.

The Civilian Conservation Corps

The idea of putting young men to work in conservation activities had been around for years when the 1932 presidential campaign began. Franklin D. Roosevelt, the Democratic nominee, suggested such a program in his acceptance speech at the Democratic convention, and it became one of his themes during the campaign. Roosevelt believed in the conservation ideal as expressed by his cousin, Theodore Roosevelt, and by Gifford Pinchot. He even listed himself as a "tree grower" in *Who's Who in America*. The economic crisis was an opportunity for him to combine conservation concepts with an urgent need to put young men to work.³⁹

Soon after Roosevelt's election, the Forest Service headquarters in Washington, D.C. was asked to begin planning for a network of conservation camps. The agency began with a target of 25,000 enrollees. This ultraconservative goal was far below what President Roosevelt had in

mind, so in December he increased the goal tenfold to 250,000. Roosevelt then doubled this figure at a cabinet meeting on March 9, 1933, and charged his advisors with securing immediate results. A presidential message went to Congress on March 21st, and after some debate and adjustments, the Emergency Conservation Work Act became law with Roosevelt's signature on March 31, 1933. The speed with that the bill was written, introduced, debated and passed indicated the depth of concern over the Depression, and the broad political support for the program.⁴⁰

The title of the act was abbreviated, and, in practice, it became the ECW program with ECW enrollees. This name was quickly replaced by the popular title, the "Civilian Conservation Corps" or the "CCC." The CCC enrolled young men of good character, 18 to 25 years of age, and housed them in camps where they received board and room and thirty dollars per month. An allotment from their wages of about twenty-five dollars per month was sent to their homes. A limited number of World War I veterans were enrolled. There was also a small quota of Native American youth, and about 10 percent of the enrollees were black youth. Initially, the law was for a six-month program only.⁴¹

The Forest Service was deeply involved in the development of the CCC program. In the spring of 1933, the regional foresters and experiment station directors were called to Washington, D.C. to help plan the program. S. B. Show and E. I. Kotok took leading roles. President Roosevelt indicated his personal commitment to the CCC by meeting with the regional foresters and station directors and outlining to them what he wanted. Show recalled that he and Evan Kelley of Region 1 spearheaded the CCC planning. Each saw the CCC as a golden opportunity to achieve long-sought goals, and each had experience with labor camps. Together with Frank Persons of the Labor Department, they worked out the concept of "local experienced men" or LEMs. This idea was to employ local woodsmen and skilled workers as crew leaders for the CCC crews. The use of LEMs was probably responsible for much of the high quality and quantity of work accomplishment by the CCCs.⁴²

Show was also given the task of distributing the camps and enrollees among various federal, state and local agencies, as well as allocating camps to the Forest Service regions. His criteria for distribution of camps to receiving units were need, workload and demonstrated ability to supervise the camps. The result was that the Forest Service got the lion's share of

the program. Regions 5 and 1 of the Forest Service were allocated more camps than the other regions, with the most, 166 camps, going to Region 5. The Pacific Southwest Experiment Station also was allotted several camps. Other agencies in California were not left out; the Division of Forestry, Los Angeles and Ventura County Fire Departments, and several U.S. Department of Interior agencies also were allotted CCC camps.⁴³

New CCC enrollees.
The variety of
clothing suggests
different
backgrounds.



Roosevelt was keenly aware of the political import of camp location. Late one Friday, while the harried regional foresters were deeply involved in planning, the White House called and told them to have maps showing camp locations and a crew job list on Roosevelt's desk on the following Monday morning. In his memoirs, Show described the uproar this demand created. It seemed to be an impossible task to achieve in less than three days. Show and his colleagues shrewdly interpreted the president's order and located the camps on the map as circles, six miles in diameter, thus giving themselves room to make changes later on.

Working day and night, Deering, Price and other regional office staff in San Francisco, and Show and Kotok in Washington, successfully met Roosevelt's demand. The number of camps that actually were occupied that spring varied considerably from the allocations. Region 5 had 149 in 1933, a total that dropped drastically to 39 in 1934 and rose to 73 in 1935, after which it gradually declined to 36 camps for the last three years of the program.⁴⁴

The Department of Labor selected the enrollees, after which the U.S. Army enrolled them, housed, clothed and fed them, and supervised their life in camp. A typical camp had eight to ten or more LEMs

and 200 enrollees from out of the area. An Army captain or lieutenant was camp commander, assisted by three or four other officers. The Forest Service was in charge of work projects and administered them through a project superintendent and a staff of several foremen. Most of the Region 5 camps were assigned road-building equipment such as bulldozers and graders. Schools were established to train specialists; Charles Young ran the school for truck trail locaters, and Ed Huestis was in charge of training bulldozer operators. Throughout the program, the key to a well-run camp and good work accomplishment was cooperation between camp commander and camp superintendent. Sometimes one or the other had to be replaced, but on the whole, the program ran smoothly.⁴⁵

Early in the game, the Forest Service wanted to use enrollees in the fire control organization. Show, in his capacity as liaison officer for the western regions, and General Malin Craig, in charge for the Army in the West, decided to permit "spike camps"; that is, crews of five to twenty men who could be maintained away from their base camp. This decision permitted the Forest Service to use these enrollees as tanker crews, fire crews and even as lookouts. Spike crews were also used for smaller work projects such as fencing, maintenance and construction of telephone lines and buildings and similar jobs.⁴⁶

The second major decision affecting fire control was issued by CCC Director Robert Fechner, who on August 17, 1933, ruled that CCC enrollees could be employed as firefighters. The next day, a fire broke out at Soap Creek between Yreka and Ft. Jones in the Klamath Forest. The fire grew quickly, eventually covering 300 acres. Forest Guard Doug Baker began the attack with several local ranchers and woodsmen. Deputy Forest Supervisor Tom Bigelow and District Ranger John Williams arrived on the scene, scouted the fire and ordered seventy-five more men. Bigelow and the rest were working on the fire when, in his words, "Suddenly, truck loads of CCC started showing up from both directions. We did not have any idea what to do with 300 men on this size fire."⁴⁷ Crews had come from four CCC camps in an event that characterized the early use of the CCC enrollees on forest fires. Within weeks after the 1933 fire season began, there was a huge supply of manpower available. Fire dispatchers called on them at once. The result was equivalent to dumping a crowd of untrained, inexperienced, juvenile pickup laborers on a fire all

at once. Bigelow had the answer to this problem on the Soap Creek Fire: he used one crew to set up camp and converted the fire into a training session for the rest of the enrollees.

Region 5 policy was to have a trained fire crew at each CCC camp, but this did not happen all at once. Some of the enrollees came from rural backgrounds and knew how to use hand tools, but most of the enrollees were raw, inexperienced boys, and they did not convert into trained firefighters between June and September 1933. Beginning in the spring of 1934, policy and direction were laid down specifically, and CCC crews became more systematically integrated into the Region 5 fire control organization. From that point on in Region 5, each CCC camp had a trained fire crew with truck, rations and tools that could be used for first attack on fires. Other enrollees were trained as reinforcements on larger fires. For the first time in its history, Region 5 had enough trained (although inexperienced) firefighters to meet any foreseeable emergency. This situation existed from 1933 through 1941, during which time each forest had at least two CCC camps.⁴⁸

The CCC was a gift from the gods to a struggling Forest Service, despite the many problems connected with gearing up to work with the camps, with other agencies and with keeping a backlog of work projects. However, many of the needs that supervisors complained about, wrote about and dreamed about could be met. The trails that had not been maintained for years were now open and in excellent condition, the roads desperately needed to reach hazardous fire areas were built, ramshackle homemade buildings were replaced and new dwellings, shops, garages and offices became a reality. Manpower was available for work projects and fighting fires.⁴⁹

The CCC was the best known but not the only New Deal program that benefited fire control in California. Other legislation either contributed to available manpower for firefighting or built structures for the Forest Service. The Federal Emergency Relief Act of May 1933 resulted in a two-pronged attack on unemployment. One method was through grants and loans to the states to alleviate unemployment. California created a State Relief Administration with these funds and established a network of labor camps in late 1933, that became known as SERA (State Emergency Relief Administration) camps. The Division of Forestry received most of the SERA camps, although Region 5 also established some SERA

camps. The Division of Forestry and Region 5 provided work projects, and in May 1934 asked permission to use enrollees for firefighting duty. Permission was granted but recalled after the Division of Forestry's Banner Grade Fire of May 14-15, 1934. On this fire, three enrollees disobeyed orders, panicked, ran the wrong way and were burned to death. Thereafter, only carefully selected and well-trained SERA enrollees were allowed to fight fire. The program peaked in 1934, when fifty crews totaling 376 men served under the Division of Forestry and Region 5. Most SERA enrollees were older men who could not stand the rigor of firefighting, so by the end of 1935 the forestry camp program lapsed.⁵⁰

The other thrust of the Emergency Relief Act was toward direct employment through the Civil Works Administration (CWA), which was succeeded by the Works Progress Administration (renamed the Works Projects Administration or WPA) and the Public Works Administration (PWA). The major effect of these agencies on fire control in California was through construction of buildings and other facilities for the Division of Forestry.⁵¹

One other New Deal act affected fire control activities to some extent. This was the National Industrial Recovery Act (NIRA) of June 16, 1933. Under Title I of the act the National Recovery Administration (NRA) was established, whose symbol was the widely-publicized "Blue Eagle." The NRA set up committees of businessmen to write "codes" under which industry was required to operate. Title II of the act provided for a public works program, and so-called NIRA crews were hired under this title. Region 5 hired nine timber stand improvement crews in 1934 under Title II. NIRA also provided funds for construction of the Forest Highway System, forest roads and trails and buildings of various kinds. These crews were available for firefighting and were used on some occasions. The program ended after the Supreme Court declared Title I unconstitutional on May 27, 1934. Title II expired in May 1935 and was not renewed.⁵²

The Ponderosa Way and Other Projects

The firefighting mission was important, but the role of the CCC in developing forest roads, trails and firebreaks and in building lookouts, fire stations, telephone lines and other facilities was even more important. During the planning phase of the CCC, Region 5 developed standardized plans for buildings of all types, from woodsheds to ranger dwellings. As

the CCC program got under way, the regional office placed a huge order for pre-cut lumber, which the CCCs used to build hundreds of new buildings. Unfortunately, the ranger dwellings were designed with only two bedrooms. Klamath Forest Ranger John Williams moved his wife and seven children into a new two-bedroom dwelling at the Fort Jones Ranger Station. He had no choice but to make bedrooms out of the woodshed, garage and front porch. When Paul Pitchlynn arrived to inspect his district and commented on the alterations, Williams remarked dryly that if the Forest Service had given him advance notice that it was going to standardize dwellings, he would have had time to standardize his family.⁵³

The most publicized single project of the CCC years in California was the Ponderosa Way. The firebreaks which snaked along the ridges of the San Gabriel and San Bernardino mountains, had inspired the 1914 firebreak along the front of the Sierra and Sequoia National Forests. In 1929 Show envisioned an extension of this old firebreak along the entire front of the Sierra and Cascade foothills. The concept was to build a roadway with an associated firebreak along the lower edges of the commercial timber belt from the Kern River east of Bakersfield to the Pit River east of Redding, a distance of about 687 miles. The "world's longest firebreak" was named for ponderosa pine, the most common commercial timber species at lower elevations. Some of the work had already been done by labor camps in 1931 and 1932, but the proposed project went far beyond these puny efforts. The CCC program offered a once-in-a-lifetime chance to do the job. Show assigned the project to the concerned forest supervisors by letter of July 24, 1933. The route was located on maps under the supervision of C. E. Dunstan and A. E. Wieslander, and construction began that fall. J. E. "Young Joe" Elliott was relieved of duties as supervisor of the San Bernardino National Forest and put in charge of the project. After illness forced him to give up the job in May 1934, he was succeeded by William G. "Bill" Durbin, who came out of retirement for the task.⁵⁴

In many places, the Ponderosa Way was a "shaded" firebreak, in which larger trees were left and undergrowth cut or grubbed out. The break varied from fifty to 200 feet wide depending on local conditions. In most cases, it was not cleared to mineral soil and would be regarded today as a "fuelbreak" rather than a firebreak. By May 1934, Elliott reported that 440 miles of the project was in place and 336 miles of road were yet

to be built. The project took advantage of existing roads and *firebreaks*, but still required the efforts of twenty-four CCC camps supervised by Region 5 and the Division of Forestry. Labor was also supplied by NIRA or CWA (public works) camps and state and federal SERA camps. The total mileage of the project is conjectural, but probably 600 to 650 miles of roadway were completed and even more firebreak.⁵⁵

Later in 1934, it was proposed to extend the road and firebreak around the head of the Sacramento Valley and down the west side foothills. Little was accomplished on this section. Neither did the Ponderosa Way quite reach the Kern or the Pit rivers. However, most of the roadway remains fifty years later. Many sections are maintained by the division and national forests, while other sections are now county or private roads.⁵⁶

The success of the Ponderosa Way as a defense against fires burning uphill from lowland brush into timber depended on having men available to hold the line during a fire, and on continued maintenance of the firebreak. It was early in the century that residents at the base of the San Gabriel Mountains found that firebreaks would not stop fires of their own accord. Headley's report on the 1911 Waterman Canyon Fire noted that firebreaks there had been ineffective. This did not mean that firebreaks should be abandoned, only that their use had to be reevaluated. Coert DuBois stated the purpose of firebreaks in his 1914 manual. From then on, fire control agencies used firebreaks as a line of defense where high values are at stake. Public concerns raised by the San Gabriel Fire of 1924 resulted in a large expansion of firebreaks in southern California. The growing mileage of firebreaks was given another boost by the CCC program.⁵⁷

Earlier worries about the cost of maintaining firebreaks began to surface again in 1930. George M. Gowen, in charge of fire research at the California Forest Experiment Station, began to address the problem in 1931, but the advent of the CCC program temporarily shelved the study. The rapid increase in firebreak mileage built under the CCC program led to a firebreak conference in October 1935, whose conclusion was that firebreaks were often ineffective because it was usually impossible to get to them in time to meet an advancing fire. The only solutions to this problem were to build more roads and install more fire crews. The conference adopted the San Bernardino National Forest firebreak system, where high

value areas were subdivided by firebreaks into blocks of not more than 500 acres. The group also recommended maintenance of primary front country firebreaks every year and secondary firebreaks every three years.⁵⁸

Jay Price, Region 5 fire control chief, endorsed the use of firebreaks at the national fire conference at Spokane, Washington, in February 1936. Price adopted essentially the same views as those recommended by the 1935 firebreak conference. He pointed out that in the typical chaparral fire, firebreaks had been more useful as travel ways than as a place to stop a fire. George Cecil of the Los Angeles Conservation Association also studied the firebreak situation in 1935 and 1936. He questioned whether firebreaks could be justified in view of their high maintenance costs. A meeting of four southern California national forests and the regional fire control staff in December 1936 further confirmed the emerging consensus about firebreaks, which was to use them only to protect high values, to keep them narrow and to make them accessible by road. As the CCC program wound down, the debate became academic since there was no labor to maintain any but the most important firebreaks. Thus, much of the Ponderosa Way and hundreds of miles of southern California firebreaks were reclaimed by chaparral and other plants.⁵⁹

Amid the debate about firebreaks there occurred several of those events that were the reason for firebreaks being built in the first place. Southern California was a center of agitation for forest reserves in the nineteenth century because fires along the front of the San Gabriel and San Bernardino mountains, followed by heavy winter rains, resulted in extensive flood damage to orchards and homes. The unhappy combination of fire and flood revisited southern California in the thirties with a vengeance.

Fire and Flood in Southern California

The towns of La Crescenta and Montrose have always been within the Los Angeles basin yet not a part of it. Situated at the base of the steeply rising San Gabriel Mountains, the towns are shielded from the flat expanses of the San Fernando Valley by the Verdugo Hills. In the thirties, these were small but handsome cities, with many fine homes and tree-lined streets. In many ways, they represented the dream that so many people came to southern California to fulfill. Fires were always a worry because of the proximity of the cities to the mountains, but the long-time absence of major fires bred a false sense of security. The last large fire in the area was

the Ravenna Fire of 1919, which burned most of the nearby Big Tujunga drainage. The old burn was not much of a threat, but just three miles north of La Crescenta, rugged Mt. Lukens, elevation 5,074 feet, loomed 3,500 feet above the city. The main stream tributary down the south face of the mountain was Pickens Canyon, which had last burned about 1900. The long summer of 1933 went by with no fires in that part of the San Gabriels. Then came fall, and the Santa Anas began to blow. At 8:10 p.m. on November 21st, a fire started in Pickens Canyon. Under the influence of the Santa Ana winds, the fire quickly spread inside and outside the Angeles National Forest. Fortunately, firefighters were able to contain the fire, but not before it had burned 2,771 acres, virtually all of Pickens Canyon.⁶⁰

The fire was unremarkable except for an incident that was both amusing and shocking and that illustrated again the folly of using untrained men to fight fire. Theodore F. "Ted" Neihaus recalled being sent to the Pickens Canyon Fire, his first large fire, and being assigned a motley crew of CCC recruits. These were city boys, fresh from the streets of Chicago, unused to hiking, working or discipline. Fortunately, old fire hand, Tex Van Sickle, was with Neihaus; his experience and coolness kept the crew under control while they tried to build line below the fire. Soon the erratic winds carried fire around them, so Van Sickle ordered the crew into the burn. There was still fuel enough in this area to re-burn, and the crew was subjected to several fire runs, which frightened them but did little damage. Finally the fire burned out and Van Sickle headed the crew for the assembly area, a small winery at the base of the mountain. He and Neihaus were helping two injured crew members, when the rest of the crew ran off down the slope.

By the time the two of them arrived at the winery, they found it afire and a regular bacchanal underway. The flames from the burning winery lit up a fantastic scene. Wine barrels had burst in the winery, and wine was running down the road, where CCC boys were on their knees drinking from the ruts. Other crew members were grabbing boxes of grapes and wine bottles from the storage area. Most of them were trying to get as much wine under their belts as possible, knowing it might be their last chance for awhile. The orgy went on unabated for some time, until Army officers finally came; they quickly got the crew under control and on their way. Neihaus and Van Sickle, completely dumfounded by events, watched

them go with a great sigh of relief. This incident would have remained as one of many war stories that old firefighters like to recall except for the rains of December.⁶¹

Winter rains began in the San Gabriels on December 12th, dropping four inches in the next three days. After a respite, rain fell again on December 29th. It continued through the 31st, and its intensity increased. On New Year's Eve, more than thirteen inches fell in just twelve hours on the slopes above La Crescenta and Montrose. Pickens Canyon, barren of vegetation, pointed like a gigantic sluice box straight at the heart of the two cities. The saturated watershed could not hold the runoff from the torrential rains. Muddy flood waters roared down the canyon, tearing out several loose rock flood control structures and carrying everything before them. Walls of mud, debris and water fifteen feet high and 200 feet wide swept down on the towns, obliterating everything in their path. Huge boulders tore down the canyon; one, estimated to weigh sixty tons, was carried more than a mile to Foothill Boulevard. Others crashed completely through the American Legion Hall in Montrose, killing twelve people. When it all was over, 659,000 cubic yards of debris (50,000 cubic yards per square mile) was estimated to have come from Pickens Canyon, destroying or severely damaging 483 homes and killing 44 people. In unburned San Dimas Canyon, which received about the same rainfall, the rain waters deposited 56 cubic yards per square mile, a thousand times less than from Pickens Canyon.⁶²

The La Crescenta-Montrose Flood brought home the capriciousness of Mother Nature in southern California. The mild, even climate and the scenic mountains could swiftly change into a deadly combination when fire stripped chaparral from the mountain slopes. There were other similar, though less fatal, events during this period. The San Marcos Fire burned from August 10-14, 1940, in the Los Padres National Forest above Goleta. The fire burned 4,365 acres of watershed, not a great fire by that forest's standards, but it burned during the annual Spanish Days Festival in Santa Barbara. Thousands of residents and visitors were as thrilled by spectacular fire displays as by the celebration. The fire burned utilities and some homes, but its greatest damage came during the following winter. A storm dropped seven inches of rain in three days within the fire area. The floodwaters devastated the San Marcos Pass Highway (State Route 154) and orchards in the valley

below. Other more localized mud and debris flows were so common in the thirties that they became the subject of jokes on commercial radio about living in southern California.⁶³

If the good folk of southern California needed another reminder that rain in California often means downpour, it came in late February 1938. From February 27th to March 4th the area from Santa Barbara to Mexico was subjected to intense rainstorms. Hoegree's Camp was a small resort on Winter Creek below Mt. Wilson, in the Angeles National Forest. Between February 27th and March 1st, 13.59 inches of rain fell there; from midnight March 1st to midnight March 2nd an additional 14.73 inches of rain were recorded. Similar rainfall amounts were observed over the southern California mountains. The result was one of the worst floods on record in California. Disaster was not confined to the lowlands. Within the Angeles Forest, two CCC camps, three guard stations and one ranger station were destroyed. No road or trail on the forest escaped damage and sixty campgrounds were washed away. The luck of the draw was that in 1937 only about 7,000 acres had burned in all four southern California national forests. What could have been unmitigated disaster was just disaster.⁶⁴

These calamities lent new momentum to existing flood-control efforts and inspired new programs in the Los Angeles basin. The Los Angeles County Flood Control District had been formed in 1915 after a damaging flood in 1914. Bonds were sold to pay for dam construction within the Angeles National Forest. Despite political wrangling and contract problems, several dams were completed during the mid-thirties; Morris Dam on the San Gabriel River in 1934 by the City of Pasadena, Cogswell Dam on the West Fork of the San Gabriel River in 1935 and San Gabriel Dam on the San Gabriel River in 1938. Many smaller debris dams were built in dozens of canyons, such as Pickens Canyon, which issued onto the Los Angeles plain. Clearly, dams were not the whole answer to the flood-control problem. The Flood Control Acts of 1936 and 1938 recognized the relationship between watershed cover and floods and gave the Forest Service responsibility for upstream flood control within the Angeles National Forest. The most important aspects of this job were channel clearance and stabilization and fire control. For decades afterwards, flood control funds were an important source of fire control funding for the Angeles.⁶⁵

The southern California floods awakened the watershed associa-

tions, which had tended to slumber, thinking the CCC would solve all problems. The Los Angeles County Conservation Association, under George Cecil, was still active, but the Tri-Counties Reforestation Committee had shifted into neutral gear, and the Angeles Protection Association seemed to have lost its momentum. At the urging of Bevier Show, a new generation of fire protection supporters emerged. With them came a demand for research into the special fire control problems of southern California. Their demands were met as Show and Kotok launched a far-reaching and practical program of applied research in the California national forests.⁶⁶

Advances in Fire Research

Under Ed Kotok, the California Forest and Range Experiment Station's fire research program meshed closely with Bevier Show's administration of Region 5. Essentially, the fire research of the early thirties was an expansion of Show and Kotok's work on hour control and detection systems and the application of this research to the national forests. The emphasis on hour control or speed of attack, was the essence of their fire control philosophy and their greatest contribution to forest fire control. Show and Kotok needed a demonstration area on which to test their theses. They proposed the Shasta National Forest to the chief forester's Fire Control Advisory Committee for this purpose and their suggestion was approved. The Shasta Experimental Fire Forest came into being early in 1929, with stations at both Mt. Shasta and Pilgrim Creek (McCloud). The objectives of research at the Shasta Fire Forest were to demonstrate the best system of fire control for a given area, to test fire control principles found elsewhere and to intensively study specific elements of fire control such as transportation, communication and detection.⁶⁷

The first study was begun in July 1929 and involved detection—specifically, the principles of visibility mapping from high points. George M. Gowen was assigned leadership of the Fire Protection Branch of the Experiment Station. A. A. Brown from Region 1 and J. R. Curry, formerly assistant state forester in Maryland, were recruited to help him. Kotok anticipated so-called “operations research” by applying a three-man task force to the detection study. The team spent 1930 and 1931 developing the visibility mapping study into a detection planning project. In May 1932, Gowen reported their findings, which were aimed at “maximum

coverage by direct visibility of fire occurrence zones with the minimum of lookouts." This minimum number of lookouts was called the primary lookout system and was supplemented during high fire danger and after lightning storms by secondary lookouts. There was so much data from this study that Gowen's team made use of punch cards to sort it out. Later, in 1932, the first school for visibility mappers was held, and a limited amount of field work began.⁶⁸

Show and Kotok believed that if their fire control principles could be applied to a given area, the result would be fewer fires, no large fires, and thus lower suppression costs and lower fire damages, resulting in an overall reduction in the cost of fire control. To this end, they selected the Sacramento River District of the Shasta Forest as a demonstration area. This area had objectives much like those of the North Butte Fire Protection District, a joint Division of Forestry and Region 5 project established December 31, 1929.

The district included 330,000 acres in Butte and Tehama Counties. The Flea Valley and Mill Creek Fires of 1928 had burned thousands of acres in the proposed district. Diamond Match Company was dissatisfied with the fire protection it had received and asked for a joint operation. About half the area in the district belonged to that company, and about half was included within the Lassen National Forest. The area was managed by Region 5 and Division of Forestry personnel on leave from their agencies. Funds came from Diamond Match Company and Region 5. In both cases, these demonstration areas showed good results until the advent of the CCC. The vast manpower and funding of the CCC and other New Deal programs made it possible to achieve the standards of the demonstration areas all over California. The result was that both special projects gradually faded into the background and were eventually discontinued.⁶⁹

Show and Kotok were able to proceed with their plans because they had convinced the leaders of the Forest Service in Washington, D.C. and other regions that their course promised the most results. Their chief opposition came from Assistant Chief for Research Earle Clapp, who favored basic research into the physics and chemistry of fire. His ideas were shelved in favor of Show and Kotok's pursuit of applied research based on past experience. Their approach was adopted in a series of national meetings in 1930 and 1931.⁷⁰

In a 1930 fire research conference at Madison, Wisconsin, the

Northern Rocky Mountain and Northwest Forest Experiment Stations, in cooperation with Regions 1 and 6, were assigned the development of a national fire danger rating system. Such a system was important because it could provide advance warning of bad fire seasons and bad fire days. It also could be used to justify hiring additional men and equipment from emergency firefighting funds. The California Forest and Range Experiment Station and Region 5 were assigned research and development on hour control and fire control fundamentals (fire behavior). Fire danger rating and hour control were to occupy most of the Forest Service's fire research energy through the thirties and forties.⁷¹

The enormous influence of Show and Kotok's work is apparent in these events. Show's dominating personality, his intellectual brilliance and his formidable background made him preeminent in fire control during the thirties. Despite their accomplishments, Show and Kotok recognized a gap in their research and in its application to southern California. All of Show and Kotok's bulletins referred to conditions in northern California. An opportunity to fill part of this void came with the establishment, in 1932, of the San Dimas Experimental Forest in Big Dalton and San Dimas Canyons along the Angeles front country.⁷²

The San Dimas Experimental Forest was established at the urging of Herbert S. Gilman, chief engineer of the San Dimas Water Company, and William A. Johnstone, an orchardist, banker and state assemblyman. About 17,000 acres were devoted to study of chaparral watersheds and the effect of fires on soils, vegetation and stream flow. C. C. Puck was placed in charge of fire studies. In 1933, a CCC camp was established at the mouth of Big Dalton Canyon. This camp and workers from other New Deal agency camps built most of the experimental forest facilities.⁷³

While San Dimas Experimental Forest was devoted to more basic and long-term watershed and fire research, Show and Kotok also wanted an analysis of past fire experience in southern California. C. A. "Chuck" Abell arrived in Region 5 during December 1937 and was assigned to this as yet undefined task. Abell developed an analysis system using fire report data and entering it on punch cards. He showed the system to Show, who immediately made space for Abell to work next to his office. Show collaborated on the study along with Bob Deering and P. D. Hanson. After several months work, the four men left San Francisco in early 1940, adjourned to Los Prietos Station in the Los Padres Forest, and wrote a

“landmark publication” entitled *A Planning Basis for Adequate Fire Control in Southern California National Forests*. It had been generally agreed that man-caused fires were the major fire problem in southern California national forests, but Show, Abell, et al., proved it and, in doing so, identified many of the solutions to the problem.⁷⁴

Show and Kotok were really dealing with fire control strategy as they expounded ways and means to control all forest fires while they were small. With a multi-pronged attack on strategy underway, they began to consider the tactics of fire control especially in large fires. This led them directly to a study of fire behavior. Once again, they turned to analysis of past fires, trying to identify patterns of fire behavior under given conditions. These investigations came full circle to Clapp's desires for basic fire research, when in 1940, Wallace Fons, a mechanical engineer at the experiment station, began examining the behavior of test fires under controlled conditions.⁷⁵

Throughout his career, Show saw research as a means to an end. His studies of light burning put the quietus on that concept even though he admitted that, under certain conditions, a light fire could benefit timber stands. He sensed that the times (1920s) were not right for management of forest fire; learning to control forest fire had to come first. The Show and Kotok bulletins were aimed at a goal of controlling forest fires to a given (and low) level under all climatic conditions. The bulletins were at hand, and the detection research was done; Show had only to wait for the right opportunity to apply the research on a scale that would convince anyone of its soundness. The establishment of the Sacramento Ranger District and North Butte Fire Protection District demonstrations might be enough to do the job, and he pursued them with the meager resources at hand. But when the CCC program unfolded, Show knew he had the golden opportunity to use the whole of Region 5 as his demonstration, and he seized the chance with characteristic vigor and assertiveness.⁷⁶

Although Bevier Show did not set down a master plan for controlling fires in California's national forests in so many words, his actions and writings all point to such a concept. For the foresters of Show's generation, the first rule of forest management was protection of watersheds and timber from fire. This did not mean that Show and other old-timers did not understand the changes taking place in forestry. In fact, the close relationship of California's people to the national forests and the growth of outdoor recreation led inescapably to the conclusion that forest management must also accommodate water, wildlife and recreation management. Range and minerals management were already well-established forest uses and had to be integrated with the management of timber. Yet old ideals die hard, and even though Show responded to the changing order, he continued to see forest protection as the highest priority for management of California's national forests.¹

Other agents damaged or destroyed forests (blister rust and bark beetles, to name two), but effective control of these and other forest pests was either unknown, very expensive or not very effective. Show's early researches and his testing in the crucible of the twenties led to the landmark bulletins written with Ed Kotok. Of these publications, Technical Bulletin No. 209, on hour control, came closest to describing what Show and Kotok hoped to do in California. On Page 1 of this bulletin, they listed four essentials to successful fire protection: a specific objective (in burned acres), attack fast enough to meet the objectives (hour control), sufficient size and distribution of manpower and improvements to maintain speed of attack and the firefighting methods and training needed to effectively use manpower and equipment on fires. These concepts seem obvious to the modern firefighter, but before 1930 they had not been stated and supported by analysis of past fires.²

Establishment of the Shasta Experimental Forest, and his close relationships with Ed Kotok, director of the experiment station, gave Show a chance to test the concepts of Bulletin 209 on a small scale. Given the normal routine of government, positive test results would have been used to urge more fire control appropriations to a Congress that responded more to crises than to long-term management proposals. Probably some modest increases in appropriation would have resulted in slow and erratic expansion of the concept to forests beyond the Shasta. Show and Kotok were not discouraged by the lack of funds and pointed fire research

in California toward exploration of four components of fire control: detection, communication, transportation and location of fire crews. Practical plans for these components, based on research, would make it possible to apply their concepts to all of Region 5. In 1931, there was no telling how much time would pass before the concepts could be applied to the entire region. Then came the New Deal and its emergency programs.³

It is significant that in the last oral interview before his death, Show emphasized his accomplishments with the CCC. As he implied to Russ Bower, the CCC was the means to an end, which was the achievement of his master plan for fire control in Region 5. This end was so important that Show was willing, even eager, to shortcut the rules if he could get the manpower and equipment necessary to carry out his plan. From the fire control standpoint, he was the right man in the right place. Show had the stature, the vision and the determination to do what he needed to do. He saw to it that Region 5 had the most CCC camps, that bulldozers and other road building equipment were assigned to the camps, that LEMs (local experienced men) were hired and that spike camps were approved. Obviously, Show could not do all of this himself. He was joined by others of like mind, such as Evan W. Kelley, but Show was the driving force that made possible the liberal interpretations of CCC use within the Forest Service.⁴

No sooner had the CCC allocations been made, than Show and Kotok put the detection planning project into high gear. Teams were trained in visibility mapping from selected high points on each national forest. This was a tedious and demanding job that required climbing all of the high points on each forest, and recording the area seen on topographic maps using techniques devised by Gowen, Brown and Curry. The scope of the job was enormous; the Plumas Forest alone had 94 peaks to be evaluated, and the total for Region 5 was more than 1,000. Show pushed the job hard; he wanted to have a new detection system built while the CCC was still available.⁵

The project was run from the California Forest and Range Experiment Station in Berkeley by A. A. Brown. Once the field work was done on a forest, a team quartered at the Lawrence Atomic Research Laboratory in Berkeley analyzed the data and prepared a report for each forest. Show, Kotok, Deering and Price attended a meeting for each forest at which four types of lookouts were approved: primary lookouts, which

were manned continuously during fire season; secondary lookouts, which were manned by lookout firemen who could be sent to fires; emergency lookouts used during smoky conditions or lightning storms; and contributory lookouts, which were manned by other forests or the Division of Forestry. The detection project was completed in three years although in many cases the final detection plans were not approved until 1938. The results of the project were an increase of fifty-eight lookouts in Region 5, an increase in lookout coverage from 40 to 68 percent and a completely new or rebuilt lookout system.⁶

Lookout on the Tahoe National Forest. Women were favored for lookout positions for their ability to adjust to isolated conditions, their skills and their dependability.



Before detection planning began, some forests tested certain sites to see if they could be suitable locations for lookouts. One such test took place in the early 1930s on a remote peak in the Santa Barbara Forest. Facilities were crude: an alidade was placed in the open air and a tent was erected close by. A local resident, eager for work, was hired and operations began. The second night of the observer's stay was warm, so he opened the tent flaps to allow better air circulation. Early in the morning he awoke to a cold, wet nose brushing his cheek. The observer thought a stray dog was in the tent, so he yelled and threw a shoe at the shape. The creature leaped out of the tent. Against the lightening sky the observer saw the unmistakable form of a young mountain lion. The observer panicked! He bolted from the tent and fled down the trail, barefoot and clad only in a shirt. He ran, trotted and staggered down the trail until he reached the nearest ranch twelve miles from the tent. He was so rattled by his experience that he refused to return even to collect his belongings.⁷

As the detection planning job ended, a project was launched to revamp each forest's communication system. While radio was coming into increasing importance, the telephone system was still the backbone of national forest communications. A. A. Brown's success with the detection project resulted in his appointment as the research member of a two-man team whose job was to revise the region's telephone system. Fred Funke, the regional equipment development specialist, was the second member of the team. The team mapped each forest's telephone system, located overused lines and switchboards and recommended a new system. More than 1,000 miles of more efficient metallic lines were built, and a total of more than 5,000 miles of new and rebuilt telephone lines resulted from the study. This study was completed in about a year. The communication project was soon followed by a transportation study for each forest based on ideas advanced by T. W. Norcross, chief engineer in the Washington office.⁸

The transportation plan was the brainchild of Bevier Show, according to George Newhall and Lee Berriman, who served as one of four teams that did the field work in 1934-1935. Show and Kotok were the overseers of the project, but the direction was again under a two-man team; A. A. Brown was the planner, and Fred P. Cronemiller, former supervisor of the Modoc Forest, directed the field work. The purpose was to prepare a plan showing the network of roads, trails and fire stations needed to meet hour control objectives. The procedure was as follows: first, to map hour control zones, then map existing fire station coverage for these zones and finally, to recommend new roads, trails and stations needed to reach full coverage of the zones. The planners broke southern California forests into "firebreak blocks" as a way to reflect the intensity of fire protection needed. The planners used risk, hazard and values at stake to determine block limits. Other transportation studies followed this pioneering work, but the 1935 transportation plans were basic to all later resource planning.⁹

Meetings were held with each forest to approve communication and transportation plans. Show, Kotok, Deering and Price attended each meeting and sometimes debated the proposals vigorously. George James, who took part in all three studies as an assistant, thought of Show as a walking brain. He was fascinated by the sometimes fiery exchanges between Show and Kotok at these meetings. These three

studies gave Show the opportunity to direct CCC camp work programs toward accomplishment of the master plan. As the planning information became available, roads, trails, lookouts and fire stations were built in approved locations. Also included was the construction of new picnic and campgrounds whose principal purpose was to protect fire hazardous areas by concentrating recreationists in safe locations. By the end of the CCC program in mid-1942, most of the facilities needed for complete fire protection in the California national forests were in place. After 1936, there remained re-codification of fire control methods and improved training techniques.¹⁰

As early as 1932, Show and Jay Price asked a team of assistant supervisors; Claude Barker, John Everitt and DeWitt Nelson, to develop a manual for fire guard training. The manual covered fire prevention, fire suppression, use and care of tools and equipment, fire control forms and lookout and guard training. It was used as a guide for three-day guard training schools conducted every spring by all Region 5 forests. The guide served until 1937, when Show, Price, Deering, Gowen and C. A. Gustafson published the *Fire Control Handbook, Region 5*, which covered everything that had gone before in more detail. One of the best sections dealt with sample fire situations and how to handle them. Show believed this handbook to be a breakthrough in fire guard training. A second volume of the handbook was published later, which dealt with dispatching for large fires and large fire tactics. Many problems were illustrated using aerial photographs and anaglyphs, a method of printing in red and blue ink that gave a three-dimensional effect when viewed through a special lens. Show was a step ahead of most regions with his master plan, which became clear when national fire policies were reviewed and revised after 1935.¹¹

Refining Old Policies

The thirties were a period of unsettled leadership in the Washington office of the Forest Service. Pinchot, Graves and Greeley were giants compared to their successors in the thirties. Greeley was followed in 1928 by R. Y. Stuart, who died in a fall in October 1933. His successor was Ferdinand Silcox, an enthusiastic supporter of Roosevelt's New Deal policies. Silcox died in 1939, and Earle Clapp became Acting Chief Forester from 1939 to 1943.¹²

None of these men had the leadership qualities of a Pinchot, the quiet intellectual force of a Graves or the intense personal interest in fire control of a Greeley. The result was a tendency for the technical fire specialists and the assistant chief in charge of operation, in this case Roy Headley, to gain power and influence. This tendency was reinforced when Silcox reorganized the chief forester's office in 1936. Thenceforth, the organization consisted of the chief forester and four assistant chiefs, one of whom was in charge of all activities in the national forests. Each assistant chief had several division chiefs reporting to him, and fire control was just one of these divisions under the assistant chief for national forests. At this point, Headley surrendered his former post as assistant chief of operations and became head of the fire control division. The reorganization put an additional administrative layer between Headley and the chief forester. The old days when fire control was a principal concern of the chief were gone. The price of success in fire control was its gradual submergence into a swarm of divisions, all clamoring for attention.¹³

The leadership of the Forest Service during the thirties was preoccupied with three issues; federal regulation of logging on privately-owned land, acquisition of privately-owned forest lands and the attempt, by Secretary Harold L. Ickes of the Department of Interior to return the national forests to his department. The regulation issue had lingered during the twenties despite a lack of support from business-dominated national administrations. Greeley had opposed federal regulation of private forestry and sidetracked the issue by securing passage of the Clarke-McNary Act.¹⁴

Meanwhile, forestry made slow gains in private industry, and as the Depression deepened, forest lands were often abandoned by their owners for lack of funds to pay taxes. The prospect of a Democratic administration in 1932 brought the regulation issue to the fore again. One way to solve the problem was for the Forest Service to acquire cut-over private timberlands. In the spring of 1932, Senator Royal Copeland of New York asked Chief Forester Stuart for a report on the status of American forestry. Stuart was happy to comply. He saw the request as a means to advance the cause of the Forest Service and to deal with the issue of federal regulation. Stuart put his staff and the regional foresters to work in what amounted to a crash program. People from the various regions and experiment stations were sent to Washington to help prepare the report. Using exist-

ing data, the assessment known as the Copeland Report was assembled by the spring of 1933, and was published as a thick, two-volume document entitled, *A National Plan for American Forestry*. Its two major recommendations were extensive acquisition of private timberlands and federal regulation of logging on private timberlands. The report also called for a large expansion of fire control especially on state and private lands.¹⁵

These proposals were controversial in and out of the Forest Service and remained so until after World War II. There were unsuccessful efforts to advance an omnibus bill containing the Copeland Report recommendations in Congress. Chief Earle Clapp was especially dedicated to the concept. In a rather plaintive note to Show on August 19, 1940, he complained that Region 5 did not understand the importance of the program. The Copeland Report was useful in many ways, but it generated controversy that diverted energy from what could have been more productive ways to advance the cause of forestry.¹⁶

Although federal regulation fell by the wayside, private land acquisition did not. Roosevelt favored private land acquisition, especially in the East and South, as a means to advance his social as well as conservation goals. The new lands were a place to use the CCC in rehabilitating cut-over timberland and abandoned farms. More than eight million acres were added to the national forests during the thirties, mostly in the South and East.¹⁷

The third issue, Secretary of the Interior Harold Ickes' attempt to take over the Forest Service, took considerable executive time, especially in the late thirties. While these issues occupied center stage, some important fire policy issues were being decided in the wings. Several important fire control figures were at the height of their power and influence: administrators Show, Price, Headley, Kelley and Godwin and researchers Kotok, Brown, Osborne, Gisborne, and Hornby. Because of his background and position, Show and his hour control philosophy dominated the scene. By far the greatest cost of fire control came from the large fires that escaped early control. The essence of Show's master plan was to catch all fires while small. This philosophy led naturally to the attempt to control every fire the first night after it started. This idea had been around a long time. Headley suggested it in his handbook, *Fire Suppression*, in 1916. It had been stated, in so many words, in the 1924 and 1931 Region 5 Boards of Review.¹⁸

Four gigantic fires, the Matilija in California in 1932, the Tillamook in Oregon in 1933 and the Selway Fires in Idaho in 1934, stimulated adoption of overnight control policies nationwide. The Selway Fires were the subject of long discussions and field trips trying to determine the best way to deal with large fires in roadless backcountry. An overnight fire control proposal was discussed at a meeting of regional foresters in April 1935. The chief forester issued his policy in May. The policy became known as the 10 a.m. Policy because it required that preparations be made to control every fire by 10 a.m. of the morning following the day the fire started. If this was not accomplished, a new target of 10 a.m. the following day was set and so on, until the fire was controlled. Such a policy could not have worked without the Forest Service access to the emergency firefighting appropriation (FFF). The policy applied to all lands no matter what their value, but was hedged by cautions about overspending emergency funds.¹⁹

The 10 a.m. Policy and the huge fires of the early thirties renewed interest in fire control and stimulated further developments. One of the most important was a national meeting of fire control experts at Spokane, Washington on February 10-21, 1936. Led by Roy Headley, it included most of the top fire control experts in administration and research. Bevier Show was conspicuous by his absence, and the chief forester did not lend his influence to the meeting.²⁰

The report of the meeting listed a wide variety of topics and revealed an even wider divergence of opinion among regions on how to deal with the thirty or so topics. Important results of the meeting were as follows: to confirm regional equipment development rather than a centralized national equipment laboratory, to continue the chief forester's Fire Control Advisory Committee and to pursue a research program into aerial attack of forest fires. The meeting displayed the initiative and innovation each region used to solve its own unique fire control problems, but it did not result in important changes in national fire control policy. Perhaps the greatest value of the meeting was as a springboard for further meetings and developments.²¹

More meetings were held on the subject of the 10 a.m. Policy in Portland, Oregon, and Washington, D.C., during 1937. A national program called "fire replanning" was the result. Apparently "replanning" referred to the original fire plans mandated by Greeley after the Mather

Field Conference. Replanning in California followed Show and Kotok's hour control concept. The program was in two parts: a fire prevention plan and a fire pre-suppression plan. The prevention plan included maps of fire occurrence, fire hazards and maps of forest uses, but the emphasis was on analysis of past man-caused fires, proposed corrective action and cost estimates to do the job. Another important section was preparation of lists of "contact men" and "key men" for each forest and the regional office. These were men and women who were most influential in molding public opinion.²²

The pre-suppression plan in Region 5 was based on a study of each forest prepared by P. D. Hanson, former supervisor of the Lassen Forest, and a small team. Before the team began operating, Hanson and C. A. Abell developed a method to determine the optimum fire crew size for a particular station. Then, using a method described by Show and Kotok in Bulletin Number 449 on planning detection stations, Hanson and his team analyzed each fire station on every forest with respect to past fire occurrence and hour control zones and rated them numerically. In most cases, the approved stations were to be manned by a five-man crew with a tank truck. Most pre-suppression plans were completed by mid-1940. Thus, as Region 5 entered World War II, each forest had new fire control plans covering detection, prevention and presuppression.²³

While the plans were being developed, it became clear that there was a major weakness in the fire control system. Throughout most of the thirties, Region 5 had no uniform way of measuring fire danger. Without a fire danger rating system, there was no advance warning that allowed fire control officers to expand or retract the organization to meet changing conditions. Also, there was no basis on which to use emergency fire funds (FFF). H. T. Gisborne, of the Northern Rocky Mountain Forest and Range Experiment Station, developed such a system in 1935, and his work probably stimulated formation of the California Fire Danger Rating Committee in December 1936. The committee drew on existing fire danger rating research and on suggestions from Region 5 field units and other agencies. A system was devised in 1937, and by 1939, more than 200 fire danger rating stations had been installed throughout the region. The California Fire Danger Rating System included four indices: ignition index (for man-caused fires), lightning index, spread index and fire load index, which was the product of the ignition and spread index.

The fire danger rating stations measured relative humidity, temperature, fuel moisture, precipitation and wind. These data was fed into the forest dispatcher's office, where they were compiled and analyzed. Daily Weather Bureau short-range forecasts were coordinated with the fire danger data, and the next day's fire danger was predicted.²⁴

With the development of the fire danger rating system and new fire control plans, Region 5 was well prepared to enter a new era of technological forest fire control. Equipment development enhanced this new surge toward technological fire control by improvements in radio, bulldozers, tankers and use of aircraft.

“The Noble Fiasco”

The thirties were a time for improving policy and procedure developed in earlier times. Firefighting equipment went through similar transformations. Some new tools were developed that became standard equipment in later years--the lightweight chain saw, for example—but most of the Forest Service's creative energies went into perfecting existing equipment, with one major exception. A proposal for aerial attack on forest fires was given enthusiastic approval by the Spokane Fire Conference.

The advent of the airplane instantly brought visions of fighting fires from the air. One of the biggest problems in fighting fire was getting to the fire before it could expand out of control. The airplane seemed the answer, but how to use it? World War I dramatically advanced aviation, especially military aviation. The success of aerial bombers in that war led many fire control men to envision bombing fires with water or chemicals. Except for a few isolated tests, these dreams were not followed up, mainly because the Forest Service had no aircraft at its disposal until 1928. Meanwhile the airplane demonstrated its value for patrol, scouting and transportation of men and supplies.

During the thirties, Region 5 aircraft contracts usually required one plane for southern California and two for northern California. The planes were mostly used for scouting large fires and patrol under smoky or thunderstorm conditions. Through 1936, most of the contract planes were open-cockpit, high-wing monoplanes. Higher-powered, closed-cabin airplanes were specified in 1937 and afterwards. In August 1938, the Forest Service took delivery of its first airplane, a Stinson Reliant with a 450-horsepower engine. It was painted green, at George Gowen's insis-

tence, and assigned to Region 5 as part of the Aerial Fire Control Project. Unfortunately, Region 5 was unable to find a pilot willing to fly the plane on a seasonal basis. The Stinson gathered dust in an Oakland Airport hangar until finally the Washington office traded it to another agency for four Piper Cubs, two of which were sent to Region 5. Andy Brenneis, supervisor of the Trinity Forest and an enthusiastic flyer, asked to try one out over the forest. He flew the underpowered craft around Hayfork and Weaverville and regretfully sent it back to Oakland. It just was not enough airplane to fly safely in rugged mountain country. Besides, an expanding aerial supply program required larger aircraft.²⁵

Dropping supplies from the air was not new in 1936, but the results were less than spectacular. Free-fall dropping of supplies sometimes resulted in tender beef but more often in goods lost, destroyed or damaged beyond use. In the early thirties, Region 5 had little incentive to improve cargo dropping techniques because there were few large fires that were not at least partly accessible by road. The most likely candidates for aerial supply were forests with large areas of roadless terrain such as the Trinity, Klamath, Sequoia and Santa Barbara. Except for the Matilija Fire in the Santa Barbara, there were few attempts at aerial supply of fire camps until after 1937. The northern regions of the Forest Service in Washington, Idaho and Montana had far more roadless terrain and had developed better air supply techniques by 1937.

Each of these three regions (Regions 1, 4, and 6) developed its own system of packaging supplies. All of them used parachutes, usually made of wool sacks, to let the packages down more slowly. In 1936, men of the Aerial Fire Control Project tested various air drop methods in the Shasta Experimental Forest at Pilgrim Creek. They recommended parachutes made of burlap eight to ten feet square with shroud lines of braided linen about eleven feet long. Other recommendations concerned such details as packaging, packing parachutes and aircraft suitability. Unfortunately, their report was not issued until May 1939, a year after the first major aerial supply operation on a large fire in Region 5.²⁶

An intense lightning storm in July 1938 started hundreds of fires in the Klamath Mountains, several of which became project fires. The Red Cap Fire was the largest. Of its seven fire camps, two were supplied completely by aircraft, two by a combination of pack string and aircraft and three by pack string. Cargo parachutes were folded in Yreka under

direction of Fred Funke, project leader of the Aerial Fire Control Project. Air drops were slowed down because there were no folded parachutes prepared in advance, a deficiency that was corrected in 1939. Four aircraft dropped supplies on the fires. None were specially adapted for air dropping, but they served well, making three or four round-trips per day for ten days. A total of twenty-six tons of supplies were dropped in that time, most of which were successful. A few were spectacular. There were the seven-foot long, crosscut saws that broke loose over Blue Creek, oscillating end-to-end, swooping and side-slipping and finally settling to rest in a deep side canyon. There was also a crate of eggs that landed perfectly, in the top of a Douglas-fir, where they nestled until a crew cut the tree down—and salvaged one egg. The fire crews were thankful, even amazed by the air drops, none more so than an old Native American on the Slide Creek Fire. He watched the parachutes floating down and remarked, "It is just like food being dropped from heaven by the Holy Critter."²⁷

After the 1938 fire season, Region 5 quickly developed an air supply dropping capability. A guide on the subject was issued in 1939, and that year 80,900 pounds of supplies were dropped for fire camps, half of it on Los Padres National Forest fires. As Region 5 contracted for larger aircraft to drop supplies and carry out other duties, it became apparent that many of the region's old mountain airfields were inadequate for larger aircraft. The economics of air supply also played a role, since it was cheaper to fly short distances from mountain airfields if they could accommodate larger planes. In addition, the Civil Aeronautics Authority had begun enforcing minimum requirements for all airfields used by commercial aircraft. These considerations led to an airfield study in 1939. Each forest listed existing airfields in and around the forest, their size and the facilities offered. The report included a map locating all airfields and eventually led to improvements in many mountain and valley airfields. The concern over airfields signaled a more complex aviation management job for Region 5. As the forties began, it was apparent that more technical expertise was needed to direct an expanding aerial fire control job. The development of rotary-wing aircraft during the thirties forecast even further complexities.²⁸

The first successful rotary-winged aircraft was the autogiro, and in 1931, Gus Nash-Boulden of the Santa Barbara Forest was the first Forest Service employee to ride in one. Earl Loveridge of the Washington office discussed the new craft with members of the Bureau of Aeronautics in

April 1932. At about the same time, Jay Price held discussions with Kellett Autogiro Company in San Francisco. The autogiro was a single-engine, low-wing monoplane modified with a four-blade rotor mounted over the pilot's seat. The rotor was disengaged when the aircraft moved forward. The autogiro could fly at very low speeds, 25 miles per hour, and could land in a very small field. It could not hover motionless, although it could hold horizontal position while it descended slowly. The autogiro's advantages over conventional aircraft for scouting large fires and patrolling were substantial.²⁹

Nash-Boulden wanted to hire an autogiro for the 1932 fire season, but Price advised him that the contracts for the season had already been let. Price believed the existing autogiro models were under-powered, should have a higher ceiling and should be able to carry more than one passenger. Region 6 was less demanding and hired an autogiro for the 1932 season. This aircraft flew a mission on the Red Mountain Fire in the Klamath Forest, dropping supplies to the fire crews on September 22, 1932.³⁰

There is no record of autogiro use in Region 5 during the mid-thirties. However, in September 1936, the Aerial Fire Control Project team dropped water bombs from an autogiro at Willow Grove, Pennsylvania. Apparently, the results did not justify more testing, because autogiros were seldom mentioned in further project correspondence and reports. Then in August 1938, the chief forester proposed to acquire eight autogiros. Congress actually appropriated \$300,000 to the U.S. Army for development of rotary-winged aircraft in 1939. Meanwhile, the helicopter was improved, and the Army abandoned the autogiro for the helicopter. The Forest Service followed suit ending the short saga of the autogiro.³¹

The Aerial Fire Control Project was at the center of most of the new developments in Forest Service aviation. The idea for the project originated with a memo from Roy Headley to Dave Godwin, dated December 2, 1935. Headley's memo mentioned direct attack on fires, transporting men and supplies to fires and use of autogiros. He directed Godwin to prepare a proposal for consideration at the forthcoming fire control meeting in Spokane. After enthusiastic acceptance of Godwin's proposal, the project began operations in December 1935 and set up headquarters at Oakland Airport. The most important goal of the project was to find ways and means to directly attack forest fires from the air.

Godwin and his team considered two basic methods: release of unconfined liquids directly on the fire and release of containers or bombs filled with water or fire retardants. The team discussed dropping unconfined liquids from an aircraft or from containers suspended from an aircraft but did not follow up either idea. Instead, they devoted most of the following two years to containers, bombs, bomb racks, bomb sights and the like. Fred Funke, the project leader in charge of field tests, was assisted by Harold C. King, hired as an “engineer-pilot,” the first pilot employed by the Forest Service.³²

The project team tested containers of various kinds in air drops at Oakland Airport in October 1936, Livermore Airport in January 1937 and at Cuyama Ranger Station, on the east side of the Los Padres National Forest, in August 1937. The containers were of several types, cardboard and tin, and of five- or ten-gallon capacity. Liquid, foam and dust type fire retardants were



An aerial cargo drop of 5 gallon cans of water on the Angeles National Forest in 1947

tested. One of the chemicals tested was mono ammonium phosphate. (Ammonium phosphates and ammonium sulfates became the standard fire retardants used in aerial tankers after the 1960s.) The team’s testing of aircraft suitability for fire bombing disclosed that most civilian aircraft were not adaptable for the purpose. This was a problem because the Army was happy to lend bombs but not its aircraft. Air drop tests continued at Livermore Airport in January 1938 and at Cuyama in March 1938.³³

Walter Puhn remembered the container tests at Cuyama in August 1937 as “the noble fiasco,” a word play on the failure of Prohibition, “the

noble experiment.” Puhn came on duty as district ranger at Cuyama in April 1937. His job in the August experiments was to start a small fire at the mouth of Quatal Canyon, then stand by to keep the fire small after the air drops. Pilot King flew a Norduyn Norseman low and slow over the fire, dropping five or ten-gallon tins of water that burst as they struck the ground and splashed water in or near the fire.

It was a typical hot and dry summer day at Cuyama. The fire quickly recovered from the water drops and had to be contained by Puhn and his crew. Each time the crew got a foothold on the fire, the drop plane would swoop down with another load of tins. The crew would scatter and more tins tumbled out to burst and affect the fire hardly at all. Several repeats of this scenario soon exhausted Puhn and the crew and gave them a jaundiced view of aerial attack on fires. The plane landed to refuel, giving the crew a respite that was to be permanent, for the plane crashed on takeoff. No one was hurt, but the Cuyama experiments ended in fiasco, at least in Puhn’s eyes.

While they would not admit to a fiasco, the experimenters gave up on direct attack on fires several months later and in 1939 moved the project to the state of Washington (Region 6) where experiments in dropping parachutists on fires were underway. Apparently, the project team never seriously considered dropping unconfined liquids, possibly because the available aircraft were less adaptable to this approach. Fred Funke flew in a Goodyear blimp in April 1936 that might have been able to drop unconfined liquids but did not follow up this possibility. Positioning a lighter-than-air craft above a convection column rising from a fire did not seem practical. Perhaps it was natural that Godwin and his team were fascinated with bombs and bombsights because the military air services had the most experience with delivering objects to ground targets. At any rate, they concluded that direct aerial attack on forest fires was too expensive under existing conditions. The theory of containment of a fire by air attack until a ground crew arrived would have to wait for better methods of dropping liquids and for faster ways to get crews to remote fires. While these exciting experiments were underway there were slower, but perhaps more important, advances in other fire control equipment.³⁴

Tools of the Trade

The airplane was the darling of fire control professionals perhaps because they dreamed that it could eliminate the hard work of firefighting by hand. But it was other, more prosaic, equipment developed in the twenties that became more important in suppressing fires during the 1930s and 1940s. The pumper truck or mountain fire truck was called a tank truck and underwent steady improvement during the 1930s, mostly the result of a change in the truck and pump industries.

By mid-decade, the cumbersome truck chassis of 1929 were replaced by much more powerful, more maneuverable and sleeker vehicles. Region 5 tank trucks had separated into three classes, light, medium and heavy. The light tank truck was a Ford or Chevrolet pickup with a small tank and crew of three or four. The medium duty truck was mounted on a 1-1/2-ton chassis, carried more water and up to eight men. This became the most popular tank truck in the region until after World War II. The heavy tank truck was mounted on a three to five-ton chassis and was used mostly in southern California, where water was scarce and protecting improvements was a necessity. Altogether, Region 5 had about forty-five tank trucks in 1936, a total that gradually increased until the beginning of the war.³⁵

The medium tank truck with a five-man crew became the standard unit used in fire replanning. For example, the new fire plans called for nine such units in the Modoc, ten in the Plumas, eleven in the Sequoia and thirty-five in the San Bernardino. Plans are one thing and budgets



Tank truck and crew mopping-up fire, Modoc National Forest. 1944

another. Most forests had less than half the approved numbers of tank truck crews in place before World War II. Show's master plan and fire replanning also called for identification of water supplies and construction of water tanks and reservoirs, especially in the southern California forests. Standardized training of tank truck operators and their crews in pumping operations began in the mid-thirties, but the tactics of fighting fire with tank trucks was slower to develop. Before World War II, the emphasis was on cutting fireline with hand tools. Water was more often used for mop-up than initial attack except perhaps in southern California.

It is "an ill winde that bloweth no man to good,"³⁶ said John Heywood 400 years ago. Although the 18th Amendment to the Constitution created many problems, it also reaped a few benefits. Many of the water tanks in the southern California national forests were acquired through the work of Internal Revenue agents. Tanks were essential in bootleg whiskey operations. One bootlegger operated within the San Bernardino Forest and protected himself by putting a forest guard on his payroll. The bootlegger and his crew worked at night. By some form of coincidence, all traces of their activities were erased by a band of sheep that happened to be driven across the area early every morning.

The use of pumps in fire control increased in the thirties until manufacturers began to improve their products for the fire control market. At first, most tank trucks used some form of power take-off from the truck engine. This method gave ample power, but the truck had to be stopped while the pump was running. By 1940, the Division of Forestry and Region 5 had developed "slip-on" units that incorporated a gasoline engine pump with a water tank in one unit. These units were easily "slipped-on" a 1-1/2-ton truck and could be used while the truck was traveling. After the fire season the pump could be removed and the truck used for other purposes. Most western regions of the Forest Service used pumps with a four-cycle engine, but Region 1 had good success with Pacific Marine portable pumps powered by a two-cycle engine. This pump was substantially lighter than pumps with comparable four-cycle engines and used less fuel. The two-cycle engine underwent rapid development after 1935, and became the power source for improved portable pumps and an important tool being tested in Region 1—the Wolf power saw.³⁷

Show's master plan was the basis for improved detection, communication and transportation systems that were constructed by the CCC in the mid-thirties. The master plan and fire replanning described a Region 5 fire control organization that consisted of lookouts, tank truck suppression crews, a few guards and fire prevention men. The tank truck crew became the backbone of a fire pre-suppression organization that remains essentially unchanged today. The improvements that have occurred since 1940 have largely been in quality of equipment, improved tactics and better communication.

Telephone lines were the most important form of communications in the region through World War II, but radio communications made giant strides during the thirties. Radio had a checkered history in the Forest Service. Early experiments in the Apache National Forest (Region 3) in 1916 were followed by wireless transmissions during the Army air patrols of 1919-1921. Because tight budgets were the rule during the twenties, Roy Headley took a dim view of most efforts to improve radio communications. Throughout the early development of radio by the Forest Service, Headley had to be conscious of an agreement with American Telephone Telegraph Company, whereby the Forest Service received lowered telephone rates so long as it did not foster a communication system that competed with the telephone company.³⁸

Headley's opposition changed to strong support after he and Chief Forester Greeley witnessed the demonstration in August 1927 of a crude little contraption built by Dwight L. Beatty of Region 1. Beatty had been a mule skinner, ranger and forest supervisor. While working in the Region 1 office, he educated himself in radio technology and built the contraption to prove that a portable radio could be built. After the demonstration, he was assigned the responsibility for radio development in the Forest Service. Beatty set forth several standards for Forest Service radios; they had to be simple, rugged and reliable. The key to reaching these standards was use of high frequencies, which required less power and therefore less weight. Beatty testified before the Inter-Department Radio Advisory Committee on behalf of the Forest Service and secured four frequencies and the promise of others, if needed. This was the essential first step toward Forest Service radio communications. By this time, Beatty had established the need for three kinds of radios; portable, semi-portable and base stations. but when he went to radio manufacturers

with his needs for low-power, lightweight radios, they turned him away. There was no market for such a product.³⁹

This didn't stop Beatty. He built a semi-portable himself, completing it in February 1930. The SP-1930 was really no lightweight by modern standards. The batteries and antenna weighed fifty pounds, the transmitter-receiver weighed eighteen pounds and the equipment case another twelve pounds. Field tests of the SP-1930 were made in 1930 and proved moderately successful. The set was a good start toward his goals and was comparatively cheap to build (\$110).⁴⁰

Beatty's energetic efforts resulted in establishment of the Forest Service Radio Laboratory in Tacoma, Washington, in 1930. There, he worked with Harold Lawson to put together voice transmitters and receivers. Beatty, Lawson and Roy Squibb improved the SP set and built the P (portable) model, which weighed only twelve pounds. Both types of radio were field tested in Regions 1, 4, 5 and 6. Set No. SP-15 was installed August 12, 1932, on Orleans Mt. Lookout in the Klamath National Forest. Despite interference from the Shasta Forest, police and ham operators, the lookout was able to talk to Orleans Ranger Station. The first use of radio on a fire in the Klamath came on September 19, 1932, when lookouts talked to each other about the Red Mountain Fire. This was also the fire in which a Region 6 autogiro dropped supplies to the fire crew. The SP sets were also used on the Matilija Fire, with mixed results.⁴¹

The performance of the SP sets in the 1932 field season stimulated Lawson to develop the PF set, which could transmit and receive code or voice and that weighed only fifteen pounds. This set was popular with the western regions of the Forest Service and with other agencies, including the U.S. Navy. Radio electronics was a rapidly developing field, and new technology was appearing daily. The Radio Laboratory recognized this and planned for obsolescence of its products. The result was constant change in Forest Service radios. One of the most important new technologies was the use of very high frequencies (VHF). By the end of 1935, the Radio Laboratory had manufactured the portable S set, the semi-portable T set, the A set for use in aircraft, and a unit for cars and pickups. These VHF units were followed in 1936 by the SPF (semi-portable phone) that became the standard radio in the Forest Service. This rugged and reliable radio was used on fires and for everyday communication on into the 1960s. Another important improvement was the battery-operated radio

relay. Messages directed to the relay were sent on to a receiver that was out of range of the original sender. The first radio relay was installed in 1941 on Mt. Diablo near Concord, California. It was forecast that additional relays on each forest would permit radio communication between the forest supervisor's office and the regional office.⁴²



SP Field Radio being tested on the Nelson Point Fire, Plumas National Forest. 1934

Fred Funke, who supervised the radio program in Region 5, tested portable, semi-portable and base stations sets on the Nelson Point Fire in the Plumas Forest in September 1934. His network of radio communication on this fire was so successful that it became a model for radio communications on future fires. After this fire, the region purchased 110 sets for initial attack fire crews, a purchase that doubled the number of radio sets in the region. By 1938, Region 5 had employed radio technicians on two forests, and mobile radio stations were in use in the Angeles National Forest. Funke worked closely with the Radio Laboratory technicians and supported them in their insistence on use of low-powered, high-frequency radio.⁴³

During the thirties, there was a battle between advocates of high power and low power. High power overcame interference from other radio users but created interference between Forest Service users and required more

weight per set than low power. Funke planned for lightweight, low-powered sets and hoped to have 3,430 of these units in the region by the mid-1940s. Forest Service radios were far from perfect in the 1930s, but as forest officers learned their advantages and limitations, they played an increasing role in fire control administration and in large-fire suppression. The critical factor in the use of radio was acceptance by the user. By the mid-thirties, radio was well on the way toward acceptance in Region 5. Regional Inspector Mayhew Davis noted in his report in September 1936, "The Klamath is sold on radio use in fire protection."⁴⁴

The development of radio was much swifter than improvements in bulldozer designs. Technically speaking, the bulldozer was an adjustable blade that could be attached to the front of a tractor. Track-laying tractors underwent steady improvement. After a slow start in the late 1920s, many loggers converted to use of tractors to skid logs. As the market for use of tractors in mining, heavy construction and logging improved, advances in engine and chassis design were made. By the late 1930s, smaller manufacturers had fallen by the wayside, and the industry was dominated by Caterpillar Co., International Harvester Co., Cletrac Co., and Allis-Chalmers Co. These companies gradually settled on three classes of tractor: light, medium and heavy. For example, the Caterpillar Co., manufactured the RD-2 and RD-4 (light), the RD-6 (medium), and the RD-7 and RD-8 (heavy). As the thirties continued, tractors became more and more powerful, larger and heavier.

Meanwhile, many attempts at improving the bulldozer blade were underway. Region 6 came up with a V-shaped blade in 1935, which they believed was better than the straight, angled blade. The Office of Blister Rust Control in Spokane, Washington built a toothed blade that worked well in clearing *Ribes* bushes (currants and gooseberries). Some regions were still experimenting with brush plows in the mid-1930s.⁴⁵

Region 5 began transporting small bulldozers on three-ton trucks as early as 1932, and in 1937 there were thirteen bulldozers under contract for fire control in Region 5. One of the reasons for low use of bulldozers in the early thirties was the lack of large fires. Another was the limited ability of bulldozers to negotiate steep terrain. This problem was solved when larger, more powerful equipment appeared in the late thirties. High operating cost was also a factor, but the most important reason for limited use of bulldozers on fires was that fire suppression was geared to the use

of manpower, especially fire crews. Throughout the thirties and forties, Region 5 depended on fire crews to suppress fires and crews meant the CCC, at least for awhile.

The Decline of the CCC

Probably the availability of large numbers of trained CCC firefighters was the principal reason for the reduction in the numbers of large fires and in acreage burned between 1933 and 1941 over any previous period. After a successful 1933 season, the CCC program was extended in 1934 and again in 1935. The economic effect of widespread CCC camps and the benefits to the young men and the nation's natural resources generated grass-roots support for the program. Roosevelt vacillated over the size of the CCC but in 1937 asked Congress to make the program permanent. Congress refused, possibly because of Roosevelt's other activities, especially his attempt to "pack" the Supreme Court. Instead of permanent status, the Congress extended the CCC law for three years and in 1939, extended it again for four years. As the United States began to rearm in the late 1930s more jobs became available, and the armed services became more attractive to young men. Enrollment in the CCCs declined drastically in 1941. After war broke out, strong sentiment in the House of Representatives favored abolition of the CCC program. President Roosevelt and the Forest Service argued for retention of the CCC for forest firefighting and other wartime duties, but Congress voted to abolish the CCC as of June 30, 1942.⁴⁶

Although the CCC provided more benefits to the national forests than any other government program, it was not without problems. After the mad pace of camp construction in 1933 and 1934, the use of the CCC settled down into a more routine operation. In Region 5, fire control received major benefits from the CCC, as described above. Despite the deaths of several CCC enrollees on forest fires around the country in 1933 and 1934, there was no ban on using CCC crews in firefighting. Even the Griffith Park disaster in October 1933, in which twenty-eight Emergency Conservation Work (ECW) enrollees were killed, did not result in a ban on use of CCC crews on fires. The ECW law provided for the CCC and other work programs. The men involved were working under the ECW program for Los Angeles County but were not CCC enrollees. In terms of fireline deaths, the Griffith Park Fire disaster

was the worst in California history. The fire demonstrated once again that attempting to fight fire with untrained, poorly led men is unproductive and can lead to tragedy.⁴⁷

By 1936, Region 5 had an intensive fire training program for CCC camps, but candidates for enrollee fire crews had to be carefully selected. New enrollees often were in poor physical shape, and some enrollees were too young for fire duty--seventeen or even younger. Many CCC enrollees were city boys without the least notion of the outdoors or the use of everyday forestry tools such as shovels, mattocks and axes. When put to work on a fire, enrollees usually did not pace themselves and tired quickly. On the other hand, CCC crewmen recovered quickly from hard work and were easily trained and led, if they had good supervision. Regional fire experts differed substantially about the value of CCC as firefighters. Firemen in Regions 1 and 6 thought they were about equal to pickup labor, while those in Region 5 rated them twice as effective as pickups. Perhaps this reflected the differences in training and in the quality of pickup labor between regions.⁴⁸

The whole policy of using CCC for fire suppression came under intense criticism when fourteen enrollees died while fighting the Blackwater Fire in the Shoshone National Forest, August 20-21, 1937. Other enrollees had died fighting fire in 1936, and the Blackwater Fire tragedy added to demands that enrollees be exempted from fire suppression duty. CCC Director Robert Fechner did not yield to these demands. Instead, he set forth new regulations, which required more intensive training before CCC enrollees could be used in fire suppression. A year later, Fechner banned use of CCC enrollees under certain fire conditions.⁴⁹

These events coincided with a decline in the number of CCC camps in Region 5 to about thirty-six. The enthusiasm of the early years also declined, and camp morale became more of a problem. Disgruntled enrollees deserted the program in increasing numbers until in 1939 the national desertion rate reached 20 percent. The reasons for the decline of the CCC were many and, to some extent, depended on the situation in each camp. Apparently, the overall quality of enrollees dropped as the more confident and energetic young men were able to find work in defense industries. Some enrollees deserted because they thought the CCC was too much like the Army.⁵⁰



The CCC had a twofold impact on fire control in Region 5. One impact was on regular fire control appropriations, and the other was over-dependence on what was, in the final analysis, an emergency program. As the CCC and other emergency programs became firmly established after 1933, regular Forest Service appropriations either remained static or were reduced. The legislators reasoned that there was no need for increased fire control budgets when other means to do the job were available. This put a crimp in Show's master plan, which had envisioned many new stations on each forest manned by regular Forest Service personnel.

The only way out of the dilemma was to train CCC enrollees to take over many of these stations under minimum Forest Service supervision. But the Forest Service regular employees were spread very thin. Only the district rangers and a few people in each supervisor's office were employed year-long. The backbone of the fire control organization had always been the seasonal employee: the guards, lookouts and, in later years, protective assistants. These loyal and faithful people came back every year, always hoping for a year-long job. Many could not continue working for a six-month season and eventually left the Forest Service for more certain employment.⁵¹

The reductions in fire control budgets were aggravated when the CCC began to decline. In the late 1930s, fewer CCC crews were available, their quality was lower, and their use on fires was restricted. Once again, Region 5 was faced with the need to find a source of manpower for reinforcements on large fires. Nonetheless, the availability of CCC crews had worked a transformation in regional fire suppression policy. The idea of a suppression crew went back to 1910 or earlier, but it became a reality in the early days of the Depression, and a fixture after 1933. The old organization of fire guards who made solitary initial attacks on fires was replaced in the thirties by small-crew initial attack. Indeed, it is likely that the easy availability of CCC crews prevented more rapid development of the bulldozer and tank truck: by the late thirties, use of fire crews was well established in Region 5. The small crew became the central feature of the pre-suppression organization established by fire replanning.

One result of the emphasis on crews was the creation of specialized firefighting crews and techniques. The Siskiyou National Forest in Oregon (Region 6) established a special forty-man crew that could subsist by itself for several days on a project fire. This crew was made up of

regular Forest Service employees and was used for reinforcements on fires that escaped first-night control. These crews were given special badges to wear and became known for high morale and effective work. The crew used the so-called "one-lick" line building method whereby each crewman took one lick (stroke) with his tool, theoretically resulting in constant forward movement and higher fireline production.

In practice, this system came to be known as "progressive line construction." Each man would work in place until the man ahead moved on. Progress was determined by the character of the fuels the crew worked in. This technique was tried in Region 5 and was useful when it was adapted to local conditions. The idea of a special crew of experienced, well-trained, Forest Service employees came out of the CCC experience and evolved eventually into today's interregional crews. In fact, some of the CCC fire crews were organized on the forty man crew model, and called "Hotshot" crews. Most forests used smaller crews of twenty men for reasons of economy and easier handling of supplies and manpower. The special crew concept got a workout during the fire seasons of the late thirties. These changes in the CCC and fire control policy and procedure were instituted in Region 5 by administrators who were at the peak of their careers.⁵²

Regional Administration in the Thirties

The leaders of Region 5 were preoccupied with fire control from the time the San Francisco office was established in 1908. Yet it was 1930 before fire control became a separate division on a par with timber management, range management and lands activities. Show elevated Jay H. Price to leadership of the new division in May 1930. Show had great confidence in Price, who was a favorite among forest personnel throughout California. Visiting most large fires was a mission for Price, and he always had time to help. During the Nelson Point Fire in the Plumas Forest in 1934, George James was helping Fred Funke test radios on the fire. One day he saw Price hiking down the fireline with a shovel on his shoulder. Ahead of Price was a pickup laborer unsuccessfully trying to widen the fireline with a shovel. Price stopped and patiently went through the standard three-step fire-tool training process with the firefighter until he understood how to use his shovel.⁵³

Price was fire control division chief until May 1935, when he was promoted to associate regional forester, Show's alter ego. After this change, Show downgraded fire control to a subunit under the Division of Operations, which was directed by old warhorse Bob Deering. There it remained until 1945 with leadership from William V. Jones, Chester Morse, George Gowen and C. A. Gustafson. Deering provided overall supervision of fire control during those years. Deering had always run the region while Show was involved in policy and research matters. There were times, especially during the early years of the CCC when an overworked Deering would chew even more pencils than usual. That was a definite sign in Deering of an imminent explosion. On those occasions, Show sent Deering off for an "inspection trip" to a peaceful forest such as the Inyo or the Eldorado.⁵⁴

Show continued to push completion of his master plan and kept close watch on performance in the field. He attended boards of review and listened attentively. After the major issues began to emerge, he would whistle softly as he rolled a cigarette. Everyone knew that this was the sign to be quiet and listen. Then Show would cogently sum up the actions on the fire and describe corrections needed. Some of the younger men in the region called him "pappy" among themselves, but he was not an approachable man. Rather than spend time counseling young men, he would make them think, with probing questions, and give them challenging assignments. After meetings or work sessions, Show seldom socialized. He would pick up a book, sit in a corner and read, or go to bed early. The exception was after boards of review, when Show would hold a "children's hour." Those in attendance would gather round Show, drink whiskey and talk about fires past and present. Show's criticisms at boards of reviews were to the point and often sharp, but participants remember him as fair and accurate in his comments.⁵⁵

Show's interest in improved management continued during the thirties. The Forest Service work planning system was devised in the late twenties by Earl Loveridge and during the thirties underwent several improvements. Show pushed the system despite reluctance by some supervisors and rangers to accept it. Work planning was probably a major reason Region 5 was able to successfully meet the demands of the CCC and other emergency programs and the stresses of World War II.⁵⁶

Paul Pitchlynn's Feather River Ranger School met annually through

the thirties and was supplemented by an advanced training course beginning in 1933. Show and Pitchlynn set out to make the advanced training so difficult that weak administrators would be eliminated. Indeed, in some years no one passed the course. Advanced training in fire control, range and recreation management began in 1940 as part of the drive for improved performance.⁵⁷

In most of these sessions, a few spaces were reserved for members of the Division of Forestry. That organization's progress during the thirties mirrored that of Region 5. The New Deal emergency programs gave the division a big assist, especially in construction of lookouts, fire stations, roads, telephone lines and the like. The experience of dealing with various emergency programs gave the men of the division increased confidence.

Although some areas of the state still did not have state rangers as late as 1941, the division advanced in professionalism and became the acknowledged experts in some areas of forest fire control, especially use of tank trucks. Although State Forester M. B. Pratt's tenure was not marked by outstanding leadership, a solid foundation was laid for his dynamic successor, DeWitt "Swede" Nelson.

Meanwhile, cooperative fire control between Region 5 and the Division and county fire departments went forward. Jay Price was largely responsible for the spirit of true cooperation that prevailed at upper levels and grew stronger in the field. He worked closely with the Division from 1926 to 1936 and was highly respected by the men in Sacramento. The Division of Forestry weathered political storms and the old light burning issue again during the thirties. The historical details of those days are beyond the scope of this narrative. Nevertheless, the Division and Region 5 shared one major fire control feature in common, the weather.⁵⁸

The Red Cap and Other Fires

The late thirties and early forties had wet winters with above normal precipitation except for 1939, which was quite dry. In fact, the 1937-1938 and 1940-1941 winters were so wet that floods struck several areas of the state. The *sine qua non* of a severe fire season in California is dry spring weather. The spring season in 1936 was normal, wet in 1937, normal again in 1938, very dry in 1939 and wet in 1940 and 1941. The toll in acreage burned each fire season followed the old rule quite well. That is not to say that large fires did not occur in those seasons with normal or

wet spring weather. Another old rule is that bad fire weather can occur within any fire season. The corollary to this rule is that most of the burned acreage in any fire season will be recorded on a few large fires.⁵⁹

Although the northern third of the state was deficient in precipitation, the 1936 fire season was not severe. Even so, a few large fires occurred. It was still winter when the first large fire of the year escaped from a brush burning job near the town of Mt. Shasta on March 19th. This was the Loeck Fire, in which many firefighters were reluctant to put out the fire, for it was their only source of warmth. The temperatures were so cold that water froze in canteens and tank trucks. This didn't stop the fire, which burned brush above a six-inch layer of snow. It was March 22nd before the fire was controlled after burning 2,655 acres. The largest burned area in any forest, 17,399 acres, occurred in the Modoc, a forest not heretofore noted for large fires.⁶⁰

The Tahoe and Sierra National Forests also suffered in 1936. The Sierra Forest had four fires that exceeded 1,500 acres, the largest being the Walker Creek Fire, which blackened 5,000 acres. About 13,630 acres of national forest land burned in the Tahoe that year. Most of the acreage was lost when the McKenzie Sawmill on the Foresthill Divide caught fire on October 15, 1936. The fire began late at night, while a Mono (east or north) wind was blowing up to 80 miles per hour, and crowned in the mixed conifer timber. The fire burned twelve miles from Westville to Iowa Hill in twelve hours destroying 150 million board feet of timber. Supervisor "Swede" Nelson and his men grimly hung onto the flanks of the fire until the wind let up the second night, when they controlled the fire. Mono winds do not occur as often as do Santa Ana winds, but the Plumas' Milk Ranch Fire of 1951 and the Tahoe's Mountain House Fire of 1959 were other examples of the damage the Monos could do.⁶¹

The only sizable fire in southern California in 1936 was the East Etiwanda Fire that burned 5,588 acres in the San Bernardino National Forest. After the fire, a board of review anticipated the fire replanning project by recommending more tank truck crews and a systematic dispatching and funding plan. The Modoc, Tahoe, Sierra and San Bernardino accounted for 73 percent of the region's fire losses in 1936 with fewer than ten major fires. The easy 1936 season was followed by a wet winter and a very wet spring in 1937. Only 13,188 acres of national forest land was burned in the 1937 fire season, the lowest on record in Region 5.⁶²

The 1937 season was almost a rest cure for the entire region, and 1938 was a moderate fire season except for the far northern forests and the San Bernardino again. The Arrowhead Fire of 1938 resulted from a faulty flue in a cabin near the top of the San Bernardino Mountains. Santa Ana winds of 50 miles per hour were blowing and relative humidity had plunged to 7 percent. Burning shingles from the cabin roof spread the fire, and 8,000 acres burned in the first seven hours. The fire ultimately burned 12,362 acres of private and public land. This fire accounted for almost all of the acres burned within the San Bernardino boundaries in 1938, but the memorable fires that year were in the far north.⁶³

The northernmost forests in the region were struck by a series of deadly thunderstorms on July 13th. Although records differ to some extent, it is estimated that 366 fires originated in these storms. The Tahoe, Plumas and Lassen Forests recorded a total of 60 fires, the Shasta, 80 and the Trinity, 44. One of the Trinity's lightning strikes grew into the Little Bear Wallow Fire. This fire was well named. Like a bear waking up from its winter's sleep, the Little Bear Wallow Fire was ugly and surly. The first attack was by an inexperienced CCC crew that always seemed to be in the wrong place at the right time. The reinforcements had to hike eight miles uphill to the fire. Fire camp was on a ridge and was supposed to be supplied by aircraft, but many drops missed the camp and were lost. Local folks said the bears ate well that winter. The fire was noted for hungry, frustrated firefighters.⁶⁴

The Klamath was bombarded with lightning strikes during the July 13th storm, and 182 fires were the result. Rain fell with most of the lightning strikes, and most of the fires were quickly suppressed. As luck would have it, the dry lightning strikes were on the western boundary of the forest in some of its most inaccessible terrain. Four of these fires grew in size, from Red Mountain on the boundary with the Siskiyou Forest south to Potato Patch Creek and Slide Creek and down to Red Cap Creek at the boundary with the Trinity. The latter fire became known as the Red Cap Fire, an event that generated a host of stories that are still being told by those who took part in it. Some fires seem to have a special quality that makes them remembered. The Red Cap was one of those.⁶⁵

The Red Cap Fire was located a few miles east of the Hoopa Indian Reservation on steep hogbacks that drained into four rivers: the Trinity, the New, the Klamath and the Salmon. Most of the fire was within Red

Cap Creek basin that accounts for its name. Several peaks over 6,000 feet elevation surrounded the fire, which was sandwiched between even higher terrain in the Marble Mountains and the Salmon-Trinity Alps. Names such as Devil's Backbone, Deadman Spring and Devil's Hole lent a grim and sinister aspect to the area.

In some ways the fire was a repeat of previous experiences in the Klamath. It began as a dry lightning strike and grew steadily. For five days, District Ranger Russ Bower fed whatever manpower he could get into the Red Cap and the other four large fires, which were nearly as remote as the Red Cap. It wasn't enough, especially when many hours of hiking were needed to get to the fires and when fireline construction was so difficult because of steep terrain. The massive extent and number of lightning fires caught the attention of the regional and national offices. After going it alone for most of a week, Bower was deluged with brass hats from San Francisco and Washington, D.C. Bob Deering and all of the regional fire control staff showed up followed by Roy Headley, chief of fire control in Washington. Deering and his crew had been through this before and put themselves at the disposal of fire boss Bower, but at least one participant reported that Bower was hampered by some of his high level assistants. Headley's presence recalled the 10 a.m. Policy. Soon hordes of men were crowding the flat at Orleans.⁶⁶

In his fire report, Bower wrote that the drought of men the first five days was replaced by a flood, and a disorderly flood at that! Some of the men were "Wobblies" picked up in Oregon who claimed they had been promised wages of thirty-five cents per hour rather than the going rate of twenty-five cents per hour. Some of these men reached remote fire camps, then threatened to strike for higher wages. This incensed most of the Forest Service overhead. The idea of someone refusing to fight fire after agreeing to do so was scandalous. At least one ranger picked up an axe handle for negotiating purposes, but firm talk led to surrender by most of the sulky crew. The worst malcontents were "sent down the road," a trail in this case, and the rest got on with the job. Still, the quality of labor was poor, and there were so many men that line production was inefficient.⁶⁷

The cargo drops were a success, as previously described, and so was the use of radio, especially VHF sets. The Weather Bureau supplied a mobile fire weather station that gave accurate forecasts. The forecasts

were relayed by radio to men on the line and helped them avoid dangerous situations and carry out backfires.⁶⁸

The fire's behavior was peculiar. Pete Hanson recalled hiking to Black Lake fire camp in an atmosphere so lacking in oxygen that it was difficult to take a deep breath or even keep a match lit. The fire smoldered and the smoke lay heavily over the area. Forty men led by Charlie Crews, fire foreman at Hayfork in the Trinity, had been sent from the camp that morning toward the head of the fire. That afternoon a change in atmospheric pressure or a weather front created an onrush of oxygen-laden air into the area, and the fire blew up. Hanson was fearful that Crews and his men had been trapped, but they soon trooped into camp. The wise old fireman had sensed the change coming and started his men out of the danger area that morning.⁶⁹

The Red Cap Fire got the press coverage and most of the attention, but conditions were rough on the other Klamath fires as well. The Steinacher Number 2 Fire was high in the Marble Mountains. Jim McNeill took his crew across the Klamath River at Murderer's Bar and hiked the men in their soggy clothes eight miles to a temporary fire camp. They shared their rations with another crew, and soon both crews were out of food. They fought fire all day on an empty stomach, lifting their heads to watch aircraft flying by to drop food to the Red Cap fire camps. The second day passed and still no food. On the morning of the third day with no breakfast and their belts kissing their backbones, McNeill sent a note of desperation to dispatcher Lee Morford at Orleans. "Lee, not for our sake, but for God's sake, send us some food." At dark their food finally arrived.⁷⁰

The Red Cap Fire burned 16,196 acres before it was controlled on July 27, 1938. The northern California fire season wound up with a fire in the Shasta Forest near Mt. Hebron, which burned 8,300 acres between August 31st and September 2nd. Northern California firefighters had gained valuable seasoning. They would need it, for precipitation in the 1938-1939 winter was two-thirds normal and the spring months were the driest and warmest in years. The 1939 fire season had all of the potential of another 1924. In addition to drought conditions, or perhaps because of them, thunderstorms set the highest number of fires on record (1,459). In fact, the total number of fires that year (2,148) was a new record for Region 5. Under the circum-

stances, it was remarkable that burned area was held to 89,399 acres of national forest land.⁷¹

The first big fire of the season was in the Sierra National Forest. The Source Point Fire started at 11:30 a.m., July 19th, from an abandoned campfire just west of Edison Company's Power House Number 8 in the bottom of the San Joaquin River Canyon. The fire began in grass and brush while a 20-mile-per-hour wind was blowing. The smoke was seen within four minutes by Edison employees, but the fire had covered 100 acres before the first crew arrived. The fire jumped the river and spread up both sides of the canyon. Downslope winds at night repeatedly pushed the fire over the line. However, most of the acreage burned during a "blow-up" under the influence of a 40-mile-per-hour wind. Bulldozers were used to good effect on the upper end of the fire, but it took 881 men to control the fire on July 31st. The fire burned 16,896 acres and was the worst fire in the Sierra Forest since 1924.⁷²

Several forests recorded large fires in 1939, but the bulk of the burned area was in the Los Padres, Sierra, Shasta and Mendocino National Forests. Historically, August and September are the months when large fires occur in the Mendocino, and 1939 was no exception. The damage was caused by a series of fires between 1,000 and 4,000 acres in size, the largest being the Fouts Springs Fire, which covered 3,610 acres. These fires burned in mid-August under the influence of a heat wave and later in the month, when thunderstorms started many lightning fires.⁷³

The August heat wave generated hot and dry conditions on the central coast. These conditions often have led to the huge fires that have haunted the Los Padres National Forest from 1917 down to the present, but it had been six years since the Los Padres had experienced a great fire. Possibly this was due to controversial closures of several important watersheds. At any rate, a major fire broke out on August 14th in both the Mt. Pinos and Monterey districts. The following day, two more fires began in the San Luis District. One of the latter fires, the Machesna Fire, became the largest of the 1939 season and burned 26,565 acres. This fire was discovered by two hunters while it was only one-fifth acre in size. In vain, they tried to control the fire. It had spread to 25 acres before the first fire crew arrived. Lack of bulldozers hampered firefighters who had to build most of the fireline by hand. Fire behavior on these fires was influenced by the heat wave conditions. It was erratic and dangerous to

the firefighters, so dangerous that on the Bixby Mountain Fire, which began August 14th, several firefighters were injured, and Division of Forestry employee, Joseph Calandra, was trapped and killed. All four major fires were man-caused.⁷⁴

Repeated thunderstorms plagued the Sierra Nevada and northern California forests during August and September 1939. The Shasta National Forest was hit the hardest. Forest personnel were just wrapping up the Dwinnell Fire, which burned 3,406 acres, when a "sleeping lightning fire" awoke. This fire had occurred a few days earlier and gone undetected. As fuels dried out, the fire spread and rising winds fanned it into activity. The fire was on Rainbow Ridge, a few miles east of the town of Mt. Shasta and was named the Deer Creek Fire. It was already ten acres in size when the first crew arrived. Burning in dense brush and scattered pine, it spread quickly toward the north under the influence of winds that reached 27 miles per hour. Spot fires, started by flaming brands thrown over a mile beyond the main fire, created a fast moving fire front that soon threatened the town of Weed. Fortunately, the wind shifted, enabling firefighters to backfire in Parks Creek, west of Weed, and knock down the head of the fire. Adding to the problems of steep terrain and dangerous fuels were breakdowns of bulldozers and the failure of some personnel to aggressively attack the fire. When it was all over, 17,410 acres had burned in the Shasta's worst fire in a decade.⁷⁵

A general rain in September cooled off what had been the hottest fire season in many years and ushered in the winter of 1939-1940, which was very wet. The spring of 1940 was also wet over most of the state and should have been the harbinger of an easy fire season. Indeed, it was easy for most forests, but not for the San Bernardino, Sequoia, Sierra and Modoc. After years as one of the "asbestos" forests in Region 5, the Modoc had become a cause for concern. In 1936 and 1938, more than 17,000 acres of national forest land burned in the Modoc, and in 1940, five major fires burned 26,367 acres. One of these fires, the Sugar Hill Number 3, burned nearly 20,000 acres. Unfortunately, the Modoc was to suffer even more in 1941.⁷⁶

The southern forests had not shared in the wet spring and endured a rash of large fires in 1940. The biggest fires in the Angeles and Cleveland were not serious. Neither were those in the Los Padres except for the San Marcos Fire described earlier. It was the San Bernardino Forest that took

over first place in burned acreage and in numbers of large fires in 1940. Winter rains caused a rank growth of grass and weeds at lower elevations that dried into "flash fuel" during what became the longest dry spell on record in that forest. No rain fell from mid-April through mid-October. The east and south slopes of the forest faced the desert and were bone dry by June 1st. The first of the large fires was the Chino Fire, which began on June 10th, followed by the Deep Creek Fire on July 22nd, the Hull Canyon Fire on August 10th, the Keenbrook Fire on August 21st and the Garner Fire on September 25th. These five fires burned 57,641 acres, most of which was on the semi-desert slopes east of the main divide.⁷⁷



Hand crew on night shift, San Bernardino National Forest, 1932. Night usually brought more favorable conditions for fire fighting, and critical work was often accomplished then.

The San Bernardino folks learned some hard lessons on these fires. They had little recent experience on large fires because policy dictated that firemen from southern California could not be spared to go to large fires in northern California. Time and again, over decades of large-fire experience in Region 5, it was shown that even one year's lapse of large fires in a forest resulted in a rusty large-fire organization. Constant experience is what makes an effective and efficient large fire organization. This poses a dilemma, for the object of fire control is to stop large fires from occurring, yet effectiveness in fighting large fires depends on fighting them often. There have been attempts to fill this gap through simulation and classroom exercises, but these methods are definitely inferior to the real event. In recent years, permanent fire teams provide a cadre of overhead who work together on a regular basis. This solves some but not all of the

problem. Perhaps, the most effective substitute for large fire experience is gained by prescribed burning during the off-season.

The San Bernardino firemen found in 1940 that aerial scouting was very effective so long as there was radio communication between the aircraft and fire camp. They made good use of radio (SV and S sets) on the firelines, reaching fire camp through radio relay stations on nearby peaks. Bulldozers were used on several fires with good results, and tank trucks were able to hold fires along roads, assist backfiring operations and save structures. Forest Supervisor "Swede" Nelson complained that five tank trucks were not nearly enough for fire protection of the San Bernardino Forest. He was not the only supervisor to complain about shortages of tank trucks, but the outlook for relief was bleak. The war in Europe continued, the draft was under way, and the military was taking the lion's share of the national budget.⁷⁸

Fortunately, the winter of 1940-1941 and the spring of 1941 were wet. The fire season went into the record book as about average in terms of acres burned (77,891 acres). In southern California it was an easy season. Only the Los Padres had any real problems. That forest had only 17 fires, but they burned about 6,500 acres. By agreement with the U.S. Army, the forest also attacked 56 fires within the Hunter-Liggett Military Reservation. These fires were often identified by the unit that started them. Thus, the 30th Infantry, 7th Infantry, 218th Field Artillery and the 18th Engineers all had fires named after them in 1941. The Los Padres also lost a firefighter on the Williams Hill Fire that year. A bulldozer operator was building fireline in chamise and buckwheat brush ahead of the fire. The fire made a run. The operator tried to turn the bulldozer, which threw a track and stopped. The operator ran but was overtaken and died. So often, it was during easy fire seasons and under apparently normal conditions that men died on the fireline.⁷⁹

There were several fires of about 1,000 acres in the Cleveland, Sequoia and San Bernardino forests in 1941. It was the Modoc National Forest, however, that seemed determined to become one of the region's noted fire traps. Throughout the terrible twenties, only 21,000 acres of national forest land burned in the Modoc. Then came 1936, 1938 and 1940; in each year the forest burned almost as many acres as during the entire twenties decade. It was in 1941 that the Modoc took its place with the other "fire forests" in Region 5. That year more than 100,006

acres burned in and adjacent to the Modoc, far more than burned in the twenties and thirties combined. The Barn Top Mountain Fires burned 86,700 acres, the largest burn since the Matilija and one of the largest fires ever recorded in California. The Barn Top Mountain and other large Modoc fires were primarily in cheat grass type in the desolate lava plateaus of the Devils Garden. Acreage was great, but damage was light. Nevertheless, there seemed to be no escaping the fact that large fires could burn in the most unlikely places, even in an average fire season.⁸⁰

A few weeks after the 1941 fire season ended, the bombing of Pearl Harbor created events that permanently changed fire control in California. The changes were most evident after the war was over, but the war itself brought new responsibilities and new demands on a reduced fire control organization in the California national forests.

While Americans were struggling to escape from the Great Depression, events overseas brought war closer and closer. Some Americans thought that the United States should help its beleaguered friends abroad, while others wanted strict neutrality. When Hitler invaded Poland in September 1939 and general war broke out in Europe, the debate intensified. The fall of France in June 1940 made many Americans realize that the time for talk was over. Congress passed the first peacetime draft law in September 1940 and 800,000 men were selected for service in October. Meanwhile, President Roosevelt tried to curb Japan's aggressive tendencies. In September 1940 he stopped shipment of strategic war materials to Japan.¹

Nervous California legislators reacted to the threat of war by passing anti-spy, anti-subversive and anti-sabotage acts in 1940. Tensions increased when Japan invaded Indo-China in July 1941. Roosevelt retaliated on July 26, 1941, by freezing Japanese assets in the United States, the most important effect of which was to cut off oil exports to Japan from the United States. Despite all of the overt signs of Japanese intent, Californians were as surprised as anyone by the Japanese attack on Pearl Harbor.²

Successive Japanese victories in the first months of 1942 brought fears that California would be Japan's next target. Blackouts were instituted in coastal cities. Air raid wardens made sure that curtains shut out any light that might aid the enemy. Cars crawled along at night, their way lit by headlights painted black except for a narrow strip. Civilians formed paramilitary groups and talked bravely about repelling invasions. Civil and military authorities worried about enemy agents and domestic trouble-makers and took rigorous measures against possible sabotage. Certainly, California highways and utilities were vulnerable to sabotage, but there was little evidence to support an actual threat. Fear of sabotage was the excuse given when Japanese aliens and Americans of Japanese descent were sent to internment camps. It was a sad demonstration of the erosion of American values and institutions generated by fear of the enemy. Alarms over sabotage and enemy invasion, magnified by repeated defeats in the Pacific, made most Californians very nervous by early 1942.³

These concerns reached a peak when a Japanese submarine, the I-17, surfaced at 7:00 p.m. on February 23, 1942, off Goleta and began shelling an oil refinery. The submarine bombarded the shore for

forty-five minutes and managed to hit a jetty and an oil well pump (\$500 damages) before retiring seaward. When defense forces finally woke up to the fact that it was not a drill, a blackout was instituted from Monterey to San Diego. Everyone was still jittery a day later. At 3:00 a.m. on February 25, 1942, false reports of enemy aircraft over Los Angeles caused the city to go dark while searchlights probed the sky. Nervous anti-aircraft gunners shot at phantom raiders, and "the shrapnel was coming down like rain."⁴ Later that morning the *Los Angeles Times* headlines proclaimed, "L. A. AREA RAIDED!" This episode made most Californians realize that even false alarms could be dangerous. There was a job to do, and it was more important than worrying about unlikely attacks.

The job was enormous. The aircraft factories of southern California expanded rapidly to meet the demand for more and more warplanes. Consolidated Vultee Aircraft Corp., Lockheed Aircraft Co., Douglas Aircraft Co., Northrop Grumman Corp., North American Aviation Co. and many smaller firms built most of the 300,000 aircraft delivered to the United States and its allies during World War II. The southern California aircraft industry, that employed 20,000 workers in 1939, had 243,000 people working in 1943. More than 96,000 men and women were employed at Lockheed alone. While southern Californians concentrated on aircraft construction, northern Californians built ships. Eureka, San Francisco, Sausalito, Vallejo and Alameda turned out merchantmen and warships. But the miracle of shipbuilding occurred in Richmond, where Kaiser Industries began with bare ground and built shipyards which, at their peak, employed 100,000 people. Almost a quarter of the 2,158 Liberty ships constructed in the United States came out of Kaiser's Richmond yards. By 1943, these shipyards could build a Liberty ship in just fifty days.⁵

Meanwhile, hundreds of thousands of servicemen were sent to California to train, man facilities, and ultimately to ship out to the war in the Pacific. Fort Ord, Hunter Liggett Military Reservation and Camp Roberts trained tens of thousands of soldiers while more thousands of marines trained at San Diego, Camp Elliott and Camp Pendleton. Sailors trained at San Diego and manned shore stations all along the coast. Service air arms flew out of March Field, Mather Field, El Toro, North Island, Alameda and dozens of smaller fields throughout California.

This immense war effort required masses of people to work in the war industries and to provide support services. California experienced a sudden population increase that could only be compared in its impact on the state to the Gold Rush itself. In seven years, from 1940 to 1947, California gained three million residents; one million came in just one year! The labor force rose by more than 1,150,000 workers in only three years; unemployment fell to a paltry 25,000 in 1943. There was a mad scramble for jobs, housing, food, transportation and schools.⁶

Overcrowding became the norm in the cities. Cheap housing and trailer courts sprang up around cities and towns, and new residents were constantly plagued by water, sewer and electrical problems. Tires and gasoline were rationed in 1942, followed by food rationing in early 1945. "Hoarding" and "black market" became household words. Many city schools ran double-sessions for years-on-end, and classes were held in "temporary" buildings that were not replaced until long after the war. Urban California went through an epochal change in World War II. The old days and the old ways were gone forever.

It was different in the mountains and upland valleys. To be sure, the military directly affected some areas, but the major result of the war in most mountain communities was to cause young people to leave for the service or war industry. After the shock of the Pearl Harbor attack wore off, residents of most mountain counties realized that the best way to contribute to the war effort was to produce lumber and strategic minerals. The War Manpower Commission halted the outflow of workers from the mountains in 1943, when it froze lumber company workers in their jobs, designating the jobs as "Fighting Posts." The commission also influenced local selective service boards to defer lumber industry workers from the draft.⁷

People in small towns such as Quincy in Plumas County reacted to war much like other Americans. Everyone wanted to do something, anything, to help defeat the enemy. People formed defense councils, held drives to collect money, rubber, tinfoil, toothpaste tubes, brass, copper and other materials. They attended First Aid classes and trained to be air raid wardens. Troops were stationed at Quincy and other mountain towns to prevent sabotage of transportation routes and utilities. Army guards were posted along the Southern Pacific and Western Pacific railroads and at highway bridges and dams until late 1942, when the

sabotage scare ended. Mostly, the citizens of mountain communities put up with the shortages and went about their jobs turning out timber and strategic minerals.⁸

Coping with Shortages

Region 5 employees shared with other Californians in the shortages of gasoline, food and amenities. Meanwhile, they had an expanding job to do. Before the war began, private lands had supplied the bulk of the timber used annually by California lumber companies. As the war progressed, the volume of timber harvested by lumber companies from the national forests grew steadily. Nationwide, about 6 percent of the nation's lumber came from the national forests in 1940. By 1945, this amount nearly doubled. In Region 5 the Shasta, Lassen, Plumas, Tahoe, Eldorado, Stanislaus and Sierra National Forests were historically the most important timber producers. These forests underwent increasing demand for timber, and timber harvest in Region 5 reached 500 million board feet by the end of the war. Beginning in 1944, new sources of timber were found in the vast Douglas-fir forests of the Trinity and Klamath. These timber stands became accessible for logging soon after the war ended.⁹

Although timber sales occupied more and more time, the fear of forest fires was always uppermost in the forest officer's mind. The problem created by the war wasn't just more work, it was also fewer workers and lowered skills in the workers that were available. Many experienced forest workers left to join the armed forces. Some of their jobs were filled with untrained, inexperienced people; other jobs remained vacant. In addition to these stresses, most of those left on the job were unable to enlist or were deferred, for one reason or another. Some of them felt a sense of guilt, a feeling of having missed great events. Servicemen who experienced the boredom and inactivity of most military assignments would have said they missed little, but that was small solace to those who stayed behind. In fact, the typical woods worker was probably exposed to more danger than many military men. In the Quincy area, many more local men were killed in wartime logging accidents than died overseas.¹⁰

As the war continued, the typical ranger found more of his time taken up with increasing demand for timber sales and administrative matters. As a result, a fire control assistant (FCA) job was established on many Region 5 ranger districts to handle routine fire control duties, a step that relieved

the ranger of these chores but also removed him from close contact with the day-to-day fire control situation. Gasoline and tire rationing restricted travel. Regional Forester S. B. Show dealt with this problem by decentralizing fire suppression. He created four zones, Southern California, South Sierra, North Sierra and Northern, each headed by a supervisor designated as Zone coordinator. A centrally located forest dispatcher was designated zone dispatcher. The forests in each zone were supposed to work together and exhaust all their resources before calling for help. From a fire control standpoint, however, the biggest problem created by the war was the lack of experienced firefighters.

The effectiveness of fire control in Region 5 depended on fast initial attack on fires by experienced, well-trained, well-led fire crews stationed in the most strategic locations. Higher paying defense industry jobs and the armed forces drew away most of the seasonal employees in Region 5. By 1945, most fire crews were composed of sixteen-year-old boys. These youngsters could not compare in quality of experience, knowledge or physical stamina with the prewar seasonal employee. Crew leaders were also inexperienced. A 1943 analysis of southern California forest crew leaders showed that half of them rated as unsatisfactory. Forest supervisors tried to compensate for poor leadership by locating their best crew leaders in the most critical assignments.¹¹

Wartime manpower shortages led to increasing use of equipment to fight fire. The tactics of the thirties, which called for massive use of manpower, had to give way. The most significant result was increasing use of tank trucks for initial attacks on fires. Initial attacks with tank trucks on fires in southern California national forests more than doubled between 1940 and 1945. Despite the lower numbers and poorer quality of fire crewmen and their leaders, the speed of attack on fires was maintained at nearly the same level as in prewar years. Tank trucks helped fill the gap left by departed seasonal workers, but by war's end, the Region 5 tank truck fleet was obsolete and nearly worn out. In addition, Region 5 had only two-thirds of the number of tank trucks needed to effectively fight fire in the California national forests.¹²

The critical manpower situation also led to more use of bulldozers on large fires. New tactics for building fireline with bulldozers quickly developed and results improved dramatically. Bulldozers had become an indispensable part of large fire suppression. By war's end, Region 5 had

about twenty-five Forest Service bulldozers available for firefighting, but most were obsolete or worn out.¹³

Even though equipment assumed a larger role in fire control, wartime fire suppression still depended mostly on firefighters, the infantry of fire suppression. Regional Forester S. B. Show listed the potential sources of firefighters in a letter of April 23, 1942, to Acting Chief Earle Clapp. It was an impressive list of eighteen sources ranging from the Boy Scouts to a paramilitary group calling itself the Minute Men of 1942. After analysis, Show thought only three from the list offered any hope for initial attack on forest fires: the CCC, the California Delinquent Youth Authority and the Conscientious Objector camps. For various reasons his assessment proved inaccurate, but other opportunities emerged from this list. Show also saw the need for statewide coordination of forest fire control. He asked the federal Office of Civil Defense (OCD) to assume this role and appointed Forest Supervisor J. E. Elliott, Sr., to the job of liaison officer with OCD.¹⁴

One of the results of this cooperative venture was formation of the Forest Firefighters Service (FFFS.) This program was organized by the Office of Civil Defense, whose director, James M. Landis, issued an order establishing the service on June 11, 1942. W. I. Hutchinson, from Show's office, became the California state coordinator for FFFS. The service enrolled college and high school students, men exempted from military service and women. The first all-woman fire crew in California was recruited under this program at Soledad, California.¹⁵

As customary sources of manpower dried up, forest officers experimented with new sources. One of these experiments began in December 1941 when Supervisor Norman J. Farrell of the Cleveland National Forest asked the California Division of Parks to use a state inmate crew to abate fire hazards near Palomar State Park. This request ultimately led to a new interpretation of Executive Order 325-A of May 18, 1905, that forbade use of convict labor on federal contracts. The solicitor general held that convicts could be used in work done under a cooperative agreement with the state. By July 1942, five inmate camps were established in southern California national forests and state parks. Inmate crews were trained using techniques developed under the CCC program. Other inmates from San Quentin Prison were also trained as reinforcement crews.¹⁶

The inmate camps became an important source of firefighters for Region 5 from 1942 on into the 1960s. Some of the inmate camps were located on national forest land. In these camps, security and camp arrangements were provided by the California Department of Corrections, and Forest Service people supervised field work, including firefighting. During World War II inmate crews were highly motivated; they believed fighting fires was a way to serve their country during wartime. Between fires, inmate laborers did all manner of woods work such as pruning and thinning trees, blister rust control, improving wildlife habitat and fire hazard reduction.¹⁷

World War II also gave women the chance to show that fire control was not all “man’s work.” The Trinity National Forest organized a Woman’s Motor Corps, which recruited and trained fifteen women to drive trucks and cars needed in a wide variety of forest jobs. The women drivers learned to drive pickups, stake sides and other trucks. The trucks did not have automatic transmissions, and most gears were not synchro-meshed. The women had to learn to double clutch and shift down with a minimum of gear grinding. They delivered firefighters to and from remote fire camps and ignored the protests about “women drivers” from nervous male chauvinists. The corps hauled “men, equipment, horses, mules, water tanks, trailers; drove 80,000 miles and didn’t dent a fender.”¹⁸

During World War II the Trinity National Forest employed Forest Service wives as the Women’s Volunteer Motor Corps to transport men, equipment and supplies throughout the forest. Pictured in 1943 are: (L) Mary Elizabeth Brenneis with Lucille Snyder (R).



Other women became fire camp cooks in the Trinity and other Region 5 forests, became fire dispatchers in several forests and served as fire lookouts. In 1944, at Newhall Ranger Station, in the Angeles Forest, all of the tanker crew were women, including the foreman. Even though women proved they could do most fire control jobs as well or better than men, it would be another two decades before women were accepted into the fire control fraternity.

The use of conscientious objectors (called “conchies”) in forestry camps was less successful. Gus Nash-Boulden had a Conscientious Objector (CO) Camp in the Los Padres National Forest. He recalled that some really were conscientious objectors, but others were “out-and-out objectors—to everything.” He complained to Bob Deering, who came down and listened, then sent the camp to the Plumas. Supervisor Dave Rogers of the Plumas was not overjoyed but accepted them. Deering was even less charitable toward the COs than Nash-Boulden. Some members of the Trinity CO camp burned their mess hall and regularly put dust in their camp truck transmissions and sugar in the gasoline tanks. Deering said, “They were the most god-awful camp in the United States, and made up of men who couldn’t get along anywhere.”¹⁹ At the Institute of Forest Genetics in Placerville, CO camp enrollees were trustworthy and hard working. The Sierra National Forest CO camp was commended for outstanding work on the Fish Hatchery Fire in the Sequoia Forest in 1942. But the good work done by other CO camps was obscured by the bad actors.

The military was the major source of reinforcements for large fires. The southern California forests had access to large numbers of soldiers, sailors and marines. But “warm bodies” were not enough, as fire bosses found out for the nth time. Sailors sometimes appeared on fires wearing black, low-cut, leather-soled shoes that were shiny and passed inspection but were not adapted to climbing brushy hillsides. Soldiers and marines often showed up for fire duty without gloves or jackets and sometimes belittled firefighting and firefighters. The same problems that made pickup labor ineffective—lack of training and inexperience—also existed among most military firefighters. Leadership was the critical factor. If the junior officer and noncoms in charge listened to the firemen and followed instructions, good work usually followed. However, most of the military men were recruits, untested in battle or firefighting. They did not know

it then, but they would soon discover that digging fireline had more in common with most infantry operations than shooting a rifle.

Toward the end of the war, the Japanese balloon bomb assault resulted in formation of the Fire Fly Project, a cooperative venture between the Forest Service and U.S. Army that was composed of troops trained to fight fire and stationed in the Pacific Northwest and northern California. The troops were dispatched from the regional offices in Portland and San Francisco. In May 1945, a detachment of the 555th Parachute Infantry battalion was assigned to Chico, California. The First Troop Carrier Command transported the troops, and the 161st Liaison Squadron did scout duty with L-5 high-wing monoplanes. Fire Fly Project ground troops from the 3171st Engineers were stationed at Santa Rosa, Chico and Camp Haan. A total of 919 officers and men were involved in the Fire Fly Project within California. Other troops replaced the engineers later that summer.²⁰

The paratroopers had to unlearn some of their army training in order to become effective smokejumpers. Even so, several injured jumpers had to be carried out after jumping on a small fire near Trinity Center in the Trinity Forest. Later that year, twenty-six men from the 555th jumped into the Big Meadows base camp in the Marble Mountains. They were dispatched from camp to several lightning fires. All of the soldiers of the 555th were African American and were reported to be superior in morale, physical condition, efficiency and leadership to the white troops. Some forest officers thought this unit was the best organized group they had ever used. Most of the other available troops were replacements who had returned from Europe and were waiting to be shipped out to the war in the Pacific. Their morale was low, and when the war ended in August 1945, their only thoughts were about discharge and going home.²¹

The military services also provided aircraft to transport fire overhead and firefighters, scout large fires and look for fires on some occasions. For a brief time it appeared that establishment by the Office of Civil Defense, of the Civil Air Patrol (CAP) in December 1941 would assist the firefighting mission in California. In May 1942 the CAP was directed to cooperate with the Forest Service in the usual aerial fire control activities: detection, scouting, transportation of men and equipment and cargo dropping. However, their service was not used much in Region 5. In some cases, existing air service contracts precluded use of the CAP; in others,

the comparatively high cost of CAP flights or the lower quality of its pilots and aircraft made Region 5 forest supervisors reluctant use them.²²

Use of aircraft within the Western Air Defense Zone was severely limited by Army regulations. The zone extended over most of California, and all aircraft use within the area was strictly controlled. It took considerable negotiation with the Army before Region 5 contract aircraft could be used with any degree of flexibility. Region 5 was required to provide uniformed, armed guards at many airfields, aircraft gasoline was strictly rationed and aircraft radio use was controlled. Most of the restrictions were not lifted until August 30, 1945.²³

There were also restrictions on the Forest Service on the use of all other radios. For a time, both fire lookouts and observation posts had to depend completely on telephone lines for communications. The military was not shy about asking for what they wanted, and they wanted Forest Service portable radios. Both the Army and the Navy adopted the Forest Service SPF set. Region 5 gave some of its SPF sets to the Army, while the Navy had the set built under contract. The SPF apparently was used by the Navy to help direct gunfire from ships to support the landings in Sicily. The Region 5 radio system suffered during the war from lack of maintenance and obsolescence, but the war also resulted in important and permanent changes in the radio system.²⁴

Before the war, the military shared the 100-meter radio frequency band with the Forest Service. Early in 1942 it was clear that the military would preempt the entire band before the end of the war, forcing the Forest Service to use VHF radio in the 10-meter band, thus breaking the longtime lease agreement with American Telephone & Telegraph Co. The agreement gave the Forest Service reduced telephone rates so long as it did not develop a competing administrative radio system. A proviso in the agreement required the telephone company to provide "adequate, satisfactory and dependable" commercial service. The war made it impossible for the company to meet its agreement in Region 5. Thus radio communication, which had been considered an emergency communication means for fire only, became an important means of administrative communication. Region 5 was in the forefront of this change and had a plan for VHF communication ready as early as January 1942. This plan was partly in response to communication problems generated by the military and partly due to requirements of the Aircraft Warning Service.²⁵

“Flash Warnings,” Smokey Bear and Balloon Bombs

As the thirties came to a close and the threat of war increased, the U.S. Army became more worried about its responsibilities for coastal defense. Even before World War II began in 1939, the Army was preparing defenses against aerial attack. The Coast Artillery made limited tests in December 1938 using 60 Region 5 lookouts to observe and report “enemy” aircraft. These tests showed that a much wider network of observation posts was needed to insure effective warning of enemy aircraft. Eight months later, in August 1939, a second trial used 259 observation posts, including 58 in Region 5 forests. This trial was generally successful and led to a third trial between January 16th and 20th, 1940. The tests solved many problems in the system and gave Region 5 a sample of the challenges involved in operating lookouts in wintertime. The third trial led to formal cooperative arrangements between the Army and Region 5 for use of lookouts as observation posts.²⁶

What came to be known as the Aircraft Warning Service (AWS) was under the direction of the IV Interceptor Command (renamed after June 1942 the IV Fighter Command, and later the 4th Air Force) whose responsibilities included the entire Pacific Coast. The warning system included observation posts manned twenty-four hours per day year long, message centers that received the “Flash Warning” sent by the posts when an aircraft was sighted, and filter centers that evaluated the messages and notified the Air Force, that dispatched interceptor aircraft if necessary. On August 26, 1941, the Army asked Regional Forester Show to man 261 Region 5 lookouts and 66 CDF and county lookouts as observation posts. Some of these posts were used in yet another trial run during October. Then the Army proposed a full-scale test of the system in early December 1941. All Region 5 forests were involved except the Modoc, Mono and Inyo.

This request was met with a certain amount of consternation. Many of these lookouts were remote and accessible only by trail. Some were more than 9,000 feet in elevation and supplying them in winter would require a major effort. Where would the money come from to do the job? After discussion between the Army and Region 5, a five-day test beginning December 12, 1941, was agreed upon, but even five days would cost nearly \$23,000. Permanent manning, which the Army wanted, would cost \$385 per post per month or \$125,895 for the winter season. Then

the events of December 7th changed the rules in a hurry; the Forest Service manned the posts regardless of funding. Reimbursement got lost in the emergency, however, and it was not until Show visited General Arnold in Washington, D.C., that repayment was forthcoming. Within a few hours of the Japanese attack on Pearl Harbor, every Region 5 observation post was manned or in the process of being manned. This required a Herculean effort in some cases. Snow and soggy roads took hours to negotiate. A bulldozer was needed to carry observers and supplies to one post in the Stanislaus National Forest. Some locations required twenty-four hours of continuous travel before the posts were reached. After struggling with several agencies for two months, on January 30, 1942, the Army put Region 5 in charge of all federal, state and county posts including some in the Mohave Desert.

During the next several months there were the usual changes in plan, mistakes and miscues that attend the establishment of a major new system under emergency conditions. Some posts were abandoned, then reactivated, others had to be built to fill in gaps in the network. This was a special problem for the Los Padres National Forest, which was a vital link in the system. This forest included mountain peaks along nearly 300 miles of coastline. Forest personnel built 18 new posts, 20 miles of tractor roads and 10 miles of pack trail for the AWS system. In the regional office, Bob Deering and Frank Jefferson coordinated regional AWS activities. On most forests, the fire control officer was responsible for the maintenance and operation of the AWS.²⁷

The AWS built up from a total of 137 posts (88 Region 5 lookouts) in March 1942 to 271 posts (207 Region 5 lookouts) in June 1943. By November 1943, the network was reduced to 96 posts (76 Region 5 lookouts.) Some of the southern California posts were literally overwhelmed with aircraft sightings. Perhaps the greatest number was reported by Chris Trapp and his wife while they were on Ranger Peak in the San Bernardino National Forest. They reported up to 2,500 sightings per month and 12,000 in a six-month season. Mrs. Trapp was so exhausted by the work that she lost forty pounds during that summer.²⁸

Andy Anderson was district ranger of the Monterey District, Los Padres Forest during the war. He tells of hiring an old cowboy named Jesse Snow for AWS duty. Jesse had only one eye, but when Andy checked him out, he found Snow could see with the one eye about as well as he

(Andy) could see with binoculars. Some weeks later, after Snow's application had been reviewed in the regional office, a letter came to Andy saying that if this was the same Jesse Snow who worked in the Stanislaus Forest in the 1920s, he owed the Forest Service \$4.25 for a key and a blanket he had not turned in when he quit. Jesse paid up.²⁹

The most harrowing experiences were recorded at the desert posts. Some of these posts were near practice bombing ranges. Several posts were mistakenly bombed or strafed by overeager pilots. At the Desierta Post, twenty-four bombs fell nearby, one landing only 140 feet away. The Whitewater Relay Post almost became part of a tragedy when a Boeing B-17 Flying Fortress crashed and burned only 200 yards away.³⁰

Fear of enemy attack on the vulnerable forests of the West was a strong stimulus for a stepped-up forest fire prevention campaign. Show and his supervisors were acutely aware of the damage that could be done with an incendiary device timed to go off in forests or brushlands during critical fire conditions. Just as unnerving was the potential for forest fires posed by hundreds of thousands of new residents with little understanding of California's critical summer fire weather. Arnold Larson, of the Angeles staff, suggested that advertising agencies could be used to help develop a fire prevention program. These suggestions led to meetings in 1942 between the Forest Service and the newly-created War Advertising Council. The outcome of these meetings was a new campaign aimed at getting a fire prevention message across to a mass audience using advertising techniques. The Los Angeles advertising firm of Foote, Cone and Belding was chosen to produce the program.³¹

The first products of the Council's campaign were posters showing an enemy with a torch and captioned, "Careless Matches Aid the Axis." In 1943, the council distributed a poster with German Fuhrer Adolf Hitler and a grinning Premier Hideki Tojo against a backdrop of burning forests and labeled, "Carelessness—Their Secret Weapon—Prevent Forest Fires." Then in 1944, Walt Disney Studios was asked to design a set of fire prevention posters. Disney capitalized on the popularity of its cartoon film, *Bambi*, and featured the lovable deer in its poster. The success of this poster sparked an idea: Why not a symbolic animal for fire prevention? The Council and the Forest Service discussed the possibilities and settled on a bear, "nose short (panda type), color black or brown; expression quizzical; perhaps wearing a campaign (or Boy Scout) hat that typifies the outdoors and the woods."³²

Thus, the first Smokey the Bear poster was drawn and printed in 1944 for distribution in 1945. The symbolic bear was named after "Smokey Joe" Martin, assistant chief of the New York City Fire Department from 1919 to 1930. A succession of artists drew Smokey, but probably the best-known renditions were by Forest Service artists, Rudy Wendelin and Harry Rossell. The Smokey Bear fire prevention campaign continued after the war ended, growing year by year and eventually becoming the most famous and best-known advertising symbol ever created.³³

The Advertising Council's first fire prevention attempts portrayed the enemy as fire starters. The Aircraft Warning Service was established to warn of enemy airborne attack, yet no observer in California ever saw an enemy aircraft. Ironically, it was an unseen, unreported enemy aircraft that carried the only bombs to kill Americans in the United States during World War II. Few people saw for this aircraft and its companions because they were unmanned balloons. These were the balloon bombs launched from Japan in 1944 and 1945 after all danger from enemy air attack seemed to be over.

General Jimmy Doolittle's raid over Tokyo sparked Japanese desire for retaliation on the United States. Japanese meteorologists knew that strong wind currents normally blew from Japan eastward, ultimately reaching the United States. These currents are strongest during winter but are deflected northward during summer by the Pacific high pressure system that is normally located west of San Francisco. Japanese meteorologists believed that after reaching altitudes of 40,000 feet or higher, these wind currents reached velocities of 100 miles per hour or higher. Thus, it was theoretically possible to reach the United States in about 60 hours with properly prepared balloons. Two years of research and testing by several departments of Japanese government led to development by the Japanese army of a balloon that could reach the United States.³⁴

The balloons were made of multiple layers of paper pasted together. Shroud lines extended to the payload that consisted of an automatic altitude control device (aneroid barometers), four 10 to 12-pound incendiary bombs, and a 30-pound anti-personnel bomb. The altitude control device dropped ballast (32 sand bags) as needed to maintain cruising altitude. A self-destruct device was attached to prevent the balloons from being recovered by Americans. The balloons were inflated with hydrogen

gas and, when filled, were about 33 feet in diameter and 70 feet tall, including shrouds and payload.

The Japanese theorized that when the balloon reached the United States, the ballast would be gone and the bombs would be dropped by the altitude control device. Apparently the system actually worked, sometimes. There were reports of mysterious blasts and explosions from near Thermopolis, Wyoming, but there were few witnesses to an explosion. One was Archie Mitchell, a minister of Bly, Oregon, who took five children and his wife on an outing to the woods on May 5, 1945. His wife and the children went exploring while Mitchell unloaded the car. He heard his wife call, "Look what I found, dear," then heard an explosion. The balloon bombs had killed his wife and all five children. Other evidence of balloon bombs was found in Alaska, six Canadian provinces and all of the United States west of the Mississippi River except New Mexico and Oklahoma. One bomb was discovered as far east as Michigan.³⁵

The first balloon bombs were sent aloft on November 3, 1944, and the launchings continued until April 1945. Thousands of balloon bombs were launched during that period. The U.S. Army wanted the balloon bombs kept secret, and the press cooperated by downplaying sightings. The Army believed that if the Japanese never heard about damage from the bombs, they would become discouraged and quit launching them. The strategy worked, but may have contributed to the six deaths in Oregon. The existence of the balloon bombs was not common knowledge, and the curiosity of one of the children probably set off the blast that killed them.³⁶

The secret was so well kept that each Region 5 forest that found a bomb thought that it was the first to do so. The Modoc Forest set the tone for secrecy, when a balloon bomb was sighted on January 10, 1945, over Crater Lake, Oregon. A P-38 fighter plane was sent in pursuit and succeeded in shooting it down. The balloon landed in a tree about a mile from Happy Camp Lookout in the Modoc. The military called Forest Supervisor Mel Barron for help in locating the craft. Barron went up in a Piper Cub piloted by a Navy flier and handled the radio communication to ground units. The fliers located the balloon and guided the ground forces to the site. By the time Barron was able to get back on the ground and drive to the site, the soldiers had packed the balloon bomb in a truck and were on their way.

This balloon was the first captured intact and provided important clues to the operation. Army officials told Barron to keep the recovery quiet, and he did. Thus, when a balloon was spotted on February 1, 1945, floating over Hayfork Valley, the Trinity Forest folks thought they were the first to see this contraption. The Hayfork balloon landed in the top of a fir tree. Ranger Ray Beals sent men to keep the curious away. Soon thereafter, a self-destruct device destroyed the gas bag. Army demolition experts recovered the hardware the next day. They also told Beals to keep it quiet, and he did.³⁷

The balloon bomb scare was not without its lighter moments. About the time Region 5 folks were warned about the bombs, a lightning fire was reported near the North Fork of the Kings River in the Sierra National Forest. A patrolman was sent to investigate. Upon arriving at the scene, the patrolman saw smoke high up in a shaggy white fir tree. The tree was felled, and there at the source of the smoke was a mysterious molten mass, about twenty inches in diameter, hard and metallic. Might this be an enemy incendiary device? The smoking mass was taken to the Kings River district office and allowed to cool. The material was examined very carefully; consultants were called in, and finally, a conclusion was reached. The mysterious mass was many years accumulation of owl dung! It had probably caught fire from spontaneous combustion. It was good for a few laughs and a reminder that all that glistens is not gold, or something like that.³⁸

Remnants of 23 balloon bombs were found in California during the war, and three were found after the war. The last balloon bomb was found in August 1954 near Emerson Peak in the Modoc National Forest. It was believed that the bombs were specifically aimed at western forests, and some Japanese officials saw this as an objective. If so, each bomb should have had a delayed action fuse to detonate the device during the fire season. It seems more likely that the bombs were primarily intended to create uncertainty and panic rather than to do serious damage. As it turned out, American bombs, incendiary bullets, rockets, shells, military men and aircraft burned far more California forest and brushlands than the enemy could have ever hoped for with balloon bombs.³⁹

The Military: Friend or Foe?

The military services willingly provided men, equipment and aircraft to Region 5 for forest fire suppression during World War II. This good record was marred by fires started by the military in training exercises or through carelessness. Southern California national forests suffered the most. Aircraft crashes were the most common cause of military fires, followed by tracer bullets, hand grenades, mortar shells, artillery shells, tank shells, bombs and rockets. Altogether, the military caused at least 60 fires in the southern California forests during the war, 20 by crashing aircraft. Considering the hundreds of thousands of trainees who slogged through the brushy mountains, the thousands of cannon, tanks and bombs used in training and the large number of military bases adjacent to national forest land, this may have been a small price to pay.⁴⁰

The folks of the Los Padres Forest had an especially tough job of fire control during World War II. In addition to their own forest, with its history of huge fires, the forest agreed in 1942 to protect the U.S. Army's Hunter Liggett Military Reservation in the heart of the Monterey Division. Suppressing fires caused by rifle fire, shellfire and bombs became almost routine for the Monterey firefighters. In one case, they suppressed a fire caused by ship-to-shore gunfire. During the war, the forest took action on more than 75 fires caused by military maneuvers, mostly on the Hunter Liggett Reservation.

Most of these fires were held to less than 100 acres, but four burned over 2,000 acres each. The Paloma Creek Fire of August 20, 1944, burned more than 14,600 acres, but the largest fire of the war years was the Tule Canyon Fire of July 1, 1942. This fire was started by a jeep's exhaust and spread rapidly, fanned by north winds. The fire was not controlled until July 5th, after it had burned 21,150 acres and taken the lives of two soldiers.⁴¹

The Army took part in firefighting at Hunter Liggett and, in one case, did it the Army way. In the summer of 1944, the Army command decided it would be good training for the troops to attack a fire in the Big Sur country and informed the Los Padres Forest that they would handle the fire. The command marshaled its forces and began the attack. An engineer company bridged the Big Sur River and a fleet of D-6 bulldozers crossed the bridge. The D-6s tried to climb the steep slopes but were defeated by lack of power and retreated to the bridge. They were followed

by a cavalry outfit that loaded food and camp equipment on pack horses. The horses started up a steep trail but fell over like tenpins as the top-heavy loads caused the horses to lose footing and tumble into the creek below. The soldiers were further stymied because they could not find the fire. Wisely, the Los Padres had sent an observer who reached the site the next day. He ordered D-8 tractors, which soon took the Army D-6s in tow and got them up the hill. The observer then looked at the map and hiked 200 soldiers to the fire, where they soon put a line around it. The observer then called for dinner to be dropped by aircraft from Willows. A short time later, the fire was contained. The Army command decided to leave the firefighting to the Forest Service after that episode.⁴²

The Angeles and San Bernardino Forests were more fortunate than the Los Padres. Although they recorded many military fires during the war, none became large. It was the Cleveland, which was saturated with military bases, that suffered the most from military fires. Vast Camp Pendleton, the largest Marine Corps training base on the West Coast, lay adjacent to the Trabuco District. El Toro Marine Air Station was just west of the Trabuco District. San Diego was home to much of the Pacific Fleet and had recruit training stations for the Navy and Marines, as well as supply depots and the North Island Naval Air Station. Satellite bases were strung all over San Diego County. It was inevitable that the military would start fires. It was unfortunate that a military fire should result in one of the worst fatality fires in Region 5 history. It was ironic that all of the dead should be military men.⁴³

The scene of the tragedy was Hauser Creek, a tributary of Cottonwood Creek that flows from Morena Reservoir into Barrett Reservoir about five miles downstream. About halfway between the reservoirs is Hauser Creek Campground. The area is about 25 miles east of San Diego and five miles north of the Mexican Border. It is very rugged terrain, with many small steeply rising buttes and peaks, covered with dense chaparral.⁴⁴

On October 2, 1943, at about 9:55 a.m., a soldier from nearby Camp Lockett fired tracer ammunition into a hillside two miles below the campground. A fire immediately erupted. Los Pinos and Lyons Peak lookouts see directly into the area and reported the smoke to the dispatcher at Descanso Ranger Station at 10:00 a. m.. The fire scene is in remote country with poor roads, so an hour and twenty minutes elapsed

before the first attack was made by the Descanso tank truck and five men. When the crew arrived, the fire was already 50 acres in size and spreading rapidly up a 60 percent slope in heavy brush. Reinforcements of 21 men arrived a few minutes later, but they were too little and too late. The fire swept on out of control, burning 3,000 acres that first afternoon. A major fire was underway.

The Cleveland dispatcher asked for 100 soldiers from Camp Lockett and 100 men from the Marine Corps Training Camp at Pine Valley. Buel B. Hunt, the Fire Training Officer for the Cleveland, was sent to Pine Valley Training Camp to take 113 marines to the fire. Hunt, a graduate forester with eleven years of firefighting under his belt, was in charge of training military men for firefighting. He was well acquainted with the pluses and minuses of using military men to fight fire.

Forest Fire Control Officer Jack N. Ewing took charge of the fire. He had confidence in Hunt's firefighting ability. Ewing assigned the marines to Hunt and directed him to begin work on the east side of the fire. Hunt was assisted by Forest Guard Jack F. Herndon. The assignment was straightforward, but there was a problem in using this particular group of marines. This was not an infantry unit organized into company, platoon and squad, each with recognized leaders. The Pine Valley Camp trained men to be truck drivers and mechanics. There was no organization to the 113 men except a loose arrangement whereby the truck driver was in charge of those who got on his truck.

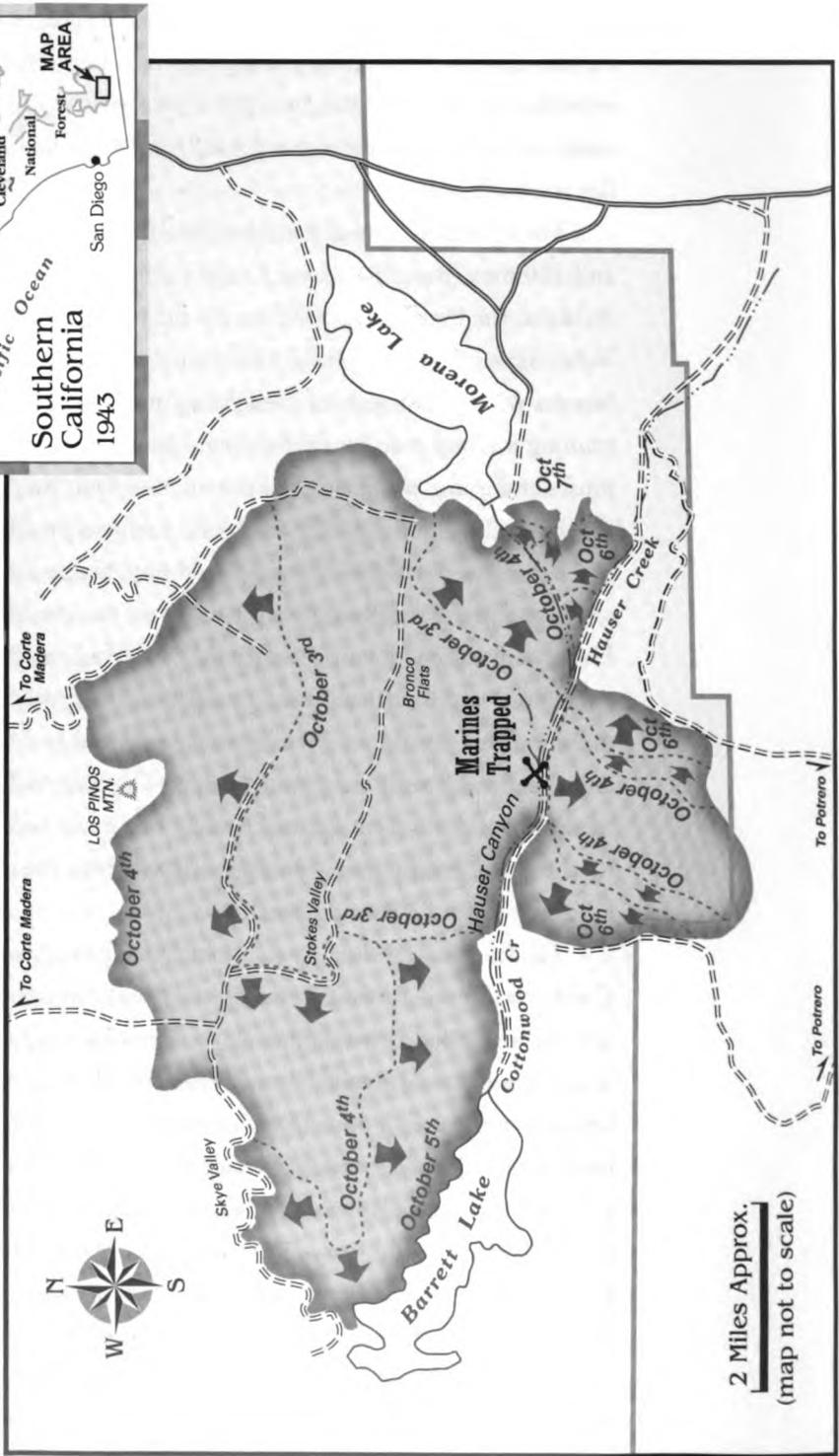
The fire was traveling up the side of the main canyon of Cottonwood Creek toward the northwest. Ewing started a crew up the west side of the fire and assigned two tanker crews to hold the road. Evidently there was a misunderstanding between Ewing and Hunt as to where the east line was to be placed. Slips in communications are not uncommon in the excitement of the first stages of a large fire. In any event, a rocky draw was selected as the place to build a control line parallel to the east side of the fire. Once the line was completed, Hunt planned to backfire into the main fire, which he believed to be a safe distance away. Herndon took one crew up the draw and began working, while Hunt worked the others lower down in the draw. Neither crew had radio communication with each other or the men on the road. Hunt and Herndon watched the work and the fire from vantage points.⁴⁵

Hauser Creek Fire

Cleveland National Forest October 2 - 7, 1943

Adapted from 1943 Map Record of Hauser Creek Fire,
J.N. Ewing, Fire Chief

-  Range of Fire
-  Cleveland National Forest
-  Daily Range of Fire (10 a.m.)
and General Direction
of Movement



2 Miles Approx.
(map not to scale)

Map 7. Hauser Creek Fire

The two crews had built about 700 feet of line, and the fire was burning at a moderate rate, when a sudden gust of wind came up the canyon. The wind had suddenly shifted from a southeast to a westerly direction, up the main canyon, and at right angles to the fireline. The wind carried the fire across the mouth of the draw up to where the crews were working, cutting off their escape route. Herndon scrambled down into the draw and lit a backfire in an attempt to burn a safety zone. At the same moment, the wind carried burning brands across the cut line, and the marines were trapped with fire on all sides of them. The crew in the lower draw was ordered up the draw at the same time men in the upper draw were ordered down the draw. Confusion resulted and men piled up, some being knocked down. Several marines ran through the fire and reached the road; a few came through with minor burns, but others were fatally burned. The rest of the marines, about ninety men, were ordered by Hunt and Herndon to gather near some boulders in the creek bottom. Despite their desperate situation these men held firm under the leadership of Hunt, Herndon and PFC Stewart and weathered the blast of fire.

The horror of those few minutes is perhaps best told by Buel Hunt, whose memory was still haunted 43 years later:

As the blowtorch-blue flames passed over us, the pain and heat were unbearable. I held my breath and looked up momentarily. My face and hair were burned. I re-covered them with my arms...After an eternity the flames burned past us. Then I went through the burn to try to help those who ran through the burning brush earlier. Burned men, with sheets of skin peeling from their bodies—men asking, “Am I going to die?”⁴⁶

After the fire cooled, the marines filtered down the draw to the road. The situation was chaotic. Most of the injured men were loaded onto trucks and taken to the Camp Lockett hospital. Others were put aboard ambulances from Camp Lockett. Three of the marines either ran through the fire or sought shelter in the lower draw and were burned to death. Four others, believed to have run through the fire, died of their burns the following day in the hospital. Six other marines were critically burned, and sixty-nine marines, Hunt and Herndon were less seriously injured. Apparently three of the critically burned men died later. In a separate incident on the same fire, a Camp Lockett soldier disobeyed orders, was caught by the fire and burned to death on October 3rd. The complete toll

of the Hauser Creek Fire was eleven dead and seventy-two injured. The fire continued to spread until it stopped at the edge of Barrett Reservoir to the west. It threatened Los Pinos Lookout and burned near Morena Reservoir before being controlled by 622 men on October 6th. Almost 14,500 acres burned.

As soon as the news of the tragedy at Hauser Creek was received in Washington, D.C., the chief forester sent David P. Godwin, assistant fire control chief, to meet with Regional Forester Show and Cleveland Supervisor Norman J. Farrell in San Diego. These three men met with representatives of the U.S. Navy, U.S. Marine Corps and the U.S. Army on October 7th. Godwin and military representatives took testimony from participants and witnesses on October 8th at Pine Valley Training Camp and at the site of the fire. After testimony was completed, a Board of Inquiry was appointed. Show headed the board, which included Robert Deering, William Mendenhall, George Gowen, W. S. Williams and Frank Price, all of Region 5.

The board found that fire behavior before the tragedy was normal for the time and place. They thought the selection of the rocky draw as a control line was within guidelines, although it was a "tight fit"; that is, had little margin for error. The board believed Hunt could have noticed the wind shift sooner than he did and moved the marines out of the area. Testimony indicated, however, that the change happened so fast that there was no time to get the men out. The board acknowledged that the sudden wind shift was very unusual and not to be expected. The board also found that the reason that more men did not die was the good discipline of most of the men and the leadership of Hunt, Herndon and PFC Stewart.

The board concluded that the reasons for the tragedy were: selection of the rocky draw as the location for the east line, and the alleged slow reaction to the wind change. In retrospect, it is strange that the board did not ask what would have happened if the wind shift had not occurred. According to their testimony, Hunt and Herndon were about to begin backfiring when the wind shift struck. It is guesswork, but probably the line would have been successfully backfired if the wind shift had not intervened. Probably any line, even a line directly against the fire edge, would have put the crew in jeopardy when the wind shifted. Looking back, it seems clear that the wind shift caused the tragedy, not the line location. The report of the board did not pursue

the reason for the wind change nor did it discuss the organization and experience of the marine fire crew.

Apparently most of the deaths and serious injuries occurred when several marines broke discipline and ran through the fire or wandered away from their mates. The interviews probed the adequacy of crew supervision, but the board apparently did not follow up this issue. This marine crew was not a cohesive unit with strong internal leadership. Would these marines have run if they had been under the rigid discipline of a typical marine infantry company? The board did not recommend that changes be made to ensure better supervision of military crews on future fires.

This fire tragedy is similar to others examined by Carl Wilson in a study of fatal and near-fatal forest fires. Many of these tragedies occurred when an unexpected wind shift trapped men who were thought to be safe. In most cases, fireline deaths happened when crewmen panicked and ran instead of staying with their leaders. Wilson concluded that firefighters must be constantly alert and aware that fire behavior can change without warning.⁴⁷

The Hauser Creek Fire was important because of the tragic loss of life and the suffering several marines went through for years after the event. It was also important because it illustrated how much was yet to be learned about fire behavior and how to predict weather changes. There does not appear to have been a regional re-examination of firefighting tactics or dispatching as a result of this fire. Neither does there appear to have been a re-ordering of research priorities to focus on fire behavior, especially fire weather prediction. Instituting an inquiry while evidence was still fresh and before the memories of those involved had faded was good practice. Hindsight suggests that once the inquiry was made, a thoughtful review would have disclosed weaknesses in the region's fire control program that could have been addressed.

Wartime Fire Seasons

World War II lasted through most of four fire seasons. Mother Nature was kind during those years. She did not visit California with a drought year, and the spring fire weather was near normal all four years. Southern California suffered from drier than normal conditions in 1942 and 1945, but not enough to create a crisis. Given the difficulty the firefighting agencies had with securing men and equipment, and given the other

demands on their time, the war years could have resulted in catastrophic fire losses. The fact that these losses did not occur strongly indicates the controlling role that weather plays in fire control in the Golden State. During the war years, an average of 69,000 acres of national forest land burned each year. An additional 13,000 acres of other ownerships within forest protection boundaries also burned each war year. Both of these figures were less than the average of the thirties decade, a period of normal to easy fire seasons. But assessing the wartime fire seasons as normal or easy is after the fact. When confronted with a typical hot, dry California summer and fall, the remnants of the veteran Region 5 fire control organization could not be optimistic. Burned acreage may have been below average, but these were tough fire seasons for the diminished Region 5 organization.⁴⁸

For example, the 1942 fire season would have been one of the easiest on record in the California Region except for a barrage of fire that struck the Sequoia National Forest. That beleaguered forest lost nearly 60,000 acres burned, more than two-thirds of the regional total. The Erskine Fire started on June 19th, outside the forest and burned 51,000 acres from Bodfish on the Kern River, fourteen miles east across the Piute Mountains to Kelso Creek. The fire spread rapidly in grass and brush and burned fiercely through the night before it was controlled the next day. The suppression effort was a case of too little, too late.

Two weeks later, on July 4th, the Rancheria Fire burned 5,740 acres south of Piute Peak. This fire was not yet controlled when, on July 5th, the Fish Hatchery Fire started in a dump above the present location of Kernville. Control of this fire was hampered by other fires that siphoned off men and equipment. At 2:00 p.m. on July 7th, the Fish Hatchery Fire blew up and burned toward the south, reaching the South Fork of the Kern River. Delays in securing manpower resulted in the fire burning 23,040 acres before being controlled on July 8th. The Division of Forestry was a full partner in controlling all three of these fires.

The last of the Sequoia's big fires in 1942 was the Stormy Canyon Fire, which was set by an arsonist at midnight on July 13th. The fire was on the west side of the Kern River several miles above the nearest safe crossing of the river. The first crew had to hike five miles before it arrived on the fire at 3:00 a.m. on the 14th. Crews had to be ordered from Porterville, and that meant miles of slow travel over mountain

roads. At about 10:00 a.m. the fire jumped the river and burned into the rocky slopes that line the east side of the Kern River Canyon. Despite whirlwinds that threw fire across the line, the fire was controlled on July 17th after burning 21,260 acres. These fires illustrated the problems many forests had during World War II in securing manpower to fight fires. Probably faster initial attack would have kept all four fires to a fraction of their final size. The 1942 fire season proved to be the worst in the history of the Sequoia National Forest.⁴⁹

The 1943 fire season began with a somewhat drier year than normal in northern California, but it was in southern California that the most serious fires occurred. The majority of these losses occurred that fall in the Cleveland and San Bernardino Forests, but there was an exception. The Corte Madera Fire illustrated that, if conditions are right, a fire can occur even in the dead of winter in the Cleveland Forest.

On January 5, 1943, a Santa Ana wind had been blowing for several days when a ranch hand on the Corte Madera Ranch started a fire in their private dumping ground. A 45-mile-per-hour wind picked up burning material and flung it into nearby brush, and the race was on. The smoke was spotted almost immediately by nearby Los Pinos Lookout. Within three minutes, three tank truck crews were on the way to the fire. In the next two hours more than 350 men and a bulldozer were dispatched. Pushed by the dry wind from the desert, the fire rushed upslope. Los Pinos Lookout had to be backfired to save the buildings. The winds on the ridges were so strong that men had difficulty standing upright. Crews were set to work and cold-trailed the rear and flanks of the fire on the 8th and all day on the 9th. At 9:00 p.m. on the 9th, the wind died and by 4:00 p.m. on the 10th the fire was mopped up. Despite the short days and cold weather of January, this fire burned 6,179 acres.⁵⁰

The Cleveland's fall 1943 fire season included the Hauser Creek Fire of 15,000 acres, which has already been described, and the Japatul, Indian and Hollenbeck fires, which burned another 13,000 acres. Tens of thousands of acres of state protected land also went up in smoke in San Diego County. For a time in the fall of 1943, the city of San Diego seemed to be ringed with fire from the Mexican Border to the San Diego River.⁵¹

The outbreak in the fall of 1943 was a sample of what was to come. The 1944 fire season was not especially dry, nor did the spring weather signify anything other than the usual California summer. But appearances

can be deceiving. The Angeles Forest opened its 1944 fire season by flirting with disaster. In the spring, forest crews had begun burning the railroad right-of-way between Newhall and Lancaster. A gust of wind, a lapse of attention, and the fire escaped near the Burmite Ammunition Factory, which was located along the railroad tracks. When the word "fire" was passed in the factory, witnesses said that employees came out of the windows, doors, skylights, any opening, pell-mell, in a scene reminiscent of a Keystone Kops film. Fortunately, the fire was stopped short of a real blow-up.⁵²

Despite this potentially explosive beginning, 1944 had typical California fire weather, with thunderstorms in the north and several minor heat waves spreading over the state during the early part of the season. The thunderstorms generated many lightning fires in the Trinity, Shasta, Klamath and Modoc forests. The largest was near Dome Mountain, a few miles west of Lava Beds National Monument. This fire started in a lava rimrock country on July 20th and burned 12,845 acres of cheatgrass, brush and juniper. It took 285 firefighters four days to control the blaze. Fires in the Modoc cheatgrass country could soon end up in the timber unless stopped.⁵³

Incendiariness, the old foe of the Mendocino Forest, made life miserable for Mendocino firefighters in 1944. The Mendocino's siege began on September 5, 1944, when the William Dam Fire took off. Forest crews were fighting this fire when the Jordan Flat Fire was touched off several miles west of Lake Pillsbury. This was one of a series of fires set by proponents of range burning. Their work was given the blind eye by supporters in the state legislature and among some local Division of Forestry rangers, who believed in improving forage and reducing fire hazard through use of fire. The Jordan Flat Fire burned 6,025 acres outside the forest protection boundary but also burned 5,000 acres inside the boundary. Inability to keep range burns within planned boundaries had always been the main drawback to their use. The burners did not believe this was a significant problem since they believed that brush should be eliminated no matter what the ownership of the lands that were involved.

This carefree attitude toward the property of others continued on September 8th, when firefighters kept the 730-acre Thomas Creek Fire out of the forest by a determined stand along the boundary. But their luck ran out on the 12th, when an incendiary fire was started on Boardman

Ridge above Lake Pillsbury. This fire was contained on the 20th but broke over the lines. Final control was achieved by a small army of 1,365 men on September 26, 1944. The fire burned 13,500 acres, almost all national forest land.⁵⁴

The 1944 fire season in southern California proceeded with rather normal conditions, until late August. Then the state was visited by one of its two fire plagues. In 1943, the Santa Ana winds had blown. In 1944, the other bane of firefighters, the heat wave began on August 23rd. For ten days, the high pressure reigned over the state, squashing the hot, dry air down, generating even hotter and drier conditions from the coast to the deserts. On the record, the period doesn't look bad for Region 5. Only 35,000 acres of national forest land burned, but firefighters struggled with fires on more than 150,000 acres of other ownerships that burned in or near the forest boundaries.⁵⁵

The largest fire of 1944 began in the Mt. Laguna area, an island of cool, forested peaks and large meadows in a sea of brush, and a favorite mountain playground for San Diegans. The Laguna Junction Fire began August 28, 1944, at 10:35 a.m. A construction worker, near the junction of Highway 80 and the Laguna Mountain Road, carelessly flipped a cigarette and the fire was under way. The fire was discovered and reported less than five minutes after it began by Cuyamaca Peak Lookout. Within twenty minutes the Cameron Station tank truck and four men made the first attack, but the fire was already beyond their control. It laid waste to more than 13,000 acres that first day, crossing over the main Laguna Mt. ridge and into the large Kitchen Creek drainage. Firefighters were mobilized quickly, but other fires had absorbed most of the overhead fire personnel and effective work was slow to begin.⁵⁶

The fire grew in size on the 29th, then on the 30th boiled up out of Kitchen Creek and spilled out onto the desert slopes to the east. About 25,000 acres were blackened in this outbreak. This fire confounded the "experts," who confidently expected the fire to die when it struck the sparsely vegetated desert slopes. Conditions were so severe that the fire burned downslope in the scanty cover, then reversed itself and came back over the main ridge. More desert slopes burned on the 31st, but the fire was controlled as weather moderated on September 1st. More than 64,000 acres had burned, including 25,405 acres of national forest. This was the largest fire in Region 5 during the war years.

There were other large fires in the Cleveland and San Bernardino during this same heat wave. In some areas, the Division of Forestry was too undermanned to meet the challenge, and large fires swept up to the forest boundaries from the lowlands. Firefighters in the Los Padres fought off the Gaviota Fire (6,000 acres) and the San Marcos Fire (12,080 acres) and managed to escape with the loss of only 640 acres of forest land. The San Bernardino Forest crews stopped the Horse Canyon Fire (28,160 acres) but only after it had burned 3,880 acres of forest lands. Meanwhile the harassed firefighters of the Cleveland fought off the Miner Fire (40,000 acres) and kept it out of the forest. The same personnel also stopped the Barn Fire (9,150 acres) after losing only 150 acres of forest land. In terms of acres burned, southern California firefighters had their worst siege in many years.⁵⁷

Shortages of experienced fire control supervisors in the forests during the 1944 season led to the formation of fire "overhead" teams in the regional office. These teams were sent to help the forests fight large fires. Andy Anderson recalled being on one team that spent fifteen days on four large fires in the Stanislaus, Plumas and Mendocino Forests. He lost fifteen pounds, two shirts, a hat and several patches of hair on these fires.⁵⁸

The fire outbreaks in 1944 coincided with a general inspection of Region 5 from Washington. The inspectors witnessed what ten days of severe fire weather could do. Among their recommendations was a proposal that a Division of Fire Control be re-established in the regional office. This was done in 1945, and Frank J. Jefferson was put in charge. Boards of Review in 1944 called for more aggressive attack on threatening fires outside the boundary, bolder action in reinforcing large fires and better cooperation with state and county fire agencies. It also called for establishment of fire overhead teams in each forest similar to those that operated out of the regional office in 1944. The reviews also noted lack of understanding of fire behavior as a major problem. Also, the Arcadia Fire Control Equipment Development Center was established at Arcadia, California, in 1945. Its mission was to test and develop experimental fire control equipment. At the end of the 1944 season, Region 5 people were geared up to do a better job in 1945.⁵⁹

But the 1945 fire season was only a pale imitation of 1944. Precipitation in 1945 was above normal except along the south coast of California. The dry season in southern California was partly balanced

off by heavy thundershowers in August. The spring weather was normal, and the fire weather was improved over 1944. Several forests recorded a few thousand burned acres, but most experienced only minor losses. The 1945 fire season found most forest fire control organizations like the girl who was all dressed up with no place to go. The Modoc went to the ball a few times, but most of the burned acreage was in the Devils Garden country, where fire was often beneficial. The Modoc's largest fire was the Damon's Butte Road Fire that scorched 12,110 acres between October 2nd and 5th.⁶⁰

The Lassen Forest also lost nearly 10,000 acres inside its boundary during 1945. The Lassen was not considered a "fire forest"; that is, it did not have a history of many large fires. It is ironic that a relatively safe forest should have a bad fire season while the rest of the region went almost unscathed. Two large fires, the McClure and the KimsheW, did most of the damage in the Lassen's 1945 fire season.

The McClure Fire started in a Fruit Grower's Supply Company logging operation on September 2nd of a Labor Day weekend. The company was supposed to suppress fires that it caused; however, most of its logging crews were on holiday. Lassen Forest crews attacked the fire, but the company was slow about sending help. Finally, on September 4th, the Lassen took over the fire and controlled it the next day, but not until 5,197 acres had burned.

The KimsheW Fire started on September 16th from an abandoned campfire on Diamond Match Company land. The origin was at the head of KimsheW Creek, northeast of Bald Mountain Lookout, near Stirling City. Northeast winds drove the fire three miles by 6:00 a.m. on the 18th. That day more ground was lost, but the big run came on the night of the 18th when the fire covered five miles to the West Branch of the Feather River. The fire was contained on September 21st but broke out again on October 5th. It was controlled on the 6th after burning 11,500 acres, of which 1,866 acres was national forest land.⁶¹

The month of September 1945 was dry and windy. Even the Bay Area was threatened with forest fires. The Lagunitas Fire, in Marin County, started on September 29th and came close to several communities before it was extinguished. When the fire got beyond the capacity of local fire departments, the county called on the Forest Service regional office for help. Frank Jefferson and a fire overhead team, who were well

broken in by the 1944 and 1945 fire seasons, took charge of the cooperative suppression effort. Included among the firefighting forces were county, state, military, San Quentin Prison and Park Service crews and the Red Cross. Very low humidity, changeable winds and steep terrain made firefighting difficult. A second major fire was caused by an airplane crash on Mt. Tamalpais on October 4th, but control on both fires was established on October 5, 1945. More than 18,000 acres had burned from near Stinson Beach over Mt. Tamalpais toward Larkspur, Corte Madera and Mill Valley.⁶²

The war ended in August 1945, and peace brought with it both euphoria and unease. Wartime shortages and restrictions were bound to end soon, but there would be trouble reintegrating veterans into the organization. Also, in 1945 Congress passed legislation making overtime pay mandatory for all work over 40 hours per week. This would result in fewer fighters being available for duty. On the other hand, overhead fire teams, first used in 1944 and 1945, proved successful and were expanded in later years. These teams became known as "Jefferson's Legions" and generated healthy competition and improved effectiveness in fighting large fires. Also successful was the use of "red cards," which listed each Region 5 fireman's qualifications for fighting large fires.

One of the more interesting aspects of the 1945 fire season emerged at the Northern California Board of Review in February 1946 at Mt. Shasta, conducted by Bob Deering, George Gowen and Frank Jefferson. In the audience was George R. Stewart, who was collecting background information for his novel *FIRE*, which hit the best seller lists in 1948. Stewart's story of the imaginary Spitcat Fire caught the public's imagination and added to the mystique of the forest firefighter.⁶³

The expanding wartime economy in California slowed long enough after V-J Day to gain a second wind, then took off once more at an ever-accelerating pace. The famous booms of the 1880's and 1920's would have hardly raised a ripple in this postwar tide of population migration, manufacturing and agricultural expansion that generated an explosive rise in home-building. The estimated population of California in 1947 was 9,832,000. The 1955 estimate increased to 13,035,000, a gain of more than 3,000,000 in only eight years. California scored the greatest percentage population gain of any major state with a 53 percent increase between 1940 and 1950. The majority of this immense shift in population came through migration from other states.¹

Astonishing population growth generated massive changes in California after World War II. Most of the new population went to southern California, although the San Francisco Bay Area also recorded large increases. These new millions placed great stress on an economy geared to production of war materials and on a culture whose recent past was rooted in the deprivation of economic depression. Added to the pressure of newcomers was a phenomenon in which all Americans shared—a desire for the material goods that they had been unable to obtain since 1930.²

This pent-up demand for homes, automobiles, appliances, radios, and soon, television, was sustained by a rapidly growing middle class. The G.I. Bill promised all returning veterans an education and loans for homes or businesses, and implied a future limited only by each person's ability. Jobs generated by the demand for material goods made these dreams attainable.

In the postwar period California became a vast market for all types of consumer goods and services. Large companies moved west or established branch offices in Los Angeles or San Francisco. More than 7,000 new manufacturing plants were established in California between 1947 and 1954. By the latter date, more than one million Californians were employed in manufacturing all types of goods. Total employment rose from 4,024,000 in 1947 to 5,494,000 in 1956. The farm economy kept pace, with receipts increasing 81 percent between 1947 and 1955.³

All of these changes transformed the national forests of California in ways similar to past booms, only on a much greater scale. More people meant more water and power development (dams, reservoirs and power lines), more outdoor recreation development and use, and more encroachments on dangerous forest and brush fuel types. Beyond this, the

construction boom of the late forties and early fifties resulted in a similar boom in logging and sawmilling in California. Lumber production in California shot up from 3.4 billion board feet in 1947 to 5.9 billion board feet in 1956, making California second only to Oregon in lumber production. When Los Angeles changed its building code to permit use of green lumber of all species in housing construction, loggers and sawmillers had a field day. Every owner of private land with timber on it was offered prices that were unheard of a few years before. Most of the timber cut came from private lands, yet private land was not enough to satisfy the insatiable demand for lumber. Timber production from California national forests rose from 295 million board feet in fiscal year 1945 to a billion board feet in fiscal 1956.⁴

Most of this enormous outflow of logs came from private and public lands within national forest fire protection boundaries. Within a decade after World War II ended, thousands of miles of new roads had been built in these lands and probably a million acres of forest had been cut over. Thousands of new logging and sawmilling operations created new fire risks. As early as 1946 there were 843 such operations in California, an increase of 272 in one year. The new timber access roads introduced people into what had been roadless areas, and the huge areas of cut-over timber created extensive new fire hazards.⁵

The extent of the changes in Forest Service operations generated by the postwar boom matched those taking place throughout the state. Responses to new pressures and new conflicts took place at every level of the Region 5 organization. At the regional office, it was the end of an era.

The End of the Show Era

History does not repeat itself, but in the broad sweep of American history, the profound changes that occurred after each of America's three major wars were similar in kind if not in scope. As could be expected, the changes that occurred after World War II were of greater magnitude than the preceding events. These changes amounted to a revolution over prewar conditions, and the Forest Service and Region 5 were not immune to the upheaval. California was out front in the new order of things, and the old order had to pass.

The wave of new leadership that struck Region 5 after World War I had crested in the thirties and was receding as the war progressed. Jay

Price left the region in 1939. Ed Kotok left California in 1941 to become assistant chief in charge of state and private forestry in Washington, D.C., Paul Pitchlynn retired in 1947, Hutchison in 1950, and old-line Forest Supervisors Dave Rogers, Joe Elliott, "Benny" Benedict and Gus Nash-Boulden retired in the 1940s. The most fundamental change occurred in October 1946 when, after thirty-five years of tumultuous service, S. B. Show retired.⁶

Show served twenty years, the longest of any regional forester in Region 5 history. He combined both research and administrative skills with innovative methods and bold risk-taking in a manner that transformed forest fire control in California from a job into an art and science. He was not an easy man to know and like. At times he seemed unforgiving, but he never forgot a friend. Though he was feared by some, he was admired by many, and he always commanded respect. He administered Region 5 as a man's world. He expected men to be men, to live by their word, to work hard and to uphold the values of his beloved Forest Service.

Each generation in Region 5 looked back on its beginnings as the "old days," even "the good old days." In those days, there were fewer laws and rules to impede a vigorous administrator; no limits on how long you worked or on how long you worked your men. Men were eager for a job, and there was joy and comradeship in completing a job or suppressing a fire. A signal of the passing of the old days came with the announcement that after February 14, 1945, the term "forest guard" was discontinued. It would be replaced with a new term, "fire control aid [sic]." The forest guard, with his "choke-bore britches" and his nickel-plated "piss-fir" badge, was history. The old order was changing as World War II came to a close, and most of the old-timers were just as glad their time was up.⁷

Show was replaced by P. A. "Pat" Thompson, a man with a varied background, strongly oriented to fire control. Thompson came from the Washington office, where he had replaced Roy Headley, who retired in 1942. He was the first of several succeeding regional foresters, none of whom were in California long enough to place their stamp on the region as Show had done. Thompson was a transition leader between Show's old order and the new order that came in 1951 with Thompson's successor, Clare Hendee.⁸

The old days ended when Bob Deering retired in 1948 after twenty-eight years of being the region's executive officer, the man who "ran the

region." When Show and Deering left the organization, an enormous vacuum occurred. There were fears and concerns among the rank and file. Who was the new boss, what did he want, how does he want it done, what are his personal likes and dislikes? These were vital issues that took time to sort out. Fortunately, in fire control, Frank Jefferson had been in charge since 1945 and offered a smoother transition from the old order to the new.⁹

Change was also in the wind among the national forests of California. Show asked Russell Bower of the Klamath to prepare an analysis of the potential for a new national forest in northwestern California. Bower did so, and his proposal was put into effect on January 1, 1947, when the Six Rivers National Forest began operations. Officially proclaimed by President Harry S. Truman on June 3, 1947, the new forest included the western districts of the Klamath and Trinity forests plus that portion of the Gasquet District (Siskiyou Forest, Region 6) that lay in California. While Region 5 gained a forest in 1947, it only balanced off the loss, in 1943, of the Mono National Forest headquartered at Gardnerville, Nevada. The Lee Vining and Mammoth Districts of the Mono were attached to an expanded Inyo Forest. The remainder of the Mono (including the Bridgeport District in California) was enfolded into a new Toiyabe National Forest in Nevada. Changes in leadership, and even in forest boundaries, were the mark of this unsettled period in Region 5 history.¹⁰

Tribulations and Trials

The end of the war did not automatically lead to improved conditions in the fire control field. Hundreds of thousands of veterans were coming home to California. Many were in the "52-20 Club." Congress provided twenty dollars per week of unemployment insurance to veterans for up to a year after their discharge to help their transition into peacetime society. Tens of thousands of veterans elected to attend college under the G.I. Bill, and many more went to work at good wages in manufacturing and other industries. Thus the pool of competent applicants for seasonal fire control jobs did not develop for several years after the war ended.¹¹

Fire crews on some forests were still composed of high school boys who barely had time to become qualified before returning to school in September. Compounding this problem was the loss of experienced seasonal people to better paying, year-long jobs in industry, often forest

industry. Shabby housing conditions and low wages were not positive inducements to prospective applicants for fire control jobs. Region 5 was in a "buyer's market" as far as jobs were concerned, and what it had to sell was not satisfactory to a new class of job applicants. The situation was well-stated in a 1946 report: "Unless some positive action can be taken to meet present day social and economic conditions we will continue to have a large percentage of protection personnel of the 'green' or inexperienced class."¹²

The 40-hour work-week law also created problems. Forests could not afford to pay overtime. When applicants asked about the amount of overtime expected, the reply had to be "little or none." A more important effect of the law was to reduce the average number of fire control crewmen available by about 30 percent. Before the law went into effect, crews worked five-and-a-half days a week but were expected to be available, at their station, when off duty. Afterwards, the same men could be worked only five days a week, which meant the daily crew size had to be reduced in order to cover seven days and to avoid paying overtime.¹³

Fire control agencies relied heavily on the military for backup manpower during World War II, but this situation changed overnight when the Japanese surrendered. After 1945, military bases were deactivated, equipment disposed of or mothballed and manpower was quickly demobilized. Fortunately, state inmate camps provided high-quality firefighters. Workers from an expanding lumber industry were another important source of labor in northern forests. In general, however, fire control agencies suffered from manpower shortages for several years after the war ended.

One bright spot in the gloomy manpower picture was the establishment of ten "Hotshot" crews in 1946. Two of these crews were financed with fire control funds, the others, from other work projects. Each crew had its own cooks, food, beds, buses or trucks, and, in some cases, pack stock. The crews served on 116 fires in 1946, including almost all of the fires larger than 300 acres in size. They were instrumental in keeping several fires to small size. It was the judgment of experienced fire control officers that these crews were equal to three to four times their number of pickup laborers.

The overhead fire teams established during the war years were another improvement over prewar conditions. Their use was well established by

1946. Air transport of overhead to large fires was also standard practice by war's end. Of course, these men had to buy their own flight insurance at a time when flying was less safe than it is today.¹⁴

The four years after the war was a time when the fire control organization on most California national forests was in a state of flux. Most units looked more and more toward use of equipment to replace men. The trend toward use of tank truck crews in initial attack continued. Tank trucks were used in first attack on 678 out of 1,367 fires in 1946. In most cases, tank truck crews kept fires small, but the tank truck fleet was obsolete, virtually worn-out and replacements were slow to appear. It was not until 1949 that a new tank truck entered the Region 5 fleet. This was the Ford cab-over, Marmon-Harrington, 300-gallon unit known to its crews as the "Green Hornet."

The use of bulldozers for line construction on large fires also increased after the war ended. Bulldozers were used on 75 percent of the major fires in 1946 and completed half of the line constructed on these fires. Like the tank trucks, the bulldozers were over-age and worn out.¹⁵

These tribulations were mixed in with some encouraging trials of surplus military equipment for fire control uses. The four-wheel drive jeep became an overnight hit with firefighters. Hand-held, two-way radios, so-called "handie-talkies," forecast more efficient, lightweight communications than the old "S" sets still in use in most forests. Surplus army trucks, "weasels" and other equipment were used in some forests, but the most promising trials were actually a continuation of pre-war aerial attack experiments.

The genesis of the aircraft trials came about after Frank Jefferson was appointed regional chief of fire control in 1945. He quickly re-energized a fire control program that had begun to show signs of the same obsolescence that afflicted regional equipment. Jefferson was a believer in use of aircraft in fire control, and soon after the war ended he established an aviation branch in his office. He hired an energetic ex-Air Force pilot named Cal Ferris to run the aviation program in Region 5. Next, Jefferson requisitioned a Stinson 150 airplane to serve as the start of a regional air fleet. Then he gave Ferris *carte blanche* to develop an aerial fire control program and to experiment, as necessary.¹⁶

The smokejumper project, which gained momentum from Godwin's Aerial Fire Control Project in 1939, was a proven fire suppression method

by 1946. Smokejumpers, both Forest Service and military, worked on several fires in northern California during the war. After the war ended, Ferris worked out a program to share expenses and use of Region 6 smokejumpers. Under the agreement, the Region 6 smokejumper base in Cave Junction, Oregon, maintained 25 jumpers, of whom five were assigned to Region 5. Ferris also provided a Noorduyt Norseman aircraft for jumping in Region 5. The region nearly lost Ferris while he was on a trip to Region 6. On May 3, 1949, he was piloting the regional Stinson when it was struck from above by another light plane. Ferris managed to crash land the Stinson in a barn. Ferris and his passengers were injured and the occupants of the other aircraft were killed. This incident probably resulted in the stringent rules that governed flying in Region 5 from then on.¹⁷

California firefighters watched, with interest, a cooperative aerial bombing survey between the Army Air Force and the Forest Service. Again, old friend, General H. A. "Hap" Arnold, was influential in getting this



Bulldozer building fire line, Wheeler Springs Fire, Los Padres National Forest, 1948. By this time, bulldozers were a key factor in fire line construction in Region 5.

project under way.

The survey took up where Godwin's crew left off in 1939, only this time the location was Montana (Region 1). The success of aerial bombing during World War II led experimenters to believe that improved

aircraft, bombsights, and bombing techniques could result in satisfactory bombing of forest fires. The emphasis, as before the war, continued to be on bombs or containers rather than free-fall liquids. The project was not successful but kept interest alive and set the stage for later experiments.¹⁸

Another revival of an aerial application to fire control was the Los Padres Aerial Project of 1946-1948. This was an attempt to substitute aerial patrol for fixed lookouts. Forest Supervisor Andrew G. Brenneis was a longtime advocate of aircraft use in forestry. The Los Padres was a good candidate for the trial because of its vast roadless areas, frequent summer haze and the large number of lookouts needed for adequate detection.¹⁹

The objective of the project was to combine aerial and fixed lookout coverage to improve overall detection. Two flights were made each day, and other flights were made to cover special situations. Three lookouts and several backcountry horse patrols were deactivated, but overall costs still exceeded those of the old system. The project had many side benefits, including surveillance of areas closed to public entry, fire prevention and associated law enforcement. The overflights found many fire violators and chased others away. The project was discontinued primarily because of its higher cost. It was, however, an example of the increasing interest in the use of aircraft for fire control. This interest revived yet another thirties-vintage trial horse, the helicopter.

Testing the Helicopter for Fire Control

Dave Godwin had been a member of the interagency committee that in 1939 recommended selection of the helicopter over the autogiro for development by the U.S. Army. Soon afterwards the threat of war ended Forest Service participation with the U.S. Army in development of the helicopter. The Army expedited the work, and in 1942 the Sikorski XR-4 made its first flight. Further improvement came quickly. At the end of the war, the Army had three helicopter models in use, the R-4, R-5 and R-6.²⁰

Both the Army and Navy had considerable experience with helicopter operations at sea level by war's end, but the mechanics of helicopter operations at higher elevations in mountainous terrain were virtually unknown. Forest Service people were anxious to test helicopters for forestry and fire control in mountainous country and approached the Army Air Force in Washington. Meetings on the subject were held between Air Force and Forest Service personnel in the fall of 1945. General Henry H. "Hap" Arnold, who had congenial relations with Region 5 in the Army Air Patrol and CCC days, was instrumental in the authorization of cooperative helicopter testing between the two agencies. Two Sikorski R-6 helicopters with pilots and mechanics were assigned to March Field airbase to take part in the tests.²¹

The purposes of the tests were to determine the capabilities and limitations of helicopters to land and take off from sites in mountainous terrain, to determine the effects of altitude, wind velocity and temperature on helicopter operations, and to determine what use could be made of helicopters in forestry and fire control activities. Although R-6 aircraft

were originally assigned to the project, the R-4, R-5A and R-5D were also tested. The R-5 series had more powerful engines and greater load capacity. The R-5A and R-6 could carry a pilot and one passenger, the R-5D, a pilot and three passengers.

The test area was in the Angeles National Forest where the helicopters flew 150 hours under varying conditions. The tests resulted in some important general recommendations, that were the R-5D with "high-lift" rotor blades could meet Forest Service needs if stripped down to 3,500 lbs. gross weight and that new helicopter development should concentrate on improving dependability, reducing maintenance requirements, increasing useful load for landings at higher elevations and improving stability.

As the tests took place, production of new helicopters was already underway. By 1947, the Bell Aircraft Co. had its model G47B available for use in southern California. Ira Funk and Fred Milam checked out the G47B and reported on its capabilities in the April 1948 issue of *Fire Control Notes*. This article set forth the basic requirements for use of helicopters in the mountains, defined helicopter terminology, reported on tests of the Bell G47B and set standards for helicopter use. It was clear that the helicopter would be a useful tool, but it was also clear that it could be a dangerous tool if misused.²²

Further testing of helicopters was needed to determine their performance in heavily forested terrain. Fire Control Officer Tom Bigelow of the Klamath National Forest believed the helicopter could be a useful tool in many forestry and fire control applications. He was especially interested in testing the aircraft as a tool to fight lightning fires. He wrote a feasibility study that was submitted to the San Francisco office on January 23, 1948, by Forest Supervisor George James. The study was approved, and a Bell G47B helicopter was assigned to the Shasta and Klamath forests for the 1948 fire season. The results of the season-long testing were encouraging. The G47B got firefighters to fires quickly in otherwise inaccessible terrain, and it hauled out heavy smokejumper equipment, allowing the jumpers to walk out unimpeded. There were other tangible benefits from the tests: 66 men were trained in helicopter operations, twenty-two landing spots were landed on and improved and 125 landing spots were found and mapped.²³

Limitations of the craft were also discovered. A more powerful engine was needed to ensure safe operations above 6,000 feet elevation, where

most lightning fires started. More landing spots were needed and potential spots needed improvement for safe operations. Training was stressed in these tests and paid off when the helicopter was used on the Dillon Fire, among others, that summer. Safety was also given high priority, but the unrecognized danger of wheeled landing gear resulted in the loss of one of the craft.

On August 8, 1948, Pilot Fred Bowen set the G47B down on a grassy area in Big Meadows. While his passenger, Ranger W. R. Denney, was making notes, the aircraft began rolling backwards. The elevation of 6,000 feet was too high to allow the pilot to completely lift the ship. As it rolled, one wheel hit a boulder and the craft fell on its side with the rotors still moving. Denney and Bowen said the sensation was "like being thrown into an eggbeater." Both men were bruised but otherwise unhurt. This incident led to the replacement of wheels by landing skids for most helicopters.²⁴

The utility of the helicopter for fire control operations was proven not long after the Army Air Force tests in 1945. The first use of the aircraft on a fire was in 1946 on the Castaic Fire in the Angeles National Forest. An Army R-5 from March Field was used for scouting the fire, and it also dropped a small amount of cargo. But it was the Bryant Fire in the Angeles that really showed what the helicopter could do under large fire conditions.²⁵

The Bryant Fire started at 8:15 a.m., August 5, 1947, in grass, brush and scattered trees at the bottom of Big Tujunga Canyon. The day was hot, and temperatures rose to 107 degrees. It was also very dry with relative humidity of 10 to 20 percent. The fire was attacked by three tank truck crews with 25 men. A tragedy occurred at the outset when a pack rat, its fur aflame, ran from the main fire to its nest outside the line. The resulting spot fire swept upslope, trapping a tanker crew. Two men died and eight were injured in the incident.²⁶

Two Bell G47B helicopters, piloted by Fred Bowen and Knute Flint, were ordered to the fire on August 6th and set to work scouting the fireline. As the fire continued, the aircraft were used to locate landing spots and ferry men, equipment and supplies. About 300 men were ferried by the aircraft during the fire. When a truck turned over and twenty-five men were injured, the helicopters were used to ferry fifteen of the most seriously hurt directly to the nearest hospital. The trips took 45 minutes each, compared to a two-hour trip by way of road. In comment-

ing on the fire report, A. A. Brown, chief of fire control in Washington, noted that experiments with water drops had also been tried, but that there was much to learn about the safe use of helicopters.

Helicopters were also used on fires in the Mendocino and Tahoe Forests in 1947. Wider use of helicopters for fire control was made during the 1949 fire season. One of the earliest and best-known photographs of helicopters in action on a fire was made during the Wheeler Springs Fire in the Los Padres in 1948. By the 1949 fire season, helicopters were stationed in several Region 5 national forests. Already, standards were being developed for helicopter landing spots, a long name that was soon abbreviated to "helispot." Region 5 forests busily prepared helispot maps, and as the aircraft spread around the region, the helicopter generated its own aura. There is an exhilaration in helicopter flying: the pace is not too fast, the view is unmatched and vertical lift and maneuverability of the ship gives the passenger a thrill. Soon everyone wanted to ride in a "chopper," as the helicopter came to be known. But, the techniques of helicopter use in fire control had not been fully explored and common operational standards were badly needed. New, more powerful helicopters were also needed if the craft was to reach its full potential for fire control operations.

Fires of the Late Forties

Fire weather during the war years was generally favorable, but conditions worsened in the late forties. The first fire season after the war's end should have been a time to share in the relaxation that came with peace. But weather is not affected by the affairs of men, and 1946 was a dry year, with the driest April since 1909. Northern California precipitation was only half of normal, and the very dry weather in the spring was accompanied by periods of north winds through October. The fire season started early, and firefighters were not optimistic.²⁷

But despite the gloomy outlook, the 1946 fire season turned out to be about average in severity, with about half of the season's days above the high fire danger category. The Modoc, Plumas and Stanislaus had between 3,000 and 7,000 acres burned each, but the rest of the region ended the season with burned areas well below average. The total area burned within protection boundaries in Region 5 was 31,670 acres, of which 27,465 acres was national forest land. This was the lowest total of burned acreage since 1937.²⁸

Nonetheless, there were several nasty fires. The Clear Creek Fire in the Plumas began at the Western Pacific Railroad tracks near Keddie and destroyed valuable timber stands. In addition, two men died on the night of September 14th, when a green tree fell on them as they were leading a bulldozer toward the fire. It was a reminder that just being in the woods could be dangerous. Two other men died during the 1946 fire season. A firefighter working on the Dumond Fire in the Sierra Forest complained of pains and dizziness. He was hospitalized but died three weeks later of coronary heart disease brought on by overexertion at the fire. In the Lassen National Forest, a dispatcher drove a tank truck off the road at Dead Man's Curve near Westwood. The vehicle turned over and his passenger, the regular truck driver, was killed. In the Mendocino Forest, there was an outbreak of incendiary fires that could have been stimulated by the new state law permitting brush burning for rangeland improvement. These incidents marred what otherwise would have been considered a successful season.²⁹

Dry weather through 1946 had been successfully overcome through extra effort and a measure of luck. Droughty conditions continued on through the fall of 1946 and into 1947. The so-called rainy season turned out to be the driest since 1898, the driest in Los Angeles since 1877. Precipitation varied across the state from one-third to one-fourth of normal. Despite the bad conditions, most forests lost only a few thousand acres to fire in the 1947 season. Many fires were quickly contained because of a well-organized and smoothly functioning fire control system. This history has recorded many fires that got away, many that were not handled well and many that were subject to unusual weather conditions, yet the vast majority were controlled while still small or after they had made a short run. Two 1947 fires in the Plumas Forest are representative of the effectiveness of the Region 5 fire control system.³⁰

On July 26, 1947, a fire started in a logging area on Jordan Creek. Relative humidity was 29 percent, relatively high for the east side of the Plumas. A lookout spotted the smoke and accurately located it. A crew of twelve men was sent to the fire within two minutes of the report. Within seven minutes, a reinforcement crew with a tank truck, the district ranger and his assistant were on their way to the fire. Soon afterwards, the Squaw Valley Hotshot crew (forty men) was dispatched to the fire. Meanwhile, a logging crew attacked the fire, but a surge of wind reaching 40 miles per

hour spread the fire beyond their control. A fire camp was soon located on the fireline, the fire suppression action was planned and organized, and the fire was stopped as it hit the first ridge above the starting point. The Jordan Fire burned 300 acres but was controlled with a minimum of effort and cost.³¹

The Coupe Fire, near the community of Challenge in the Plumas, burned more than 100 acres but was suppressed in short order, once crews arrived. The relative humidity was low, 16 percent, and the winds in the fire area reached 20 miles per hour, resulting in high fire danger. The fire started on September 3, 1947, and was quickly reported by two lookouts. A crew started for the fire within two minutes of the report, followed by crews and three bulldozers from a nearby logging operation. The fire made a run but was controlled at 7:30 p.m. the same day after lines were built by bulldozer and fired out.

While these two fires were representative of normal performance, the Frenchman Fire, also in the Plumas, showed that Murphy's Law was in effect on some fires. The fire was probably started by a choker-setter smoking in the woods. The smoke came up in a "blind" area and was seen by a lookout who could only guess at its location. The guess was off by four miles. A second lookout spotted the smoke but was reluctant to break into a conversation underway on the telephone. His reading would have crossed that of the first lookout and given a correct location, but he never reported. The dispatcher called a rancher, who could see into the supposed fire area. The rancher saw no smoke, which suggested the fire was small. The dispatcher did not ask the second lookout for a bearing on the smoke and sent a small crew to handle a small fire. At the scene, a logging crew could have controlled the fire, but only one man went to the fire while five others went for help. Even so, the fire was only a spot when the logger arrived, but the wind came up and the fire ran out of control. Fortunately, the later suppression action was effective and the fire was controlled early the next morning after burning 709 acres. The Mendocino Forest did not escape so easily.

The range burning incendiaries were back at their old stand in 1947. Between September 12th and 15th, four large fires were set. One, the Schuyler Fire, accounted for nearly a third of the acres burned in Region 5 during 1947. A rancher started the Schuyler Fire at about 12:15 p.m. on September 15, 1947. The fire began on Alley Creek, a few miles north

of Nice, a town on Clear Lake. Other incendiary fires had fully occupied initial attack crews, so the fire made good headway before the first work began. The fire burned up Bartlett Mountain at a normal rate, but the next day made an explosive run over the mountain, down Bartlett Creek on the other side and on to Bartlett Springs on the North Fork of Cache Creek. After six days of exhaustive work in wild backcountry, 605 men controlled the fire. It had burned 24,100 acres; most of the total was national forest land.³²

After the 1947 fire season ended, Regional Forester Pat Thompson visited the Schuyler Fire area and discussed the incendiary problem with forest personnel. He agreed with local forest officers that a study of brush removal practices and grass re-vegetation was needed and assigned his range management staff officer to help the forest. An administrative study was prepared, and Deer Creek in the Upper Lake District was selected as the site of the first controlled burn. A burn in October 1948 was only partly successful but was followed up by bulldozer clearing, disking and reseeding the burned area to grass. The next year, further burning and mechanical brush removal tests were carried out on Pitney Ridge. By 1951 a brush removal and grass re-vegetation program was well established on Mendocino Forest lands near Upper Lake. Brush removal studies and projects were conducted in cooperation with local ranchers, the Division of Forestry and other interested agencies. As a result, the incendiary problem subsided, and the foundation for more intensive chaparral management in Grindstone Canyon was laid.³³

One of the larger fires of 1947 was the Boca Fire, which began on August 5th in the Tahoe National Forest. The fire started alongside Highway 40. It was attacked while still small, but was soon lost when a strong southwest wind sent a fire whirlwind across the highway, the Truckee River and a double-tracked railroad right-of-way. Almost 9,000 acres burned in the next three days. Large sections of line were in sparse east-side pine stands and were only "hot-spotted"; that is, firefighters only worked in the scattered locations where the fire was most active.³⁴

The Peligreen Fire in the Lassen Forest was one of the most serious of the 1947 season. It also revealed breakdowns in the Lassen's large fire organization. The fire burned 18,700 acres in the west side of the forest, where large fires were not common. It started about ten miles south of State Route 36, near Round Mountain. Suppression was slow to begin.

The Board of Review for the fire found that the fire boss did not allow enough time for firefighters to arrive, thus invalidating the entire control strategy. On top of this, the fire was poorly organized in camp and on the fireline. There was no doubt in the board's mind that mismanagement was the reason the fire lasted too long, burned too many acres and cost too much to suppress.³⁵

For months the 1948 rainy season did not live up to its name. Weather is notoriously unpredictable. In California it is even more so. Thus, when November and December 1947, and January and February 1948 passed with below normal precipitation, it seemed another drought year was ahead. Then, hosanna! the heavens opened and the rains came, in March, in April, in May, even in June. Soon there was enough rain, then too much; the drought became floods.³⁶

The forests in Region 5 reveled in a "normal" fire season, healed the wounds of the past year and dealt with routine fire duties, except for three of the chaparral forests; the Cleveland, Los Padres and Mendocino. Erase the large fires in these three forests from the record and only 6,500 acres were burned within regional protection boundaries in 1948. At the risk of repetition to the point of boredom, it must be said again that every fire season in California produces at least a few days of severe fire weather when a large fire may occur.³⁷

One of the early fires of the 1948 season could by no means be considered serious. The regional office questioned the cost of a small fire in the Lassen that resulted when the previous fall's slash burning came alive in the spring sun. The Lassen responded with a tale of woe. The Coppervale tank truck and crew went toward the fire, drove into a mudhole and never emerged. After this crew disappeared in the mud, the Chester crew was dispatched with its four-wheel drive tank truck. This crew took a different route to the fire, found another mudhole and remained. After some time, the forest mechanic was sent to the rescue but had to return to town where he bought a heavy block and tackle to retrieve the trucks. All of this resulted in overtime and other expense. The forest concluded glumly that they could have bought a winch for the four-wheel drive for less than the cost of the fire.³⁸

The serious business of the 1948 season began on July 8th, when the Cleveland rolled their crews to a fire at Barrett Dam not far from the scene of the Hauser Creek disaster. This ill-fated area claimed another life

when winds changed at night from southwesterly to easterly. A firefighter became separated from his crew and died when the fire flashed over the line. Again shifting winds and an error in individual judgment cost a life. This fire was caused by a cutting torch, burned 7,690 acres and took five days to subdue. Two months later, the Mendocino was back in the record books with another major fire.³⁹

The Red Bridge Fire began at the confluence of the forks of Stony Creek, a few miles west of Stonyford. It was a typical September day in the Mendocino, hot with late summer dryness that pinches the nostrils; a light breeze was blowing up the steep chaparral-covered slopes of Stony Creek Canyon. The fire had already covered five acres when first attacked. The first crew on the scene took one look and knew they were in for a campaign. Winds increased to 35 miles per hour as the fire expanded, and the fire fed itself, eventually denuding 14,189 acres. The Mendocino had counted its third major fire in five years (1944-1948.) The next three years would bring two additional large fires. Between 1943 and 1951, the Mendocino Forest sustained losses of more than 85,000 acres of burned watershed and timberlands, exceeded in that period in Region 5, only by the Cleveland, Los Padres and Modoc.⁴⁰

In September, the Los Padres experienced an old-time spectacular fire, a reminder of the past, and unfortunately, a forecast for the future. Since 1933, only one fire, the Machesna Fire of 1939, had exceeded 20,000 acres in the Los Padres. Meanwhile, hundreds of thousands of acres of chaparral that burned between 1917 and 1933 had regrown, matured and, in some areas, was declining, its branches dying and litter building up underneath. The stage was setting for conflagrations in the fifties, sixties, seventies and eighties. In the thirty-five years after 1949, 650,000 acres burned in the Los Padres in just seven fires.⁴¹

The Wheeler Springs Fire came from a typically southern California combination: a hot, dry summer; a heat wave; steep chaparral covered slopes, and buildings literally surrounded by brush. A persistent heat wave had plagued the Los Padres from August 30th that year. Potentially disastrous fires had been successfully controlled on August 31st, September 3rd, 10th and 12th. On the 12th, the worst day of the heat wave, the Ojai District crews were working on a 25-acre fire that began at 1:00 a.m. A tank truck crew had been moved to Wheeler Gorge Station

to fill in behind the regular crew that was on the fire. Wheeler Gorge was a dangerous location from a fire standpoint.

After the Matilija Fire of 1932, U.S. Highway 399 (now State Route 33) had been completed along the North Fork of the Ventura River and over the mountains to Coalinga. On its winding way along the river, the highway passed through Wheeler Gorge, a narrow, twisting canyon. Wheeler Springs Resort had been built on privately owned lands near the gorge. At about 2:25 p.m. on September 12th, a butane heater in an outbuilding at the resort malfunctioned, sending a jet of flame into an overhanging oak tree and igniting surrounding brush and leaves. The backup fire crew at Wheeler Gorge was at the fire scene within five minutes of its start, but the fire had already spread over twenty acres when they arrived. Their initial efforts concentrated on keeping the fire west of the highway. At about 6:00 p.m., the wind direction, which is normally up the canyon in daytime, shifted to the down-canyon direction, which is normal for evening and night hours. Under the influence of the wind shift, the fire turned around and headed back toward the resort. The fire crews tried valiantly to hold the line of the highway, but at about 6:45 p.m. the fire spotted across the road at several points.

At this time, Forest Supervisor Andy Brenneis knew a major conflagration was underway. The South Zone dispatcher and the regional office were notified and mobilization began. The night of September 12th, several thousand acres burned on both sides of Highway 399. The east side of the fire was most active, and the advancing fire forced the lookout man on Nordhoff Peak to abandon his post. The lookout building burned the next day as the fire spread across Cozy Dell Canyon toward the outskirts of Ojai. That night, the 13th, the fire burst into Ojai, one tongue of fire reaching as far as Meiners Oaks before it was stopped. Twenty-two homes were burned, and one resident died of heart failure as he tried to protect his home.

On the 14th, the fire made a great run of about 10,000 acres; spreading on both sides of Highway 399, reaching Rose Canyon and burning over the main ridge into the Sespe Creek drainage. Late that day, as the situation was escalating into another Matilija disaster, the weather moderated; winds began to slack off, fog penetrated the lower canyons and the relative humidity rose throughout the area. There were 25 miles of firelines to build before control could be assured, but 1,500 men were

available to fight the fire. An all-out effort that night closed most of the gaps in the line, and control was attained at 6:00 p.m. on the 16th after the fire had burned 25,885 acres.

This was the first fire in Region 5 history that employed large numbers of aircraft. Two Region 5 Stinson aircraft scouted and dropped supplies, and other planes were used to ferry crews and overhead from northern California. Six helicopters were used: one Army Sikorski R-5 and five Bell G47Bs, which saved valuable time that would have been lost had crews used roads and trails. Perhaps the most innovative use of the helicopter was to transport crews to "hot-spot" long stretches of fireline, enabling follow-up crews to quickly cold trail the fire.



Sikorski R5 helicopter scouting fire line, Wheeler Springs Fire, Los Padres National Forest, 1948.

By 1950, most Region 5 forests had helicopters during fire season.

There were many heroic attempts by firefighters to save buildings in Ojai, most were successful. In one account, Horace Jones and his crew from the San Bernardino and Ned Taylor and his crew from the Angeles combined with local citizens to save a house. The men backfired and ran all over the area, putting out many spot fires while the fire roared all around them. Wildlife ran from the unburned area and stood behind the struggling crews. The fire encircled the area and deer, fox, rabbits, raccoons, even a black bear were as dependent on the firefighters as was the homeowner. Finally the fire passed over, leaving the home scorched but still standing. Presumably the wildlife were as grateful to the firefighters as were the people of Ojai. Citizens of that town expressed their gratitude just as they did years later (1985) when the Wheeler Gorge Fire ravaged the same area.⁴²

That old bane of the California firefighter, the Santa Ana winds, was the culprit in the Cleveland's other major fire of 1948. It seemed highly improbable that a major fire could occur after two weeks of wet and cool weather in late October. The Cleveland's seasonal fire forces had been let go on October 31st. Then on the morning of November 4th, a strong Santa Ana wind began blowing.⁴³

About 1:00 p.m. that day, at Green River Camp in the Santa Ana River bottom, a mile north of the Trabuco District boundary, a mattress in a trailer caught fire. By 1:30 p.m. the fire was burning in grass and sagebrush on both sides of Highway 18 (now State Route 91, Corona Freeway). Despite the severe winds, the fire was controlled on November 6th and mopped up 400 yards into the burn. At 3:00 a.m. on November 8th, the winds rose again to 55 miles per hour and sparks blew out of the fire interior across the fireline. The fire spread southwards in and around Santiago Reservoir. Almost 800 men were needed to control the fire again on November 10th. The Green River Fire, the largest in Orange County since 1928, burned 11,740 acres within the Cleveland protection boundary and 35,260 acres outside, a total of 47,000 acres.

When the last major fire of the season burns in November, the transition to the next fire season is brief indeed. The weather in early 1949 reverted to a dry pattern. A very wet March was cancelled, in effect, by a very dry, hot and windy April and a normal May. On balance, the spring weather seemed about normal, but what counts is the result, and that was an early fire season. Despite this portent of a bad fire year, 1949 was about average as fire seasons go. There were 75,669 acres burned within forest protection boundaries, just slightly more than the ten-year average and 15 percent less than the average year of the thirties decade. Not so bad as fire seasons go—but that depended on how close to the fires you were.⁴⁴

Bob Marshall ran the tank truck at Tennant Station in the Shasta National Forest. On August 19, 1949, Bob was given the day off to get a haircut and buy his children some clothes in Klamath Falls. As he returned along U.S. Highway 97, he noticed a "Fire Camp" sign pointing down the Red Rock county road. That meant a large fire, so he hurried back to Tennant only to find his truck gone to a fire at Sheep Wells. Marshall hurried after the crew and found them on the fire but not the truck! Where was it? The story came out. The crew had gotten too close to the head of the fire. In their excitement they high-centered the truck

on a stump, where it sat going nowhere. The fire swept on and over the truck, burning it and all of its contents including Marshall's fire gear. Some days it didn't pay to take time off to get a haircut.⁴⁵

The Sheep Wells Fire took off, driven by a southwest wind, and burned into the Modoc Forest. It took 892 men to control the fire after it had burned 12,485 acres, about half of which was on the Shasta and half on the Modoc. The Modoc had another large fire in 1949, the Sleepy Peak, which burned nearly 5,000 acres. More than 6,000 acres burned in the Trinity in 1949, and the Stanislaus had its worst fire in fifteen years when the Walton Spur Fire burned 6,359 acres. It was not the loss of timber and brush that hurt the Stanislaus on this fire. A man died fighting the fire, the second man to die in Region 5 during 1949. In this case, swirling winds in the Tuolumne River Canyon pushed the fire out of control lines, trapping and killing a tractor operator working above the fire. Elsewhere in northern California, 1949 was a relatively quiet fire season.⁴⁶

Southern California forests accounted for nearly half of the year's burned acreage. Comparatively speaking, the Los Padres got a rest in 1949, recording only 29 fires and 6,345 acres burned. Most of the burned area came in the Alamo Fire of June 5th (4,440 acres) and the Tassajara Fire of September 19th (1,420 acres), both of which were caused by burning buildings. The Cleveland had an easy year, but the San Bernardino Forest lost 6,651 acres to fires, almost all of which was in the Middle Fork Fire (6,380 acres).⁴⁷

It was the Angeles Forest that had the worst record of the year in southern California. The forest had closed its fire season with a record somewhat worse than average. Then on November 2nd, while a Santa Ana wind blew from the desert, a fire started at Atmore Meadows on the north end of the Saugus District. Initial attack was delayed until fire people could be found. By then a large fire organization was needed. The fire burned 9,460 acres before it was controlled. Instead of an acceptable record, the Angeles had its worst fire season since 1928.⁴⁸

The Angeles lost a total of 16,311 acres in 1949, more national forest land burned in the forest than during the entire decade of the thirties. Unfortunately, the 1949 season was the beginning of thirty-year period when the forest averaged more than 18,000 acres burned every single year, a total of 550,000 acres burned from 1950 through 1980. An area

equivalent to almost the entire area of the Angeles (650,000 acres) had burned over in those three decades.⁴⁹

Far to the north, another 1949 fire resulted in major changes in fire control around the country. In Mann Gulch, a short, steep ravine leading to the Missouri River, a tragedy occurred not unlike that of the Hauser Creek Fire. A crew of smokejumpers attacked a lightning fire; the wind shifted; the crew was surrounded by fire. Some stayed in a burned-out area and survived, while others ran uphill. Thirteen of those who ran, died. The Mann Gulch tragedy spurred the Forest Service to a determined effort to learn and understand forest fire behavior. A separate Division of Fire Research had been established in the Washington office in 1948, headed by former national Chief of Fire Control and California Experiment Station researcher, Arthur A. Brown. Fire behavior research became a major theme for the future and none to soon, for the fire tragedies did not end at Mann Gulch.⁵⁰

The 1950s would bring new technology to the art and science of forest fire control. The decade would see the reintroduction of fire to reduce hazards. Much closer cooperation between fire agencies was in the offing. The stakes were high as California continued its explosive growth on through the fifties, but in the long and short run, the inexorable ebb and flow of California climate still held the key to success in controlling fire in the forests and brushlands.



A smokejumper descending toward a fire. A base for smokejumpers was established at Redding in February 1957.

California's growth in people, industry, agriculture and problems continued through the 1940's, slowed only slightly by minor business recessions. During the postwar years, tensions between the United States and the Soviet Union increased, and the confrontation became known as the cold war. This armed confrontation fed California's defense industries, adding to the state's already frenzied growth. When, on June 30, 1951, President Harry S. Truman committed U.S. troops to fight North Korea because of its invasion of South Korea, another escalation in California's growth occurred. The Korean War affected the state much less than did World War II, but the impact was still considerable.¹

These new demands only intensified the shock waves already rippling through the national forests of California. The days of custodianship, when the national forests were guarded for the people of a dimly perceived future, were over. The future was "now," and "now" was not as it had been expected to be. The European model followed by forestry school textbooks suggested that forests were to be managed for forest products with a few other uses thrown in as an afterthought. Not in America, and not in California!

Instead, the vast energy generated by millions of new residents and thousands of new businesses, created a helter-skelter rush for national forest resources: water and power generation; second homes, recreation areas, timber; minerals; utilities, highways and roads; and wildlife and fish. These demands, and the energy with which they were pursued, led to increasingly complex resource management and more conflicts between uses and users. A few years before, it would have been inconceivable that California national forests could not meet all the demands of the state's citizens. But some far-sighted Region 5 leaders were saying it was time to get serious about land-use planning. They saw that multi-resource goals, priorities and standards were already needed. The most dynamic resource use, and the use with most effect on other uses, was timber sales.²

Most foresters in Region 5 believed that management of timber and watersheds was the primary reason for the existence of the national forests. The Organic Act of 1897 was specific in this respect. Furthermore, the postwar timber sales boom required large numbers of new foresters who were strongly oriented toward timber management and the leaders of Region 5 were excited by this prospect. After fifty years of custodianship, forest supervisors could actually see timber stands being managed.

But California's swelling population worked substantial changes in this forester's dream world.

By 1950 it was clear that outdoor recreation would have to be given a major share in the use and management of Region 5 forests. Recreation had always been an important use in the region, but its heaviest impact had been in a few areas such as, the Angeles, San Bernardino, Lake Tahoe and a few locations in the western Sierra Nevada. By the mid-1950s, the growing population of young, middle-class families was flooding the forests. The old campgrounds and picnic areas, built in CCC days could no longer accommodate them. Hunting and fishing visitation to the national forests also grew with the population, as did the use of wilderness and roadless areas. The California life style with its emphasis on sun, casual dress, the outdoors and vehicles was in the process of formation. New fire control problems arose as recreationists dispersed throughout the national forests.

However, the rapid expansion of timber sales exceeded outdoor recreation as a source of fire control problems. The demand for timber sales from the region's forests reflected the housing boom in California. Volume of timber cut from Region 5 forests grew steadily from 1946 through 1950 when it reached 569 million board feet. Just five years later, production had risen to more than one billion board feet, more than three times the production in 1945. The volume of timber sales continued to grow into the 1970s.³

The ascendancy of timber sales in the Forest Service led to a diminished priority for fire control, even though officially this was disavowed. Job load analyses were the basis of organization and pay in the Forest Service. These analyses tended to focus on "professional or ranger caliber work"; that is, forestry work. Many fire activities were reassigned to non-professional or technical status. This decision had far reaching consequences. Fire experience at the district level was essential to the professional development of both line (ranger and supervisor) and fire control staff jobs, and now it was less available.⁴

A whole new dimension of forest protection problems arose with the rapid expansion of cut-over areas. What was most the economical way to protect cut-over timberland? What was the best way to dispose of logging slash? How could the increased job be funded? Who should do the work? In addition to these problems, the growth in number and dispersal of

timber sales required many more inspections of logging operations.

Despite increased emphasis on fire prevention, many fires in the early fifties were traceable to logging operations. Sparks from tractor and chain saw exhausts were a particular problem. Exhaust fires spawned an urgent program by the Arcadia Equipment Development Center to find effective spark arresters for all internal combustion equipment. Many changes were made in timber sale contracts to strengthen fire protection.

For decades Congress viewed the national forests as revenue producers. The leadership of the Forest Service encouraged this view because they believed it, and because it helped increase appropriations. Keeping timber sales revenue up required keeping associated costs down. Slash disposal costs could soon eat up all the revenues from a timber sale, so something less than complete slash disposal was sought.

The only practical way to deal with increased hazard, without going out of business, was to update the old partial slash disposal and extra protection techniques. Fortunately, higher stumpage rates for timber made it possible to collect more funds from the timber sale receipts to be used to abate fire hazard created by the sale. Usually, the slash disposal plan called for disposal of slash along roads, at log landings, and perhaps along ridges or selected skid trails. In addition, cooperative deposits made by the timber sale operator were used to hire extra patrolmen, fire crewmen or lookouts to watch the area. Fire protection became an important cost of purchasing national forest timber.

Outdoor recreationists and timber sale purchasers alike agreed on the need for fire protection of forests and brushlands. This was one goal all seemed to be able to agree on. Well, almost all! There were a growing number of professionals of several disciplines who believed that fire was not bad for forests or brushlands, if it was properly used.

Light Burning Revisited

Harold Weaver successfully used fire to thin “dog-hair” stands of ponderosa pine in the Colville Indian Reservation in north-central Washington during the early 1950s. Meanwhile, Harold Biswell, who came to the University of California Department of Forestry in 1945, also conducted experiments in prescribed burning, a method that he had used in Georgia. He was a confirmed believer in the use of fire in forest management.⁵

Interest in controlled burns for range improvement had never subsid-

ed among livestock owners in the foothills of California. An upsurge in demand for burning just before World War II and support from scientists like Biswell led the state legislature to authorize experimental controlled burns in 1945. Between 1945 and 1952, controlled burns for range improvement were conducted in more than 700,000 acres by the California Division of Forestry. Of this total area, about 13 percent was area burned by escapes from the planned burn area.⁶

The state's controlled burning program escalated in the early 1950s, as did the fears of forest supervisors whose forests adjoined the burns. There were several controlled burn committees along the west slope of the Sierra Forest. In August 1950, the Oakhurst Control Burn Committee notified Supervisor Byron Beattie that they planned a controlled burn on September 2nd and 3rd and asked him to have a crew stand by in case the fire entered the forest. Beattie already had experienced a "controlled burn" in Fresno County that escaped onto the forest and burned 500 acres. The Oakhurst Committee got the same message that other brush burners received: it was their responsibility, under the law, to keep the fire away from national forest land, and any suppression costs and damages from an escape would be charged to the committee.⁷

About this time the term "controlled burn" began to be replaced by the more precise description, "prescribed burn." This new term recognized that burning should be according to a prescription and that it could not always be controlled. The role of prescribed fire in Region 5 and the cooperative relationships with the Division of Forestry and adjacent landowners were discussed in a letter from Regional Forester Clare Hendee to his forest supervisors on July 23, 1951. Hendee's letter recited research into vegetative conversion that was underway, including a wildland soils map of Mendocino County and basic soil and water research underway at San Dimas Experimental Forest. It also listed modest accomplishments in brushland conversion in Region 5 between 1945 and 1950. Attached to the letter was a statement of policy on brushland clearing. The letter and the policy clearly stated that protection of watershed and prevention of soil erosion came first, and that Forest Service funds could not be spent to burn brush on private lands. Beyond these two rules, the policy listed many ways brushland could be converted to other vegetation, including the use of fire. Prescribed fire was acknowledged as a tool but only if it was

used with careful planning and under close supervision. Hendee's letter stressed the need for close cooperation with the Division of Forestry and local burning committees.⁸

Hendee's letter was well received by the leaders of the Range Land Utilization Committee, including Professors Harold Biswell of the University of California, Berkeley and Professor B. A. Madson of the University of California, Davis. Local range improvement committees also were pleased. Region 5 field people had become exasperated with the careless attitude of some controlled burners toward adjoining national forest land and had not been "cooperative" with controlled burn committees. Hendee's letter and an intensified campaign by supervisors to meet with local burning committees paid off in better understanding of the Forest Service policy and problems and fewer escapes onto forest lands.

A meeting between representatives of the experiment station, Bill Branch, director of state and private operations for Region 5, and three forest supervisors was held November 16, 1951, to discuss the controlled burning problem. It appeared that enthusiasm for burning was waning along the front of the southern Sierras because of the high cost and the time needed to do the job. On the other hand, the south coast area offered opportunities to demonstrate prescribed burning to improve watershed condition as well as to improve range conditions. The experiment station was urged to move ahead with research and demonstrations to show the public what had already been accomplished. The situation around the Mendocino Forest was different, in that people lived in the brush and ranchers had a long history of annual brush burning.⁹

The Mendocino had recently entered into cooperative agreements with the California Fish and Game Department to manage 12,000 acres of brushland for deer. The forest had tested prescribed burns off and on, dating back to the early twenties. Its most recent prescribed burning experiments began after the Schuyler Fire of 1947 and had gradually expanded. These experiments became the nucleus of a major chaparral management program in Grindstone Canyon. This program started after the tragic Rattlesnake Fire of 1953 was stopped just short of the massive chaparral stands in the canyon. The Grindstone Project led the way in chaparral management for the entire state. The project grew over the years and provided the know-how needed to begin chaparral manage-

ment in the vast brushfields of southern California.¹⁰

Meanwhile, Professor Biswell was not satisfied with using fire to convert brush to grass; he also wanted to use fire to reduce hazards in timber stands. His experience in Georgia showed that fire was useful, indeed necessary, in reducing fire hazards and disease in Southern pine stands. Biswell conducted a field meeting at Hoberg's in Lake County on April 5, 1952, to demonstrate what light burning could do. He actually used the term "light burning," perhaps not knowing its full history in California. The stand was 40-year-old ponderosa pine that had been burned before. Simeri Jarvi, the Region 5 observer, estimated that up to one-third of the fuel was consumed by a slow-moving, low-intensity fire. Jarvi believed that resistance to control had been reduced but that a fire could still burn through the treated stand, albeit at lowered intensity.¹¹

Biswell felt that treatment could be done at a cost of less than nine cents per acre. Jarvi disagreed. Everyone present did agree that snags (dead trees) should be removed. Jarvi believed that Show and Kotok's studies should be reviewed and that prescribed burning could be done but only if each project area was carefully planned. Not stated was the major drawback to past attempts at extensive prescribed burning, which was high cost. Region 5 did not receive funds to do more than a few tests of prescribed burning, and Biswell's experiments did little to convert Region 5 to his cause.

Arthur W. Sampson and L. T. Burcham wrote the definitive statement on controlled burning for range improvement in 1954. Their booklet, *Costs and Returns of Controlled Brush Burning for Range Improvement in Northern California*, culminated ten years of study. Their research indicated first, that only a small portion of California's nine million acres of brushland was suitable for conversion to grass. They found that chamise-covered lands were usually unsuitable for conversion, that brush burning costs were higher than had been assumed, and that unplanned firing of brushlands was seldom profitable to range managers. Range burns usually improved grazing for only four years before the lands returned to brush. The researchers found that the state's brush burning program had reduced numbers of incendiary fires and losses in burned acres due to those fires. They wrote that range burns were successful only when the resources of the project area were inventoried and when the burn was carefully

planned and supervised.¹²

Several Region 5 forests experimented with prescribed burns during the early 1950s. In some cases, improved range forage was the object, and in others, the purpose was to remove brush for planting trees, or for other reasons. The whole program received a serious setback in 1957, when the Klamath Forest set fire to a planned burn in the old Bogus Burn containing 500 acres of crushed brush. The burn was well planned, crews were in place and the weather was favorable. The burn was lit off at 5:00 a.m. on September 24, 1957. The fire weather office in Redding called at 7:00 a.m. to report a major weather change. Too late! The Bogus Fire was off and running and was not stopped until it had burned 12,831 acres in California and Oregon. After the Bogus Burn escape, the prescribed burning program subsided until the 1970s. The program had demonstrated real value in chaparral management, but questions of cost and benefits remained in timber stand hazard reduction.¹³

The 1950 Fire Season: Throwback to the Twenties

After twenty years of maintaining annual burned acreage below 100,000 acres, Region 5 backslid badly in 1950. The 1950 fire season was the seventh in succession with subnormal precipitation in California. The spring weather was warm and dry except for a few days of rain early in April and May. Northerly winds negated the moisture from these rains and at the end of June, a heat wave sent temperatures soaring. The heat wave lasted over the Fourth of July holiday, and July 1950 became one of the hottest Julys on record. A second heat wave struck in late July and a third in mid-August. The clincher for this hot summer was a superheated high pressure system that squatted over the state from August 25th through September 9th. This heat wave included some of the most dangerous fire weather in many years. Rains came to the northern part of the state in October, but it was a month later before the fire season ended in the south, and only after a period of Santa Ana winds.¹⁴

Heat waves result from movement over the state of a high pressure system that often catches tropical moisture in its clockwise circulation and generates thunderstorms. In 1950 Region 5 took action on 1,018 lightning caused fires (compared to a five-year average of 712 fires.)¹⁵ Experience showed that the majority of burned acreage in most fire seasons occurs during heat waves or Santa Ana conditions. This was the

case in 1950, when there were five periods of severe fire weather: July 2-7 (eight large fires), July 22-31 (eleven large fires), August 4-9 (six large fires), August 14-23 (nine large fires) and September 2-4 (thirteen large fires.) When the season ended, 220,208 acres of national forest land had been blackened. The fire season exhausted Region 5 firefighters. It was a year to be classed with the 1920s. On the credit side was the fact that many fires were caught before they could become major conflagrations.¹⁶

In a season with so many large and damaging fires, it would be impossible to do more than discuss a few representative fires. The first large fire of the season occurred in June in the far north. when the Modoc Forest began its most severe season since 1941 with the Baggett Gulch Fire, which burned 3,795 acres, almost all commercial timberland. However, the first real region-wide crisis came in July.¹⁷

The Los Padres Forest had used the 560 acre Lake Ridge Fire on June 7th to shake down the fire organization. It was well that they did so, for a month later the major fires struck in quick succession. Six large fires burned that July Fourth weekend as if celebrating the national holiday with plumes of smoke. On July 3rd the San Marcos Fire broke out in view of Santa Barbara, followed quickly on the same day by the Pine Ridge Fire in the San Luis District. Then on Independence Day, the Pilitas Fire was started by a smoker in the San Luis District. The next day, the Indian Valley Fire in the Monterey District was discovered. These were major fires, burning large areas in and adjacent to the forest: the San Marcos (9,560 acres), the Pine Ridge (15,100 acres), the Pilitas (21,000 acres) and Indian Valley (5,765 acres). The Los Padres had help from all over California and from other states as well, but it was not enough.

On July 7th the Clear Creek Fire began and was followed on the next day by the Dalton Fire. A complete fire team from the Sierra Forest was flown in to take charge of these fires. They were assisted by two local district rangers, and this proved to be a very effective combination. The Los Padres had a brief but furious fire campaign early in July. The six fires burned nearly 60,000 acres; there were still several months of the season left, but the forest survived them comparatively unscathed.¹⁸

The heavy demands of the 1950 fires season caused Region 5 to expand its program of importing out-of-region help. California asked Regions 1, 3, 4 and 6 for fire overhead on four occasions, and a total of 142 fire overhead were loaned by the four regions. In keeping with a

national training program, Region 5 also accepted 21 men from other regions for large-fire training. These assignments were evidence of the growth of inter-regional cooperation in fire control.¹⁹

This program was furthered by the first use of Native American crews from the Southwest. The saga of these units began with a Mescalero (Apache) crew organized by the Indian Service, U.S. Department of Interior, in 1948. The crew was used in 1949 by the Lincoln National Forest in New Mexico (Region 3) with good success. Then in 1950, Mescalero and Hopi crews were sent to Region 5, where they performed very well on six fires in southern California forests. The following year, 20 crews from the Mescalero, Zuni and Hopi Reservations fought four major fires in Region 5. In 1953, 26 Native American crews were used on fires in California national forests.²⁰

The Southwest Native American crews established an outstanding record and continued to be a major source of reinforcements through the 1960s. The typical crew included 21 firefighters, three straw bosses, a crew leader and a Forest Service liaison officer. Each crew member wore a hard hat painted with tribal insignia. Crew members ranged in age from 18 to 60 years and had to pass a medical examination before becoming a crew member. Firefighting brought needed revenue to Native American families, and the 1951 season produced \$100,000 in firefighting wages. Native American crews were often used on "hot line" and backfiring situations because of their skill, discipline and endurance. One Native American leader summed up the crew viewpoint: "Fighting fire is one thing the white man does that makes sense."²¹

Most of the Region 5 forests that suffered in 1950 took their beatings from one large fire or a series of major fires that burned at the same time. The Plumas National Forest was in the latter category. These multi-fire campaigns completely depleted forest resources. In the crisis, fire crews and overhead were often on the fireline for two or three 12-hour shifts before relief arrived. When the rest of the region was aflame, help was usually slow to reach the fire. This was the case in July, when five fires struck the Plumas along the Honey Lake Escarpment south of Susanville, all burning at the same time. The fires began on the plateau above the Honey Lake Valley, but downslope winds swept the fires out of the timber into the valley below. The Laufman Ranger Station was saved only by

backfiring, and the community of Milford was threatened.²²

August was a fateful month for the Doublehead District of the Modoc. With headquarters at Tule Lake, near the Oregon border, this district is far from the mainstream in Region 5. August 16th began a time when the rest of the region came to know the Doublehead better. That day a lightning fire with the innocuous name of Plum Ridge swept through 10,500 acres of flat forest land, killing 9 million board feet of timber. The Doublehead crew was still mopping up this blaze when on August 22nd, a power-line failure started the Pumice Hill Fire that burned 6,680 acres of scrubby juniper, sage and grass. The weary firemen of the Modoc gained a second wind. They needed it, for on August 31st, a fuel spark from a Southern Pacific Railway train started the Mammoth Fire, which burned 6,580 acres. This was the last major fire for the Modoc that year.²³

Meanwhile, a thousand miles to the south, in San Diego County, the largest fire of the 1950 season started on August 16th, a mile or so up Conejos Creek, a tributary of El Capitan Reservoir, located about three miles north of Alpine in San Diego County. Assistant Ranger Lloyd Britton attacked the fire with 46 men, but the fire had covered twenty acres before he and his crew arrived. They had no chance with this fire that, like a 600-pound gorilla, did just as it pleased. The Cleveland put its Plan II, for dire emergencies, into effect and estimated that 15,000 acres would be burned by 8:00 a.m. the next day. Their estimate was accurate. As the heat wave persisted, the fire ate up terrain at a terrifying rate, threatening the towns of Julian and Pine Hills on the north and Cuyamaca State Park on the east. By the morning of August 18th, two days into the fire, the voracious red monster had consumed brush and trees on 40,000 acres. That morning, winds from the north and northwest increased in velocity. Suddenly the fire changed fronts, and the south end of the fire became the head and swept toward the communities of Descanso and Alpine and U.S. Highway 80.²⁴

The huge fire was jointly run by the Cleveland Forest and the Division of Forestry, and an army of 1,327 men, 39 tank trucks and 16 bulldozers was mobilized to fight it. On August 18th and 19th, homes were burned in the community of Descanso Park. Firefighters worried at the flanks of the fire and gradually began to slow its expansion. In the afternoon of August 22nd, the weather moderated and control was established that same day.

More than 75 percent of the fireline was established through backfiring.

It was a week to forget, until the fire could be re-fought in the winter. Some of the firefighters literally dropped to the ground from exhaustion. Others were out on their feet, refusing to give up. Overhead came from every Region 5 forest and from several other regions. There were Native American crews, Hotshot crews, Division of Forestry inmate crews, pickups and U.S. Navy men, who performed well despite the fact that many wore out a complete outfit of clothing and shoes in just one shift.

The damage and destruction of homes and other private property done by the Conejos Fire resulted in requests by citizens of San Diego County for a congressional inquiry. A sub-committee of the Public Lands Committee of the House of Representatives held a hearing in San Diego, at which the fire was reviewed with fire officials and citizens. The conclusion was that the fire was well handled in most respects. A second conclusion was that southern California brush fields should be broken into planned control units by broad fire lanes. The hearing was important because it brought southern California fire and chaparral management problems into the postwar political arena.

One reason the 1950 season, though severe, was not as bad as it could have been was the presence of ten regional Hotshot crews. The crews were located in the Cleveland, San Bernardino, Sierra, Eldorado, Plumas and Shasta Forests and were used on 85 fires, 40 of them major fires. They spent 60 percent of their time in fire suppression and often saved fires from becoming larger. Region 5 also recruited work crews who were given training similar to Hotshots crews and performed very well. All of these crews were far more effective than pickup labor and forecast a time when all firefighters would be members of trained crews.²⁵

There was barely time for Region 5 firefighters to read the mail and catch up on their sleep when a thunderstorm struck the central Sierra Nevada on September 2nd. This was a dry storm with lots of lightning but little rain. The Stanislaus Forest reported 14 lightning fires within a rectangular area about 17 miles long by 10 miles wide between the North Fork of the Tuolumne River and Clavey River, east of the town of Twain Harte. Nine of the fires escaped control and grew rapidly in the searing heat and low humidity. The fires occurred on the Labor Day weekend, and reinforcements were hard to find. They spread so quickly toward each other that the decision was made to treat them as one fire—the infamous

Wrights Creek Fire, one of the most destructive fires ever to strike the central Sierra Nevada. The fire eventually consumed timber and brush on 24,956 acres and killed at least 50 million board feet of timber, enough to build a small city.²⁶

At the same time, across the valley and north of Sacramento, the Mendocino National Forest was waging its own war. The scene was one of chaparral-covered canyons that seemed lifted intact from southern California, so closely did it resemble those southern forests. The Little Stony Fire was discovered on September 3rd, while the area baked under extreme fire danger conditions. The fire eventually burned 24,000 acres, 19,500 acres of that was national forest land. This one fire accounted for 96 percent of the Mendocino's burned acreage in 1950.²⁷

That same Labor Day weekend was indeed a day for labor in the Shasta and Modoc forests. A spark from a railroad engine set the Porcupine Fire a few miles from the northeast end of Big Valley. A fire near the town of Mt. Shasta had first call on men and equipment. As a result, the Porcupine Fire crews needed a week to control this blaze, which burned through lava breaks and timberlands. The fire covered 12,163 acres, and was almost evenly divided between the two forests.²⁸

At the south end of the state, on that same weekend, the Cleveland was once again on fire. Thunderstorms ignited four fires in very rugged and isolated country northeast of Escondido. The Guejito, Aqua Tibia, Skye Valley and Boulder Creek fires were not monster burns like the Conejos, but they required handline construction and sapped what little strength the Cleveland firemen had left. The Cleveland's 1950 fire season was not over, however. On December 22nd, a prescribed burn escaped and was not contained until December 30th after burning 3,400 acres. The 1950 fire season finally was laid to rest just before the New Year.²⁹

The losses of the 1950 fire season shocked the leaders of Region 5. It was a return to the twenties, which was not supposed to happen, given the gains in knowledge, skills, organization and equipment. Regional Fire Chief Frank Jefferson was given all kinds of advice as to why such heavy losses had been sustained, ranging from some incisive comments by Region 5 personnel chief, Andy Brenneis, to a back-to-basics plea by Charles Arment of the experiment station and a suggestion by Earl Loveridge of the Washington office that Jefferson replace fire crews with lookout firemen, which Jefferson had used successfully

in Region 1.

During a talk at a Society of American Foresters meeting, Jefferson reflected on the 1950 season by assessing the value of advanced equipment. The helicopter was a great tool, but he cautioned that bad weather could ground the aircraft and the old methods had to be ready to backup the new. The radio was a marvel of communications, he said, but only if there was system and discipline in its use. He doubted that aerial bombing of fires would work. Jefferson then restated a basic principle that lasted for twenty years before it eroded under the pressure of the environmental era. The principle was that fire suppression was first priority for all employees in Region 5; that is, a fire department within the regional organization was not wanted. All disciplines had a stake in fire control. He summed up the 1950 fire season by stating that the Chief needed to decide what level of fire protection he wanted and then finance it. He wrote, "To expect service of caviar with a shad roe allotment doesn't add up."³⁰

Intensifying Fire Suppression

The western regions of the Forest Service underwent heavy losses and high fire suppression costs in 1949. Chief Lyle Watts and his fire chief, C. A. Gustafson, were worried enough to call a service-wide fire control meeting at Ogden, Utah in January 1950. The topics discussed at the meeting were grouped into four major areas: finances, research, fire suppression and fire control equipment. Steadily increasing inflation had increased the cost of fire control by about 25 percent since 1946. Despite modest increases in wages, the Forest Service could not compete with industry for better workers. In fact, the drain on experienced forest workers continued. Thus, the service was faced with higher costs and lowered effectiveness.

The death of 13 smokejumpers in the Mann Gulch tragedy of 1949 emphasized the need for more research into fire behavior. There was an urgent demand to get what was known into the hands of firefighters. The report of the 1950 meeting stated, "...many of our older experienced men are being replaced by younger, inexperienced men who did not recognize dangerous fire behavior."³¹ Considerable time at the meeting was spent discussing fire control equipment development and the standardization of such equipment between regions. Helicopters and other aircraft were thoroughly discussed. There seemed to be a note of desperation in the discussion of finances and fire suppression. In contrast, the participants

seemed happy while talking about equipment, almost as if technology would save the day. The postwar years were marked by inflation, rising costs and lowered real financing. These economic forces pushed the western regions toward common fire suppression standards, terminology and tactics, for none of them had enough manpower to go it alone.

The 1950 fire season did nothing to ease the postwar problems in fire control. The national fire deficit bill in 1949 was \$7 million; it was higher in 1950, and in addition, 116 million board feet of timber was killed, mostly in California. This dismal record was magnified by another bad fire season in 1951. Region 5 again had the worst record in the nation, with 166,185 acres burned within forest protection boundaries. Almost 400,000 acres had burned in the California national forests in the 1950 and 1951 fire seasons.³²

Fire control people, like farmers, are never satisfied with the weather. A dry spring means a bad fire season; a wet spring results in more growth of grass, which dries into "flash fuel" and is an excellent place for fires to start and travel rapidly. Thus it was in northern California in 1951. A wet April and May, which should have indicated an easy fire season, were followed by four very dry months with unusually low humidity. There were eight days, over most of northern California, when relative humidity was below 10 percent. Sinuses dried up, and so did the woods. Dry thunderstorms coursed over the mountains, setting a record number of lightning fires. Southern California was dry, winter and spring, which was no surprise. The surprise was a series of light rains that blessed the southern part of the state from July through October.³³

A long fire season is like a campaign in a war. A long period of tension-filled waiting is punctuated by brief spurts of intense, bitter fighting. Most of the action during the 1951 fire season came in four weeks of burning in August and early September. The first battle was in the Sierra Forest on July 7th. A welding spark flew into grass on a high fire danger day, and 7,627 acres burned. Only twice before in twenty years had the Sierra Forest burned so many acres in one fire. The fire was much more intense than first estimated and spread very fast in steep terrain and light fuels.³⁴

The scene then shifted to the Modoc, where on August 1st, a Southern Pacific Railway train cast a fuel spark into grass alongside the tracks near Mears, a siding halfway between Canby and Tulelake. Some

might say that was very close to nowhere, and so it seemed when forces had to be mobilized. The country there is high, flat plateau covered with ponderosa pine, broken here and there by lava outcrops, cheatgrass-covered slopes and barren pumice flats. The Mears Fire raced through 25,000 acres of this terrain in just two days. It took 916 men to control the fire.³⁵

The second phase of the 1951 campaign came during the week of August 13th when a heat wave blanketed the state. Five forests struggled with large fires, but the Los Padres was the center of the storm. Three major fires burned 21,000 acres in the forest and required more than 1,000 men to subdue. The largest fire was the Navajo-Black Fire, which was started by an incendiary on August 15th. This fire burned Black Mt. and the head of Navajo Creek in the La Panza Mountains southeast of Paso Robles. The area was just north of the area burned by the Machesna Fire of 1939, a remote and rugged brush-covered land. Region 3 trainees were aghast at the willingness of the fire boss to back off a long distance from the fire, build lines three dozer blades wide and backfire 3,000 acres. The trainees admitted that they had no experience with sudden changes in wind and humidity that could nullify cold trails or narrow fireline built by hand next to the fire. The Navajo-Black Fire went into the forest records at 17,200 acres, another in the long list of Los Padres conflagrations.³⁶

While the Los Padres fought their huge fire in isolated, uninhabited backcountry, the San Bernardino Forest was trying to keep the Little Bear Fire from destroying homes and resorts near Lake Arrowhead. Outstanding cooperation from local and state fire control agencies was instrumental in holding the fire to 2,980 acres. The local water authority even released precious water from Lake Arrowhead for use by fire control pumps in the canyon below the lake. The most important factor in control of this fire, however, may have been a rain dance performed by members of a Zuni fire crew.³⁷

After dancing one night, the crew leaders told the plans chief that rain would end the fire within 24 hours. The plans chief smiled tolerantly and prepared plans for the next shift based on a weather forecast calling for more hot and dry weather. By 10:00 a.m. the next morning, a drenching rain quenched the fire. It was the Zuni's turn to smile tolerantly—and even laugh a little.

Weary firefighters went home and tried to fight off the overwhelming

lethargy that comes after many shifts on the fireline. Several days on the fireline produced a sluggishness, a kind of a don't-give-a-damn feeling that transcended attempts to regain energy and vitality. Sleep helped, but there was not much chance to sleep before another crisis occurred. August 18th, the day after the Navajo-Black Fire was controlled, began a week of unprecedented lightning fires. In five days, California was pounded by thunderstorms which started 649 fires and sent firemen chasing 152 other lightning strikes that never materialized into fires.³⁸

The area north of Sacramento was hardest hit, with 624 fires, 158 in the Plumas Forest alone. As in the past, the roadless forests of northwestern California suffered the most damage. Ten fires in that area reached major proportions, including the Three Creek Fire (3,500 acres) and the Lens Summit Fire (8,000 acres) in the Six Rivers Forest; the Howe's Camp Fire (3,250 acres) in the Mendocino; the Jim Jam Fire (7,300 acres) in the Trinity; the Devils Fire (10,610 acres) and the Pony Peak Fire (6,400 acres) in the Klamath Forest.

The Jim Jam Fire was located in roadless country a few miles northeast of the tiny hamlet of Denny on New River. This miserable fire spread over 1,300 acres in the first two hours after lightning struck. Because forest crews were already committed to 95 other lightning fires in the Trinity, a crew of loggers was sent to the Jim Jam Fire. All they could do was work on the flanks of the fire. Reinforcements were sent but had little effect as the fire continued to grow. Fire camps had to be supplied by air, and there was a long steep hike just to get to the fire.

The Del Rosa Hotshot crew from the San Bernardino Forest spent eight hard days on this fire. The crew had one long shift that really tested their mettle. At 5:00 a.m. on August 27th, they went on the fireline and immediately had to retreat when a high wind pushed the fire over the line. They built another line and backfired it successfully, then patrolled the line, mopping-up hot spots and putting out spot fires until noon on the 28th. During this 31 hour period, the crew was without food or blankets and spent the last several hours of the shift shivering in a light rain. The crew foreman proudly claimed, "Only trained and organized Hotshot crews will produce effective work under such conditions."³⁹

The Jim Jam Fire was also the occasion for the ultimate in inter-regional assistance. The barrage of fires in the back-country of northwestern California soon exhausted the local supply of pack mules. Not only

were mules in short supply, but some of the contract packers on the fire spent more effort trying to pad expenses than to pack mules. In desperation, the Trinity Forest asked Region 1 to fly a pack string down to the fire. The mules were duly flown into Eureka, where they were loaded onto trucks and hauled to Denny and used on the fire.

Two weeks later, in Alturas, Regional Forester Clare Hendee and George James was escorting Earl Loveridge, chief of operations in Washington, around the Modoc as part of a general inspection of Region 5. Hendee mentioned the mule airlift as an example of inter-regional cooperation. Shipping mules by air! Loveridge's eyes bulged, and he was so furious that he foamed at the mouth. His old boss, Roy Headley, "would have booted the originator of the fire mule lift over the nearest cliff and Loveridge would have helped push."⁴⁰ M. M. "Red" Nelson, who was part of the inspection team, had to walk Loveridge around for a half hour before he recovered from his rage. That may have been the last mule airlift in Region 5. Meanwhile, the Pony Peak Fire in the Klamath was proving to be a worthy competitor to the Jim Jam as nastiest fire of the year.

The Pony Peak Fire was not the largest of the Klamath's fires, but it stuck in firefighters' memories as the Red Cap Fire had in 1939. The fire was controlled by a single inexperienced fireman when it was only a spot. Apparently his mop-up was not adequate, for the fire broke out again the next day, August 21st. Pony Peak is about a dozen miles up the Klamath River from Somes Bar and three airline miles west. Smokejumpers were dispatched to this fire and to others during this outbreak, but most crews had to hike uphill five or more miles (about four hours) to the camp near the fire. At first the fire spread toward the southwest into Dillon Creek; then on the 24th, a weak weather front passed through the area and winds switched to the northwest. Crews and packers using the Aubrey Creek Trail found the fire had swept across the trail behind them. When they reached fire camp, it too was threatened. Soon afterwards the camp and some of its contents was overrun by the fire.

The fire front charged on southeasterly to the Klamath River. Chaotic conditions at the upper fire camp resulted in a near mutiny by some of the pickup laborers, and they had to be sent off the fire the next morning. Many of the overhead believed that the general headquarters in Happy Camp had their headquarters where their hindquarters should be when it came to understanding the plight of firefighters working in very steep

terrain and returning after shift to poor camp conditions. The same misty rain that helped stop the Jim Jam Fire ended the Pony Peak Fire on August 28th. This fire left firefighters with gripes and aggravation as contrasted with the satisfaction felt after most fires were controlled.⁴¹

This outbreak of lightning fires, or "lightning bust" in firefighter parlance, was the third onslaught of the 1951 campaign. There was one more trial to come, in early September. On the 11th of September, a train traveled over the Western Pacific Railroad tracks near Rodgers Flat in the Feather River Canyon. A hot spark flew out from the engine, landed on a pile of rotting ties and started the Milk Ranch Fire. The fire, named after the creek up which it burned, advanced quickly upslope until it was about two-thirds of the way up the canyon wall. At this point, a Mono or east wind was blowing; the wind caught the fire and sent it down canyon, across side slopes, at a terrific pace. The wind rose to 40 miles per hour and drove the fire 17 miles down the canyon that night.

The Plumas Forest reacted quickly and had 1,200 men ready to fight the fire the next morning. The fire was long and narrow. The strategy was to keep the fire confined to the south side of the canyon, which is more than 3,000 feet deep at that point. Other crews were to stop the fire at the top of the canyon slope and catch the head of the fire when the wind died down. The strategy worked, and within forty-eight hours the fire was contained. The cost was high; 21,812 acres burned, including 53 million board feet of timber, and 61 men were injured; some were severely hurt when they were struck by rolling boulders.⁴²

At the same time, the San Bernardino Forest was beset by the Gaston Fire, which originated in a privately owned dump ground on September 12th. The area is about five miles north of Banning in very steep and rugged terrain. The fire burned northwest over rocky ridges to the San Gorgonio River, where it was halted after burning 14,240 acres, half of which was national forest land.⁴³

A relatively small fire in the San Bernardino National Forest in late 1951 illustrated the fact that a fire did not have to be a monster blaze or a tragedy to stick in a firefighter's memory. Lynn Biddison was superintendent of the Chilao Hotshots when the crew was sent to the Meadow Fire early in October 1951. The fire was high in the San Gorgonio Wilderness, where brush and subalpine timber was interspersed with rock slides and barren slopes. Ranger Jack Horton thought the fire had petered out at

the 10,000 foot elevation, but strong Santa Ana winds whipped it alive again. The fire crews put out fires in isolated areas of fuel, went to the next burning area only to find the first area had flared up again. The cold was severe, and the wind was so strong that cooking fires could not be kept alive. The crews lived on cold sandwiches for more than a week. It was so cold that sleeping pits were dug around a central bonfire. Three or four men slept in each pit, huddled together for warmth. A watch was established to keep the bonfire going and put out sparks that landed on the blankets of the sleeping crewmen. It was the cold, not the flames that made this fire memorable. The fire took ten days to suppress.⁴⁴

So the second bad fire season in succession ended. The 1950s were shaping up as a fire decade. The human cost was high: three men died in accidents while fighting fire, and another died of a heart attack while hiking to the Pony Peak Fire. Suppression costs exceeded \$4 million for the second season in a row, and 250 million board feet of timber were burned. In addition, more than 24,000 acres of young, growing timber was destroyed. It was a hard blow, which caused Region 5 to look critically at its performance.

Regional Forester Clare Hendee attended boards of review and gave his personal attention to the problems identified by the boards. The reviews listed organization, training and execution of the suppression job as being the major areas needing improvement. Work on these problems was underway, and a new Region 5 handbook titled, *Principles of Organizing for Forest Fire Suppression*, was used as a guide to improve organization. Training programs were intensified, but the lack of adequate finances was still the underlying weakness in the program. Another major problem illustrated by the 1951 season was a breakdown in fire prevention, especially in industrial operations. Railroads and logging shows caused several of the most severe fires in 1951.⁴⁵

There were some bright spots in the 1951 season, however. The use of resources from other regions expanded in 1951, especially use of smoke-jumpers. All 28 jumpers at the Cave Junction Base were used in the August lightning fires. When the region called for more jumpers, Region 6 sent five more and Region 1 sent 60. In addition, Native American crews from the Southwest and overhead from Regions 1, 3 and 4 helped out. Cooperation from lumber companies, the military, county fire departments and the Division of Forestry indicated a trend toward a coordinated state-wide fire

control system that would eventually include all fire control agencies.⁴⁶

Despite these rays of hope, the outlook was grim. Questions about high suppression costs and fire damages were being asked in the service and out. The situation generated another meeting of western regions at San Francisco in January 1952 whose purpose was to review progress since the 1950 meeting and decide on new directions. The themes of the 1952 meeting were much the same as in 1950: finances, organization, equipment, slash disposal and fire behavior research. There was more urgency because in 1951 a billion board feet of national forest timber went up in smoke.

Some good work had been done since 1950. Fire programs in the western regions were progressing toward a common standard, the Region 5 fire organization handbook was adopted, and the concepts of inter-regional dispatching and inter-regional fire crews were tabled only for lack of funds. Rising timber sales receipts made it possible to collect more funds to protect cut-over areas. Progress in fire behavior research at the Rocky Mountain and California forest and range experiment stations promised to provide field guides within a few years. New leadership in Washington and San Francisco seemed to be rejuvenating the fire control program.⁴⁷

In Washington, D.C., Richard E. McArdle succeeded Lyle Watts as chief of the Forest Service. McArdle's background was in research and included some fire control research. He seemed attuned to the management era that the Forest Service was entering. In San Francisco, Frank Jefferson retired in 1952 and was replaced by "Red" Nelson from the Washington office Division of Fire Control. Nelson had been a forest supervisor in Washington (Region 6) and was well acquainted with western conditions. Fortunately, the winter of 1951-1952 gave all western regions a respite from fire in the following summer.⁴⁸

The 1952 and 1953 Fire Seasons: A Study in Contrasts

The 1952 fire season was preceded by a winter as notable as Paul Bunyan's Winter of the Blue Snow. Snow was so widespread over the West, so continuous and so deep that it frosted the hills around San Francisco Bay, closed highways for weeks and stranded a passenger train on Donner Pass for three days. Above 4,000 feet elevation in northern California, snow lay on the ground into June. The southern half of California reveled in its wettest winter in years. It was a winter to remember throughout the West.

The consequence of this phenomenon was a short summer and an easy fire season. Fire danger was well below average, and so was the number of man-caused fires. There were 1,205 lightning fires, a total exceeded only by the years 1939, 1949 and 1951. But not to worry, the total burned acreage in all of Region 5 was only 17,414 acres.⁴⁹ This total was the second lowest in the history of the region. There were only 13 fires over 300 acres compared to a five-year average of 40. Only the Cleveland and San Bernardino Forests reported more than 1,500 acres burned.

The Indian Potrero Fire in the Cleveland accounted for almost half of the region's burned acreage. It began on November 4th, when a marine tossed a smoke grenade that ignited grass and brush and eventually burned 6,197 acres. The only other fire of significance was the South Fork Fire in the San Bernardino Forest, which burned 4,760 acres. Otherwise the California national forests escaped the 1952 season with minor losses. The easy fire season gave regional fire chief Red Nelson and his staff time to review the region's disheartening financial situation.⁵⁰

The leadership of Region 5 knew that the severe fire losses of 1950 and 1951 could not continue to be sustained without repercussions from the public and from Congress. The Congressional hearing and review of the Conejos Fire indicated the need to improve performance. On January 10, 1952, Regional Forester Hendee asked for permission to use emergency firefighting funds (FFF appropriation) to increase the seasonal fire organization. Earl Loveridge responded from the Washington office with a rambling memorandum outlining the fire problems of other regions and chiding Region 5 for not doing a better job of fire prevention. He acknowledged that Region 5 needed more fire control funding, and then denied the request. Hendee responded to these comments by pointing out that man-caused fires in the region were only three percent higher than the average for the years 1936-1950 despite massive increases in population and logging in California in the interim. A table in the response showed that 619 fire control personnel were needed just to reach 85 percent of planned needs. In other words, the region's fire control program was manned at less than 50 percent of planned needs.⁵¹

Sadly enough, legislatures at all levels of government respond much quicker to emergencies than they do to plans to prevent emergencies. Flood control dams are built after a flood, earthquake-proof buildings are required after an earthquake, and expanded fire control preparedness

occurs after a fire disaster. Politicians must respond to public attitudes, and the public does not like to see large numbers of firemen and fire trucks waiting for a fire that may not occur. So the Washington office did what they could with the funds available, and tried to improve effectiveness and efficiency in the face of seemingly insuperable obstacles.

While the Division of Fire Control in San Francisco sparred with its counterpart in Washington, Regional Forester Hendee took steps to attack the problem of rapidly accumulating slash from timber sale operations. In July 1952 he appointed two committees to study the problem in the field and make recommendations for improved slash disposal practices. One committee under Supervisor Russell Bower of the Klamath studied Douglas-fir slash disposal problems in the northwest. The other committee under Supervisor William A. Peterson of the Plumas, was responsible for slash disposal studies in the rest of the region.⁵²

The problems created by cutting forest over large areas were many and complex. Cutting trees let in sunlight, creating a more severe microclimate. Limbs and branches from felled timber, and timber and brush broken during logging created much higher fire hazard than in the unlogged stand. Chunks and pieces of logs left after logging took decades to rot and generated extremely hot fires when ignited. In addition, logs and stumps in cut-over areas made fireline construction much more difficult. These and other problems would not be solved in one year or two, in fact, some of them persisted for decades. Hazardous fuel conditions in the national forests would not improve until markets for waste materials developed and until most of the defective old growth timber was removed, or so it seemed then.

These internal attempts to improve fire control conditions were supported by Hendee and given impetus by Red Nelson and his staff. Improvement had to begin at the field level, however, and it was here that old hands brought up in the Show tradition were vital to success. Men such as Russell Bower, Norman Farrell, William Peterson, Paul Stathem, Guerdon Ellis, and William Fischer served as forest supervisors during this trying period when Region 5 was moving rapidly out of custodianship toward multiple use management.

When their careers were over, a new breed of forest supervisor, with a new orientation, replaced them. In many forests, fire control lost strong personal involvement and emphasis when this generation of

supervisors retired.

Precipitation during the winter of 1952-1953 was above normal in northern California. The reverse situation was true in southern California. Dangerous fire weather was recorded in every month from May through December of 1953. Santa Ana winds blew on three occasions in October and twice in December, creating extreme fire danger. Below average fire danger in northern California was punctuated by five general thunderstorms in August and September. Storms in mid-August set 381 fires; another storm in mid-September set 304 fires, and the regional total of lightning fires reached 1,244, close to the all-time high. This was the third year in succession that more than 1,200 lightning fires were recorded in the region. The 1953 fire season boiled down to many small lightning fires in the north and six large fires in the south.⁵³

The first of the year's large fires was the Big Dalton Fire in the Los Padres Forest, which was started by a power line at about 1:00 p.m. on July 10th, in the same area that the same power line started a fire on July 1, 1923. The first fire burned 9,500 acres before it was controlled, but the Big Dalton Fire was aptly named: it burned 73,500 acres of which 30,620 acres were under forest protection. The fire started just inside the forest boundary, a few miles north of Pine Canyon Station, and near the Cuyama River. It roared off to the south and was stopped just north of the Sisquoc River, east of Santa Maria. The Santa Barbara County Fire Department handled the majority of the fire. Much of the fire inside the forest was stopped along roads. Twenty-nine bulldozers built most of the fireline, and the fire was under control after six days' work.⁵⁴

The Cleveland Forest went back to the scene of the Hauser Creek tragedy one more time in 1953. Bronco Flats, just north of Hauser Creek, burned during a Santa Ana wind on October 11th. More than 9,000 acres burned before the winds died and control was established. While the Bronco Flat Fire was sweeping over chamise near Barrett Reservoir, the Mowry Number 2 Fire started on October 13th near the community of Palomar. This fire burned 9,560 acres before it was controlled.⁵⁵ The 1953 fire season rigorously tested a program the Angeles began in the winter of 1949-1950. This was the "pre-attack planning" or pre-attack project, which was started along the Angeles Front facing the San Fernando Valley and Los Angeles.

Pre-attack planning was the brainchild of Angeles Fire Control Staff

Officer Harry Grace. Its purpose was to save time during that critical first few hours of a major fire. Every ridge and canyon was walked and notes made about everything pertinent to fire suppression. The character of fireline needed, fire camp locations, water sources, tractor loading sites, helispots, potential bulldozer line and other information was recorded, and marked in the field with steel signs and posts. The area was broken into seven "blocks," and maps were made for each block, with all data located on the map by standard symbols. The system was very helpful in suppressing the Monrovia Peak Fire and was authorized for optional use throughout the region.⁵⁶

The Angeles needed pre-attack plans because it had a year to remember in 1953. Four major fires burned a total of 76,425 acres, and three of the four were larger than any fire in the forest since 1924. The first of these conflagrations was the Sulphur Fire, which began on July 2, 1953, at the Sulphur Springs Campground near the crest of the San Gabriel Range, 15 miles north of Arcadia. Vetter Mountain Lookout spotted the smoke at 11:34 a.m., and eighteen minutes later a patrolman attacked the fire with hand tools. Reinforcements of 35 men arrived less than ten minutes later, but the fire went over the hill, literally. It burned out almost all of the Little Rock Creek drainage, blackening the eastern slopes of the San Gabriel Range from Mt. Pacifico north to the desert.⁵⁷

Two months later, on September 9th, a thunderstorm struck the forest. Four lightning fires were spotted in the East Fork of the San Gabriel River. A helicopter was sent to one of the fires and crashed, removing the fastest means of attack on the other fires. Fire Control Assistant Ned Taylor drove to a point overlooking the area and spotted a fire burning on the north side of the Fish Fork of the river, north of Mt. San Antonio. The Fish Fork Fire started in brush and grass that had grown up after a previous fire 17 years earlier, but burned into areas with spotty cover well above 4,000 feet elevation. It should have been easy to control, but a warm air mass, driven by north and east winds, spread the fire into areas that had not burned for hundreds of years. It took the first crew six hours to reach the fire, by which time it was completely beyond their attempts at control. It was in such rugged and inaccessible terrain that a Washington office observer thought the fire suppression job was staggering.

Strategy was dictated by the terrain, inaccessibility and high watershed values. Small fire camps of 30 to 50 men were set up at many points

along the fireline and maintained by air cargo drops and helicopters. More than 36,000 pounds of cargo were dropped to eleven fire camps during the fire. Helicopters delivered hot meals in vacuum-packed containers to some camps, and disposable paper sleeping bags were used effectively. The camps were moved as needed to meet changes in the fire front. Firefighters built line directly against the fire edge rather than backfiring valuable watershed cover. Nineteen Southwest Native American crews fought this fire along with Hotshot crews and many other units. Five members of one Zuni crew received burns when the fire flared on one sector, but none was seriously injured. The fire was well managed by Fire Boss Harry Grace and crew but still burned 21,450 acres before it was controlled.⁵⁸

The Fish Fork Fire allowed Mt. Baldy District Ranger Anselmo Lewis to demonstrate his celebrated expertise as a service (supply) chief and the panache with which he carried it off. Lewis was noted for hiring members of a religious cult, Fountain of the World, to man the fire camp kitchen. Cult members believed that their leader, Krishna Venta, was Christ reborn. The cultists wore long, flowing robes and went barefoot as testimony to their belief. One night during the Fish Fork Fire, a forest officer overheard a conversation between Lewis and a cult member. Lewis was munching Muscat grapes and repeating, "He can't be," every time the cult member made a certain statement. Finally the cultist stopped his argument and challenged Lewis saying, "Mr. Lewis, every time I say Krishna is Christ, you say, 'He can't be.' Why?" Lewis crunched another Muscat grape, looked up and blandly said, "Because I am."⁵⁹ That was all there was to that conversation. Lewis continually mystified a generation of budding fire overhead by anticipating their needs with uncanny precision, often having men and equipment on the desired spot before they were requested. It was said that he always had several fire crews, tank trucks, fire camps and bulldozers stashed away just in case of need.

The Angeles fire people gradually relaxed after the Fish Fork Fire and looked forward to a winter's rest. But December brought Santa Ana winds and the Barrett Fire, which began December 12th in Barrett Canyon near Mt. Baldy village. This fire burned downhill under the influence of a cold, dry wind, eventually reaching lower Cucamonga Canyon in the San Bernardino Forest. The fire was controlled on December 18th but broke loose again under Santa Ana conditions on December 27th and

was not controlled until January 2, 1954, after burning 8,250 acres. The same Santa Ana winds that sent the Barrett Fire over the lines made the Monrovia Peak Fire a memorable exercise for all concerned.⁶⁰

A smoker dropped a cigarette along the West Fork Truck Trail at about 3:30 p.m. on the 27th during extreme fire weather conditions. Relative humidities ranged as low as 10 percent. and winds reached 68 miles per hour at Mt. Wilson. At 6:45 the fire was raging down the steep chaparral covered slopes toward the cities on the plains—Monrovia, Arcadia and Sierra Madre. City and county fire departments massed sixty-one large fire engines to stave off the fire and were successful, even though the fire reached the lawns of some homes. Regardless of their efforts, thirty-six homes were destroyed in Big and Little Santa Anita Canyons. After two days, the winds eased, and hard work stopped the fire on the east flank and along the West Fork of the San Gabriel River to the north.

Then on the 31st, the Santa Ana winds whipped up again. The west line between Mt. Wilson and the town of Sierra Madre weakened, and then gave way. Frantic line building and backfiring mended the breaks, and the firefighters caught their breaths. About 1,100 firefighters were involved, including 443 Southwest Native Americans from eight different tribes. There were no serious injuries despite the rough terrain and violent fire conditions, but cases of poison oak rash and severe colds were common. Temperatures in fire camps fell below freezing at night. Paradoxically, it was necessary to keep the firefighters warm, and this was done with “salamander” orchard heaters.

The Monrovia Peak Fire generated many stories. Lynn Biddison remembered that six inches of snow fell on January 6, 1954, and 15,000 feet of hoselay froze. That morning Biddison visited the chow line and found the Krishna Venta cultists serving breakfast, in robes and bare feet. His hands shaking and blue with cold, Brother Paul filled Biddison’s tray.

“Aren’t you cold, standing there in the snow with bare feet?”

asked Biddison.

“No.” replied Brother Paul.

“Why not?” asked Biddison.

“Because the Master told me it is not cold,” replied Brother Paul.

When the cult members were released from the fire, they walked with bare feet to the nearest road, seven miles through the snow.⁶¹

District Ranger Carl Wilson had good reason to remember the last

days of the Monrovia Peak Fire. The Rose Bowl Game was to be played on January 1st just a few miles away and was to be televised nationwide. Wilson went home during a lull in the action to take a shower, change clothes and say “hello” to his parents and family. He had time for the “hello,” but the fire was loose again before he had time for anything else. This time, the fire was heading for Mt. Wilson, with its bristling array of television and electronic towers. Forest Supervisor Bill Mendenhall told Wilson to “get that fire out—or else.”⁶² The Rose Bowl could not be televised nationally if the transmission facilities were destroyed by the fire. Wilson and his crew beat back the fire as the New Year dawned. The smoke plume provided a dramatic backdrop to the football telecast. The scores? Monrovia Peak Fire: 14,090 acres. The Rose Bowl: Michigan State 28, UCLA 20.⁶³

The fire season ended as a spectacular setting for the annual football spectacular in Pasadena. The 1953 season was a close second to 1924 as the most severe of all time in southern California. The great fires in the south were not soon forgotten, but they were overshadowed by the events on one fire in the Mendocino Forest, which burned only 1,400 acres.

Tragedy on the Fireline

The 1953 fire season is remembered first because of the terrible tragedy on Rattlesnake Creek, where fifteen men lost their lives. The long list of the dead and the forty-one widows and children they left behind was heartbreaking. Even sadder was the random nature of the events that led to the disaster. It was a tragedy that should not have occurred. Incendiary fires were nothing new in the Mendocino Forest. They had been set for all kinds of reasons. The Rattlesnake Fire was started by a young man who wanted a job. He was unemployed and deeply in debt. His wife and three children had left him because he could not support them. Obviously he was not thinking clearly when he started the fire, because a temporary firefighting job would do little to solve his problems. Nonetheless, he started two fires on July 9, 1953. The first fire was on private land outside the Mendocino forest boundary. The second was started with a kitchen match at about 2:20 p.m. along the Alder Springs Road inside the forest. Apparently he thought there would be little damage from the fire other than to some chamise brush.⁶⁴

The Division of Forestry quickly suppressed the first fire. However,

the second fire gathered headway in chamise and other chaparral, burning into an area cut by many short steep canyons and threatening to burn over the slopes of Rattlesnake Creek and into the huge Grindstone Canyon. Fire Prevention Aid Archie Miller spotted the fire while driving the Alder Springs road and reported it through Elk Creek Butte Lookout at 2:40 p.m. At 2:46 p.m. four tank trucks with 18 men and Stonyford District Fire Control Assistant Charles Lafferty headed for the fire. One tank truck was from the New Tribal Life Mission establishment at Fouts Springs. At 3:10 p.m., 45 loggers and two bulldozers were dispatched and a backup crew of missionaries from New Tribal Life Mission was ordered to the fire. The Division of Forestry also dispatched two crews.

The wind was from the southeast and pushed the fire toward the west all afternoon and into the evening. The firefighters made good progress, keeping the fire south and west of the Alder Springs road. At about 9:00 p.m. turbulent winds cast a burning brand north of the road, near what was known locally as Powderhouse Turn. The first plan was to build a dozer line above the spot fire and then build flanking lines on both sides and burn the enclosed area, but this plan was frustrated when the bulldozer owner refused to cooperate because the terrain was too steep for his equipment. At about 9:00 p.m., while this plan was being considered, the wind died, and the spot fire became inactive. It then seemed feasible to put a line directly around the spot fire, and a crew of twenty-five missionaries and two forest officers was sent in to do the job. The crew did not have a radio with which to communicate with the fire boss, but this was not unusual. Small portable radios were at a premium. The suppression action was not unusual and was successful, for the crew soon had a line around the spot fire.

Then a set of separate events took place that, when they converged, resulted in tragedy. At about 10:00 p.m., the wind began blowing again, but its direction had shifted from southeasterly to westerly. Within minutes there were several spot fires across the road and west of the crew's location. Quick work by tank truck crews smothered the spot fires—except one, which, in the dark and smoke, was out of sight of the road. The forest officers with the missionary crew noticed the change in fire activity, discussed what to do in case of a blow-up and then moved the crew to a small draw to eat lunch. They could not see the main fire edge

from this draw.

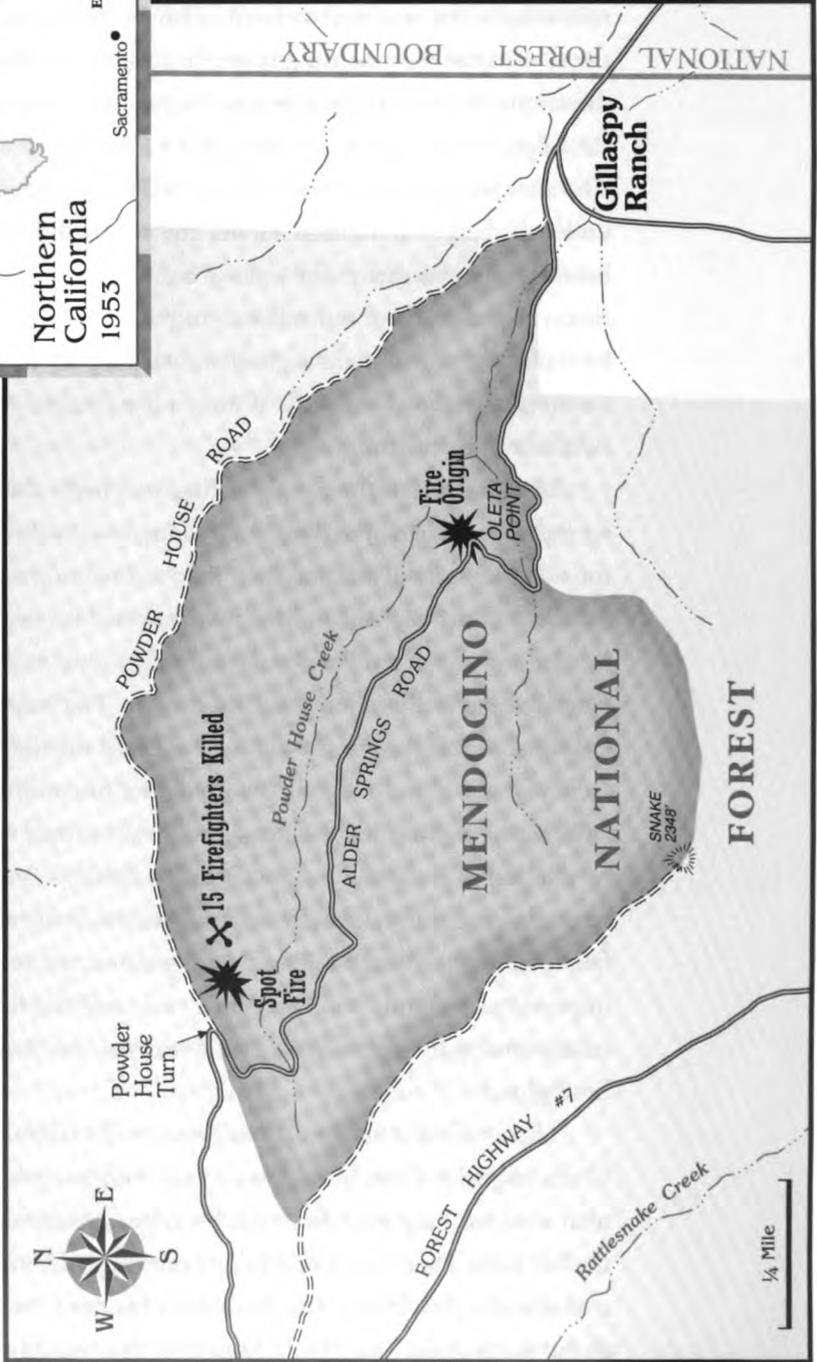
At about 10:15 p.m. the unseen spot fire fed by a rush of westerly wind, exploded, driving fire to the north and then to the east. The missionary crew was directly in the path of the flames. Charles Lafferty ran toward the crew warning them "to come out of there." As he yelled directions, the fire changed fronts. Nine of the crew ran northeast toward the ridge, the remainder ran due east on a long angle toward the ridgeline. The crew was in the midst of a dense brushfield, where travel was slow under the best of conditions. It was nighttime, and fire and smoke were bearing down on them. The intense heat and fire overtook fifteen of them, including the forest officers, and they died. Lafferty barely escaped by frantically crawling through the brush back to the road. The nine who ran to the northeast survived. Within a few minutes the entire canyon was swept clean by the fire.

The tragedy left the people of Region 5 badly shaken. The fire was set by an incendiary, the dead were young men with families, and the missionaries were dedicating their lives to the unfortunate. It all seemed so senseless. Chief Richard E. McArdle expressed his own personal anguish in a letter to Regional Forester Hendee and appointed a distinguished panel to review the action taken on the fire. The board found that experienced, competent firemen had directed the fire, that strategy and tactics were within the limits expected for a fire of this type in this area, and that firefighters had taken aggressive but proper action. Three recommendations were made: research into fire behavior and application of that research was urgently needed; safety precautions must be used without fail, including posting a lookout, laying out escape routes in advance and improving communications between crews and the fire boss; and greater tenure among firemen was needed in order to develop skilled professional fire-fighters.

There were fateful similarities between the Rattlesnake and Hauser Creek tragedies. Both sites were covered with heavy brush. Both crews of men were working away from the fire edge, without communication to the fire boss. There was a drastic and unexpected wind shift. By bizarre coincidence, Jack Ewing, the fire boss at Hauser Creek, was also fire boss of the Rattlesnake Fire. His feelings after this second awful affair can only

Rattlesnake Fire

Mendocino National Forest
July 9 - 11, 1953



Map 8. Rattlesnake Fire

be imagined.

Chief McArdle wrote in his charge to the review board, "We all realize that fighting a forest fire is dangerous. It can't be made a soft job. Despite that fact, or because of it, we must assure every precaution to guard the safety of those who take on this tough assignment. Human life must never knowingly or carelessly be subordinated to other values."⁶⁵ Memorial services were held in Willows on July 13th for the fifteen who died.

The final act in the tragedy began when the arsonist visited the fire camp. There he heard Forest Service Investigator Henry C. Erhart and Glenn County Sheriff Lyle G. Sale interviewing witnesses. He wandered over and offered the information that it was his green Buick that had been seen in the vicinity before the fire started. After investigators questioned him at length, he admitted setting both fires. He was charged with two counts of murder and lodged in the Glenn County jail on July 12th. The arsonist was convicted of two counts of arson and sentenced to a long term in prison.⁶⁶



Weather was the critical effect on forest fires but often could not be seen. This panorama shows an inversion layer of smoke which sometimes occurred over the Trinity-Klamath country.

The pace of fire protection research slowed to a walk during World War II. At that time, only nine scientists were working in fire protection research nationwide. At a fire control conference held at Washington, D.C. in 1948, Chief Lyle Watts suggested that it was time to form a separate Division of Fire Research in his office. His Assistant Chief for Research, E. I. Kotok, then listed three major areas needing fire control investigation: fire behavior, application of fire behavior knowledge and analysis of past fires to improve the fire control system. After some discussion, the conference agreed with Chief Watts, and a Division of Fire Research was established late in 1948, with Arthur A. Brown as its first director.¹

Brown made the rounds of the regions in 1949, seeking advice and identifying problems. His agenda was changed before he completed his mission by two events: the Mann Gulch Fire in Montana and the announcement that the Soviet Union had tested an atom bomb. The loss of thirteen highly trained smokejumpers in the Mann Gulch Fire resulted in a few days of national shock and horror, in sharp contrast to the low-key reaction to the tragedy at Hauser Creek. The nation was at war in 1943; the loss of ten marines and one soldier was not news when compared to thousands of battlefield casualties. On the other hand, the Mann Gulch tragedy occurred in the aftermath of war, when life had once more become valuable. The fire was featured in *Life* magazine, and the fact that the dead were smokejumpers added a twist to the sensation. This fire tragedy and a steady sprinkling of fire-related deaths each year after 1943 placed the highest priority on fire behavior research. But research results do not appear overnight, and there would be many other fireline deaths before better information was available and field people were trained in its use.²

The other event, USSR's atom bomb test, set off a nervous reaction throughout American society. The Office of Civil Defense published booklets about surviving an atom bomb attack, how to avoid radiation poisoning and how to build a fallout shelter. Many people actually built shelters in their back yards, and many cities designated communal bomb shelters in subways and other underground locations. Of special concern to the Forest Service, were the conflagrations set off by the atom bombs dropped on Japan and by massive air raids by the allies on Europe and Japan. The term for this phenomena was "mass fire," and it dominated

forest fire research for several years. Not only was research into mass fire a national priority, it was also an important source of funding for Forest Service fire control research needs, many of which coincided with mass fire investigations.

The 1950 Fire Conference at Ogden, Utah, emphasized the need for more fire behavior knowledge, both in the laboratory and the field. Some steps were taken with publication of Jack Barrows' booklet, *Fire Behavior in the Northern Rocky Mountains*, but fire behavior positions in the large fire organizations were not formalized until 1958. These efforts depended on existing information and were essentially stopgaps. The urgency was there but the funding was not, until 1952. In January of that year, at the Western Regions Fire meeting, Arthur A. Brown announced the possibility of cooperative funding with the Defense Department for study of mass fire. This was the beginning of several years of joint investigations into many aspects of fire and its behavior under a wide range of conditions.³

The promise of cooperative funding for fire research was to be the foundation of new research directions, but the costly 1953 fire season provided the impetus for immediate action. More than 130,000 acres burned in three southern California fires, and fifteen lives were lost on the Rattlesnake Fire in the Mendocino Forest. In addition, heavy rains in January 1954 on slopes denuded by the Monrovia Peak Fire caused severe damage to the cities of Sierra Madre, Arcadia and Monrovia. Many ideas dispersed among fire and other agencies were brought together during the winter of 1953-1954. The response to these events was a multi-agency planning session in January 1954 that produced Operation Firestop.⁴

Keith Arnold, of the School of Forestry at Berkeley, was a key man at the inception of Firestop. After the 1953 fire season, Arnold had separate meetings with Region 5 Fire Chief M. M. "Red" Nelson, and Deputy State Forester Jim Mace, among others. Arnold proposed an all-out application of modern technology to fire suppression. Arnold was loaned by the School of Forestry to the experiment station for the project. Not long afterwards, Arnold succeeded Charles Buck in charge of fire control research at the station and later became station director.⁵

Firestop was a cooperative effort among fire agencies, universities, Defense Department units, other federal and state agencies and several aircraft and chemical companies. The plan included five groups of studies that included the following topics: fire retardants, backfiring techniques,

fire behavior, local winds, and application techniques that dealt with dropping water or chemicals from the air. The operation was supposed to be a one-year study, but the energy of the program sparked other related fire research projects.

The operation was most widely known for its use of aerial applications to forest and brush fires. The biggest breakthrough came about by accident. Before Operation Firestop was organized, Douglas Aircraft Company was flight testing a prototype of its new passenger plane, the DC-7. Part of the test involved dumping 1,300 gallons of water ballast at a speed of 190 miles per hour. The plane's crew was amazed to find that the discharge left a strip of water one mile long and 200 feet wide on the airstrip. The water remained for ten minutes despite an air temperature of 106 degrees and a relative humidity of 4 percent. The company notified Los Angeles County Fire Department of the results, and a further test was arranged in cooperation with the Angeles Forest, Arcadia Equipment Development Center and the Division of Forestry. The test was carried out on December 2, 1953, at Rosamund Dry Lake near Lancaster. The test was not as successful as the first drop, but it resulted in further tests in Operation Firestop.⁶

The Operation Firestop drop tests used a converted U.S. Navy TBM torpedo bomber with a capacity of 600 to 800 gallons. The aircraft made lower passes than had the DC-7 and was able to drench an area 50 feet wide by 270 feet long. These tests proved the feasibility of dropping unconfined liquids from the air but did not investigate the organization of air tanker fleets or the availability of aircraft for this purpose.

The first experimental air drop was on the Jameson Fire in the Cleveland National Forest on August 26, 1954. The fire was moving downslope toward Lake Elsinore. Crews were held back while the TBM dropped water. The drop was ineffective and the crews lost ground to the fire while they waited. Other aerial drops were made from helicopters on spot fires and along firelines.⁷

A Sikorsky S-55 was modified to carry 100 gallons of water and became the prototype of helicopters specially adapted for firefighting. Another experiment proved that it was feasible to lay fire hose from a helicopter. Up to 2,000 feet of 1-1/2" hose was laid over rough terrain to demonstrate this potentially valuable technique.

Operation Firestop was not the typical fire control research project. It was fast-moving, and developed immense energy and excitement among the involved agencies. It emphasized immediate results. Its greatest success was the melding of fire retardant research with aerial applications and in demonstrating the feasibility of new fire suppression techniques. The details of field applications of findings were left to later studies and administrative tests. Operation Firestop began a new era of cooperation among agencies. It vividly demonstrated the importance of equipment development to fire control and set the stage for new centers devoted to fire control equipment development and fire research. Operation Firestop was the genesis of the new age of fire control. Meanwhile, other traditional fire control research was underway.

The new directions in research were responsible for much of the advanced suppression technology of later years, but most of these studies were time consuming. Time was needed to investigate, test, write and distribute results and to train the rank and file in the use of the new information. The demands from field people for better fire behavior information, and the opportunities opened up by study of mass fire, resulted in the 1955 reorganization of the Fire Research Division of the California Forest and Range Experiment Station.

Under Division Director Keith Arnold, six major programs were identified. The first program included all cooperative work with the Department of Defense. These projects dealt with the potential effects of atomic explosions in wildlands and with mass fire experiments. Wallace Fons headed a second program, which investigated fire physics, the study of combustion, ignition, fire spread and the effects of heat. The Defense Department also cooperated in these experiments. Clive Countryman directed the third program, which included most of the important fire behavior research. This was the study of fire environment and continued previous work that had been titled "fire weather." Included were investigations into fuel moisture, volume and arrangement of fuels, cover types and wind effects on fire. Another program was listed as fire control and was in the mode of the old Show and Kotok studies; that is, analysis of past fire actions and fire damages. The work in this field was mainly in fire danger rating and tests of chemical retardants. The fifth program concerned use of fire as a management tool. This was an inactive program aimed at what later came to be known as

prescribed fire. Operation Firestop was the sixth and most important program through 1955.

Thus, after many years, the emphasis of fire control research in California had swung around to investigation into the basics of fire and how it burned. The information would be needed to make adjustments in fire control policy, methods and organization to meet the growing challenge of controlling forest fires in California.⁸

Map 9.
National Forests
in California 1955



Aerial Attack

When Frank Jefferson hired Cal Ferris to head the region's aviation program in 1946, he started an activity that played an increasing role in regional fire control thereafter. Starting with two Stinson aircraft, Ferris built the Region 5 fleet to four airplanes in 1952 and to eight in 1955, including three larger aircraft: a Lockheed Lodestar, a Noorduyn Norseman and a Douglas DC-3. The air operations staff in 1946 consisted of Ferris and a few part-time pilots. By 1955 there were six pilots, a dispatcher and three mechanics. In 1954 the aviation unit flew 288 days, 304,000 miles and logged 1,795 hours. About 513,000 pounds of freight was hauled and 136,300 pounds of cargo dropped on fires. The unit carried 1,824 passengers in 1954. These statistics do not mean much in themselves, but as a measure of change from zero in 1946 they are impressive.⁹

Although the accomplishments of the Region 5 aviation unit were significant, it was the spread of aircraft use throughout the region that made aircraft an integral part of the fire control system. In 1954 every forest in the region had observation aircraft under contract, and eleven forests had helicopters under contract. One of the most important jobs of the aviation unit was to check out every contract pilot and plane before they were allowed to carry Forest Service personnel or fly Forest Service missions. This was especially important for helicopters, which had demonstrated a distressing tendency to crash. The unit was by no means restricted to fire control duties. The pilots flew many other Forest Service missions such as; reseeding burns, spraying tree nurseries, taking aerial photographs, flying rescue missions, assisting fire research and flying administrators from point to point.

Despite great progress made in nine years, the aviation unit in 1954 was still flying hand-me-down aircraft and living a precarious existence. The unit was seen by some in the Washington office as an unnecessary expense, if not a luxury. Region 5 aviation paid for itself, but much depended on the character of the fire season. If it was an easy season, the air unit had to scramble to make ends meet. In the easy seasons, the unit contracted with other regions and sold their services wherever they could. Much of the progress in aviation was due to the energy and enthusiasm of Cal Ferris and the widespread support for aviation throughout the region. Old-time aviation buffs such as Andy Brenneis must have felt their faith was finally redeemed.

There is no doubt that the helicopter brought an entirely new dimension to aerial fire control. The major benefit of the craft was the ability to get firefighters to a fire while it was small enough to handle. Once a fire escaped initial attack, the helicopter could be used to reinforce the crews on the line, to transport supplies and scout the fire. The helicopter began to assume a whole new role when Operation Firestop demonstrated its capacity for direct aerial attack. The operation modified helicopters for dropping water or retardant directly on fires. The new technique was applied on the Jameson Fire in August 1954, where helicopter drops of water knocked down spot fires ahead of the main fire.¹⁰

This work was followed up in 1955 at Arcadia Equipment Development Center with a special project that aimed to fully integrate helicopters into the fire suppression organization and to test various applications of helicopter accessories. Three accessories were tested: a "helitanker"; that is, a self-contained pumper unit that could be flown to isolated locations, a hoselay tray and a method to drop unconfined water or retardants. The program was under the leadership of Carl Wilson, who had transferred from district ranger in the Angeles Forest to the experiment station. Early in 1956 this program was designated the Helitack project. One of the most important aspects of the project was to prepare operating instructions, standards for helicopter use and training guides for use of helicopter attack crews. It was very successful and evolved the initial attack methods that made the helicopter an essential part of the fire suppression organizations throughout the United States.¹¹

While the Helitack project was under development, the original method of aerial attack, the smokejumper program, was also changing. Region 5 had supported several jumpers at the Cave Junction base in Oregon for several years. From 1949 through 1953, Region 5 fire seasons averaged 1,200 lightning fires per year, as compared with a longtime average of about 990 lightning fires per year. The result was heavy use of smokejumpers from Cave Junction and even other bases in Montana and Washington state. From 1948 through 1955, the Cave Junction Smokejumper Unit made two-thirds of their jumps (179) on Region 5 fires. It was clear that Region 5 needed its own smokejumper base. After much discussion about how finances should be allocated between regions, a smokejumper base at Redding Airport was authorized in February 1957. The new base included twenty jumpers, three

squad leaders and a foreman. Another arm of aerial attack was in place in Region 5.¹²

The year before the smokejumper base was established, the final leg of the aerial attack triangle came into regular use. Aerial bombing of forest fires was an old vision that became a reality in 1955. The “fireoplane” described in 1912 by Ranger Farley was just a dream, but in 1917 a Mr. Jotter visited the Sierra Forest with more substantial ideas. Jotter planned to attend the University of California in the winter of 1917-1918 and “expected to take up aeronautics and chemistry with the idea of perfecting a light fire-extinguishing chemical, and a practical aeroplane for use next season.”¹³ Jotter enlisted in the Army before he could attend the University and was not heard from again. After Jotter, the idea lapsed until the Army Air Service and the Aerial Attack Project tried their hands at bombing fires with limited success, as we have seen.

Then came the water ballast drop by the prototype DC-7 in December 1953, followed by Operation Firestop. In 1954 the operation’s tests of unconfined water drops were highlighted by a public show in September, when Paul Mantz’s converted U.S. Navy TBM torpedo bomber dropped water on simulated fires. The public was thrilled, and the Forest Service observers excited by this event. But who was going to organize an aerial bombing program and make it work? Joe Ely, that’s who!

Ely was the fire control officer of the Mendocino National Forest at Willows. A chance remark about water drops in a meeting at Redding in early 1955 made him contact Floyd Nolta of Willows Flying Service. Nolta did all kinds of flying, including observation flights and cargo dropping for the Forest Service, but was primarily a crop duster. Ely asked Nolta if he could modify his plane to drop water on a fire. Nolta told Ely to return in a week. The Stearman biplane had a tank in the fuselage to hold crop dusting materials. Nolta simply cut a hole in the bottom of the tank and attached a gate with hinges and a rope pull leading to the cockpit.¹⁴

In July 1955, Al Edwards, Ely’s assistant, watched Nolta’s brother Vance take off with a load of water. Floyd fired some grass along the airstrip; Vance made a low pass, opened the gate to the tank, and the water doused the fire. Then on August 13, 1955, a lost hunter lit a signal fire on Hull Mountain, north of Clear Lake. The fire escaped and had burned 500 acres when Ely sent Vance Nolta to the attack in the modified Stearman. Nolta dropped water several times, cooling off the fire crews

and perhaps slowing the fire. It was the beginning of a new era in forest fire control. The modified Stearman became known as an “air tanker.” It had proved itself, but there were no funds to pay for air tankers. Ely went to the regional office during the winter of 1955-1956 and met with “Red” Nelson and Cal Ferris. He secured a commitment for \$4,000 to pay the air tankers to be available during fire season (stand-by time). When they were flying missions on a fire their flying time was paid from fire emergency funds (FFF appropriation.) With this support, six additional N3N and Stearman biplanes were converted to air tankers, and the Willows Air Tanker Squadron came into being.

This group of fliers was a reincarnation of the old barnstorming days of aviation. They flew open cockpit biplanes, wore leather helmets and were used to flying low and making acrobatic escapes from power lines and trees. The squadron attacked fires with all the élan of World War I fighter pilots, flying into narrow canyons, pulling out vertically from drops and occasionally bringing back tree limbs in their undercarriage. One story about L. H. McCurley was characteristic of their tongue-in-cheek approach to their sudden fame. McCurley’s N3N was on the ground at Quincy Airport being viewed curiously by a small crowd when McCurley approached. “How do you fly an airplane without instruments?” asked one curious bystander. The face of the cockpit was empty of the usual array of gauges and dials except for an oil pressure gauge and a fuel meter. McCurley replied with a deadpan expression, “I’ve got an instrument. You see that nut on the cockpit floor? It is on the end of a string. When the nut hits me in the nose, I know I’m flying upside down.”¹⁵

Willows Air Tanker
at Quincy.
September 1957



The seven air tankers flew fire suppression missions throughout California in 1956. In 1957 the squadron was increased to twelve aircraft and even more missions were flown. During the 1956 season, the ground crew added a fire retardant, sodium calcium borate, to the water and the air tankers became even more effective. A newsman re-christened them "borate bombers," but that name faded when borate was abandoned for more effective retardants. The success of this group of crop dusters was soon copied by other pilots, who began converting larger aircraft with bigger payloads into air tankers. Sophisticated mixing and loading facilities followed, and modern air tanker operations evolved. The prototype DC-7, which started the whole idea with a water ballast drop, became an air tanker thirty years later. The Willows Air Tanker Squadron went back to crop dusting as the larger air tankers appeared, but they had written a lasting chapter in the history of fire control.¹⁶

Toward a Common Fire Protection Program

The expansion of population, industry and urban development into California wildlands after World War II forced closer cooperation among all fire control agencies. There had been a growing amount of cooperation between the Forest Service and the Division of Forestry because these two agencies were responsible for fire protection of most of the land in the state. When DeWitt Nelson left his job as forest supervisor of the San Bernardino National Forest to become State Forester in 1945, he immediately took steps to strengthen cooperative relationships.¹⁷

Nelson's approach was a refreshing contrast to the hands-off style of Merritt Pratt, whose tenure of more than twenty years was not noted for dynamic leadership. During Nelson's first few years in office, he visited field units throughout California, getting to know the men who fought the fires and dealing with the local citizens. He injected enthusiasm and belief in the Division's goals and fostered an *esprit de corps* among the people of the Division not unlike that of the early Region 5. World War II required the Division to expand its operations, and improved funding under Governor Earl Warren was one result of broader responsibilities and more forceful leadership. Within a few years after the war, the California Division of Forestry had developed its traditions, its skills and its organization into an outstanding fire control agency.

Meanwhile, the Los Angeles County Fire Department had continued its growth into a strong and professional fire control organization with responsibilities for protection of structures and wildland. County fire departments in Santa Barbara, Ventura and Kern Counties also moved forward. Rapid growth of California urban areas resulted in many new fire departments as entirely new cities were created in less than a decade. Heavily populated unincorporated areas also formed fire departments and built both paid and volunteer fire stations. Unfortunately, there was little standardization of fire equipment, radio communication, policy, organization, or firefighting tactics among this conglomerate of federal, state, county, city and local fire control agencies. A major reason for this was that the mission of most local fire departments was to protect improvements while the wildland fire control agencies were concerned with protecting resources.¹⁸

The two missions began to overlap as more building took place in wildlands. Some city and county fire departments had wildlands within their protection boundaries. At the same time, construction of homes and other buildings within national forest protection boundaries created a perplexing problem for forest administrators. The Forest Service fire control mission was to protect national forest resources. Forest Service fire crews were not trained to fight structural fires, which require a different set of skills and equipment than forest firefighting. Yet most rangers often sent tank trucks to house fires within their districts because not to do so would destroy local public relations. As the missions of the fire control agencies began to overlap, there was greater pressure for joint operations and standardized fire control tactics and methods.

The pressures became acute during World War II due to shortages in manpower, equipment and facilities. The California Disaster Act, as amended in 1945, provided for division of the state into mutual aid regions. This was accomplished with the help of an Advisory Committee on Fire Services representing fire control agencies at all levels of government. The state was divided into sixteen mutual aid regions. Within each region, the fire control agencies were required to respond to help other agencies in time of need, without charge. During extreme emergencies, the governor could require mutual aid between regions. The mutual aid plan was the core of more sophisticated cooperative fire control programs of the future. Region 5 had membership on the advisory committee, but

federal law permitted extension of mutual aid only on fires that were a threat to national forest land.¹⁹

In practice, this requirement of federal law was sometimes stretched out several miles beyond the forest boundary. Wartime fires in southern California were often attacked far beyond the forest protection boundary because the Division of Forestry was overloaded with other fires and could not respond. After the war, the fire control agencies moved ever closer to a common fire control program.

The Mountain Center Fire in the San Bernardino National Forest on July 2, 1950, was an example of first-class cooperation. Within one hour of the fire's start, the following forces were on the way: four Forest Service tank trucks with 17 men; State Ranger Holland, three Division of Forestry tank trucks and a bulldozer; San Bernardino County equipment including a motorgrader, two bulldozers, two "nurse" tankers, and a trained thirty-man county jail fire crew; and from the town of Idyllwild, a twelve-man trained volunteer fire crew. Southern California always demonstrated a much greater concern with forest fires than other areas of the state, and cooperation between agencies began sooner and reached deeper than in the rest of California.²⁰

It would be inaccurate to suggest that there were not tensions, disputes and competition between the Division of Forestry and Forest Service in individual cases. On some fires, people from one outfit or the other would make mistakes, perform poorly or otherwise create friction. This continued to happen, but from the beginning, the emphasis at higher levels was on getting the facts, trying to correct errors and developing true cooperative relations. This feeling was fostered by common boards of review, joint annual meetings at the local level and a growing respect for each other's fire control problems.

Friction was made worse in areas such as Mendocino County, where local citizens "wished the State to help burn the wildland but be ready to come a-running to save the barn."²¹ The controlled burning program of the late forties and early fifties in Mendocino and other counties, resulted in many escapes that burned onto national forest land. Regional Forester Hendee's policy in 1952 served as a beginning for better understanding, if not agreement, between controlled burners, the division and Region 5. When the Mendocino began its Grindstone Canyon vegetative type

conversion projects, there was general approval by local ranchers, the division and Forest Service visitors.

Cooperation between the division and Region 5 became stronger through the 1950s, when the two agencies jointly operated many major fires. As respect grew between the men at field level, it became logical to exchange radios, cooperate in fire prevention activities, jointly sponsor research projects and eventually set up joint fire dispatching centers. As the two largest fire control agencies grew closer together, they incorporated the larger county fire departments into a common cooperative program. This added more complications since these departments were organized more on the lines of city fire departments. These efforts ultimately resulted in closely coordinated fire control programs in southern California and changes that eventually were applied to all fire control agencies across the country.²²

Growth in cooperation would have been impossible without strong support from the State Board of Forestry and citizens groups, especially the Southern California Watershed Fire Council. The Council was formed in 1954 as a successor to the Tri-Counties Reforestation Committee, which dissolved in 1942. The fires of 1953 and the floods of 1954 re-awakened southern California to the threat of fire and stimulated formation of the council. The council, with support from its constituent governments, provided much of the impetus for increased appropriations for fire control and flood prevention in southern California after 1954.²³

Hot Times in the Mid-Fifties

Now and then in southern California, one fire season blends into the next. The Monrovia Peak Fire was controlled on January 3, 1954. As it was being mopped up, the 1953 fire season was declared over—on January 11, 1954. The new fire season began with about normal weather after dry and wet spells, hot and cold waves and still and windy days were averaged out, which suggests the fallacy of “normal” weather. Perhaps the record of daily fire danger rating was the best measure of the severity of a fire season. By 1954 the fire danger ratings had been recorded for about fifteen years and according to these records, 1954 was about average.²⁴

Only five forests recorded more than 5,000 acres burned in 1954; the San Bernardino, Los Padres, Cleveland, Tahoe and Modoc. The total burned area in Region 5 was 51,525 acres, less than half of the area

burned in the severe 1953 fire season. The number of lightning fires in 1954 fell to 298, the lowest number since 1942. Man-caused fires were also at a low figure, 687, compared to a five-year average of 807. This good record had its impetus from Regional Forester Hendee, who in 1952 made fire prevention a personal campaign. Several analyses of man-caused fires pinpointed fire prevention problems. New high-visibility fire prevention signs were installed.

Special measures were taken to reduce the number of lumbering and railroad fires with excellent results. Seventeen railroads of all sizes were contacted by forest officers and representatives of the California Fire Prevention Committee, which included railroad companies in its membership. Railroad rights-of-way burning and clean-up were improved. Some railroads began to follow trains with fire prevention speeder crews to stop trains throwing sparks and to catch any fires that started while they were still small. Vigorous law enforcement action on several railroad-caused fires gave the work extra meaning to the industry.²⁵

Hunters and fishermen came in for special attention when surveys revealed that 27 percent of all man-caused fires were started by this class of visitor. The hunter registration program of previous years was emphasized, as were special hunter fire prevention patrols. Letters and news releases to newspapers, radio and television stations were also used with success. The Western Fairs Association sponsored fire prevention exhibits at county fairs throughout California. Many state, local and military agencies also cooperated in preventing fire. The fire prevention job is endless, and usually the results cannot be counted because they consist of fires that never start. The fire prevention technician who spent day after day talking to visitors, inspecting buildings for fire safety, registering hunters, putting up fire prevention signs and posters and cleaning up hazardous areas was the unsung hero of this operation.

Even though the 1954 fire season was as average as it could be, it produced a few fires that would be tough shows in any year, and one that resulted in fatalities. Two of the fires occurred within a few days of each other in late September. The Tunnel Number 6 Fire began in the Tahoe Forest on September 23rd, south of Sierra Buttes. A large area of mixed forest and brush was burned, and the fire took the lives of three Folsom Prison inmates. The men were part of an honor camp crew and had been

assigned with a forest officer, two pickup firefighters and six other inmates to a night shift patrol of a bulldozer line.²⁶

Four of the inmates slipped away from the rest of the crew, intent on catching some sleep in the brush away from the fireline. That night a Mono wind came up and swept the fire toward the line patrolled by the crew. The crew boss called on the crew to escape down the fireline, and all left except the four who were asleep. One of the four managed to wake up and get away; the other three died as the fire overran their sleeping place.

Far to the south, in the San Bernardino Forest, the Panorama Point Fire began on September 27th. Under the influence of a moderate Santa Ana wind, the fire spread down slope from Panorama Point on State Route 18, a few miles from the village of Crestline. The fire burned 5,079 acres, not huge by southern California standards, but in December the Cable Canyon Fire burned 3,854 acres just to the west. Together with the Waterman Number 4 Fire and the Arrowhead Springs Fire of 1953 on the east, about 13,000 acres of contiguous watershed directly above the City of San Bernardino had been denuded between September 1953 and December 1954. When the rains came, flood debris from the barren watersheds threatened new subdivisions and choked the valuable water spreading grounds in the valley below.²⁷

The largest fire of 1954 was in the Los Padres Forest. No surprise there. The Devil Fire began on October 10th under strange circumstances. Three people, each with valid permits, were in the Devils Peak area of the Ventana Wild Area that day. Investigation revealed three possible causes of the fire: a cigarette or match from a smoke break taken by two of the visitors, a spark from the shoes of one of their horses or a deliberate set by a third person in the area, who was a devoted, if scatter-brained, nature lover. No matter, the Devil Fire started in a remote roadless area. Smoke from nearby controlled burns settled into the area preventing discovery of the fire until 9:00 p.m., hours after it started. The first crew reached the fire at 1:00 a.m., October 11th. Two hours later, north winds rose to 40 miles per hour and the fire took off. Firefighters kept plugging away as the fire burned southward over Skinner Ridge toward the Little Sur River.

Prospects looked favorable for control until the afternoon of the 14th when the wind switched to the south and blew hard. The fire turned around and swept northward and out of the forest. Winds moderated on the 18th, and the fire was controlled that day. Most of the line had to

be built by hand, but top-notch Native American and inmate crews did yeoman work despite shifting winds and steep terrain. More than 13,000 acres burned, about half inside the forest. (The same area, and a whole lot more, burned in the 175,000-acre Marble Cone Fire of 1977. Similar burning conditions, low-lying smoke and shifting winds also affected the later fire.)²⁸

Describing fires and fire seasons involves much use of comparatives, diminutives and superlatives. Relating a natural disaster requires a yardstick by which the severity of an event may be measured. For many years in Region 5, the 1910 fire season was the criterion of a bad fire season. Then 1924 became the all-time standard. The foundation of the 1924 season was a two-year drought that set the stage for disaster. It was not the individual huge fires that set 1924 apart from other bad fire seasons such as 1919, 1926 and 1928, but the unrelenting nature of the 1924 season. From April through September, major fires burned throughout the state. Often several major fires burned at once. There was no let-up and firefighters suffered permanent health damage from incessant fireline duty. But time marches on, and by the 1950s, there were few firemen who remembered the 1924 fire season. They had their own standards for bad fire seasons, and the 1950 fire season helped set that standard.

The 1950 season was similar to 1924 in its season-long nature, although burning conditions were not as severe as in 1924. However, bad fire seasons in California are remembered for very large fires that do a season's worth of damage in a few days. The 1951 and 1953 fire seasons followed this pattern, as did the 1955 fire season. The 1955 season was the fourth severe fire season in six years. In truth, the 1950s began to resemble the 1920s for the number and severity of fire seasons.

California weather is not only variable within itself, it varies according to location within the state. Often southern California has had severe fire weather while northern California enjoyed a moderate season and vice versa. When the entire state was in drought, such as in 1923-1924 or 1976-1977, a state-wide disaster usually resulted.

Precipitation was subnormal over most of California during the winter of 1954-1955, but spring weather was different between north and south. Northern California had a wet, cold April and a dry May and June. Southern California experienced a wet and cold April and May and had low fire losses, with one major exception. The forests in northern

California survived the dry weather, the usual mid-season lightning busts and man-caused fires, but no major problems were experienced until late August. The heat wave of August 27th to September 13th was the controlling event in the 1955 fire season.²⁹

This heat wave created severe conditions throughout California. Many weather stations recorded all time-high temperatures, including Los Angeles, which had 110 degrees on September 1st. Relative humidity readings were also very low with 10 percent recorded for several days in succession and readings at some stations down to 4 percent. From a fire danger rating standpoint, the season as a whole ranked with the 1950, 1951 and 1953 seasons as severe. But it was the two-week heat wave that resulted in that ranking. Fire danger rated in the extreme during the entire period on many forests. The 1955 season was second only to 1950 in burned acreage since 1932, with 185,045 acres burned within national forest protection boundaries.³⁰

Of this large area, the vast majority burned during the two-week heat wave. This kind of fire season; that is, a long, dry summer with a short period of intense fire suppression activity, is typical of California. Thus, the damage wrought by a fire season depends on how well the firefighting agencies get through a few periods of heat waves or Santa Anas. Thunderstorms with dry lightning are characteristic of heat waves, and potentially this makes them even more damaging than Santa Anas.

The 1955 heat wave began with very hot weather and fires on August 27th. As the heat wave wore on, fires increased in number until the Labor Day weekend (September 3-5), when 139 fires were reported throughout the region. On Sunday, the 4th, temperatures ranged from 100 to 110 degrees over the Klamath Forest and relative humidity was at 8 percent or lower. A thunderstorm threw out dry lightning, with the first strikes reported at about 5:00 p.m. The Klamath firemen had been fighting fire for several days in succession and were worn down when the lightning struck. On Labor Day morning, the Klamath had eight major fires. Four of these fires eventually exceeded 5,000 acres each; Kidder Creek, 14,562 acres; Six Mile, 5,272 acres; Dutch Creek, 9,122 and the great Haystack Fire, 63,507 acres. Not all of the burned area was within forest boundaries, but this brief siege of dry lightning strikes produced the most burned area within the Klamath Forest in its history (76,564 acres).³¹

There were peculiarities of this heat wave in the Klamath that plagued firefighters before and since. Smoke made it very difficult to determine where the firelines were, and aircraft were of little help in this respect. A temperature inversion kept smoke down at lower levels and raised temperatures on the fireline, resulting in hot burning fires at night. On the Six Mile Fire, temperatures were 70 degrees at 6,000 feet and 40 degrees at 2,400 feet elevation.

Turbulent local winds made flying helicopters hazardous. Proctor Ault of the Klamath flew with pilot Bob Trimble, a premier mountain helicopter pilot, over the Six Mile and Taylor Creek Fires on September 5th. He wrote, "This was the roughest ride I ever had. I don't know how pilot Bob Trimble ever held onto that ship. The tail of the 'copter was fish-tailing like a big salmon going up a shallow river and bouncing up and down something dreadful..."³² Too often the new aerial attack methods were frustrated by unstable weather. Shank's mare became the only way to get to remote fires, and shovel and Pulaski the only way to control them.

High nighttime temperatures kept the fires burning fiercely and slowed control efforts. Then, on the 6th, the Haystack Fire exploded across the Klamath River, into the South Fork of Humbug Creek and over the ridge west of Yreka. By this time 3,000 men were assembled to fight the Klamath fires. At last the weather moderated on September 10th, and all the large fires were controlled by the 14th.³³

The same storms started many fires in the Six Rivers Forest including the Heely Fire, which burned 22,000 acres. The Mendocino Forest fought the 9,000-acre Mud Springs Fire that burned outside the forest boundary. The Shasta-Trinity Forest's largest blaze was the Thompson Peak Fire, which burned 12,910 acres. In the Lassen Forest, the Merrill Fire burned 17,550 acres, one of the largest burns in the forest's history. More than 175,000 acres of all ownerships burned in northern California during the two week heat wave.³⁴

At the same time northern California forests fought ten large fires, a major fire struck the Sequoia Forest. The McGee Fire was not the largest in forest history, but it was the most damaging. Fire danger was extreme on September 2nd, but this did not stop a rancher from doing some controlled burning in a creek bed a half-mile outside the forest boundary. The fire started about three miles north of Miramonte and was quickly attacked by Division of Forestry crews. The fire spread rapidly up Milk

Ranch Creek to the east, burning toward Pinehurst and on into the forest. Several resort communities and the General Grant Grove area of Kings Canyon National Park were in the path of the fire. Joint fire operations were soon established, with the division working the south end of the fire where many structures were threatened. Park Service crews built a safety line within the Grant Grove area, and the Sequoia Forest handled the rest of the fire. The fire burned near Pinehurst, Miramonte, Cedarbrook and Sequoia Lake community, but the most severe damage was to mixed stands of pine, fir and giant sequoia in upper Mill Flat Creek and Converse Basin. The basin was the site of many large giant sequoia including the Boole Tree, one of the larger sequoias ever measured. One hundred million board feet of timber burned, only about 30 percent of which could be salvaged.³⁵

Over on the coast, the Los Padres marked the heat wave with another of its huge conflagrations, the Refugio (pronounced Refoofio) Fire, which started on September 7th. The fire began at 1:06 a.m. when an electrical spark ignited gasoline fumes in a building housing a light plant at the La Chirpa Ranch on Refugio Pass. This area is about 20 miles west of Goleta along U.S. Highway 101, and then north up the twisting Refugio Pass Road, which is notable today because it leads to the Reagan Ranch. By 8:00 a.m. the fire had spread over 1,200 acres, and at 6:00 p.m. of the first day, 22,000 acres had been blackened. The fire was reported to Santa Barbara County Fire Department firemen, who located the fire and relayed the information to the Los Padres office. Suppression action was slowed because many of the forest fire overhead and crews were on fires on other forests. Although there is a road along the Santa Ynez summit from Refugio Pass to San Marcos Pass above Santa Barbara, it has a dirt surface and travel over it is slow.³⁶

After the fire made its first run all the way to the Pacific Ocean on the afternoon of the 6th, the county forces concentrated on the lower slopes that contained any structures. Many canyons drain the mountains in this area and most had homes or ranches. Protection of these structures diverted many of the forces needed to keep the fire from spreading. It was a frustrating fire to fight, situated as it was on a steep, narrow mountain ridge with many canyons plunging off both sides. Winds were erratic and fires lines were built repeatedly and backfired only to be outflanked by the fire. The fire ate its way to the west and east and was not stopped

until it reached the gentler lower slopes. On the east it was stopped just short of Highway 154 and San Marcos Pass. About 54,510 acres of forest protected land burned, and 30,260 acres of outside lands burned for a total of 84,770 acres.

There was some criticism of the handling of the fire, mostly because of ineffective backfiring and failure to use and transmit special weather forecasts and fire strategy to fireline overhead. All agreed that the camps, food, transportation and other services were first class. The Regional Board of Review made eleven recommendations after reviewing the three largest fires including the Refugio. They noted, once again, the need for training of fireline overhead in fire behavior and fire weather. They believed that "fire generals" were needed who could be assigned to huge fires such as the Refugio, and they urged that more men be trained as fireline overhead.³⁷

The 1955 fire season was much like other bad seasons in the past and like many others to come. The damage was done in one brief period. More than 500 million board feet of timber burned, suppression costs totaled more than \$3 million, 177,801 acres burned and one man died on the Thompson Peak Fire when he was struck by part of a falling snag. Perhaps the most important forecast of the future was the mass mobilization that took place. The ability of Region 5 to assemble manpower and equipment for the emergency was impressive. About 18,400 men, 529 bulldozers, 919 tank trucks and 57 aircraft fought the fires. This feat was to be duplicated many times in years to come, but huge losses would continue to be sustained during the critical fire weather of bad fire years.³⁸

Epilogue

This history of fire control in the California national forests ends with the rains that closed the 1955 fire season. If the ending seems abrupt that is the way of fire seasons and some histories. However, it leaves the following fifty years of fire management history in California yet to be told-- by someone else. Unfortunately, it also leaves untold the fifty-year history of fire in California that preceded this one. The California Gold Rush began the greatest mass migration of people in the United States during the 19th century. These people saw great forests, brushlands and grasslands when they arrived in California in 1848, through the 1850s and later. Their story is told in more than 700 published books, in uncounted published articles, letters, diaries and other data, and in many more unpublished accounts. In their "get in, get out" search for riches J. S. Holliday wrote, "The '49ers and their year created the jackpot mentality that would dominate California for decades." (J. S. Holliday, *Rush for Riches*, {Berkeley: University of California Press, 1999}, 147). They and their successors would use, misuse and abuse California wildlands in ways that ultimately led to controls on mining, grazing, hunting and fishing, logging and fire. The story of the decades between 1848 and 1898 is the history behind this history and needs to be told in order for the issues in this history to be understood. It also needs to be told for us to better understand the role of fire in California today and the natural and man-made limitations on its use and its control.

The history that ends with this epilogue is mostly the story of response to the challenges of bad fires or bad fire seasons. There was little organized fire control in California before the severe 1910 fire season shocked the leaders of the Forest Service into action. Coert duBois laid the foundation of modern fire control when he assembled the existing knowledge of the subject and published it in 1914. His intense personal emphasis on fire control helped translate his words into action on the ground. The great fires in the Angeles Forest in 1919 resulted in a further leap forward in fire control policy and procedure. The 1924 fire season caused even further changes, as did the 1934, 1950, 1953 and 1955 fire seasons and the 1953 Rattlesnake Fire.

The role played by a few outstanding men in developing fire control policy and procedure is undeniable. DuBois, Show and Kotok in California and Greeley and Headley on the national scene shaped the art and profession of fire control in California. There were many others who

played supporting roles and whose names appear prominently throughout this history. It was the fire control organization however, that was the most important actor on the stage. The story of fire control in California is also the story of the birth, growth and maturation of a decentralized organization well suited to the task of protecting the national forests. Most important, from the beginning to the end of this history all Region 5 employees recognized that each of them had a role in this organization.

The growth of the organization was in response to challenges from society and the environment. Region 5 did not exist in a vacuum; it was severely affected by World War I, the booming twenties, the Great Depression, World War II and the postwar boom. At the same time, the impact of runaway fires and explosive fire seasons had to be recognized and addressed. Not to be forgotten were the effects of changes in national fire control policy. As time went on, fire control in Region 5 became more dependent on other regions and other agencies.

The list of major fires in this history are but names whose meaning is in the fading memory of a diminishing group of firefighters. Did it matter that millions of acres were burned, that men were injured and died, and that great damage was done to natural resources and private property? The hectic pace of life in urban California continued, oblivious to the perils of the natural world until the floods rose, the earth shook or the air was filled with smoke and ash. Regardless of the attitude of the general public, it mattered to those who fought the fires. It mattered because firefighters believed that controlling fires was good, worthwhile and necessary. It also mattered as a test of their response to emergency conditions, and as a testament to the physical strength, the intelligence and the stamina needed to persevere and control a fire. It mattered as a measure of firefighters' standing with respect to their peers and even in their advancement in the Region 5 organization. These were the kind of beliefs that maintained the fire control organization in Region 5 for many years.

By the end of 1955 a new era of fire control was beginning to assert itself: Aerial attack would soon become the darling of the media; firefighter safety would become high priority; technology at all levels became common, perhaps necessary, for effective fire control to continue; and fire control policies and practices would change to meet the demands of new tools, new research, changing natural resource management, increased population and widely fluctuating national and state politics.

Under pressure to reflect the role of fire in the natural world, fire control would become "fire management" even as ever-growing man-made impacts required even more effective control of fire in the forest. In ensuing years the results would suggest that little had changed in either controlling or managing fire. In the fifty years (1956-2005) following the end of this history, fire control would become so complicated, so intertwined in controversy, legislative battles and the overwhelming impact of huge population growth that it should be considered not as just new chapters for this history but an entirely new volume of historical inquiry.

In Region 5, the agency built its reputation on controlling fire and still receives support for its fire control program. For several decades after 1955, fire management moved from a starring role in the agency to one of the supporting cast for timber, wildlife, recreation and other resource management. In 2005 it may again be on the rise, perhaps because the old axiom of forestry, that a resource must be protected before it can be managed, still holds true today.

Finally, it is interesting to note that history has played an important role in the development of fire control policy and methods in California. Show and Kotok's researches of the 1920s and 1930s were based on analysis of historical data in the form of fire reports. This method may still afford insight into better ways to protect people and resources from fire. In that respect, this history may provide some clues to improve future fire protection in the California national forests.

Footnotes by Chapter

Chapter I: California Climate, Vegetation and Forest Fires

- ¹ In the poem "New Hampshire" by Robert Frost, (*Complete Poems of Robert Frost*, (New York: Holt, Rinehart and Winston, 1964), 199.
- ² Michael W. Donley, et al., *Atlas of California* (Culver City: Pacific Book Center, 1979), p. 137. This atlas shows a modified version of Koppen's climatic classification on a large scale map and relates California's climate to Mediterranean climates around the world. Also Glenn T. Trewertha and Lyle H. Horn, *An Introduction to Climate*, 5th ed.(New York: McGraw-Hill, 1971), pp. 227, 260.
- ³ Morris H. McCutchen, "Climatic Features as a Fire Determinant"; John W. Menke and Richard Villasenor, "The California Mediterranean Ecosystem"; in U.S. Department of Agriculture, Forest Service, *Proceedings of the Symposium of the Environmental Consequences of Fire and Fuel Management in Mediterranean Ecosystems* (Washington, D.C.: Government Printing Office, 1977). Hereafter, papers from this symposium are identified by short title, *Symposium*. The discussion of climate relies mostly on McCutchen, who was a climatic researcher with Pacific Southwest Forest and Range Experiment Station, Berkeley. His paper also relates California conditions to other Mediterranean climates. Papers from this symposium are valuable for brief, clear presentations of complex natural systems.
- ⁴ In *The Best Easy Listening Songs Ever*, (Milwaukee: Hal Leonard Publishing Co., 1991), p. 136. "It Never Rains in Southern California," words and music by Ray Wiggins and Tim Christian, 1990 PRI Music, and Tony, Toni, Tone Music, Burbank, 1990.
- ⁵ U.S. Department of Commerce, Weather Information Service, *Climates of the States*, 2 vols., (Port Washington, N.Y.: National Oceanic and Atmospheric Administration, 1974), 2:541. This book also describes the "Pacific High" and associated weather in some detail and lists rainfall records for California.
- ⁶ Donley, *Atlas of California*, p. 134.
- ⁷ Task Force on California's Wildland Fire Problem, "Recommendations to Solve California's Wildland Fire Problem," California Division of Forestry, June 1972.
- ⁸ Forest Service, Region 5, "Board of Review Report, February 12, 1952," Federal Record Group 095, Box 22271, Federal Records Center, San Bruno, Calif. Further references to this depository are abbreviated to FRG for Federal Records Group. Clinton B. Phillips, and Jerry Reinecker, *The Fire Siege of 1987: Lightning Fires Devastate the Forests of California*, California Department of Forestry, September 1988. Table 1 includes a list of major fires.
- ⁹ Ibid.
- ¹⁰ Benedict Spinoza, John Bartlett, *Familiar Quotations*, (Boston: Little Brown & Co., 1955), p. 281.
- ¹¹ California State Board of Forestry and Fire Protection, *The Changing California: Forest and Range 2003 Assessment*, estimates that 7.8 million acres in California are in the wildland-urban interface including about 3.2 million homes "highly threatened by wildfire."
- ¹² Charles W. Philpot, "Vegetative Features as Determinants of Fire Frequency and Intensity," *Symposium*. The description of chaparral is based on Philpot, and Menke and Villasenor. Menke and Villasenor also have a good description of the various vegetative classifications used in California.
- ¹³ U.S. Department of Agriculture, Forest Service, *Logging Slash: Its Breakdown and Decay at Two Forests in Northern California*, by Willis W. Wagener and Harold R. Offord, Research Paper PSW-83 (Berkeley: Pacific Southwest Forest and Range Experiment Station, 1972). This is a long-term study in the timber stands of the Sierra Nevada-Southern Cascades that showed 43 percent of the volume of large chunks and logs left after logging still remained 29 years later. By contrast, large logs in the Pacific Northwest

decayed within 20 years; it took only six years for decay to reduce large logs in southern hardwoods, and within five years more than half the volume of ponderosa pine logging slash was decayed in Rocky Mountain forests.

Chapter II: American Settlement and Forest Fire: 1848-1898

- ¹ Harold H. Biswell, "Fire Ecology in Ponderosa Pine Grasslands," in *Proceedings. Tall Timbers Fire Ecology Conference*, June 1972 (Tallahassee, Fla.: Tall Timbers Research Station, 1973). Biswell was the foremost professional exponent of prescribed burning for fuel reduction in California wildlands. He was author of many articles and monographs on the subject. This citation outlines his ideas on Native American burning. Also, Henry T. Lewis, *Patterns of Indian Burning in California Ecology and Ethnohistory*, *Anthropological Papers* No. 1 (Ramona, Calif.: Ballena Press, 1973). In this paper, Lewis tries to tie together the ecological and ethnological investigations. He relies on Biswell for the idea of park-like conditions in prehistoric forests. Lewis worked seasonally for the National Park Service in their fire management program. Also, Stephen J. Pyne, *Fire in America*, (Princeton: Princeton University Press, 1982). Pyne is a history professor at the University of Northern Arizona and has been a seasonal fire employee of the National Park Service for many years. *Fire in America* is a comprehensive history of fire and fire control. Pyne describes the history of fire over the entire United States and provides details about people, fires and controversies. He makes a case for Native American burning throughout the United States.
- ² U.S. Department of Agriculture, Forest Service, *A Record of Forest and Field Fires in California from the Days of the Early Explorers to the Creation of the Forest Service*, by L. A. Barrett (San Francisco: Region 5, 1935). Barrett grew up in Santa Ana and went to work for the General Land Office in 1902. After three years as a surveyor and forest inspector in several western states, he became the first supervisor of the Plumas, Diamond Mountain and Lassen forest reserves in 1905. Barrett recorded fires from old newspaper accounts and supplemented them with personal interviews. He doubted that Native Americans burned extensively in the mountains of California. Also, University of California, Agricultural Extension Service, *The Influence of Fire on California Pristine Vegetation: A Consideration in Controlled Burning*, by L. T. Burcham, (Berkeley: n.p., 1960). Burcham analyzed diaries of Spanish explorers and British trapping parties. He suggested Native American burning was sporadic and usually in grass types. Burcham was a long-time employee of California Division of Forestry. Also, C. Raymond Clar, *California Government and Forestry*, 2 vols. (Sacramento: Division of Forestry, 1959-1969). Clar began his career with CDF in 1927 and rose to be chief deputy state forester in 1941, where he served until 1953. He was the authority on the history of state and private forestry in California. He also doubted the tradition of extensive Native American burning in California.
- ³ Burcham, *The Influence of Fire*.
- ⁴ John Charles Fremont, *Narratives of Exploration and Adventure*, ed. Allan Nevins (New York: Longmans, Green & Co., 1956); William H. Brewer, *Up and Down California in 1860-1864*, ed. Francis P. Farquhar (Berkeley: University of California Press, 1966). Twenty-three diaries by forty-niners were also reviewed. All but two mentioned forest conditions.
- ⁵ J. Goldsborough Bruff, *Gold Rush: The Journals, Drawings and Other Papers of J. Goldsborough Bruff*, ed. Georgia W. Read and Ruth Graves, California Centennial Ed. (New York: Columbia University Press, 1949).
- ⁶ Lewis, *Patterns of Indian Burning*.

- ⁷ U.S. Department of Agriculture, Forest Service, "Forest Fire Protection in California," by S. B. Show, Historical File, Aviation and Fire Management Staff, Region 5, San Francisco; U.S. Department of Agriculture, Forest Service, *Fire and the Forest (California Pine Region)*, by S. B. Show and E. I. Kotok, USDA Circular 358, (Washington, D.C.: Government Printing Office, 1925); U.S. Department of Agriculture, Forest Service, *The Dry Rot of Incense Cedar*, by J. S. Boyce, USDA Bulletin 871 (Washington, D.C.: Government Printing Office, 1920).
- ⁸ Bruce M. Kilgore and Dan Taylor, "Fire History of a Sequoia-Mixed Conifer Forest," *Ecology* 60 (January 1979); Willis W. Wagoner, "Past Fire Incidence in Sierra Nevada Forests," *Journal of Forestry* 59 (October 1961). Many other articles on fire history and tree rings in the Sierra and southern California have been published.
- ⁹ Both Barrett, *Forest and Field Fires*, p. 6, and Biswell, "Fire Ecology," p. 74, agree that lightning fires could have been very extensive.
- ¹⁰ Louise Amelia Knapp Smith Clappe, *The Shirley Letters from the California Mines* (New York: Alfred A. Knopf, 1949), p. 205.
- ¹¹ William Downie, *Hunting for Gold* (San Francisco: California Publishing Co., 1893; facsimile reprint ed., Palo Alto: American West, 1971), p. 117.
- ¹² Bruff, *Gold Rush*, pp. 186, 196, 369. An excellent discussion of the feelings of nineteenth-century Americans toward wild country is found in Roderick Nash, *Wilderness and the American Mind* (New Haven: Yale University Press, 1967), chap. 2. Nash provides a good description of the psychological and religious roots of attitudes toward wild country. He helps explain some of the behavior that resulted in widespread burning of the woods. The darkness of primeval forests was one of the most objectionable features to frontier Americans.
- ¹³ Mark Twain, *Roughing It* (Avon, Conn.: Heritage Press, 1972), p. 121.
- ¹⁴ Paul D. Kelleter, "Forest Description of Siskiyou County, California, 1904," FRG 095, Box S0006180 (Vault), Federal Records Center, San Bruno, Calif., (Typewritten). This is one of many reports prepared by the U.S. Bureau of Forestry in cooperation with the State of California. Many other early observers confirm this practice.
- ¹⁵ W.H. Hutchinson, *California Heritage. A History of Northern California Lumbering*. (Chico: Diamond National Corp., n.d.), pp. 19, 25.
- ¹⁶ U.S. Department of Agriculture, Forest Service, "Notes on Fire, Lumbering, Range Conditions, and Soil and Water Conditions 1900," by George B. Sudworth, comp. by A. M. Avakian (Berkeley: California Forest and Range Experiment Station, 1939), pp. 20, 24, 26. These selections are from Sudworth's photos and notes from his field trip to the southern Sierra.
- ¹⁷ U.S. Department of Agriculture, Forest Service, *California Rural Lands and Management: A History of Use and Occupancy of Rural Lands in California*, by William S. Brown and S. B. Show (San Francisco: Region 5, 1944), pp. 150, 152. Also, Burcham, *California Rangeland: A Historical-Ecological Study of the Range Resource of California* (Sacramento: California Division of Forestry, 1957), pp. 153-156; Also, Mary Austin, *The Flock*. Reprint (Santa Fe, NM: Gainon, 1973). Sheepmen were the owners of the herds who hired shearers to manage their flocks. Sometimes the sheepmen also herded.
- ¹⁸ *San Francisco Examiner*, September 5, 1889.
- ¹⁹ Barrett, *Forest and Field Fires*, p. 23.

- ²⁰ John Muir, *The Mountains of California*, 2 vols. (Boston: Houghton Mifflin Co., 1917), 2:97.
- ²¹ Sudworth, "Notes," pp. 38, 35, 33. Also U.S. Geological Survey reports on the forest reserves of California for 1898 through 1902. For examples of these reports, see notes 27 and 31. Most of these reports would probably show some bias in favor of fire control because the authors worked for the U.S. Division of Forestry.
- ²² Brown and Show, *California Rural Land Use*, p. 195. Brown and Show tend to forgive the sheepherders their fires on the basis that woods burning was a sign of the times. However, the herders seemed to go far beyond the usual carelessness or relatively small-scale burning done by other forest users.
- ²³ Photographs in personal files.
- ²⁴ Quoted in Clar, *California Government and Forestry*, 1:119.
- ²⁵ U.S. Department of Agriculture, Forest Service, *Inyo National Forest*, by Douglas Robinson, (Bishop Calif.: Inyo National Forest, 1933), (Typewritten).
- ²⁶ David McEntire, *The Population of California* (San Francisco: Commonwealth Club, 1946), pp. 3, 7, 23-25.
- ²⁷ U.S. Department of Interior, Geological Survey, *Forest Conditions in the Northern Sierra Nevada, California* by John B. Leiber, Professional Paper No. 8, Series H, Forestry (Washington, D.C.: Government Printing Office, 1902), pp. 19, 40, 41.
- ²⁸ Quoted in Lee Morford, *Wildland Fires* (Yreka: Wildland Fire Consultants, n.d.) pp. 9, 11.
- ²⁹ *Yreka Journal*, July 31, 1889, September 6, 1893, August 28, 1896, quoted in Morford, *Wildland Fires*, pp. 14, 15, 16.
- ³⁰ Clinton G. Smith, "Forest Description of Mendocino County, California, 1903," "Forest Description of Humboldt County, California, 1904," "Forest Description of Del Norte County, California, 1904," Paul D. Kelleter, "Forest Description of Siskiyou County, California, 1904." FRG 095, Box S0006180 (Vault), Federal Records Center, San Bruno, Calif.
- ³¹ U.S. Department of Interior, Geological Survey, *The San Gabriel Forest Reserve* by John B. Leiber, in 20th Annual Report USGS 1898-99. Part V (Washington, D.C.: Government Printing Office, 1900) and by the same author, *The San Jacinto Forest Reserve and San Bernardino Forest Reserve* in the 19th Annual Report USGS 1897-98. Part V (Washington, D.C.: Government Printing Office, 1899).
- ³² L. C. Miller, "Notes on the Tujunga Watershed, San Gabriel Forest Reserve, 1903," "Notes on the Arroyo Seco Drainage System, San Gabriel Forest Reserve, 1903," "Notes on Occurrence and Effect of Fire on the Santa Ana Watershed, 1904." Also see: W. I. Hutchinson, "Fires in the San Gabriel Timberland Reserve, 1903"; W. J. Gardner, "Forest Conditions in Southern California, 1906"; R. D. Craig, "San Bernardino Forest Reserve, 1903-1904"; T. B. Lukens, "Notes on Hodges' Account of Grazing and General Management of the San Bernardino Forest Reserve." All of these are found in FRG 095, Box S0006180 (Vault), Federal Records Center, San Bruno, Calif., and all of these accounts also document widespread damage by sheep grazing and shepherd fires.
- ³³ U.S. Department of Agriculture, Forest Service, *Bibliography of Early California Forestry. 1939-1941*, 69 vols., WPA Projects 70-10896 and 70-12132 (Berkeley: California Forest and Range Experiment Station, 1942).

Chapter III: The Forest Reserves in California: 1891-1905

- ¹ Samuel P. Hays, *Conservation and the Gospel of Efficiency: The Progressive Conservation Movement 1890-1920* (Cambridge: Harvard University Press, 1959), pp. 19-20. Hays emphasizes the role of irrigation in the passage of Section 24 and in the Conservation Movement. He provides insights into Pinchot's political ability. He puts forth a convincing argument that the Conservation Movement was based on belief by a few Progressive leaders in "scientific management," not on grass-roots support. Also, John Ise, *The U.S. Forest Policy* (New Haven: Yale University Press, 1924; New York: The Arno Press, 1972), pp. 74-75, 79-80. Ise includes many details of early developments in forestry legislation. Also, Paul W. Gates, *History of Public and Law Development* (Washington, D.C.: U.S. Government Printing Office, 1968), pp. 419, 478-479. This is the most authoritative work on public land law and gives details of post-Civil War legislative failures.
- ² Hays, *Conservation and the Gospel of Efficiency*, p. 28; Ise, *U.S. Forest Policy*, pp. 92-96, 121; Gates, *History of Public Land Law*, p. 396
- ³ Samuel T. Dana and Sally K. Fairfax, *Forest and Range Policy*, 2nd ed. (New York: McGraw-Hill, 1980), pp. 58-59. The standard work on forest policy. It takes a balanced view of various elements in the conservation movement. Dana and Fairfax emphasize the importance of watershed protection and scenic preservation in the passage of Section 24. Also, Henry Clepper, *Professional Forestry in the United States* (Baltimore: Johns Hopkins University Press, 1971), p. 23. This is the basic work on professional forestry in the United States. It provides a framework and details that add realism to the history of forestry. Also, Ise, *U.S. Forest Policy*, pp. 115-117. Also, Harold K. Steen, *The U.S. Forest Service: A History* (Seattle: University of Washington Press, 1976), pp. 26-27. This is the most complete and authoritative history of the Forest Service. It is told from the national perspective and provides important background for regional and local events. Some historians see inclusion of Section 24 as an "accident of history," but given the strong pressure for forest reservation, a forest reserve rider to a legislative bill was probably only a matter of time and opportunity.
- ⁴ Clar, *California Government and Forestry*, 1:69 and Francis P. Farquhar, *History of the Sierra Nevada*, paperback ed. (Berkeley: University of California Press, 1969). Farquhar tells the story of the first state park in Chapter 13.
- ⁵ Clar, *California Government and Forestry*, 1:chap. 3.
- ⁶ Farquhar, *History of the Sierra Nevada*, p. 203.
- ⁷ *Ibid.*, p. 217.
- ⁸ Robert L. Kelley, *Gold vs. Grain* (Glendale: Arthur H. Clark, 1959), pp. 239-240.
- ⁹ Brown and Show, *California Rural Land Use*, pp. 168-175; T. H. Watkins, *California: An Illustrated History* (New York: American West, 1973), pp. 251-252.
- ¹⁰ Brown and Show, *California Rural Land Use*, p. 175.
- ¹¹ Miller, "Notes on the Tujunga Watershed," and "Notes on the Santa Ana Watershed." See note 32, Chapter II, above.
- ¹² This account of Abbott Kinney is pieced together from the following sources. Clar, *California Government and Forestry*, 1:128. Clar also mentions Kinney frequently in chapters four and seven. Also, Harris Newmark, *Sixty Years in Southern California. 1853-1913* (New York: Houghton Mifflin, 1930). Newmark tells of Kinney's arrival in southern California on page 519. Also, Shirley Sargent, *Theodore Parker Lukens: Father of Forestry* (Los Angeles: Dawson Book Shop, 1969). On page 51, Sargent tells

of Kinney's background and his association with Lukens, who was an ardent preservationist and U.S. Division of Forestry employee.

- ¹³ Clar, *California Government and Forestry*, 1:95.
- ¹⁴ U.S. Department of Agriculture, Forest Service, *Leaves From a Forest Ranger's Diary*, by L. A. Barrett (Quincy, Calif.: Plumas National Forest, 1976), pp. 41, 45.
- ¹⁵ James D. Richardson, ed., *A Compilation of the Messages and Papers of the Presidents*, 10 vols. (Washington, D.C.: Bureau of National Literature, 1897), 8:5792. Some sources mistakenly list the San Gabriel Forest Reserve as the first designated in the U.S.. The first was the Yellowstone Forest Reserve, which was established March 30, 1891, followed by others in Wyoming and Colorado.
- ¹⁶ Dana and Fairfax, *Forest and Range Policy*, p. 59.
- ¹⁷ G. Michael McCarthy, "The Forest Reserve Controversy: Colorado Under Cleveland and McKinley," *Journal of Forest History* 20 (April 1976), pp. 80-90.
- ¹⁸ Steen, *U.S. Forest Service*, pp. 47-50. Much of the following discussion is based on Steen.
- ¹⁹ *Ibid.*, pp. 49, 53.
- ²⁰ Harold T. Pinkett, "Some Neglected Trails in Forest History," *Journal of Forest History* 20 (April 1976), pp. 60-66.
- ²¹ Steen, *U.S. Forest Service*, p. 60.
- ²² Jenks Cameron, *The Development of Governmental Forest Control in the United States* (Baltimore: Johns Hopkins University Press, 1928), p. 220. Cameron downplays Pinchot's role in the conservation movement and gives a more conservative viewpoint on development of forest policy. He includes many valuable details about people and issues. Also, W. A. Richards, "Work of the General Land Office in the Administration of the Reserves," in *Proceedings of the American Forest Congress* (Washington, D.C.: H. M. Suter Publishing Co., 1905), pp. 381-389.
- ²³ U.S. Department of Agriculture, Forest Service, *Sierra National Forest* by George B. Sudworth (San Francisco: Region 5, n.d.), p. 11, (Typewritten.) These are recollections of an important Division of Forestry employee noted for his books on dendrology.
- ²⁴ U.S. Department of Agriculture, Forest Service, *History of Forest Supervisor Richard L. P. Bigelow*, by R. L. P. Bigelow (Nevada City: Tahoe National Forest, n.d.), pp. 3-4, (Typewritten.) These are two large volumes of typed diaries dated May 23, 1902, through April 30, 1936, and supplemented by Bigelow's memories.
- ²⁵ Sudworth, *Sierra National Forest*, p. 8.
- ²⁶ Bigelow, *History*, pp. 25-31.
- ²⁷ Quotation is from *Experiences* by Eugene F. Tully, History File, Sierra National Forest, Fresno, pp. 3-4. This is a memoir by Gene Tully, who served as ranger on the Sierra Forest Reserve from 1903 to 1912. Tully objected to Shinn's methods. Also, Bigelow, *History*, pp. 25-31, 40. Bigelow tells of sheepmen swearing revenge against him for driving sheep off the reserve. He also details a 1904 high country inspection, during which he found many areas of good sheep feed. This account seems to be at odds with other accounts of overgrazing. Also, John O'Neal, "Two Blades of Grass Where Thousands Grew Before," *The Western Livestock Journal* 31 (March 1953). O'Neal was born in Madera County in 1880. He was the son of one of the first rangers in the Sierra Forest Reserve and a lifelong stockman. He described open forest resulting from frequent fires before his first trip to the high country in 1903. On the trip, rangers from the Sierra Reserve found fourteen bands of sheep (28,000) in trespass. O'Neal described

the methods used to scatter sheep and thus punish the sheepmen. He wrote that several rangers resigned after this episode. His dislike of the Forest Service was intense. O'Neal's viewpoint on sheep grazing was supported by Roy Boothe, in U.S. Department of Agriculture, Forest Service, *Personal Narrative* by Roy Boothe (Bishop: Inyo National Forest, 1940), p. 40. Boothe felt damage from sheep grazing was exaggerated. It should be noted that Boothe, Tully and O'Neal grew up on foothill ranches and Bigelow began his life in the Sierra on a ranch. Shinn's instructions on sheep trespass to Bigelow are found in *The Inyo National Forest* by Douglas Robinson (Bishop: Inyo National Forest, n.d.), pp 7-11. They tell Bigelow to scatter sheep when they are in the reserve and to be firm with the sheepmen. Possibly some of the strong feelings were also generated by preservationists who were campaigning for exclusion of livestock from the reserves at that time.

- ²⁸ S. B. Show, *History of the Development of U. S. Forest Service Fire Control in California*, typescript at Bancroft Library, Berkeley, Calif., p. 38. Show tells of a fire in the Angeles Reserve in 1901 that was discovered on July 2nd and reported by letter to the supervisor on July 8th. The supervisor took action on the fire on July 9th. Also, U.S. Department of Agriculture, Forest Service, *History of the Angeles National Forest* by S. B. Show (San Francisco: Region 5, 1945), p. 31.
- ²⁹ *Ibid.*, p 31. There were twenty water companies drawing water from the San Gabriel Forest Reserve and nine water companies drawing water from the San Bernardino Forest Reserve at this time.
- ³⁰ J. W. Robinson, *The San Gabriels: Southern California Mountain Country* (San Marino: Golden West Books, 1977), pp. 148-157.
- ³¹ Robinson, *The San Gabriels*, p. 159; U.S. Department of Agriculture, Forest Service, Region 5, San Francisco, "Save West Fork Cabin," by Steve Williams and Mike Milosch, *Pacific Southwest LOG* (January 1984): employee newsletter. The first ranger station in the forest reserves was Alta Ranger Station built on the Bitterroot Forest Reserve in 1899; Show, *History of Angeles National Forest*, pp. 87-88.
- ³² U.S. Department of Agriculture, Forest Service, *Historical Development of Fire Control in California National Forests*, by R. W. Ayres (San Francisco: Region 5, 1939), pp. 3-4. The duties of rangers are also discussed in Douglas Robinson, Sudworth, Show, Bigelow, J. W. Robinson, Barrett, Morford and most other sources on the forest reserves.
- ³³ *Forest Reserve Manual*, quoted in Ayres, *History of Fire Control*, pp. 5-7.
- ³⁴ Douglas Robinson, *The Inyo National Forest*, pp. 4-5.
- ³⁵ Ayres, *History of Fire Control*, pp. 5-7.
- ³⁶ A brief biography of Shinn is found in Joseph Henry Jackson's introduction to Shinn's *Mining Camps: A Study in American Frontier Government* (New York: Alfred A. Knopf, 1948).
- ³⁷ Morford, *Wildland Fires*, p. 35.
- ³⁸ *Ibid.*, p. 44.
- ³⁹ Hutchinson, *California Heritage*, p. 29.
- ⁴⁰ Clar, *California Government and Forestry* 1:chaps. 8, 9, 10. This discussion of state forestry is based on Clar.
- ⁴¹ *Ibid.*, p. 221.
- ⁴² Steen, *U.S. Forest Service*, p. 74.

Chapter IV: Assuming Control of the Reserves: 1905-1910

- ¹ The sketch of Lukens is based on Shirley Sargent, *Theodore Parker Lukens*, and Ronald F. Lockmann, *Guarding the Forests of Southern California: Evolving Attitudes Toward Conservation of Watershed, Woodland, and Wilderness* (Glendale: Arthur H. Clark, 1981), pp. 94-109.
- ² The discussion of events around the turn of the century depends largely on Clar, *California Government and Forestry*. 1: chaps. 7, 8. Clar brings out the importance of watershed protection and custodial management in the establishment and expansion of the forest reserves.
- ³ U.S. Department of Agriculture, "The Attitude of Lumbermen Towards Forest Fires," by E. A. Sterling, *Yearbook of Agriculture*, 1904 (Washington, D.C.: Government Printing Office, 1904), pp. 133-140.
- ⁴ T. P. Lukens, "Notes on Hodges Account of Grazing and General Management of the San Bernardino Forest Reserve -1904," FRG 095 Box 50006180, (Vault) Federal Records Center, San Bruno, Calif.
- ⁵ Coert DuBois, *Trailblazers* (Stonington, CO.: Stonington Publishing Co., 1957), p. 46.
- ⁶ Clar, *California Government and Forestry* 1:195-201; *Sacramento Union*, June 23, 1903, quoted in Clar, *California Government and Forestry* 1:198.
- ⁷ Barrett, *Diary*, p. 45.
- ⁸ *Ibid.*, p. 34.
- ⁹ Morford, *Wildland Fires*, p. 20; Harley to Bigelow, February 28, 1907, Historical File 1680, vol. 1, Klamath National Forest, Yreka.
- ¹⁰ Dana and Fairfax, *Forest Policy*. p. 69.
- ¹¹ Gifford Pinchot was a controversial figure and remains so today. Harold T. Pinkett's *Gifford Pinchot: Private and Public Forester* (Urbana: University of Illinois Press, 1970) provides a balanced look that brings out Pinchot's ability to pick good subordinates and inspire them. Also, Clepper, *Professional Forestry*, treats Pinchot as a prime mover but gives equal treatment to those who prepared the way for him. Also see, Dana and Fairfax, who, in *Forest and Range Policy*, point out that Pinchot's friendship with President Theodore Roosevelt together with the rising Progressive movement was responsible for "Conservation's Golden Era." They also put forestry in perspective with other natural resource reform movements. No matter what one thinks of Pinchot personally, his philosophy was so powerfully instilled in the Forest Service that the major elements were present in the agency for decades.
- ¹² Gifford Pinchot, *Breaking New Ground* (New York: Harcourt Brace, 1947), pp. 283-285. See also Barrett, *Diary*, p. 30 and DuBois, *Trailblazers*, chap. 4 for examples of Pinchot's policy as carried out in the field.
- ¹³ Pinkett, *Gifford Pinchot*, p. 69; Pinchot, *Breaking New Ground*, p. 202.
- ¹⁴ Pinchot, *Breaking New Ground*, pp. 282-285. In the years he directed the Division, later the Bureau of Forestry, most of Pinchot's men were in the field making surveys and preparing reports and plans. This program produced a strong cadre of planners—men who knew how to collect field data, interpret it and prepare long-range plans. This was to prove vital because forestry and fire control required anticipation and advance planning. Pinchot laid down a few simple rules for getting work done: find the right man for the job, make job expectations clear to him, let him do the job, and recognize his good work. See also, DuBois, *Trailblazers*. p. 57. Also, Hays, *Conservation and the Gospel of Efficiency*, p. 35. Hays describes the importance of long-range planning in the "scientific" Progressive ideal. However, long-range planning was not a new idea in forestry because a timber crop takes from 40 to 120 years to mature and plans must be made accordingly. Hays and, to some extent, Dana and Fairfax, *Forest Policy*,

emphasize the “scientific management” aspect of Pinchot’s philosophy. Hays suggests the philosophy of the Roosevelt administration was “top down” authority (p. 272) and that management was influenced by engineering ideas of efficiency at the expense of human rights (p. 126). Engineer Frederick W. Taylor (1856-1915) was the first to study work as a function. He emphasized productivity and did not concern himself with mission. He assumed results would flow from increased productivity. Taylor’s ideas gained acceptance among the “scientific” progressives but were only part of a more comprehensive Forest Service management scheme. The importance of individual contribution and human relations to the Service comes forth in memoirs, correspondence and official policies of the early Forest Service. Also see, Peter Drucker, *Management: Tasks, Responsibilities, Practices* (New York: Harper & Row, 1973) for a discussion of Taylor’s contributions and limitations. Drucker’s management philosophy, which he termed Management by Objectives (MBO) is similar to that of the early Forest Service.

¹⁵ Pinchot, *Breaking New Ground*, p. 266.

¹⁶ Steen, U.S. Forest Service, pp. 85-86; Pinkett, *Gifford Pinchot*, pp. 81-85.

¹⁷ U.S. Department of Agriculture, Forest Service, *Annual Report of The Forester to the Secretary of Agriculture, for the Fiscal Year Ended 30 June 1906*, pp. 11, 12; *Annual Report of The Forester for the Fiscal Year Ended 30 June 1907*, pp. 3, 4.

¹⁸ U.S. Department of Agriculture, Forest Service. *Annual Report of The Forester for the Fiscal Year Ended June 1909*, pp. 36-37.

¹⁹ Dana and Fairfax, *Forest Policy*, p. 83.

²⁰ Pinkett, *Gifford Pinchot*, p. 69; Pinkett, “Some Neglected Trails in Forest History,” p. 63; Elmo R. Richardson, *The Politics of Conservation: Crusades and Controversies 1897-1913* (Berkeley: University of California Press, 1962), pp. 25-26.

²¹ Pinkett, *Gifford Pinchot*, pp. 72-75; Steen, *U.S. Forest Service*, p. 80. The verse is in Show, *The Development of Forest Service Organization, Personnel and Administration in California*, 1963, Typescript, unedited and unfinished due to author’s death. Library, School of Forestry and Natural Resources, University of California, Berkeley.

²² Dana and Fairfax, *Forest Policy*, pp. 69-72, 86.

²³ Richardson, *Politics of Conservation*, pp. 74-83.

²⁴ Pinchot, *Breaking New Ground*, pp. 257-259; U.S. Department of Agriculture, *The Principal Laws Relating To Forest Service Activities*, Agricultural Handbook Number 453 (Washington D.C.: Government Printing Office, 1974).

²⁵ Barrett, *Diary*, p. 30; DuBois, *Trailblazers*, p. 57.

²⁶ Morford, *Wildland Fires*, p. 20; Barrett, *Diary*, pp. 31-32; Brown and Show, *California Rural Land Use*, p. 249.

²⁷ Boothe *Personal Narrative*, pp. 2-3.

²⁸ Sudworth, *Sierra National Forest*, p. 17.

²⁹ Barrett, *Diary*, pp. 34-35; Boothe, *Personal Narrative*, p. 2.

³⁰ William B. Greeley, *Forests and Men* (Garden City: Doubleday and Co., 1952), pp. 78-81; Barrett, *Diary*, p. 33.

³¹ Steen, *U.S. Forest Service*, pp. 88-89; Clar, *California Government and Forestry*, 1:234; Barrett, *Diary*, p. 32; Douglas Robinson, *Inyo National Forest*, pp.16-19; Wesley E. Hotelling, *My Life with the Kar-ooks. Miners and Forestry* (Willow Creek Calif.: By the Author, 1978), pp. 28-36.

- ³² Brown and Show, *California Rural Land Uses*, p. 250; Greeley, *Forests and Men*, p. 83.
- ³³ Barrett, *Diary*, pp. 37-42.
- ³⁴ U.S. Department of Agriculture, Forest Service, *Annual Report of The Forester* for the Fiscal Year Ended 30 June 1908, p. 14.
- ³⁵ Steen, *U.S. Forest Service*, pp. 107-108; DuBois, *Trailblazers*, p. 69.
- ³⁶ Morford, *Wildland Fires*, p. 29.
- ³⁷ Barrett, *Diary*, pp. 34, 41, 43, 102; Greeley, *Forests and Men*, p. 78. Barrett thought that overgrazing and many surface fires from the pre-1900 era made firefighting easier in 1905.
- ³⁸ Clar, *California Government and Forestry*, 1:264-270.
- ³⁹ *Ibid.*, pp. 203-204.
- ⁴⁰ Hutchinson, *California Heritage*, p. 29.
- ⁴¹ Greeley, *Forests and Men*, p. 79.
- ⁴² Barrett, *Diary*, pp. 31-32; Morford, *Wildland Fires*, p. 29; Douglas Robinson, *Inyo National Forest*, p. 16; Show, *History of the Angeles National Forest*, p. 39.
- ⁴³ Barrett, *Diary*, pp. 36-37.
- ⁴⁴ Boothe, *Personal Narrative* pp. 6-14.
- ⁴⁵ U.S. Department of Agriculture, Forest Service, *A History of Electronic Communication in the Forest Service, 1945-1975*, by Gary Graven Gray (Washington, D.C.: Government Printing Office, 1982), pp. 6-9.
- ⁴⁶ Barrett, *Diary*, p. 38; Ayres, *History of Fire Control*, p. 8;
- ⁴⁷ Hotelling, *My Life*, p. 28; U.S. Department of Agriculture, Forest Service, *Early Day Experiences in the U. S. Forest Service* by Robert H. Abbey, (Susanville: Lassen National Forest, n.d.); U.S. Department of Agriculture, Forest Service, *Chronological History of the Klamath National Forest*, by R. W. Bower, 5 vols. (Yreka: Klamath National Forest, 1980), 1:29
- ⁴⁸ Barrett, *Diary*, pp. 60, 39-40.
- ⁴⁹ *Ibid.*, pp. 101-103.
- ⁵⁰ *The Sierra Ranger* 2 (June 1912), pp. 9-11: Employee newsletter, Historical File, Sierra National Forest, Fresno, Calif.
- ⁵¹ Barrett, *Diary*, pp. 38, 43.
- ⁵² *Bulletin No. 1*, (Sacramento: California Department of Water Resources, 1951); U.S. Department of Agriculture, Forest Service, *Systematic Fire Protection in the California Forests*, by Coert DuBois (Washington, D.C.: Government Printing Office, 1914), p. 95. Historical File, Aviation and Fire Management Staff, Region 5, San Francisco.
- ⁵³ Barrett, *Diary*, pp. 43, 102; Morford, *Wildland Fires*, p. 21; Ayres, *History of Fire Control*, p. 9.
- ⁵⁴ Morford, *Wildland Fires*, p. 27.
- ⁵⁵ Olmsted obituary in *California District Newsletter* 8 (February 20, 1925).
- ⁵⁶ Clar, *California Government and Forestry*, 1:298; U.S. Department of Agriculture, Forest Service, Region 5, "Annual Fire Report, 1979," San Francisco, Calif.
- ⁵⁷ DuBois, *Trailblazers*, p. 68.

⁵⁸ Abbey, *Early Day Experiences* p. 26.

⁵⁹ Morford, *Wildland Fires*, pp.29-30; *The Sierra Ranger* 2 (June 1912), p. 6.

Chapter V: Experimenting with Policy and Procedure

¹ U.S. Department of Agriculture, Forest Service, *Proceedings, Forest Supervisor's Meeting, San Francisco, California, December 13-19, 1910*, FRG 095, Box S0006180 (Vault) Federal Records Center, San Bruno, Calif., pp. 11-12.

² *Ibid.*, p. 77.

³ *Ibid.*, p. 78.

⁴ *Ibid.*, pp. 79-113; Ayres, *History of Fire Control*, p. 10.

⁵ *Proceedings, Forest Supervisor's Meeting, 1910*, p. 112.

⁶ Stewart H. Holbrook, *Burning an Empire*, foreword by William B. Greeley (New York: The Macmillan Co., 1944), chap. 11.

⁷ Pyne, *Cultural History of Fire*, pp. 239-252; Holbrook, *Burning an Empire*, p. 131; Bower, *History of the Klamath National Forest*, 1:114.

⁸ Pyne, *Cultural History of Fire*, describes deficit financing on p. 263; Cameron, *Governmental Forest Control*, pp. 255-316; Steen, *U.S. Forest Service*, p. 128.

⁹ Holbrook, *Burning an Empire*, p. 132. The quotation is in Dana and Fairfax, *Forest Policy*, p. 101.

¹⁰ Cameron, *Governmental Forest Control*, pp. 261, 280-286; Pinkett, *Gifford Pinchot*, pp. 114-129; Steen, *U.S. Forest Service*, pp. 104-107; Clepper, *Professional Forestry*, pp. 66-67.

¹¹ DuBois, *Trailblazers*, p. 71; U.S. Department of Agriculture, Forest Service, "Transferred to the Ranger District out Yonder: Coert DuBois, 1882-1960," by Robert W. Ayres, *California Ranger* 20 (April 1960): Employee newsletter, Historical File, Recreation Staff, Region 5, San Francisco. Olmsted was in charge of the Mt. Tamalpais Protective Association for a time and was forester for Diamond Match Co. from about 1915 until 1923.

¹² *Proceedings, Forest Supervisor's Meeting, 1910*, p. 78

¹³ Ayres, *History of Fire Control*, p. 10.

¹⁴ U.S. Department of Agriculture, Forest Service, *National Forest Protection Plans*, by Coert DuBois (Washington, D.C.: Government Printing Office, 1911), pp. 1-2; Historical File, Aviation and Fire Management Staff, Region 5, San Francisco.

¹⁵ "Report to the Western Forestry and Conservation Association, December 4-5, 1911," by Coert DuBois, quoted in Bower, *History of the Klamath National Forest*, 2:13-15; DuBois, *Fire Protection Plans*, pp. 2-8.

¹⁶ An account of the Waterman Canyon Fire is in Pauliena B. LaFuze, *Saga of the San Bernardinos* (San Bernardino: San Bernardino County Museum Association, 1971), pp. 189-195.

¹⁷ Morford, *Wildland Fires*, pp. 34-35; Ayres, *History of Fire Control*, p. 11.

¹⁸ Quoted in Morford, *Wildland Fires*, p. 33. See also, *The Sierra Ranger* 3 (November 1913); *The Sierra Ranger* 4 (November 1914); *The Sierra Ranger* 5 (November 1915) and Morford, *Wildland Fires*, p. 35, for descriptions of fire seasons from 1911 through 1915.

¹⁹ Morford, *Wildland Fires*, pp. 35-36.

²⁰ Boothe, *Personal Narrative*, pp. 18-19.

²¹ DuBois, *Systematic Fire Protection*, p. 53.

- ²² Bower, *History of the Klamath National Forest*, 1:45. Quotations are from "A Novel Experiment: Hallie Comes to Eddy's Gulch," by Rosemary Holsinger, *Pacific Southwest LOG* (February 1984).
- ²³ Bower, *History of the Klamath National Forest*, 1:43; *The Sierra Ranger* 3 (June 1913), p. 1; *The Sierra Ranger* 3 (February 1914), p. 12.
- ²⁴ DuBois, *Trailblazers*, p. 76; DuBois, *Systematic Fire Protection*, p. 2; *The Sierra Ranger* 3 (February 1914), p. 12.
- ²⁵ DuBois, *Trailblazers*, p. 69.
- ²⁶ *The Sierra Ranger* 3 (February 1914), p. 12.
- ²⁷ DuBois, *Trailblazers*, p. 79.
- ²⁸ Pyne, *Cultural History of Fire*, pp. 104, 469.
- ²⁹ DuBois, *Systematic Fire Protection*, pp. 3, 5-6, 15-16.
- ³⁰ *Ibid.*, p. 22.
- ³¹ *Ibid.*, p. 38.
- ³² *Ibid.*, p. 39.
- ³³ *Ibid.*, p. 54.
- ³⁴ *The Sierra Ranger* 4 (February 1915), p. 10; Show, *History of the Angeles National Forest*, pp. 55-56; John W. Robinson, *The San Gabriels. I: The Mountains from Monrovia Canyon to Lytle Creek* (Arcadia: Big Santa Anita Historical Society, 1983), p. 151
- ³⁵ *The Sierra Ranger* 5 (August 1915), p. 9; *The Sierra Ranger* 5 (November 1915), p. 1.
- ³⁶ *The Sierra Ranger* 5 (August 1915), p. 9; *The Sierra Ranger* 5 (November 1915), p. 1.
- ³⁷ Kelley to Bigelow, November 24, 1915, Historical File 5100 FM Administration and Organization, Tahoe National Forest, Nevada City, Calif.
- ³⁸ Ayres, *History of Fire Control*, pp. 85-86; Bigelow, *History*, p. 186; George Wharton James, *Lake of the Sky: Lake Tahoe* (Chicago: Charles T. Powner Co., 1956), pp. 349-350; Barrett, *Diary*, p. 90.
- ³⁹ *The Sierra Ranger* 3 (November 1913), pp. 2, 16.
- ⁴⁰ *The Sierra Ranger* 2 (June 1912), p. 7.
- ⁴¹ Show, *History of the Angeles National Forest*, p. 129.
- ⁴² *The Sierra Ranger* 2 (February 1912), pp. 5-6.
- ⁴³ *The Sierra Ranger* 3 (June 1913), p. 10.
- ⁴⁴ The female firefighters are shown in a photo in *The Pacific Southwest LOG* (March 1979.) Comments on Forest Service wives are found in: Grace Thompkins Sargent, "Forgotten Mother of the Sierra," *California Historical Quarterly* 38 (1959). Also, Foresters Wives Club of Washington, D.C., *Samplers of the Early Years*, (Washington, D.C.: Foresters Wives Club of Washington, D.C., 1980), pp. 10-11. Also see, U.S. Department of Agriculture, Forest Service, "They Also Serve," by M. A. Benedict, *Service Bulletin* 3 (March 1929): Employee newsletter, Historical File, Sierra National Forest, Fresno, Calif.
- ⁴⁵ Bigelow, *History*, p. 164; Bigelow to Mace, September 25, 1913, Historical File 5170 Cooperation, Tahoe National Forest, Nevada City, Calif.
- ⁴⁶ Show, *History of the Angeles National Forest*, p. 127.
- ⁴⁷ *Ibid.*, p. 33.

- ⁴⁸ Robinson, *The San Gabriels I*, p. 202; Barrett, *Diary*, p. 47;
- ⁴⁹ Show, *History of the Angeles National Forest*, p. 127; Bower, *History of the Klamath National Forest*, 2:166.
- ⁵⁰ DuBois, *Trailblazers*, p. 85.
- ⁵¹ "Moving Picture of Forest Fire," *Sierra Club Bulletin* 10 (December 1913), p. 70; *The Sierra Ranger* 2 (December 1912), p. 3.
- ⁵² *The Sierra Ranger* 1 (June 1911), p. 1; Ayres, *History of Fire Control*, p. 64.
- ⁵³ Ayres, *History of Fire Control*, pp. 78-79; Bower, *History of the Klamath National Forest*, 2:51.

Chapter VI: Controversy and Confusion

- ¹ Donald Bruce, "Light Burning: The Report of the California Forestry Committee," *Journal of Forestry* 21 (February 1923).
- ² Clar, *California Government and Forestry*, 1:212, 344. Also, S. B. Show and R. F. Hammatt, "Will Fire Prevent Fire?" This is one of four essays under a general title of *Forest Fire Protection in California*, Historical File 1680-9, Aviation and Fire Management Staff, Region 5, San Francisco, pp. 1, 9, 12.
- ³ G. L. Hoxie, "How Fire Helps Forestry," *Sunset* 34 (August 1910), pp. 145-151; T. B. Walker quoted in Clyde Leavitt, "Forest Fires," in *Report of the National Conservation Commission* (New York: The Arno Press, 1972), 1:424-425. Also, DuBois, *Systematic Fire Protection*, p. 18.
- ⁴ Steen, *U.S. Forest Service*, pp. 135-136 discusses Walker's endowment at Yale and Graves's attitude toward light burning. Also, Pyne, *Cultural History of Fire*, p.104, gives a more complete description. Also, a detailed description of Walker's 1910 light burning near the Lassen National Forest is found in Edwin R. Hamilton, Assistant Ranger to Supervisor, Lassen National Forest, November 2, 1910, Historical File, 1680, vol. 1, Klamath National Forest, Yreka, Calif. This report describes two areas totaling several thousand acres that were burned in October 1910. One was level with open stands of pine; the other, with more varied topography covered by mixed conifers, with considerable reproduction and pole stands. Hamilton found the burns erratic and destructive of young growth. Danger of fire was reduced, and his report suggests that some needed thinning took place. However, in summary, he felt the damage to future stands outweighed the temporary reduction of fire hazard. He also cited actual costs of seventy-one cents per acre on one area and more than a dollar per acre on the other. A thorough job of burning would have cost one to five dollars per acre depending on the area. At the time, fire protection costs were running a few cents per acre. Also, S. B. Show, "Light Burning at Castle Creek," *Proceedings of the Society of American Foresters* 10 (October 1915).
- ⁵ Pyne, *Cultural History of Fire*, p. 104; Frederick E. Olmsted, "Fire and the Forest: the Theory of 'Light Burning,'" *Sierra Club Bulletin* 8 (January 1911); *The Sierra Ranger* 1 (April 1911), pp. 5-6; *Proceedings, Forest Supervisor's Meeting, 1910*, pp. 138-141.
- ⁶ Show and Kotok, *Fire in the Forest*, pp. 1, 2, 17; Clar, *California Government and Forestry*, 1:208-210.
- ⁷ *Proceedings, Forest Supervisor's Meeting, 1910*, pp. 110-112, gives viewpoints of individual supervisors; DuBois, *Systematic Fire Protection*, p. 18; Bower, *History of the Klamath National Forest*, 2:86, 94-95.
- ⁸ DuBois to Graves, November 16, 1915, FRG 095 Box 27837, Federal Records Center, San Bruno, Calif., p. 2. This letter describes DuBois's proposal in full.
- ⁹ Graves to DuBois, January 14, 1916, FRG 095, Box 278-7, Federal Records Center, San Bruno, Calif.
- ¹⁰ Correspondence, FRG 095, Box 27837, Federal Records Center, San Bruno Calif.; Ayres, *History of Fire Control*, pp. 16-17.

- ¹¹ Ayres, *History of Fire Control*, p. 18; *The Sierra Ranger* 4 (August 1914), p. 1; Show, *History of Fire Control*, p. 67.
- ¹² Show, *Development of Forest Service Organization*, p. 58. Show says the Feather River Experiment Station was established in July 1912. Also, U.S. Department of Agriculture, Forest Service, *History of the Development of the Fire Research Program in California*, by Carl Wilson (Berkeley: Pacific Southwest Forest and Range Experiment Station, 1983), p. 2. Also, S. B. Show, "Climate and Forest Fire in Northern California," *Journal of Forestry* 17 (December 1919), which describes the 1915 experiments. Also see, S. B. Show, "Light Burning at Castle Rock."
- ¹³ Steen, *U.S. Forest Service*, pp. 137-139; Wilson, *History of Fire Research*, p.1
- ¹⁴ U.S. Department of Commerce: Weather Bureau, *Climate Summary of the United States*, Section 18—Southern California and the Owens Valley, Section 17—Central California. Section 16—Northeastern California, (Washington, D.C.: Government Printing Office, 1955); U.S.. Department of Agriculture, Forest Service, *Forest Fires in California. 1911-1920: An Analytical Study*, by S. B. Show and E. I. Kotok, USDA Circular 243 (Washington, D.C.: Government Printing Office, 1923), p. 68.
- ¹⁵ Quoted in Wilson, *History of Fire Research*, p. 3. Galleher was in charge of reconnaissance in the district silviculture (timber management) staff and was familiar with the entire district.
- ¹⁶ Show and Hammatt, "Will Fire Prevent Fire," p. 2, describe White's ideas about light burning. White began his agitation for light burning in 1916, but it was not until his articles in *Sunset* in 1920 that he fully expressed his viewpoint.
- ¹⁷ Ayres, *History of Fire Control*, p. 21; Clar, *California Government and Forestry*, 1:414.
- ¹⁸ Show and Hammatt, "Will Fire Prevent Fire," pp. 11-16.
- ¹⁹ Stewart Edward White, "Woodsmen, Spare Those Trees!" *Sunset* 44 (March 1920), pp. 23-26; Henry S. Graves, "The Torch in the Timber," *Sunset* 44 (April 1920), pp. 37-40, 80-90; Stewart Edward White, "Getting at the Truth," *Sunset* 44 (May 1920), pp. 62, 80-82; Paul G. Redington, "What is the Truth? The Forest Service and Stewart Edward White Agree to Study Forest Fire Damage," *Sunset* 44 (June 1920), pp. 56-58.
- ²⁰ Clar, *California Government and Forestry*, 1:462-464, 488-494. Clar has the best account of the events surrounding the committee's establishment and operation. The committee report is described in Donald Bruce, "Light Burning."
- ²¹ Ashley L. Schiff, *Fire and Water: Scientific Heresy in the Forest Service* (Cambridge: Harvard University Press, 1960).
- ²² Many attempts were made to plant trees in California forests dating back to Luken's efforts in the San Gabriel Mountains as early as 1892. Repeated failures convinced most Forest Service people that natural regeneration must be protected if a future forest were to be grown. Efforts to convert brush on timber sites were failures and planting was suspended in 1920. See U.S. Department of Agriculture, Forest Service, *History of Timber Management in the California National Forests 1850-1937*, by R. W. Ayres, (San Francisco: Region 5, 1958). During the CCC days large-scale brushfield plantations were attempted. Advent of the bulldozer allowed brush to be removed in strips and windrowed, but it was not burned. Planted trees did not survive competition from brush that grew back. into cleared strips or from rodents that set up housekeeping in the windrows. Not until the early 1950s was the planting problem in California forests solved. Successful plantations required complete removal of competing vegetation, development of vigorous planting stock and removal of competition after planting for three to ten years. District 5 lacked the knowledge and capability to assure artificial regeneration for the first forty-five years

of its existence. Also, see page 96, Show, *Personal Reminiscences of a Forester, 1907-1931*, typescript at University of California, School of Forestry and Natural Conservation library, 243 pages.

²³ See Chapter II, note 12.

²⁴ Ayres, *History of Fire Control*, pp. 15, 67.

²⁵ Robert Burns, "To a Mouse," in *The Poems of Robert Burns, Selected and with an Introduction by Delancey Ferguson* (New York: The Heritage Press, 1965), p. 37.

²⁶ The description of the Sisson Fire is based on Ayres, *History of Fire Control*, p. 13; Brown and Show, *Rural Land Use in California*, pp.296-297; Bower, *History of the Klamath National Forest*, 2:65; and Show, *History of Fire Control*, p. 61. Show says the fire burned 2,000 acres and cost \$35,000 to put out, an enormous sum in those days.

²⁷ DuBois, *Systematic Fire Protection*, p. 35; Roy Headley, *Fire Suppression*,. District 5, U.S. Forest Service. May 1916. FRG 095, Box 60006180 (Vault), Federal Records Center, San Bruno, Calif., p. 22; For marginal notes see correspondence in FRG 095, Box 27837, Federal Records Center, San Bruno, Calif.

²⁸ Show, *History of Fire Control*, p. 63. Show lists Headley's strengths. The brief biography of Headley is based on a news release in the History Office, Forest Service, Washington, D.C.

²⁹ Headley, *Fire Suppression*, p. 21.

³⁰ Ayres, *History of Fire Control*, p. 15; The policy is quoted in Bower, *History of the Klamath National Forest*, 2:73; Show, *History of Fire Control*, p. 68. Show lists total District 5 fire protection forces by year: 1914-563; 1915-537; 1916-429; 1917-365; 1918-313.

³¹ Kelley to Bigelow, November 24, 1915, Historical File, Tahoe National Forest, Nevada City, Calif.

³² The discussion of Headley's handbook is based on Headley, *Fire Suppression*, pp. 2, 29, 17, 19, 23, 49; Show and Kotok, *Forest Fires in California*, p. 4; Bower, *History of the Klamath National Forest*, 2:87, 92; and Show, *History of Fire Control*, p. 69.

³³ Headley, *Fire Suppression*, p. 2.

³⁴ *Ibid.*, p. 17.

³⁵ *Ibid.*, p. 23.

³⁶ Show and Kotok, *Forest Fires in California*, p. 68.

³⁷ Headley, *Fire Suppression*, p. 1. Also, Show and Kotok, *Forest Fire in California*, p. 68. Also see, Bower, *History of the Klamath National Forest*, 2:120. Bower shows 1,861 fires and 337,000 acres burned in District 5 during 1917. As Bower points out on page 2:66, fire reporting in the 1911-1920 period included false alarms, and acreage estimates were often inaccurate. Show and Kotok's figures have been accepted here because of their scientific analysis of the fires during this decade.

³⁸ Show, *History of Fire Control*, pp. 71-74.

³⁹ Quotation from Show, *Reminiscences*, p. 94. Ayres, *History of Fire Control*, p. 18; Show and Kotok, *Forest Fires in California*, pp. 3-4; Show, *History of Fire Control*, p. 80;

⁴⁰ Clar, *California Government and Forestry*, 1:235-240. Clar is the authority on early cooperative relations between the Forest Service and the state. This discussion is based on his Chapters 11 and 12.

⁴¹ *Ibid.*, 1:268-270. The Tri-Counties Reforestation Committee was permanently established in January 1907 and was an outgrowth of the California Water and Forest Association. It functioned until 1942, when World War II caused its suspension. In 1954 the committee's work was assumed by the Watershed Fire Council of Southern California. Don R. Bauer, vice president of the council, describes it as "a citizen

study group chartered by the supervisors of the nine southern California counties to address the needs for adequate watershed protection." Mr. Bauer kindly provided detailed information about the committee and the council's work by letter of October 28, 1985.

⁴² Clar, *California Government and Forestry*, I: chap. 14.

⁴³ DuBois to Headley, July 21, 1916, FRG 095, Box 27837, Federal Records Center, San Bruno, Calif.

⁴⁴ Report entitled "Fire Cooperation Campaign Season of 1920," FRG 095, Pox 2787, Federal Records Center, San Bruno, Calif.

⁴⁵ Clar, *California Government and Forestry*, 1:299, 306, 312.

⁴⁶ *Ibid.*, 1:418-421.

⁴⁷ *Ibid.*, 1:429-433, 443-444.

⁴⁸ *Ibid.*, 1:446.

Chapter VII: World War I and Postwar Changes

¹ Show and Kotok, *Forest Fire in California*, p. 73; Clar, *California Government and Forestry*, 1:414; Bower, *History of the Klamath National Forest*, 2:112, 114, 117.

² *The Statistical History of the United States from Colonial Times to the Present* (Stamford, Conn.: Fairfield Publishing Inc., 1965), pp. 126, 127. The cost of living index rose from 128 in 1910 to 286 in 1920 then declined to 234 by 1924. Also, Cameron, *Governmental Forest Control*, pp. 294-295. Cameron writes that one-third of all district rangers resigned in 1921. Also, Steen, *U.S. Forest Service*, pp. 141-142. Also, Show, *Development of Forest Service Organization*, pp. 33, 89.

³ Morford, *Wildland Fires*, p. 43. The Tea Creek Fire is described on pages 42-44.

⁴ *Ibid.*, p. 42.

⁵ U.S. Department of Agriculture, Forest Service, *Historical Overview: Los Padres National Forest*, by E. R. (Jim) Blakeley and Karen Barnette (Goleta: Los Padres National Forest, 1985), p. 71; William S. Brown, *History of the Los Padres National Forest* (San Francisco: Region 5, 1945), pp. 136, 94. Historical File, Los Padres National Forest, Goleta, Calif.

⁶ Show and Kotok, *Forest Fire in California*, p. 68.

⁷ Ayres, *History of Fire Control*, pp. 20-21.

⁸ Morford, *Wildland Fires*, p. 44; Bower, *History of the Klamath National Forest*, 2:140, 148.

⁹ Show and Kotok, *Forest Fire in California*, p. 68.

¹⁰ Mendenhall to Charlton, December 13, 1919, Historical File, Angeles National Forest, Pasadena, Calif. This report describes the San Gabriel Fire in detail.

¹¹ *Ibid.*

¹² *Los Angeles Evening Herald*, September 17, 1919, quoted in Robinson, *The San Gabriels*, p. 203. See also U.S. Department of Agriculture, Forest Service, *Angeles National Forest Fire History, 1905-1979* (Pasadena: Angeles National Forest, 1979).

¹³ Mendenhall to Charlton, December 13, 1919.

¹⁴ Pyne, *Cultural History of Fire*, p. 439.

¹⁵ Clepper, *Professional Forestry*, p. 166.

¹⁶ Correspondence between Headley and the Washington office and between Vilas and DuBois in FRG

095, box 38538, Federal Records Center, San Bruno, Calif.

¹⁷ *Concise Dictionary of American History*, 1962 ed., s.v. "Air Force, United States."

¹⁸ A. W. Potter to DuBois, March 31, 1919, FRG 095, Box 3858, Federal Record Center, San Bruno, Calif. A copy of the letter accompanied this memo but was not retained.

¹⁹ *Ibid.*; DuBois, *Trailblazers*, p. 81.

²⁰ FRG 095, Box. 38538, Federal Records Center, San Bruno, Calif.

²¹ *Ibid.* Arnold was addressed as Major and Colonel but usually signed his name as Major. This title is used throughout for consistency.

²² *Ibid.* There was considerable experience available about handling carrier pigeons, but they proved to be erratic and undependable.

²³ *Ibid.*

²⁴ *Ibid.*

²⁵ *Ibid.* Roy Headley sat as a member of a committee on Commercial Aviation of the Bureau of Foreign and Domestic Commerce. The committee minutes of January 20, 1920, outline a program to develop commercial aviation in the United States.

²⁶ *Ibid.* The report of the 1919 Air Patrol covered all of the successes and failures of the experiment.

²⁷ *Ibid.*

²⁸ *Ibid.*

²⁹ Boothe, *Personal Narrative*, p. 77.

³⁰ FRG 095, Box 38538, Federal Records Center, San Bruno, Calif.

³¹ *Ibid.* A clipping from the *Alturas Plaindealer* of July 16, 1920, gives details of the accident.

³² *Ibid.*

³³ *Ibid.* Copies of correspondence between E. T. Allen and others, from the secretaries of war and agriculture and from agency heads and officials in state government document the struggle to obtain funding. Also an exchange between Headley (then in the Washington office) and Redington about Kotok's report about the air patrol illustrates Headley's rather rigid and uncompromising attitude.

³⁴ *Ibid.* A clipping from the *San Francisco Californian* of September 26, 1921, by Willis T. Chapman is titled, "Forest Fliers Have 'Nerve' Camp For Rest."

³⁵ *Ibid.* The supervisors were virtually unanimous on the pluses and minuses of air patrol.

³⁶ *Ibid.* Although blimps were proposed for fire control in 1916 or earlier, it was 1921 before the U.S. Navy was queried about their use.

Chapter VIII: Building a Fire Control Tradition: 1920-1924

¹ Frederick Lewis Allen, *Only Yesterday: An Informal History of the Nineteen Twenties* (New York: Harper & Brothers, 1931), pp. 166-168; Frederick Lewis Allen, *The Big Change* (New York: Harper & Brothers, 1952), pp. 115, 124.; Samuel Eliot Morison, Henry Steele Commager and William Leuchtenburg, *The Growth of the American Republic*, volume 2, sixth ed. (New York; Oxford University Press, 1969), pp. 423-470.

² Allen, *Only Yesterday*, p. 161; Allen, *The Big Change*, pp. 121-123; Harvey Wish, *Society and Thought in Modern America: A Social and Intellectual History of the American People from 1865* (New York.: Longmans, Green & Co.), pp. 441-445.

- ³ McEntire, *The Population of California*, p. 3;
- ⁴ Remi Nadeau, *Los Angeles: From Mission to Modern City* (New York: Longmans, Green & Co., 1960), p. 146; Richard F. Pourade, *The Rising Tide: The History of San Diego*, vol. 6 (San Diego: Union-Tribune Publishing Co., 1967), p. 9; Watkins, *California: An Illustrated History*, p. 352. Also, Carey McWilliams, *Southern California Country: An Island on the Land, American Folkways* (New York: Duell, Sloan & Pearce, 1946), pp. 135-137, 156-182, 227-248. McWilliams arrived in Los Angeles in the early twenties. He had a jaundiced view of the society and culture of southern California, but he loved the excitement of constant change he found there.
- ⁵ Andrew F. Rolle, *California: A History*, 3rd ed. (Arlington Heights, IL: AHM Publishing Co., 1978), pp. 501-503
- ⁶ Tad Burness, *Cars in the Early Twenties* (Philadelphia: Chilton Hook Co., 1968), pp. 75, 109; Allen, *The Big Change*, pp. 121-124.
- ⁷ McEntire, *The Population of California*, pp. 23-25; Nadeau, *Los Angeles*, pp. 147-157; W. W. Robinson, "The Southern California Real Estate Boom of the Twenties," *The Historical Society of Southern California Quarterly*, 24 (March 1942).
- ⁸ Robert M. Fogelson, *The Fragmented Metropolis: Los Angeles, 1850-1930* (Cambridge: Harvard University Press, 1967), pp. 164-177; David Lavender, *California: Land of New Beginnings* (New York: Harper & Row, 1972), p. 372.
- ⁹ Rolle, *California*, p. 434-440.
- ¹⁰ Steen, *U.S. Forest Service*, p. 147.
- ¹¹ *Ibid.*, p. 145; Also, Greeley, *Forests and Men*, pp. 74-78
- ¹² Steen. *U.S. Forest Service*, p. 146.
- ¹³ Clar, *California Government and Forestry*, 1:446-447.
- ¹⁴ Earl Pierce and William Stahl, *Cooperative Fire Control: A History of Its Origin and Development Under the Weeks and Clarke-McNary Acts* (Washington, D.C.: Government Printing Office, 1964), p. 33 quoted in Pyne, *Fire in America*, p. 352.
- ¹⁵ Clar, *California Government and Forestry*, 1:559.
- ¹⁶ Headley and Show had a career-long disagreement over fire policy. Show respected Headley as a shrewd and worthy opponent, but he had little good to say about Headley's theories of fire control. In his memoirs and unpublished monographs, Show often belittled Headley's policies. Show believed that DuBois moved Headley out of the operations job the only way he could, by promotion to Washington. If true, this move came back to haunt Show, for Headley was in a position to direct national fire policy after Show became district forester. After Greeley left the Forest Service, Headley asserted himself and took a larger role in formulating fire policy. See S. Bevier Show, *The National Forests of California* (Berkeley: Bancroft Library, 1965), p. 21 (Typewritten transcript of an oral interview by Amelia R. Fry), Also, Show, *Development of Forest Service Organization*, pp. 122, 128, 140; Show, *Reminiscences*, p. 94; Show, *History of Fire Control*, p. 80; Pyne, *Fire in America*, pp. 267-268.
- ¹⁷ Robert L. Deering, (Oral interview at San Francisco by Carl Wilson, John Hall and Joe Elliott, Jr., January 11, 1980). A copy of the tape was loaned by Carl Wilson. Also, Boothe, *Personal Narrative*, pp. 18-21.
- ¹⁸ Robert L. Deering Interview.
- ¹⁹ *Ibid.*

- ²⁰ Robert L. Deering Interview; Show, *Development of Forest Service Organization*, pp. 85, 90, 97, 103; Edward I. Kotok, *The U.S. Forest Service: Research, State Forestry and the FAO* (Berkeley: Bancroft Library, 1975), pp. 173-174, (Typewritten transcript of an oral interview by Amelia R. Fry).
- ²¹ Greeley's directive is quoted in Bower, *History of the Klamath National Forest*, 3:3; Ayres, *History of Fire Control*, p. 27.
- ²² "Report of the Mather Field Conference," Historical File, Aviation and Fire Management Staff, Region 5, San Francisco.
- ²³ Ibid. A photograph with names of conferees on the back is in the History Office, Forest Service, Washington, D.C.
- ²⁴ R. C. M. Berriman, Georgetown District Ranger, wrote about beds to the supervisor of the Eldorado on January 28, 1919: "We now have at practically all of the firemen's stations a bedstead fitted with springs. These are rather cold comfort without a mattress. At present the fireman either gets their own or goes without." Berriman suggested the forest buy some mattresses. Historical File, Eldorado National Forest, Placerville, Calif. Also, "Report of the Mather Field Conference."
- ²⁵ Ibid.
- ²⁶ Ibid. Also, correspondence with J. E. Elliott, Jr., February 27 and 28, 1987, and March 4, 1987. Elliott states that kerosene lanterns were used at night. A makeshift lantern called a "bug" was made by punching a hole in the side of a one-gallon food can and inserting a candle. The bottom and sides of the can served as reflectors, and a piece of No. 9 telephone wire was attached for a handle.
- ²⁷ "Inspection Report, Klamath National Forest." Historical File 1680, vol. 3, Klamath National Forest, Yreka, Calif.
- ²⁸ Pourade, *Rising Tide*, p. 82.
- ²⁹ Possibly the pocosin swamps of coastal North Carolina or the pine barrens of New Jersey may equal the Los Padres in size and frequency of large fires.
- ³⁰ "Matilija No. 2: A Report on the Wheeler Springs Fire of 1948 on the Los Padres National Forest," by Andrew G. Brenneis and Robert F. Kelleher, Historical File, Los Padres National Forest, Goleta, Calif.
- ³¹ Jacinto D. Reyes, "Thirty Years Fighting Fire in Our Forests," *Ventura County Historical Society Quarterly* 11 (August 1966), p. 12.
- ³² Reyes, "Thirty Years Fighting Fire," p. 12; Historical File, Aviation and Fire Management Staff, Region 5, San Francisco. About 725,718 acres burned in the four southern California forests during the twenties, which was 42 percent of the District 5 total.
- ³³ "Report of the Los Angeles Fire Protection Conference, October 30, 1923," FRG 095, Box 27837, Federal Records Center, San Bruno, Calif.; Reyes, "Thirty Years Fighting Fire," p. 12; Historical File, Los Padres National Forest, Goleta, Calif.
- ³⁴ Boothe, *Personal Narrative*, pp. 55-61. Also, J. E. Elliott, Jr., Correspondence. Elliott says a common method to "pick up" firefighters was to station a deputy sheriff and a truck at the back door of a pool hall or beer joint. The forest officer went in the front door and asked for volunteer firefighters. As the denizens stampeded out the back door, onto the truck they went. It was no wonder that such recruits weren't worth much as firefighters.
- ³⁵ Ibid., p. 61.
- ³⁶ Brown, *History of the Los Padres*, p. 87. Boothe worked with Jordan in the Sierra Forest. Jordan was well-liked there and his wife, Louise, had "ideal qualifications for a Ranger's wife" according to Boothe. See Boothe, *Personal Narrative*, pp. 50-51.

- ³⁷ Historical File, San Bernardino National Forest, San Bernardino, Calif.
- ³⁸ U.S. Department of Commerce, Weather Bureau, *Climatological Data*, California Section, 1923.
- ³⁹ This account of the meeting is based on the "Report of the Fire Protection Conference, October 30, 1923," and correspondence in FRG 095, Box 27837, Federal Records Center, San Bruno, Calif.
- ⁴⁰ Ibid. Flintham was in charge of the Los Angeles County Department of Forestry and Fire Warden. The shorter title of County Forestry and Fire Department is used for brevity's sake.
- ⁴¹ U.S. Department of Agriculture, Forest Service, *Service Directory*, October 1923, p. 26.
- ⁴² Stephen A. Nash-Boulden, *Supervision, Fire and Growth: Thirty-five Years of Growth* (Goleta: Los Padres National Forest, 1979), pp. 10-12 (Typewritten transcript of an oral interview by Reed Holderman). Nash-Boulden describes the San Bernardino division after his arrival as forest supervisor in 1925. He said the district got out of hand and illustrated his comment with several examples. In one case, a ranger bought whiskey and charged it to the government as hay. That ranger was fired along with several others. The same situation did not exist on the Pasadena district, where Bill Mendenhall ran a tight ship.
- ⁴³ Ibid.
- ⁴⁴ Weather Bureau, *Climatological Data*, 1923-1924.
- ⁴⁵ Ayres, *History of Fire Control*, pp. 28-29; U.S. Department of Agriculture, Forest Service, *California District News Letter*, May 9, 1924. A complete bound file of this newsletter is in Historical Files, Recreation Staff, Region 5, San Francisco. Also, "Board of Fire Review for Northern California, District V, Season of 1924, November 4, 1924," pp. 2-3, Historical File, Aviation and Fire Management Staff, Region 5, San Francisco.
- ⁴⁶ "Report of Conference, March 3, 1924," FRG 095, Box 27837, Federal Records Center, San Bruno, Calif. Also Clar, *California Government and Forestry*, 1:544. Clar states that the association was incorporated in November 1925, but apparently it was functioning before then. H. S. Bissell is identified as president of the association at the March 1924 meeting. Also, letters were exchanged between the association and District 5 during 1924.
- ⁴⁷ "Report of Conference, March 3, 1924."
- ⁴⁸ Ibid.
- ⁴⁹ Clar, *California Government and Forestry*, 1:584; "Report of the Board of Fire Review for Southern California, December 1924," p. 24, Historical File, Aviation and Fire Management Staff, Region 5, San Francisco.
- ⁵⁰ Hutchison to Redington, June 23, 1924, FRG 095, Box 27837, Federal Records Center, San Bruno Calif.
- ⁵¹ "Fire Review for Northern California, 1924," pp. 1-2.
- ⁵² Bower, *History of the Klamath National Forest*, 3:85-86.
- ⁵³ Ibid., 3:86-88.
- ⁵⁴ Historical File, Aviation and Fire Management Staff, Region 5, San Francisco.
- ⁵⁵ Bigelow, *History*, pp. 370-383.
- ⁵⁶ Associated Press dispatches, *Oroville Daily Register*, July through August, 1924.
- ⁵⁷ *Los Angeles Times*, September 4, 1924; *Oroville Daily Register*, September 4, 1924.

⁵⁸ “Fire Review for Southern California, 1924.” The description of the San Gabriel Fire is based on this report. Also, Show, *Reminiscences*, pp. 121-122. Show says that Greeley took over the fire and gave it to Evan Kelley. Kelley wanted to backfire the entire North Fork. Instead, Show took a crew out and cold trailed the fire in that area.

⁵⁹ *District News Letter*, September 20, 1924.

⁶⁰ “Fire Review for Southern California, 1924.”

⁶¹ Wiley, John L., *History of Monrovia* (Pasadena: n.p., 1927) quoted in Robinson, *The San Gabriels II*, pp. 76-77.

⁶² Nash-Boulden, *Supervision. Fire and Growth*, p. 22.

⁶³ Historical File, Aviation and Fire Management Staff, Region 5, San Francisco.

⁶⁴ Cameron, *Development of Governmental Forest Control*, pp. 317-318. Cameron made some interesting comments about California weather and firefighting conditions. The 1924 fire season, he wrote, was unusually dry, “with practically no rainfall from early April till late August.” This time of year in California is normally dry. It was the lack of precipitation, hot weather and drying winds in the winters of 1922-1923 and 1923-1924 that set the stage for disaster. His comments about firefighting in District 5 as compared to Districts 1 and 6 were also erroneous.

⁶⁵ *District News Letter*, September 20, 1924; *District News Letter*, October 17, 1924.

⁶⁶ *Oroville Daily Register*, August 16, 1924; Interview with George James, September 15, 1986. Rumors persisted into the thirties that Redington had suffered a nervous breakdown during the 1924 fire season. Also, Robert L. Deering Interview. Deering described the breakdown and the strain it placed on others in the district office. There is ample documentation of trips made by Redington to several forests during the summer of 1924. Redington met with local forest officers, politicians and interest groups during these trips. Apparently he was not completely incapacitated. Redington was transferred to the Washington office in February 1926. Also, Show, *Reminiscences*, p. 119. Show commented on Deering during the 1924 season, “You just didn’t argue with Bob. Red had blown up early in the campaign and Bob took over—a real tough job.”

⁶⁷ News for Forest Schools, 3 (November 1924). This was a District 5 newsletter sent to forestry school students as a promotion of Forest Service activities.

Chapter IX: Responding to a Decade of Fire: 1925-1929

¹ Steen, *U.S. Forest Service*, pp. 180-188; Clar, *California Government and Forestry*, 1:557-562; Dana and Fairfax, *Forest and Range Policy*, 2nd ed., pp. 123-127; Show, *Reminiscences*, p. 122. Show recalled that he, Price, Kotok and Pitchlynn came up with the idea of boards of review and “sold it to Deering.”

² Bower, *History of the Klamath National Forest*, 3:87; *California District News Letter*, September 12, 1924; *Ibid.*, September 19, 1924; Nash-Boulden, *Supervision. Fire and Growth*, p. 22; *Oroville Daily Register*, August 16, 1924; Bigelow; *History*, p. 370-383.

³ The discussion of the northern California review is based on “Report of the Board of Fire Review for Northern California, 1924.” Also, Show, *Reminiscences*, p. 122. Show remembers the Northern California Board of Review and that “Red couldn’t take it for long.” (See Note 66, Chapter VII.) Also, Ayres, *History of Fire Control*, pp. 30-34; Ayres wrote that the chief forester revised fire damage appraisals in April 1925, February 1926, and July 1926 as a result of the 1924 fires. The revisions strengthened lawsuits against individuals and companies that started fires in national forests. District Forester Redington called for hazard surveys in January 1925. Hazard maps were to be kept in each forest fire

atlas. Also, Bower, *History of the Klamath National Forest*, 3:100. Assistant rangers and a few new rangers attended the first session of the ranger school from October 8th to November 14th. An advanced course, held from November 14th to 19th, trained supervisors and assistant supervisors. Trainees from both sessions were enthusiastic in praising the school. Also, Show, *History of Fire Control in California*, p. 123. Show was an instructor at the first session. He wrote that about half of the first class retired after the classes ended.

- ⁴ The discussion of the southern California review is based on "Report of the Board of Fire Review for Southern California, 1924." Sherman had been supervisor of the Sequoia National Forest, and Kelley had been supervisor of the Eldorado Forest. Kelley was a veteran fire control administrator, but none of the board had much experience in directing control of large chaparral fires. Greeley put Kelley in charge of the San Gabriel Fire, but he was not a notable success in that assignment.
- ⁵ *Ibid.*, p. 59.
- ⁶ *Ibid.*, p. 59.
- ⁷ Clar, *California Government and Forestry*, 1:596-597; Ayres, *History of Fire Control*, p. 34.
- ⁸ Robinson, *The San Gabriels*, p. 203; Robinson, *The San Gabriels II*, p. 77; Show, *History of the Angeles National Forest*, p. 86. Show says the Angeles had 14 miles of Forest Service roads in 1920, 27 miles in 1925, 94 miles in 1930, 165 miles in 1932, 1,106 miles in 1936 and 1,177 miles in 1940. Obviously the CCC built most of the roads in the forest. Also, J. E. Elliott, Jr. Correspondence. The lower standard roads were called "truck trails," a name still in use in southern California.
- ⁹ *Service Directory*, 1925; *Service Directory*, 1928; Bower, *History of the Klamath National Forest*, 3:103; Clar, *California Government and Forestry*, 2:98; Correspondence, FRG 095, Box 27837, Federal Records Center, San Bruno, Calif.
- ¹⁰ Show, *Reminiscences*, p. 136. Show remembered one counseling session. "Gus gave them the resign or answer charges looking to dismissal routine and I sat by and scowled at them." Nash-Boulden, *Supervision. Fire and Growth*, pp. 9-12. Nash-Boulden died in 1987 at the age of 100.
- ¹¹ *Service Directory*, 1929; Taped interview with William A. Peterson, July 20, 1985; George James Interview; Show, *The National Forests of California*, pp. 54, 82; J. E. Elliott, Jr. Correspondence. Elliott says that staff officers were known as "Rangers-at-large," sometimes defined as people whom the forest supervisor planned to transfer elsewhere as soon as possible.
- ¹² Clar, *California Government and Forestry* 1:449-451, 2:8. This section is based on Clar's books, which are the authority on this subject.
- ¹³ *Ibid.*, 1:485-486; Correspondence, FRG 095, Box 27837, Federal Records Center, San Bruno, Calif.
- ¹⁴ Clar, *California Government and Forestry*, 1:485-486; Show, *History of Fire Control in California*, p. 167. Show believed that Pratt was a weak administrator with politically potent supporters.
- ¹⁵ Clar, *California Government and Forestry*, 1:486, 528-534. Chairman Pardee would have been asked to resign anyway, so he made the most of his opportunity. Also, *News for Forest Schools*, 2 (February 1923).
- ¹⁶ Clar, *California Government and Forestry*, 1:482.
- ¹⁷ *Ibid.*, 1:550, 587.
- ¹⁸ *Ibid.*, 1:554-555.
- ¹⁹ *Ibid.*, 1:536.

- ²⁰ Ibid., 1:521-527; Donald C. Swain, *Federal Conservation Policy: 1921-1933* (Berkeley: University of California Press, 1963), pp. 12-16. Swain has the best account of Pinchot's attempt to regulate logging on private lands and Greeley's alternative approach to the situation. Also, Dana and Fairfax, *Forest and Range Policy*, pp. 123-127.
- ²¹ Clar, *California Government and Forestry*, 1:501-503. Rider was a former supervisor of the Klamath National Forest. He was Deputy State Forester for many years. Also, *News for Forest Schools*, 1 (April 1922) and 2 (November 1923). The fire prevention work included construction of firebreaks, piling and burning slash in strips along the firebreaks, stringing telephone line, posting a lookout and patrolling the area. Also, James A. Young and Jerry D. Budy, "Adaptation of Tracklaying Tractors for Forest Road and Trail Construction," *Journal of Forest History* 31 (July 1987). Young and Budy report a 25-mile-long firebreak built around a timber sale with tractor and grader.
- ²² Clar, *California Government and Forestry*, 1:601-602. Pratt also had to respond to the Board of Forestry. The board nominated the state forester to the director. The Division of Forestry began operations on July 29, 1927.
- ²³ Ibid., 1:607.
- ²⁴ Ibid., 2:102
- ²⁵ Ibid., 2:20, 98, 103. The association was known as the Southern California Conservation Association from 1924 until 1927. It was an outgrowth of several previous committees of the Los Angeles Chamber of Commerce. Also, Ibid., 1:545-546. The California Development Association began operations in 1921 as a voice of the chambers of commerce of the state. The association became the State of California Chamber of Commerce in 1925. Also, Kotok, *The U.S. Forest Service*, pp. 32-35. The first president of the state chamber of commerce was Norman Sloan, former forest supervisor of the Cleveland and Shasta Forests. Ed Kotok became well acquainted with Sloan and members of similar organizations in southern California. This close working relationship was important in gaining public and political support for fire control and forestry programs in California and Washington, D.C. Also, Show, *History of Fire Control in California*, pp. 161-173. San Mateo and Marin Counties also had county fire departments.
- ²⁶ Show's biography is based on comments by his sister Ruth in Show, *The National Forests of California*, pp. ii-xi. Also, see biographies in Forest Service press releases, History Office; Forest Service, Washington, D.C. Also, Show, *Reminiscences*.
- ²⁷ Letter from Edward S. Kotok, July 7, 1986.
- ²⁸ Show, *Reminiscences*, p. 6; City fathers changed the name of Sisson to Mt. Shasta in November 1925 according to Bower, *History of the Klamath National Forest*, 3:111.
- ²⁹ Show, *Reminiscences*, p. 10.
- ³⁰ Kotok, *The U.S. Forest Service*, pp. 244-250; letter from Edward S. Kotok, July 7, 1986.
- ³¹ Letter from Edward S. Kotok, July 7, 1986. Also, Show, *The National Forests of California*, pp. xii-xiii. Ruth Show Kotok and Edward S. Kotok, her son, both describe the way Show and Kotok needled each other. Show liked to tease, and sometimes his teasing went beyond fun. When he met Ed Kotok, he was on the receiving end as often as not. It appears that teasing was a form of mental jousting between the two men. It took several years before they developed a mutual understanding and were able to channel the teasing into more productive pursuits. Also, George James Interview. James recalled sitting in on many meetings with Show and Kotok during the thirties and watching in some awe as they verbally crossed swords. All accounts agree that Show and Kotok were both intellectually brilliant, each in his own

way. Also, Show, *Reminiscences*, p. 41. Show, et al., broke Kotok of bumming pipe tobacco by loading up a can with chopped rubber bands and leaving it for him to find.

- ³² Show, *Reminiscences*; Historical Files, Eldorado National Forest, Placerville, Calif.
- ³³ Show and Kotok, *Forest Fires in California*, 1911-1920.
- ³⁴ U.S. Department of Agriculture, Forest Service, *Weather Conditions and Forest Fires in California*, by S. B. Show and E. I. Kotok, U.S. Department of Agriculture Circular No. 354 (Washington, D: C.: Government Printing Office, 1925); U.S. Department of Agriculture, Forest Service, *Cover Types and Fire Control in the National Forests of California*, by S. B. Show and E. I. Kotok, U.S. Department of Agriculture Bulletin No. 1495 (Washington, D.C.: Government Printing Office, 1929); U.S. Department of Agriculture, Forest Service, *The Determination of Hour Control for Adequate Fire Protection in the Major Cover Types of the California Pine Region*, by S. B. Show and E. I. Kotok, U.S. Department of Agriculture Technical Bulletin No. 289 (Washington, D.C.: Government Printing Office, 1930); U.S. Department of Agriculture, Forest Service, *Principles of Forest Fire Detection on the National Forests of California*, by S. B. Show and E. I. Kotok, U.S. Department of Agriculture Technical Bulletin No. 574 (Washington, D.C.: Government Printing Office, 1937). Also, a letter from Edward S. Kotok, April 25, 1985. Edward S. Kotok recalled the collaboration between Show and Kotok: "As a youngster, I remember Dad and Bevier sitting at the dining room table yelling and arguing over each and every sentence in their earliest publications...And my mother, Ruth...was the transcriber, secretary and ultimate authority on grammar, syntax, clarity and meaning...These writing sessions would go on for two or three weeks at a stint."
- ³⁵ Show, *Development of Forest Service Organization*, pp.95-96, 103. Also, Show, *Reminiscences*, pp.124-129. Show was offered both the district forester and experiment station director jobs. He recalled Greeley saying, "Bevier, if you can get on top of the fire situation, I'll be satisfied."
- ³⁶ Biographical data, History Office, Forest Service, Washington, D.C.; Clar, *California Government and Forestry*, 1:593-594.
- ³⁷ Historical Files, Aviation and Fire Management Staff, Region 5, San Francisco, Calif.
- ³⁸ Weather Bureau, *Climatological Data*, California Section, 1926; Bower, *History of the Klamath National Forest*, 3:120.
- ³⁹ Bower, *History of the Klamath National Forest*, 3:124; Morford, *Wildland Fires*, p. 56.
- ⁴⁰ Morford, *Wildland Fires*, pp. 56-57.
- ⁴¹ *Ibid.*, pp. 57-58.
- ⁴² Show, *Development of Forest Service Organization*, p. 102; Ayres, *History of Fire Control*, p. 42; Hotelling, *My Life with the Kar-ooks*, p. 87; *District News Letter*, August 20, 1926; *Ibid.*, October 3, 1926; Show, *Reminiscences*, pp.142-146. Show recalls that five rangers quit, a supervisor was demoted and another was warned.
- ⁴³ Annual Fire Reports, District 5, Historical Files, Aviation and Fire Management Staff, Region 5, San Francisco, Calif.; Fire reports, Historical Files, Sequoia National Forest, Porterville, Calif. On August 12, 1926, the Bear Mountain Fire started seven miles west of the Sequoia Forest boundary. Before the fire was controlled on August 21st, it burned 35,000 acres, of which 14,700 acres was national forest land. This fire was started by a smoker or incendiary.
- ⁴⁴ Ayres, *History of Fire Control*, pp. 37, 65, 81; Annual Fire Reports, District 5, Historical Files, Aviation and Fire Management Staff, Region 5, San Francisco, Calif.
- ⁴⁵ Ayres, *History of Fire Control*, pp. 38, 42.

⁴⁶ Bigelow, *History*.

⁴⁷ Boothe, *Personal Narrative*, pp. 12-13.

⁴⁸ Taped interviews with Rupert Asplund, September 4, 1984, and May 5, 1985.

⁴⁹ Robert L. Deering Interview. Also, J. E. Elliott, Jr. Correspondence. Joe Elliott, Jr. recalls Durbin's uncanny accuracy with tobacco juice. Durbin liked to sit before a fireplace with a vertical grill. His jets of tobacco hit the chosen spaces nine out of ten attempts. Durbin was notoriously thrifty. Whenever a building was torn down he had the workers save all bent nails and straighten them for later use.

⁵⁰ Clar, *California Government and Forestry*, 2:25; Show, *The National Forests of California*, p. 25. Also, "Obituary: Jay Price," *Journal of Forestry* 60 (February 1962), p. 153. Price died December 10, 1961.

⁵¹ Rupert Asplund Interviews.

⁵² Correspondence, FRG 095, Box 38359, Federal Records Center, San Bruno, Calif.

⁵³ Ibid.

⁵⁴ Ibid.

⁵⁵ Ibid.

⁵⁶ Memo to files, Robert L. Deering, October 7, 1925, FRG 095, Box 38359, Federal Records Center, San Bruno, Calif.; Pyne, *Fire in America*, pp. 441-442. Pyne mentions a picture in the August 1919, *Scientific American* magazine of an Army Air Patrol plane dropping chemicals on a fire.

⁵⁷ Opinion from C. W. Boyle, acting solicitor of the United States to W. B. Greeley, April 6, 1927, and other correspondence, FRG 095, Box 38359, Federal Records Center, San Bruno, Calif. In 1926, there were 199 flights, 328-½ hours of flying time, one first report of a fire, 62 reconnaissance missions, and the total cost of air patrol in District 5 for 1926 was \$19,227. The record for 1927 was 128 flights, 262 hours flown, 11 first reports, 34 reconnaissance missions and a total cost of \$17,516.

⁵⁸ "Fire Review for Northern California, 1924"; Robert L. Deering Interview; Ayres, *History of Fire Control*, p. 41; *District News Letter*, July 9, 1926; Young and Budy, "Adaptations of Tracklaying Tractors."

⁵⁹ Letter from Edward S. Kotok, April 25, 1985.

⁶⁰ Show, *History of Fire Control in California*, pp. 137-139. Show wrote that three trailbuilders were purchased by District 5 each year after 1927. The purpose was for road building. Also, Ayres, *History of Fire Control*, p. 41; Robert L. Deering Interview; Rupert Asplund Interviews. Earl Morrow did the work on the blade according to Asplund. Morrow was a "mechanical genius" and had been mechanic for World War I ace Eddie Rickenbacker. Also, Young and Budy, "Adaptations of Tracklaying Tractors." Cletrac was an acronym for Cleveland Tractor Company. Hall and Wooldridge demonstrated their dozers in 1931 in the Mendocino National Forest.

⁶¹ Rupert Asplund Interviews; Bower, *History of the Klamath National Forest*, 3:142; Ayres, *History of Fire Control*, pp. 40, 69. Ayres wrote that Los Angeles County Forestry and Fire Department loaned a fire truck to the Angeles Forest in 1921. It was used on a fire the following year. Also, the *District News Letter*, July 29, 1926 reported that the Shasta National Forest had received the third fire truck in the district.

⁶² Woodbridge Metcalf, "Tank Trucks for Rural and Forest Fire Fighting," *Journal of Forestry* 31 (May 1933), pp. 522-532.

⁶³ Clar, *California Government and Forestry*, 2:28-30; Brown, *History of the Los Padres National Forest*, p. 154. Also, Rupert Asplund Interviews. Headley was still looking for cheaper ways to build firelines even after the trailbuilder was developed. He arrived in the Sierra National Forest in 1930 with a horse and

fire plow unit ready to test under Sierra conditions. Asplund and Earl Morrow were assigned to help him. They trekked up to Bass Lake and picked an open timber stand thickly grown with bear clover (*Chamaebatia foliolosa* Benth.). This low-growing, aromatic plant has a myriad of deep, interlaced roots. Asplund and Morrow unloaded the horse and plow, hitched up and set off across the bear clover slope. The fireline left by the plow looked clean, crisp and beautiful as a ten-inch flap of bear clover peeled off to one side of the trench. Headley was beaming with satisfaction as they continued for a hundred yards or so across the slope. Then he looked back along the plow line and watched in dismay as the bear clover slowly folded over and fell back into the trench as if it were on a hinge. Asplund remembered, "Headley didn't say anything; he just loaded up the horse and plow and went back to Washington." Of course, horse and plow units had been used in 1915 in the Sierra and Lassen Forests.

- ⁶⁴ Ayres, *History of Fire Control*, pp. 48-49; *Proceedings, Forest Supervisor's Meeting, December 1910*; Clar, *California Government and Forestry*, 2:146; Show, *History of Fire Control in California*, p. 144. Benedict proposed establishment of fire crews in early 1927, but Greeley did not see the need for them.
- ⁶⁵ Swain, *Federal Conservation Policy*, p. 17; Bower, *History of the Klamath National Forest*, 3:152.
- ⁶⁶ Bower, *History of the Klamath National Forest*, 3:154.
- ⁶⁷ Annual Fire Reports, District 5, Historical Files, Aviation and Fire Management Staff, Region 5, San Francisco, Calif.
- ⁶⁸ Clar, *California Government and Forestry*, 2:47-48. Subsequently each agency kept track of funds spent on the other's land and settled up at the end of the fire season.
- ⁶⁹ Annual Fire Reports, Historical Files, Sequoia National Forest, Porterville, Calif.
- ⁷⁰ Annual Fire Reports, District 5, Historical Files, Aviation and Fire Management Staff, Region 5, San Francisco, Calif.; Morford, *Wildland Fires*, pp. 61-62.
- ⁷¹ Morford, *Wildland Fires*, p. 62.
- ⁷² Historical Files, Los Padres National Forest, Goleta, Calif.
- ⁷³ Fire Reports, Historical Files, San Bernardino National Forest, San Bernardino, Calif.; Fire Reports, Historical Files, Cleveland National Forest, San Diego, Calif.
- ⁷⁴ Fire Reports, Historical Files, Cleveland National Forest, San Diego, Calif.
- ⁷⁵ Fire Reports, Historical Files, San Bernardino National Forest, San Bernardino, Calif.; Boothe, *Personal Narrative*, pp. 63-64.
- ⁷⁶ Fire Reports, Historical Files, San Bernardino, National Forest, San Bernardino, Calif. The fire report treated the death of the two Mexicans in a rather off-hand manner.
- ⁷⁷ Annual Fire Reports, District 5, Historical Files, Aviation and Fire Management Staff, Region 5, San Francisco, Calif.
- ⁷⁸ Morford, *Wildland Fires*, pp. 64-65, 67.
- ⁷⁹ *Inyo Inklings*, August 1, 1928, (Forest Newsletter).
- ⁸⁰ An excellent description of the stock market craze of the late twenties is in Cabell Phillips, *From the Crash to the Blitz: 1929-1939* (New York: The Macmillan Co., 1969), pp. 16-30. Also, Arthur M. Schlesinger, Jr., *The Crisis of the Old Order 1919-1933: The Age of Roosevelt* (Boston: Houghton, Mifflin Co., 1957), pp. 49-60.
- ⁸¹ Clar, *California Government and Forestry*, 2:193; Show, *The National Forests of California*, p. 1; Annual Fire Reports, District 5, Historical Files, Aviation and Fire Management Staff, Region 5, San Francisco,

Calif. Reported incendiary fires within national forest boundaries in Region 5 were 1928 - 72; 1929 - 177; 1930 - 135; 1931 - 209; 1932 - 189; 1933 - 90; 1934 - 61.

⁸² Annual Fire Reports, District 5, Historical Files, Aviation and Fire Management Staff, Region 5, San Francisco, Calif.

⁸³ Bower, *History of the Klamath National Forest*, 3:178.

⁸⁴ *Ibid.*, 3:174-179.

⁸⁵ Phillips, *From the Crash to the Blitz*, pp. 30-31. Also, see Schlesinger, *The Crisis of the Old Order* for a comprehensive view of the politics of the twenties from a liberal historian's viewpoint.

Chapter X: Fire Control Comes of Age: 1930-1935

¹ Schlesinger, *Crisis of the Old Order*, pp. 162-167; Allen, *The Big Change*, p. 146.

² Phillips, *From Crash to Blitz*, p. 34. Also, see Watkins, *California: An Illustrated History*, pp. 363-376, for the economic picture in California and pp. 405-414, for an objective account of the California farm situation.

³ Schlesinger, *Crisis of the Old Order*, p. 249.

⁴ Quoted in Schlesinger, *Crisis of the Old Order*, p. 57

⁵ *Ibid.*, pp. 163-269; Phillips, *From Crash to Blitz*, pp. 44-56; Allen, *The Big Change*, p. 146; Rolle, *California*, p. 470; Charles A. Beard and Mary R. Beard, *America in Midpassage* (New York: The Macmillan Co., 1939), pp. 55-127.

⁶ The flavor of the Depression years in Region 5 comes through in Jim McNeill's "These Changing Years" and other accounts in the History File, Klamath National Forest, Yreka, Calif. Also, Show, *Forest Service Organization*, p. 123. Also, Bower, *History of the Klamath National Forest*, 4:45,65. Also, Ayres, *History of Fire Control*, pp. 50-53. The quote is in Ayres, p. 50.

⁷ Show, *Reminiscences*, p. 209.

⁸ Clar, *California Government and Forestry*, 2:193; State of California, Division of Forestry, *California State Forestry Labor Camps*, by Walter D. Winters (Sacramento: Division of Forestry, 1973), p. 3; Also, see Chapter IX, Note 81.

⁹ Clar, *California Government and Forestry*, 2:194-198; Also, in May 1930 the Forest Service changed the name of its districts to "regions." Henceforth, District 5 is referred to as Region 5 and the district forester as the regional forester; G. H. Collingwood, "Forestry Aids the Unemployed," *American Forests* 38 (October 1932), pp. 550, 574-575.

¹⁰ Winters, *Forestry Labor Camps*, pp. 3-20; Show, *History of Fire Control*, pp. 161-162. The first camp in Region 5 was set up on the South Fork of the Merced River in the Sierra Forest. Show says the state contributed \$110,000, Region 5 \$14,000 and the California Protective Association \$8,300 toward the camps in the 1931 season.

¹¹ Robert L. Deering, "Camps for the Unemployed in the Forest of California," *Journal of Forestry* 30 (May 1932), pp. 554-557; Ayres, *History of Fire Control*, p. 53; Clar, *California Government and Forestry*, 2:194; 206-210; Schlesinger, *Crisis of the Old Order*, pp. 178-179.

¹² Bower, *History of the Klamath National Forest*, 4:2, 66; Ayres, *History of Fire Control*, p 51.

¹³ Clar, *California Government and Forestry*, 2:213-216; Winters, *Forestry Labor Camps*, pp. 17, 26, 35. The quote is in Winters, p. 8.

- ¹⁴ Swain, *Federal Conservation Policy*, p. 20; Clar, *California Government and Forestry*, 2:213-216.
- ¹⁵ Weather Bureau, *Climatological Data California Section - 1929-1939*; Annual Fire Reports, History File, Aviation and Fire Management Staff, Region 5, San Francisco.
- ¹⁶ Annual Fire Reports, History File, Aviation and Fire Management Staff, Region 5, San Francisco.
- ¹⁷ Bower, *History of the Klamath National Forest*, 3:186-187; Morford, *Wildland Fires*, p. 73; Jim McNeill, "There's a Man Hurt Up There," History File, Klamath National Forest, Yreka, Calif.
- ¹⁸ Annual Fire Reports, History File, Aviation and Fire Management Staff, Region 5, San Francisco. Calif.
- ¹⁹ *Ibid.*; History File, Plumas National Forest, Quincy, Calif.
- ²⁰ Annual Fire Reports, History File, Aviation and Fire Management Staff, Region 5, San Francisco; History Files, Los Padres National Forest, Goleta, Calif.; History File, Mendocino National Forest, Willows, Calif. The name of the California National Forest was changed to Mendocino National Forest on July 12, 1932.
- ²¹ Hotelling, *My Life with the Kar-ooks*, pp. 97-102.
- ²² Annual Fire Reports, History Files, Aviation and Fire Management Staff, Region 5, San Francisco.
- ²³ History Files, Plumas National Forest, Quincy, Calif.; Annual Fire Reports, History File, Aviation and Fire Management Staff, Region 5, San Francisco.
- ²⁴ Bower, *History of the Klamath National Forest*, 4:147. Bower also recorded a near-miss fatality when Ranger Clyde Lewis was backpacking into a fire in the South Fork of the Salmon River on September 14, 1934. As he hiked along, lightning struck a nearby tree, bounced off and hit Lewis, knocking him down and out. Lewis woke up and lay there, probably pondering on his choice of a career, then got up and went on to the fire. Also, DeWitt Nelson, *Management of Natural Resources in California. 1925-1966* (Berkeley: University of California Library, 1976). (Typewritten manuscript of an oral interview by Amelia R. Fry.) Both Bower and Nelson were on the fire that killed Everitt. He had been supervisor since May 1934. Also, Elliott Correspondence.
- ²⁵ Annual Fire Reports, History File, Aviation and Fire Management Staff, Region 5, San Francisco.
- ²⁶ The description of fire prevention activities is based on Ayres *History of Fire Control*, pp. 51, 74-77 and Debby Wetlaufer, *Fire History (1910-1980)*, San Bernardino National Forest, San Bernardino, Calif.
- ²⁷ The excerpts from Lyle Hill's diary are taken from Bower, *History of the Klamath National Forest*, 4:7-70. They are selected from the years 1931-1932, and are intended as a small sample of routine fire control work. A day-to-day excerpt would show even more routine, sometimes boring work.
- ²⁸ The description of the Matilija Fire is based on "Briefed Fire History, October 1, 1932" by S. A. Nash-Boulden and Fred Funke found in FRG 095, Box 61147, Federal Records Center, San Bruno, Calif.
- ²⁹ Nash-Boulden, *Supervision, Fire and Growth*, pp. 16-17; Also, Brown, *History of the Los Padres National Forest*, p. 143. Brown has a different version of this incident, or else Nash-Boulden was in more than one narrow escape on this fire.
- ³⁰ Nash-Boulden, *Supervision, Fire and Growth*, pp. 17, 20.
- ³¹ *Ibid.*, p. 17; Brown, *History of the Los Padres National Forest*, p. 143.
- ³² Show to The Forester, September 23, 1932, FRG 095, Box 61147, Federal Records Center, San Bruno, Calif.; Brown, *History of the Los Padres National Forest*, p. 142. All accounts describe this awesome display. As amazing as this fire run was, it has probably been exceeded. See Holbrook, *Burning an Empire*, pp. 137-141, for a description of the Tillamook Fire in Oregon, which reportedly consumed 270,000 acres of

heavy timber in just twenty hours, August 24-25, 1933.

³³ Nash-Boulden, *Supervision, Fire and Growth*, p. 17.

³⁴ *Ibid.*; Also, Brown, *History of the Los Padres National Forest*, p. 144. Brown describes the heroic efforts of Mrs. H. M. Hunt, a Ojai horse rancher, who saved a crew by keeping them under wet blankets in a creek as the fire swept over them. This may have been the incident of the 17th. Emerick's first name was not found in the files.

³⁵ Show to The Forester, October 7, 1932, FRG 095, Box 61147, Federal Records Center, San Bruno, Calif.

³⁶ *Ibid.*

³⁷ Nash-Boulden to Show, October 5, 1932, FRG 095, Box 61147, Federal Records Center, San Bruno, Calif.

³⁸ Peter Michelmores, "Fire in the Front Country," *Reader's Digest* (December 1986): 106-111.

³⁹ Clar, *California Government and Forestry*, 2:235-236; John A. Salmond, *The Civilian Conservation Corps, 1933-1842: A New Deal Case Study* (Durham: Duke University Press, 1967), p. 8; Schlesinger, *Crisis of the Old Order*, pp. 334-336; Dana and Fairfax, *Forest and Range Policy*, pp. 142-144; "Franklin D. Roosevelt; Forester," *Journal of Forestry* 31 (January 1933), pp. 1-3, Editorial; Rolle, *California*, pp. 471, 478.

⁴⁰ Salmond, *Civilian Conservation Corps*, pp. 9-23. Salmond has the best account of the CCC from the national viewpoint. He describes the legislative process and the opposition of labor and the Socialist Party. Labor protested the low wages for enrollees but may have been mollified by appointment of labor leader, Robert Fechner, as head of the CCC. The socialists saw the CCC camps as potential "fascist work camps." The Army kept a low profile in the debate because many people were concerned that the CCC might become a para-military organization such as the Hitler Youth.

⁴¹ *Ibid.*, pp. 26, 35-37, 101; Congress adopted the name Civilian Conservation Corps by act of June 23, 1937. Also, Clar, *California Government and Forestry*, 2:239.

⁴² Show, *History of Fire Control*, pp. 179-182. Show described the CCC days as "the big Bonanza." Also, Show, *National Forests of California*, pp. 10-23. Show's comments about some of the other participants in CCC planning are brutally frank. Also, Clar, *California Government and Forestry*, 2:239.

⁴³ Show, *National Forests of California*, pp. 19-23; Also, Bower, *History of the Klamath National Forest*, 4:76-77. Bower reported a conversation with Show years later. Show said after the meeting with the president, he and Kotok worked all night developing the organization and equipment needed for the camps. They telephoned Deering and instructed him to prepare bids and begin recruiting. At the regional forester's meeting the next day, Show was chastised for violating fiscal rules, but his plan was accepted. Bower questioned Show about the ethics of such procedure. Show replied that, in this case, the ends justified the means. Also, Clar, *California Government and Forestry*, 2:243.

⁴⁴ Show, *History of Fire Control*, pp. 179-182; Show, *National Forests of California*, pp. 24, 97; Also, Brown and Show, *California Rural Land Use*, p. 450. The numbers of camps by states varies in different sources because some camps were in place for only a few weeks before they were disbanded or moved elsewhere. Brown and Show listed the number of camps at the end of the fiscal year, June 30th, except in the case of 1933, when the date used was September 30th. Brown and Show's figures are used in this section.

⁴⁵ Show, *History of Fire Control*, pp. 184-186. Each camp was assigned two trailbuilders or tractors with graders, seven 1-1/2-ton trucks and five pickup trucks. Also, Salmond, *Civilian Conservation Corps*, pp. 84-85.

⁴⁶ *Ibid.*, p. 46; Also, Show, *National Forests of California*, pp. 97-98. Show says he and Craig made the

decision on spike camps. This may be so, but this was a decision with national implications. Salmond suggests Roosevelt made this decision. Like the decision to use CCC for firefighting, the spike camp decision at the national level may have only confirmed what was already underway in the field.

- ⁴⁷ Salmond, *Civilian Conservation Corps*, p. 46; Also, Bower, *History of the Klamath National Forest*, 4:89, 137-138. It is clear from Bower's compilation of diaries, that CCC crews were used to fight fire before Fechner's order was issued.
- ⁴⁸ Bower, *History of the Klamath National Forest*, 4:91, 137-138. The use of untrained CCC crews for firefighting occurred throughout the state. It is inexplicable that fire dispatchers would send raw, untrained youth to fight fire, but they did. Even the trained CCC fire crews should not be equated with experienced, trained crews. At first, enrollees were limited to one year's service, thus it was impossible for them to gain much experience. The enrollment date of new CCC men was in June after the fire season had already begun. Furthermore, there were few large fires during the thirties in which to gain experience.
- ⁴⁹ Show, *History of Fire Control*, p. 185. Show wrote, "I had to get everyone geared up. First, everyone had to grasp the concept of the great opportunity with—at the moment—no restrictive rules."
- ⁵⁰ Clar, *California Government and Forestry*, 2:219-234. Clar has an excellent description of SERA camps. Also, Bower, *History of the Klamath National Forest*, 4:198.
- ⁵¹ Phillips, *From the Crash to the Blitz*, p. 124. Phillips lists the laws and explains the changes in nomenclature of New Deal agencies.
- ⁵² Phillips, *From the Crash to the Blitz*, pp. 216-218; Clar, *California Government and Forestry*, 2:218; Bower, *History of the Klamath National Forest*, 4:100, 135, 196-199. Also, Elliott Correspondence. J. E. Elliott, Jr. worked on a NIRA crew that helped build the Monrovia Peak Truck Trail in 1933.
- ⁵³ Bower, *History of the Klamath National Forest*, 4:86; Brown and Show, *California Rural Land Use*, pp. 453-454. Brown and Show quote Region 5 sources on the accomplishment of the CCC in Region 5, as follows: constructed 7,850 miles of road, 1,120 miles of trail, 560 vehicle bridges, 242 horse and foot bridges, 13,600 miles of telephone line, 656 dwellings, 250 lookout towers or houses, 1,950 other buildings, 155,000 rods of fence, 24 large dams, 2,815 water systems, 1,845 sewage disposal systems, 7 airfields, 9,000 miscellaneous improvements, 21,254 acres of trees planted, and timber stand improvement on 6,400 acres. Fire accomplishments included 778,600 man days on fires, 884,000 man days on fire prevention and pre-suppression, 7,475 miles of roadside hazard reduction each year, permanent hazard reduction on 83,000 acres and construction of hundreds of campgrounds covering 4,100 acres.
- ⁵⁴ Clar, *California Government and Forestry*, 2:253-263; Elliott Correspondence.
- ⁵⁵ J. H. Price, "The Ponderosa Way," *American Forests* 40 (September 1934), pp. 387-390, 429-430; Clar, *California Government and Forestry*, 2:252-258; Bigelow, *History*, pp. 613-646; Show, *History of Fire Control*, pp. 190-192. Show wrote that thirty-six NIRA camps were assigned to bridge projects on the Ponderosa Way. The large number of camps from several different agencies working on the project over a period of years made accurate reporting of totals of road and firebreak constructed almost impossible.
- ⁵⁶ Clar, *California Government and Forestry*, 2:255-256. The Ponderosa Way was not always continuous. The road crossed the Middle Fork of the Feather River at Island Bar and dead ended in a cliff on the north side. Locally, it was known as "the road and bridge to nowhere."
- ⁵⁷ Ayres, *History of Fire Control*, pp. 58-62.
- ⁵⁸ *Ibid.*

⁵⁹ Ibid. Also, "Report—Fire Control Meeting. Spokane, Washington, February 10-21, 1936," History File, Aviation and Fire Management Staff, Region 5, San Francisco, Calif. At this meeting, Price reported on an analysis of Angeles Forest firebreaks. Over a twelve-year period there were 450 miles of firebreaks; eighteen fires hit 72 miles of firebreak, of which 32 miles were effective in stopping the fires. Factoring this out, Price figured one-half of one percent of the Angeles firebreak system was used effectively each year. The average width of the Angeles firebreaks was eighty feet, and maintenance costs per year were \$150 per mile.

⁶⁰ *Angeles National Forest Fire History*, History File, Angeles National Forest, Pasadena, Calif.

⁶¹ Theodore F. Neihaus, "Baptism by Fire," *FSX Newsletter* 35 (November 1985). This is a newsletter for retired Region 5 employees. Also, Elliott Correspondence. The March 1933 Long Beach earthquake was still on everyone's minds at that time. J. E. "Little Joe" Elliott, Jr., was at the top of the Pickens Canyon Fire as a member of a NIRA crew. Nearby, a green CCC crew from out of state stayed awake all night long worrying that an earthquake would swallow them.

⁶² Show, *History of the Angeles National Forest*, pp. 117, 121; *Los Angeles Times*, January 1-2, 1934; Carl Wilson Correspondence, September 23, 1985; April 29, 1986; May 19, 1986; October 27, 1986; September 24, 1987. Those killed at the American Legion Hall were attending a New Year's Eve dance. Also, Elliott Correspondence. Fire engines were needed to pump the field dry at the nearby Rose Bowl. The game was played despite the tragedy and poor field conditions. The score: Columbia 7, Stanford 0. Also, L. Kraebel, "La Crescenta Flood," *American Forests* 40 (June 1934), pp. 251-254.

⁶³ Brown and Show, *California Rural Land Use*, p. 442; Annual Fire Reports, History File, Los Padres National Forest, Goleta, Calif.; Brown, *History of the Los Padres National Forest*, p. 138. The Santa Barbara National Forest was renamed the Los Padres National Forest on December 11, 1936.

⁶⁴ Show, *History of the Angeles National Forest*, pp. 14-125; Annual Fire Reports, History File, Aviation and Fire Management Staff, Region 5, San Francisco; *Los Angeles Times*, March 2-4, 1938.

⁶⁵ Robinson, *The San Gabriels II*, pp. 57-69; Show, *History of the Angeles National Forest*, p. 97. Many millions of dollars were used by the Forest Service to build stream stabilization structures in later years.

⁶⁶ Show, *The National Forests of California*, pp. 100-194.

⁶⁷ Ayres, *History of Fire Control*, pp. 46-48; "Report: Spokane Fire Control Meeting," History File, Aviation and Fire Management Staff, Region 5, San Francisco.

⁶⁸ George M. Gowen, *Discussion of Detection System Planning* (Berkeley: California Forest & Range Experiment Station, 1932), FRG 095, Box 21372, Federal Records Center, San Bruno, Calif. Also, A. A. Brown Correspondence and Commentary, June 4, 1987, June 15, 1987.

⁶⁹ Ayres, *History of Fire Control*, p. 48; Clar, *California Government and Forestry*, 2:107-114. The managers during the life of the North Butte Protection District were Rueben Box, Clyde Lewis and Richard Roseberry, all Region 5 rangers. The district was discontinued in December 1947.

⁷⁰ Pyne, *Fire in America*, p. 472.

⁷¹ Ibid., p. 473.

⁷² Robinson, *The San Gabriels II*, pp. 123-127.

⁷³ Ibid.

⁷⁴ U.S. Department of Agriculture, Forest Service, *History of the Development of the Fire Research Program in California* by Carl Wilson (Berkeley: Pacific Southwest Forest and Range Experiment Station, n. d.), p. 5; Pyne, *Fire in America*, p. 474; "Report of the Ham Station Fire, August 1, 1918," History File, Eldorado

National Forest, Placerville, Calif.; C. A. Abell Correspondence, June 30, 1987. Abell had the highest regard for Show, who was both kind and generous to him.

⁷⁵ Pyne, *Fire in America*, p. 476; "Report: Spokane Fire Control Meeting," History File, Aviation and Fire Management Staff, Region 5, San Francisco.

⁷⁶ Pyne, *Fire in America*, pp. 470-475. Pyne gives a good summary of Show's influence in fire research and on the use of the CCC. Also, "Ham Station Fire," History File, Eldorado National Forest, Placerville, Calif.; Also, see Note 43 for an example of Show's intense pursuit of his goals.

Chapter XI: New Policies and New Techniques: 1936-1941

¹ Steen, *U.S. Forest Service*, p. 299.

² Show and Kotok, *The Determination of Hour Control*, p. 1.

³ "Report, Spokane Fire Meeting."

⁴ Show, *National Forests of California*, especially p. 52; Also, Chapter X, note 43 for Show's discussion with Bower and for Show's viewpoint on the CCC. Also, Show, *History of Fire Control*, pp. 185-190. Show hired the best qualified engineers from a list kept by the American Society of Civil Engineers and also hired many unemployed logging bosses and graduate foresters.

⁵ Show, *National Forests of California*, p. 85; Ayres, *History of Fire*, p. 48.

⁶ George James Interview. James was one of the team members that evaluated the field detection data. Also, "Report, Spokane Fire Meeting," wherein A. A. Brown described the methods used. Also, copies of each forest detection plan in FRG 095, Box 21372, Federal Records Center, San Bruno, Calif. Also, A. A. Brown, "Improving Forest Fire Detection in California," *Journal of Forestry* 33 (November 1935). Also, A. A. Brown Correspondence and Commentary. Brown wrote that the Lawrence Laboratory was the only building in Berkeley with space enough for the job. The detection office came to be known as the "Radiation Laboratory."

⁷ A. A. Brown Correspondence and Commentary.

⁸ George James Interview. James also helped Fred Funke with the communication project and Fred Cronemiller with the transportation planning. Also, "Spokane Fire Meeting" Report, wherein A. A. Brown described communication planning in Region 5. He reported construction or reconstruction of 957 miles of single metallic line, 279 miles of double metallic line, 10 miles of triple metallic line, 1,604 miles of grounded line and 400 miles of circuit. A total of 5,318 wire miles were planned for Region 5 plus 1,121 miles for the Division of Forestry as of 1936. He also reported about transportation planning in Region 5. Also, A. A. Brown, "Design of National Forest Transportation Plans to Meet the Fire Control Problem in Northern California," *Journal of Forestry* 35 (May 1937); "Design of National Forest Transportation Plans to Meet the Fire Control Problem in Southern California," *Journal of Forestry* 35 (June 1937); A. A. Brown Correspondence and Commentary.

⁹ "Report, Spokane Fire Meeting." The report contains a paper, 'Transportation Planning,' by T. W. Norcross, who wrote that the Region 5 transportation plans were very intensive but were aimed primarily at fire protection. The result was that timber access, recreation and public travel needs were not adequately met. Reconstruction of some fire roads would be needed to meet multiple road uses. This criticism suggests Show's preoccupation with fire protection. Also, Ayres, *History of Fire Control*, p. 42; George Newhall and Lee Berriman, "We Remember Transportation Planning -1934," FSX Newsletter, 35 (November 1981); A. A. Brown Correspondence and Commentary.

¹⁰ George James Interview.

- ¹¹ Ayres, *History of Fire Control*, p. 54; U.S. Department of Agriculture, Forest Service, *Fire Control Handbook - Region 5 -1937*, by S. B. Show, J. H. Price, R. L. Deering, George M. Gowen and C. A. Gustafson (San Francisco: Region 5, 1937); Also, Show, *Development of Forest Service Organization*, p. 182; Also, Bower, *History of the Klamath National Forest*, 4:5.
- ¹² Steen, *U. S. Forest Service*, pp. 330-331.
- ¹³ Show, *Development of Forest Service Organization*; pp. 138-156, 215 for Show's opinion of these changes.
- ¹⁴ Ibid.
- ¹⁵ Steen, *U. S. Forest Service*, pp. 199-202; Swain, Federal Conservation Policy, pp. 23-25.
- ¹⁶ Steen, *U.S. Forest Service*, p. 236; Copies of the documents are in FRG 095, Box 62182, Federal Records Center, San Bruno, Calif.; Show, *Development of Forest Service Organization*, p. 215.
- ¹⁷ Steen, *U.S. Forest Service*, p. 217.
- ¹⁸ Ibid., pp. 223-244; Also, Headley, *Fire Suppression*, p. 23; Also, "Fire Review for Southern California, December 1924," p. 27; "Report of Board of Fire Review -Region 5 - Season of 1931," p. 13, History File, Aviation and Fire Management Staff, Region 5, San Francisco; Also, Pyne, *Fire in America*, pp. 272-273.
- ¹⁹ Pyne, *Fire in America*, pp. 279-284.
- ²⁰ Ibid.; "Report, Spokane Fire Meeting."
- ²¹ "Minutes, Ogden Fire Conference, February 1940," FRG 095, Box 27900, Federal Records Center, San Bruno, Calif.
- ²² Pyne, *Fire in America*, p. 284; Fire prevention plans for each forest are in FRG 095, Box 21373, Federal Records Center, San Bruno, Calif.
- ²³ Regional Forester to Forest Supervisors, April 28, 1938 in FRG 095, Box 27836, Federal Records Center, San Bruno, Calif.; Also, studies of each forest by P. D. Hanson, et al., in FRG 095, Box 21374, Federal Records Center, San Bruno, Calif.
- ²⁴ Bower, *History of the Klamath National Forest*, 4:254; John Curry, Leslie Grey and I. C. Funk, "Forest Fire Danger Rating and its Application in California," History File, Aviation and Fire Management Staff, Region 5, San Francisco.
- ²⁵ Harold C. King, "Annotated Digest of Aerial Fire Control Project Correspondence, December 1935 to March 1939," and Harold C. King, "A Brief Summary of the Direct Attack Project, December 1936 to September 1939," FRG 095, Box 222729, Federal Records Center, San Bruno, Calif.; Also, Andy Brenneis, "A Love Affair -The Airplane and Me," *FSX Newsletter*, 4 (August 1986); Also, Correspondence, FRG 095, Boxes 22271 and 38359, Federal Records Center, San Bruno, Calif. Brenneis wanted a pilot training program for Region 5 personnel. C. A. Gustafson was in charge of fire control in San Francisco. His comment was, "I have been attempting to convince myself the use of aircraft by the Service will become increasingly important as the years go by. I have not been able to conclude that it will."
- ²⁶ "Aerial Delivery of Supplies," History File, Aviation and Fire Management Staff, Region 5, San Francisco; Correspondence, FRG 095, Box 22271, Federal Records, Center, San Bruno, Calif.; Bower, *History of the Klamath National Forest*, 4:297. Also, J. F. Campbell, "Servicing Fire Crews by Airplane," *Journal of Forestry* 37 (July 1939), pp. 531-538. Campbell describes the Region 6 cargo dropping tests in 1937 and 1938.
- ²⁷ Quotation in Al Crebbin, "I Remember When FFF was Unleashed on the Klamath," *FSX Newsletter*, 34 (November 1980); Bower, *History of the Klamath National Forest*, 4:307, 313-317.

- ²⁸ Bower, *History of the Klamath National Forest*, 4:347.
- ²⁹ Correspondence, FRG 095, Box 38540, Federal Records Center, San Bruno, Calif.
- ³⁰ *Ibid.*; Bower, *History of the Klamath National Forest*, 4:60.
- ³¹ King, "Digest of Aerial Project Correspondence."
- ³² *Ibid.* On November 11, 1936, A. A. Brown advised the project leaders that release of unconfined water would be disrupted by the propeller blast. Apparently, Brown got this information from a physicist at the University of California in Davis. Despite this advice, it is curious that no attempt was made to drop unconfined water, since this was a research and development project. Also, Carl Wilson Correspondence.
- ³³ *Ibid.* Also, Walter Puhn, "Noble Fiasco at Cuyama," *FSX Newsletter*, 39 (November 1985). Also, Carl Wilson Correspondence.
- ³⁴ King, "Summary of Direct Attack Project"; Correspondence, FRG 095, Box 22272, Federal Records Center, San Bruno, Calif. Nash-Boulden wanted to hire the Goodyear blimp for the 1937 fire season at the rate of \$25 per hour. He was turned down. Also, A. A. Brown Correspondence and Commentary. Brown says that Godwin suggested the idea of a proximity fuse to detonate the water bombs near the fire.
- ³⁵ "Report, Spokane Fire Meeting"; Clar, *California Government and Forestry*, 2:261. The Division of Forestry had 94 tank trucks in 1934.
- ³⁶ Quotation in John Bartlett, *Familiar Quotations* (New York: Little, Brown and Co., 1955), p. 94; Fire prevention and fire pre-suppression plans for each Region 5 forest are found in FRG 095, Box 21373, Federal Records Center, San Bruno, Calif. In 1936, the Division of Forestry had 100 tank trucks and Los Angeles County had 20. These fire organizations developed tactics for tank trucks, because most of their fires were in fuel types more suitable for tank truck use (grass and brush). *The Fire Control Handbook - Region 5 -1937* barely mentions direct attack on forest fires with tank trucks. Also, J. E. Elliott, Jr. Correspondence; James K. Mace, "The Use of Small Tankers in Fire Control," *Fire Control Notes* 4 (January 1940); F. W. Funke, "A Slip-on Tanker Unit," *Fire Control Notes* 4 (April 1940).
- ³⁷ "Report, Spokane Fire Meeting"; Ellis Lucia, "A Lesson From Nature: Joe Cox and His Revolutionary Saw Chain," *Journal of Forest History* 25 (July 1981), pp. 158-165. The Wolf chain saw was first patented in 1920 but was not the first such saw. It was the H. A. Stihl Company of Germany that introduced the first successful lightweight (40-pound) chain saw to the United States in 1937. Region 1 promoted the light-weight chain saw with the lumber industry and helped break down resistance of old-time loggers to its use. Lucia also mentions early development of the bulldozer by Ed Stamm and Ernie Swigert of Portland, Oregon. However, it was the angled bulldozer blade that made the equipment a firefighting tool. Also, G. W. Duncan, "Power-driven Saw," *Fire Control Notes* 2 (April 1937).
- ³⁸ Gray, *Radio for the Fireline*, pp. 19-28, 33. The discussion of the development of Forest Service radios is based on Gray's comprehensive history.
- ³⁹ *Ibid.*, p. 35. The first Forest Service radios transmitted and received in Morse code. Gray says that Beatty and Headley deserved major credit for the foundation of Forest Service radio policy and its aggressive development.
- ⁴⁰ *Ibid.*, pp. 37-38.
- ⁴¹ *Ibid.*, p. 58; Bower, *History of the Klamath National Forest*, 4:55, 60.
- ⁴² Gray, *Radio for the Fireline*, pp. 62, 89-91, 100. VHF transmission was "line of sight"; that is, could not go over or around obstacles between sender and receiver.
- ⁴³ *Ibid.*, pp. 135-141. The first forest radio technicians in Region 5 were Ray Richards of the Los Padres and Guy V. Wood of the Sequoia. Also, George James Interview.

- ⁴⁴ "Report, Spokane Fire Meeting"; Bower, *History of the Klamath National Forest*, 4:231.
- ⁴⁵ "Report, Spokane Fire Meeting"; P. D. Hanson, "Tractor Use in Fire Suppression," *Fire Control Notes* 3 (January 1939). Blister rust requires gooseberry and/or currant bushes as an alternate host before infecting white and sugar pines. Removing the bushes interrupts the life cycle of the rust and prevents infection of the pines.
- ⁴⁶ Salmond, *Civilian Conservation Corps*, pp. 113, 148, 157-158, 210-217.
- ⁴⁷ *Los Angeles Times*, October 4-6, 1933. Twenty-six men died in the fire, two died later and 125 were injured. There were about 1,500 ECW workers in Griffith Park, City of Los Angeles, when a fire broke out in Mineral Wells Canyon within the park. The workers rushed to the fire via a trail that traversed the upper slopes of the canyon. The fire spread around the base of the ridge along which the men were hiking. Backfires may have been set, further endangering the men upslope. So many men were on the trail that some were trampled in the ensuing panic. The men were sent to the fire, or went of their own accord in a leaderless gang. Few had training in fire suppression. *The Los Angeles Times* articles have graphic descriptions of the tragedy as well as photographs of the scene and an excellent map of the fire. Also, George H. Cecil, "The Griffith Park Disaster," *American Forests* 40 (January 1934), pp. 15, 46. This is a general account but includes a good aerial photograph of the scene.
- ⁴⁸ "Report, Spokane Fire Meeting." The legal minimum age for enrollees was 18, but some boys of 17 or younger managed to evade the requirement.
- ⁴⁹ Pyne, *Fire in America*, pp. 367-370.
- ⁵⁰ Brown and Show, *Rural Land Use in California*, p. 450; Salmond, *Civilian Conservation Corps*, p. 181.
- ⁵¹ Pyne, *Fire in America*, pp. 362-365, 435.
- ⁵² Pyne, *Fire in America*, pp. 376-377; "Report, Spokane Fire Meeting"; J. E. Elliott, Jr. Correspondence; Edward P. Cliff and Rolfe Anderson, "The 40-Man Crew—A Report of the Activities of the Experimental 40-Man Crew." *Fire Control Notes* 4 (April 1940); George H. Schroeder, "Oregon's Red Hats," *Fire Control Notes* 5 (July 1941) pp. 129-130; C. A. Abell Correspondence, June 30, 1987. Abell says the term "Hotshot" was in use in Region 7 in 1937.
- ⁵³ George James Interview; Show, *Development of Forest Service Organization*, p. 106; Show, *The National Forests of California*, p. 25.
- ⁵⁴ George James Interview; Robert L. Deering Interview; Show, *The National Forests of California*, p. 65; Floyd Iverson, "The Red Cap Fire & Ruby Glenn," *FSX Newsletter*, 38 (August 1984).
- ⁵⁵ William A. Peterson Interview; George James Interview; C. A. Abell Correspondence; Edward S. Kotok Correspondence. Deering, who admired Show, said that Show was "good to get along with except when he drank too much, when he got mean." DeWitt Nelson in *Management of Natural Resources*, page 70, mentioned that Show liked to have "his boys" join him in a drink. Nelson thought that drinking was a problem in Show's later years. On the other hand, most others believed that Show held his liquor well and was kind and generous except to those who refused to perform their work. After prohibition was repealed, it was accepted that many working men had a drink after a hard day's work.
- ⁵⁶ U.S. Department of Agriculture, Forest Service, *Job Load Analysis and Planning of Executive Work in National Forest Administration* by Earl Loveridge (Washington, D.C.: Government Printing Office, 1932). The U.S. Army was so impressed with the Forest Service management systems that it made a special study of them. See U.S. Department of the Army, *An Army Study on Program Control in the U.S. Forest Service*, Department of Agriculture; George S. Blanchard, Captain, U.S.A.

(Washington, D.C.: Department of the Army, 1949). On page 21, Captain Blanchard spoke to the characteristics of the Forest Service as follows: "Probably no other agency in Government can claim the loyalty and dedication of its members to the organization and its purpose as can the Forest Service. Many reasons contribute to the height to which morale has risen through the years, one of which is the history and tradition built up since 1905 when the present Forest Service was constituted."

- ⁵⁷ Show, *Development of Forest Service Organization*, p. 117; Bower, *History of the Klamath National Forest*, 4:187.
- ⁵⁸ Clar, *California Government and Forestry*, 1:486; 2:25, 235-236. The Division of Forestry responded to the decline of the CCC by hiring 800 crewmen for the 1939 fire season.
- ⁵⁹ Weather Bureau, *Climatological Data*, California Section. 1936-1941. Comments on weather conditions in this section are based on these reports.
- ⁶⁰ Annual Fire Reports, History File, Aviation and Fire Management Staff, Region 5, San Francisco; Morford, *Wildland Fires*, p. 76.
- ⁶¹ Show, "North Winds and National Forest Fires in California," *Fire Control Notes* 1 (December 1936), pp. 14-16; Nelson, *Management of Natural Resources*, p. 68.
- ⁶² Wetlaufer, *Fire History (1910-1980) San Bernardino National Forest*, p. 30; Annual Fire Reports, History File, Aviation and Fire Management Staff, Region 5, San Francisco.
- ⁶³ *Ibid.*; Roy Headley, "Lessons from Larger Fires of 1938," *Fire Control Notes* 3 (July 1939).
- ⁶⁴ Asplund Interview; Wes Hotelling, "The Hot Little Bear Wallow Fire," *FSX Newsletter* 39 (May 1985).
- ⁶⁵ Draft magazine article, by W. I. Hutchinson, dated July 21, 1938, FRG 095, Box 62182, Federal Records Center, San Bruno, Calif.; Bower, *History of the Klamath National Forest*, 4:307.
- ⁶⁶ *Ibid.*, 4:296-309; Iverson, "The Red Cap Fire & Ruby Glenn."
- ⁶⁷ Bower, *History of the Klamath National Forest*, 4:298-303; William A. Peterson Interview. "Wobblies" was the nickname for members of the International Workers of the World union.
- ⁶⁸ Bower, *History of the Klamath National Forest*, 4:309-310.
- ⁶⁹ Pete Hanson, "The Red Cap Fire," *FSX Newsletter* 38 (November 1984).
- ⁷⁰ Morford, *Wildland Fires*, pp. 81-82.
- ⁷¹ *Ibid.*, p. 86; Bower, *History of the Klamath National Forest*, 4:298, 308; Annual Fire Reports, History File, Aviation and Fire Management Staff, Region 5, San Francisco.
- ⁷² History File, Sierra National Forest, Fresno, Calif.; U.S. Department of Agriculture, Forest Service, *Extracts from Reports of Larger Fires in 1939 in Western Regions* by Roy Headley (Washington, D.C.: General Printing Office, 1940).
- ⁷³ *Ibid.*; History Files, Mendocino National Forest, Willows, Calif.
- ⁷⁴ History Files, Los Padres National Forest, Goleta, Calif.; Brown, *History of the Los Padres National Forest*, p. 136; Headley, *Extracts from 1939 Fire Reports*.
- ⁷⁵ *Ibid.*; Morford, *Wildland Fires*, pp. 82-86; Bower, *History of the Klamath National Forest*, 4:327.
- ⁷⁶ Annual Fire Reports, History File, Aviation and Fire Management Staff, Region 5, San Francisco.
- ⁷⁷ Annual Fire Reports and Board of Review, San Bernardino, National Forest, San Bernardino, Calif.
- ⁷⁸ *Ibid.*

⁷⁹ Carl C. Wilson, "Fatal and Near-Fatal Forest Fires—The Common Denominators," *International Fire Chief* 43 (November 1977), pp. 9-15.

⁸⁰ Annual Fire Reports, History File, Aviation and Fire Management Staff, Region 5, San Francisco; Morford, *Wildland Fires*, p. 95; "Wartime Fire Control on Northern California National Forests: December 1943," and "Supplements 1 and 2," FRG 095, Box 27899, Federal Records Center, San Bruno, Calif.

Chapter XII: The Challenges of World War II: 1942-1945

¹ C. L. Sulzberger, *The American Heritage Picture History of World War II* (New York: American Heritage Publishing Co., Inc., 1966), pp. 35-145.

² *Ibid.*, p. 131; Samuel Eliot Morison, *The Rising Sun in the Pacific: 1931-April 1942 (History of the U.S. Naval Operations in World War II)*, Vol. III. (Boston: Atlantic, Little Brown, 1948), p. 64. About 80 percent of Japanese oil imports came from the United States. Also, Rolle, *California*, p. 521; Studs Terkel, *"The Good War"* (New York: Pantheon Books, 1984), pp. 189-190, 301; Show, *History of Fire Control*, p. 222. Show wrote that the Army asked the Forest Service to guard important facilities until they could take over.

³ Rolle, *California*, pp. 521-524; Lavender, *California: Land of New Beginnings*, p. 394; Watkins, *California: An Illustrated History*, pp. 428-434; Morison, et al., *Growth of the American Republic*, 2:561-562; Correspondence, FRG 095, Box 27837, Federal Records Center, San Bruno, Calif. Also, correspondence from William Anderson, December 16, 1987. Anderson burned some debris along the road to Hetch Hetchy Dam in early 1942. When he returned to the ranger station, he found Forest Supervisor Jesse Hall and an Army officer. The Army thought the smoke from the fire might have been a signal to guide Japanese aircraft to the dam.

⁴ Quotations in Terkel, *"The Good War."* pp. 236; Arthur M. Schlesinger, Jr., ed., *Almanac of American History* (New York: Bramfield House, 1986), p. 487; Rolle, *California*, p. 522; Bert Webber, *Retaliation: Japanese Attacks and Allied Countermeasures on the Pacific Coast in World War II* (Corvallis: Oregon State University Press, 1975), pp. 31-32. Webber wrote that the captain of the I-17, Kozo Noshino, visited the Goleta area before the war. During his visit, Noshino fell from a path into a patch of prickly pear cactus. He acquired some cactus spines but lost some "face" in this incident. His selection of targets may have been an attempt to regain his lost self-respect. Also, Clark Gleason, "Smelter Devastation—Japanese Balloon Bombs," *FSX Newsletter*, 38 (November 1984). Gleason wrote that the I-17 was sunk in March 1943 off Nouméa in the South Pacific.

⁵ Rolle, *California*, p. 526; Watkins, *California: An Illustrated History*, p. 435.

⁶ *Ibid.*, p. 435; Lavender, *California: Land of New Beginnings*, p. 396.

⁷ Cermak, "Quincy, California, in World War II," unpublished paper, 1986, 11 pp.

⁸ *Ibid.*

⁹ Fairfield, *Statistical History*, pp. 310, 312; Bower, *History of the Klamath National Forest*, 5:53-54. Historical File, Timber Management Staff, Region 5, San Francisco.

¹⁰ Cermak, "Quincy in World War II." The War Manpower Commission also declared many Forest Service jobs as "Fighting Posts."

¹¹ Show, *History of Fire Control*, pp. 228-243; Correspondence from R. W. Asplund, October 20, 1987. The Shasta National Forest set up a fire training program at Mt. Shasta High School. High school boys from northern California were recruited and given two weeks training in fire control. Also, reports titled,

“Fire Control on Northern California Zone National Forests, 1940-1944,” with two supplements and “Fire Control on Southern California National Forests, 1940-1944,” with two supplements, FRG 095, Box 27899, Federal Records Center, San Bruno, Calif. These reports are important sources for conditions during World War II.

¹² Ibid.

¹³ Ibid.

¹⁴ Show to Clappe, April 23, 1942, OCD publication 3401-1, and other correspondence, FRG 095, Box 27837, Federal Records Center, San Bruno, Calif. Also, J. E. Elliott, Jr., Correspondence, October 8, 1987. Under OCD, J. E. Elliott, Sr., had responsibilities for all wildland fire control in California and was involved in fire control in all western states.

¹⁵ Correspondence, FRG 095, Box 27837, Federal Records Center, San Bruno, Calif. David P. Godwin and Alan MacDonald, “The New Fire Crusade,” *American Forests* 47 (April 1943). The authors describe the FFFS, inmate and conscientious objector (“conchie”) camps.

¹⁶ Correspondence, FRG 095, Box 27837, Federal Records Center, San Bruno, Calif.

¹⁷ Ibid.

¹⁸ Quote in A. G. Brenneis, “The Trinity N.F., 1940-1946,” *FSX Newsletter*, 38 (November 1984); Fay Jensen, and Mary E. Brenneis, “The Women’s Motor Corps,” *FSX Newsletter*, 36 (August 1982); Asplund interview; Bower, *History of the Klamath National Forest*, 5:33. Among the women drivers were Florence Morris, Lucille Snyder, Jo Duffield, Eleanor Asplund and Mary Brenneis. Also, Correspondence from Lynn Biddison, December 1, 1987.

¹⁹ Nash-Boulden, *Supervision. Fire and Growth*, pp. 30-31; Brenneis, “The Trinity National Forest, 1940-1946;” Deering Interview; Fish Hatchery Fire Report, November 16, 1942. Historical File, Sequoia National Forest, Porterville, Calif.; Correspondence from John Murray, October 16, 1987. Bower, *History of the Klamath National Forest*, 5:53, reports a CO camp was successfully used for timber cruising. For one objector’s viewpoint see Terkel, “*The Good War*,” pp. 166-174.

²⁰ “Final Report, Fire Fly Project, January 31, 1946,” FRG 095, Box 27835, Federal Records Center, San Bruno, Calif.; Asplund Correspondence, October 20, 1987. Army aircraft were also available for fire duty in northern California from Hamilton Field near San Rafael.

²¹ Ibid.; Brenneis, “The Trinity National Forest., 1940-1946;” Asplund Interview and Correspondence, October 20, 1987; Bower, *History of the Klamath National Forest*, 5:37, 67, 69. Bower also records that paratroopers were stationed at Redwood Ranger Station in the Siskiyou National Forest (Region 6). This base evolved into Cave Junction Smokejumper Base. Region 6 met with the Army at Cave Junction to discuss use of paratroopers as smokejumpers on July 22, 1943. This is documented in FRG 095, Box 22271, Federal Records Center, San Bruno, Calif. Also, Correspondence from M. M. Nelson, November 2, 1987. One member of the 555th died in a jump in the Umpqua Forest (Region 6).

²² Correspondence, FRG 095, Box 22271, Federal Records Center, San Bruno, Calif.

²³ Ibid. It was not until August 1944 that the 4th Air Force agreed to a Zone Flight Authorization to cover all Region 5 planes used in fire control. Previously an authorization was needed for each airplane.

²⁴ Gray, *Radio for the Fireline*, p. 194.

²⁵ Ibid., p. 196.

²⁶ U.S. Department of Agriculture, Forest Service, *Sky Watchers of the Hinterlands* by William S. Brown (San Francisco: Region 5, 1943), pp. 2-5. The story of the AWS is based on Brown’s account.

- ²⁷ Ibid., p. 20; Brenneis, "The Trinity National Forest, 1940-1946"; Show, *History of Fire Control*, pp. 220-221.
- ²⁸ Brown, *Sky Watchers*, pp. 15, 23.
- ²⁹ Anderson Correspondence. Anderson wrote that telephone line maintenance was a particular problem during the AWS years.
- ³⁰ Brown, *Sky Watchers*, pp. 27, 37-39, 49; Biddison Correspondence.
- ³¹ The section on Smokey the Bear is based on Bob Loeffelbein, "Smokey Hits 40!" *American Forests* 90 (May 1984) and Jay Heinrichs, "The Ursine Gladhander," *Journal of Forestry* 80 (October 1982). Also, Pyne, *Fire in America*, pp. 175-176.
- ³² The quotation is in a letter written by Richard Hammatt, dated August 9, 1944, in Loeffelbein, "Smokey Hits 40!"
- ³³ Loeffelbein, "Smokey Hits 40!"
- ³⁴ Bert Webber, *Retaliation*, pp. 93-148', 66-68. The discussion of the balloon bombs is based on Webber's book. A Japanese Glen type seaplane from the submarine I-25 dropped two 170-pound incendiary bombs on Wheeler Ridge east of Brookings, Oregon, on September 9, 1942. A small fire was started by one of the bombs. It was quickly extinguished by Siskiyou Forest personnel and bomb parts were recovered. A second bombing mission on September 25th near Grassy Knob Lookout, east of Port Orford, Oregon, was unsuccessful. The second flight was reported by the AWS as an enemy aircraft, but the seaplane returned safely to its mother ship.
- ³⁵ Ibid., pp. 93-98, 99-104.
- ³⁶ Ibid., pp. 107-124.
- ³⁷ Ibid., pp. 115-118; Asplund Interview. Brenneis, "The Trinity National Forest, 1940-1946." Also, Neal M. Rahm, "The Fire Fly Project," *Fire Control Notes* 7 (July 1946), pp. 4-7.
- ³⁸ U.S. Department of Agriculture, Forest Service, *Administrative Digest* (San Francisco: Region 5, October 3, 1952). Employee Newsletter.
- ³⁹ Webber, *Retaliation*, pp. 108, 147. Out of about 9,300 balloon bombs launched from Japan between November 1944 and April 1945, only 342 were found in North America during the war.
- ⁴⁰ "Fire Control on Southern California National Forests, 1940-1944."
- ⁴¹ Annual Fire Reports, Historical File, Los Padres National Forest, Goleta, Calif.
- ⁴² Asplund Correspondence, October 20, 1987.
- ⁴³ "Fire Control on Southern California National Forests, 1940-1944."
- ⁴⁴ "Report of the Hauser Creek Fire," Firebase Accession Number FB78-1442, Interagency Fire Control Office, Boise, Idaho. The account of the Hauser Creek Fire and inquiry depends mostly on this source. Apparently the wind shift was caused by a change in atmospheric pressure systems, in which marine winds replaced a weak Santa Ana. Also, Buel B. Hunt to Cermak, July 25, 1987. Hunt stated that he has never seen the board's report, but did receive a letter of commendation from the regional forester in recognition of his attempts to save the lives of the marines. Hunt also believes the board's conclusions blighted his subsequent career in the Forest Service. Hunt left the Forest Service and had a long and distinguished career with the Division of Forestry.
- ⁴⁵ There is some disagreement as to who selected the location for the east line. Ewing's testimony was that Hunt selected the location. Hunt was not asked directly if he selected the location but says now that he did not. The location was important only because the board believed its selection led to the tragedy.

- ⁴⁶ Hunt to Cermak, July 25, 1987.
- ⁴⁷ Ibid.; *San Diego Union*, October 5, 1943; Show, *Development of Forest Service Organization*, pp. 255-256; Carl C. Wilson, "Fatal and Near-Fatal Fires."
- ⁴⁸ Region 5 Fire Reports, Library, School of Conservation and Forestry, University of California, Berkeley, Calif.
- ⁴⁹ Ibid; Annual Fire Reports, Historical File, Sequoia National Forest, Porterville, Calif. Acreage in the 1942 fires described in the text includes area burned outside the forest protection boundary. Altogether there were 98,000 acres burned in and adjacent to the Sequoia in 1942, including 58,422 acres of national forest land.
- ⁵⁰ Annual Fire Reports, Historical File, Cleveland National Forest, San Diego, Calif.
- ⁵¹ Ibid. Also, personal recollections.
- ⁵² Weather Bureau, *Climatological Data* California Section. 1942-1945; Biddison Correspondence.
- ⁵³ Annual Fire Reports, Historical File, Modoc National Forest, Alturas, Calif.; Morford, *Wildland Fires*, p. 95.
- ⁵⁴ "Board of Review, Mendocino National Forest, November 13-17, 1944," Annual Fire Reports, Historical File, Mendocino National Forest, Willows, Calif.
- ⁵⁵ "Fire Control on Southern California National Forests, 1940-1944"; Show, *History of Fire Control*, p. 236. Show wrote that 168,000 acres burned in six fires that originated in CDF protection area.
- ⁵⁶ Ibid., p. 237. Show wrote about the Laguna Junction Fire as "historic." The account of the Laguna Junction Fire is based on the Laguna Junction Fire Report, Historical File, Cleveland National Forest, San Diego, Calif.
- ⁵⁷ "Fire Control on Southern California National Forests, 1940-1944." Biddison Correspondence. Biddison says that his fire crew leader was severely reprimanded for attacking a fire in Los Angeles County jurisdiction in 1944. Interagency cooperation depended on prior agreements and funding arrangements.
- ⁵⁸ Anderson Correspondence..
- ⁵⁹ "Fire Control on Southern California National Forests, 1940-1944"; Show, *Development of Forest Service Organization*, pp. 256-270; Pyne, *Fire in America*, pp. 436-437. An equipment development meeting in Washington, D.C., in 1945 recommended establishment of four equipment development centers. The Arcadia Center was assigned fire control equipment.
- ⁶⁰ Region 5 Fire Reports, Library, School of Conservation and Forestry, University of California, Berkeley, Calif.; Annual Fire Reports, Historical File, Modoc National Forest, Alturas, Calif.; "Board of Review Report, May 27, 1946," FRG 095, Box 27898, Federal Records Center, San Bruno, Calif.
- ⁶¹ KimsheW and McClure Fire Reports, Historical File, Lassen National Forest, Susanville, Calif. Fruit Growers Supply Co. belonged to Sunkist Corp. whose antecedent companies helped secure the proclamation of the southern California forest reserves. The company manufactured lumber and box shooK that was used to make citrus crates.
- ⁶² A report on the fires is in FRG 095, Box 27898, Federal Records Center, San Bruno, Calif.; Anderson Correspondence.
- ⁶³ "Fire Control on Southern California National Forests, 1940-1944"; Bower, *History of the Klamath National Forest*, 5:76; "Board of Review, May 27, 1946."

Chapter XIII: Transition to Peace: 1946-1949

- ¹ State of California, State Printer, *California Blue Book*, 1958 ed., p. 808; U.S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States*, 1964 ed., p. 13.
- ² *California Blue Book*, 1958 ed., p. 808.
- ³ *Ibid.*, pp. 811, 829.
- ⁴ *Ibid.*, p. 829; Timber Cut and Sold Reports, Historical File, Timber Management Staff, Region 5, San Francisco, Calif. John H. Murray Correspondence. Murray recalls that the federal government expected a postwar recession. Postwar planning was a big project in Region 5 during January 1945.
- ⁵ "Fire Deficiency Report, FY 1947," FRG 095, Box 61197, Federal Records Center, San Bruno, Calif.
- ⁶ Bower, *History of the Klamath National Forest*, 4:323, 5:107, 132, 163, 217.
- ⁷ *Ibid.*, 5:60.
- ⁸ *Ibid.*, 5:220.
- ⁹ *Ibid.*, 5:160.
- ¹⁰ *Ibid.*, 5:110. Since the report proposed taking the Gasquet District from the Siskiyou, Show sent it to Regional Forester Lyle Watts of Region 6. Watts sent it to former Siskiyou supervisor Ed Cliff. Cliff recalled writing a marginal note on the report, "I'm not in favor of this." He saw the report after it was returned by Watts, who had written under his note, "But I am, Lyle Watts." Also, Deering Interview in which Deering expressed bitter opposition to the break-up of the Mono National Forest.
- ¹¹ Rolle, *California*, p. 529.
- ¹² "Fire Deficiency Report, FY 1947." Much of the description of Region 5 immediately after the war is based on this excellent report.
- ¹³ *Ibid.*
- ¹⁴ *Ibid.*
- ¹⁵ *Ibid.*
- ¹⁶ Andrew G. Brenneis, "A Love Affair—The Airplane and Me," *FSX Newsletter* 41 (May 1987).
- ¹⁷ Bower, *History of the Klamath National Forest*, 5:174-175. Also, Correspondence, FRG 095, Box 22272, Federal Records Center, San Bruno, Calif.
- ¹⁸ Correspondence, FRG 095, Box 27838, Federal Records Center, San Bruno, Calif.
- ¹⁹ "Report, November 7, 1947 of Los Padres Aerial Project," and "Fire Plan, Los Padres National Forest, Revised 1946," FRS 095, Box 22272, Federal Records Center, San Bruno, Calif. Also, Brenneis, "The Airplane and Me," *FSX Newsletter* 41 (May 1987).
- ²⁰ David P. Godwin, "Helicopter Hopes for Fire Control," *Fire Control Notes* 7 (April 1946). The R-4 developed 180 horsepower; the R-5, 450 horsepower; and the R-6, 235 horsepower.
- ²¹ Ira C. Funk, "Report of Test Operations of Army Helicopters in Mountainous Areas," FRG 095, Box 22271, FRG 095, Federal Records Center, San Bruno, Calif.
- ²² I. C. Funk and F. W. Milam, "The Helicopter Bell Model 47B," *Fire Control Notes* 9 (April-July 1948).
- ²³ Bower, *History of the Klamath National Forest*, 5: 141-142, 149, 156, 158; T. A. Bigelow, "Final Report on Helicopter Tests Conducted on the Klamath and Shasta Forests, Season 1948," FRG 095, Box 22271, Federal Records Center, San Bruno, Calif.

- ²⁴ Bower, *History of the Klamath National Forest*, 5:156.
- ²⁵ F. J. Jefferson, "The Helicopter, a New Factor in Fire Control," *Fire Control Notes* 9 (January 1948); "Fire Deficiency Report, FY 1947."
- ²⁶ Jack C. Kern, "First Extensive Use of the Helicopter in Forest Fire Control," *Fire Control Notes* 9 (July 1948); Jefferson, "The Helicopter"; Biddison Correspondence. One of the contributing factors to the tragedy was the lack of standard fire hose threads between fire control agencies. Region 5 and Los Angeles County Fire Department used different hose threads, which meant that hoses from county fire trucks could not be attached to Angeles Forest hoselines. Thus, support for the trapped tank truck crew was lost. This tragedy led to demands for use of standard hose threads among California firefighting agencies.
- ²⁷ *Climatological Records*—California Section—1946; "Fire Deficiency Report, FY 1947."
- ²⁸ Region 5 Fire Records, Library, School of Conservation and Forestry, University of California Berkeley.
- ²⁹ "Fire Deficiency Report, FY 1947." The names of the men killed on the Clear Creek Fire were Charles F. Lucas, Jr. and Lawrence D. Graham, both of Meadow Valley Lumber Co. The Lassen foreman was Donald E. Schuman, and Cecil Lowan was the man who died after fighting fire in the Sierra. Also, Carl Wilson Correspondence, September 24, 1987. Wilson wrote that this accident resulted in a drive for a region-wide driver training program.
- ³⁰ *Climatological Records*—California Section—1947.
- ³¹ After the 1946 fire season, special reports were required for all fires more than 100 acres. The Jordan, Coupe and Frenchman fires are the subjects of such special reports in FRG 095, Box 21571, Federal Records Center, San Bruno, Calif.
- ³² Annual Fire Reports, Historical File, Mendocino National Forest, Willows, Calif.
- ³³ Anderson Correspondence, December 16, 1987.
- ³⁴ "Special Fire Report, Boca Fire," FRG 095, Box 21571, Federal Records Center, San Bruno, Calif.
- ³⁵ "Northern California Board of Review Report 1947 Season," FRG 095, Box 27898, Federal Records Center, San Bruno, Calif. Annual Fire Reports, Historical File, Lassen National Forest, Susanville, Calif. 1948.
- ³⁶ *Climatological Records*—California Section.
- ³⁷ Region 5 Fire Records, Library, School of Conservation and Forestry, University of California, Berkeley.
- ³⁸ Correspondence, FRG 095, Box 22272, Federal Records Center, San Bruno, Calif.
- ³⁹ Annual Fire Reports, Historical File, Cleveland National Forest, San Diego, Calif.; Wilson, "Fatal and Near Fatal Fires."
- ⁴⁰ Annual Fire Reports, Historical File, Mendocino National Forest, Willows, Calif.
- ⁴¹ Andrew G. Brenneis and Robert F. Kelleher, "Matilija No. 3: A Report on the Wheeler Springs Fire of 1948 on the Los Padres National Forest, California," Historical File, Los Padres National Forest, Goleta, Calif. The account of the Wheeler Springs Fire is based on this report.
- ⁴² *Ibid.*; Copy of a letter to *The Ojai*, September 17, 1948, furnished by Mrs. Horace Jones.
- ⁴³ "Special Fire Report, Green River Fire," FRG 095, Box 21571, Federal Records Center, San Bruno, Calif.
- ⁴⁴ *Climatological Records*—California Section—1949: Region 5 Fire Records, Library, Department of Forestry and Natural Resources, Berkeley.
- ⁴⁵ *Ibid.*; Morford, *Wildland Fires*, p. 94.

⁴⁶ Annual Fire Reports, Historical File, Modoc National Forest, Alturas, Calif. Also, National Wildfire Coordination Group, "Preliminary Report of Task Force on Study of Fatal/Near Fatal Wildland Fire Accidents," Historical File, Aviation and Fire Management Staff, Region 5, San Francisco, Calif.; Also, Region 5 Fire Records, Library, School of Conservation and Forestry, University of California, Berkeley.

⁴⁷ Ibid.

⁴⁸ *Angeles National Forest Fire History*, History File, Angeles National Forest, Pasadena, California.

⁴⁹ Ibid.

⁵⁰ "Report of the Board of Review, Mann Gulch Fire, September 29, 1949" gives the basic facts, but many articles describing details of the tragedy have been written since then.

Chapter XIV: Rebuilding a Fire Control Organization: 1950-1953

¹ Rolle, *California*, pp. 531, 535; *California Blue Book* - 1958 ed., pp. 808, 817, 822-823.

² A few forests had been selling timber for many years, but most were in a custodial status until World War II and the postwar boom. Land-use plans were introduced in Region 5 after World War II. The Klamath Forest completed some plans in 1946, but the best known was the Red Mt. Unit Plan completed in February 1949 by Assistant Supervisor A. K. Crebbin and Ranger Rex Denney. This plan became a model for land use planning in other forests and the ancestor of current Forest Land Management Plans. See Bower, *History of the Klamath National Forest*, 5:69-70, 78-80, 119, 131, 171-172, 217.

³ Timber Cut and Sold Reports, Historical File, Timber Management Staff, Region 5, San Francisco; "Report, Fire Control, Fire Research and Safety Meeting, Ogden, Utah, January 1950," FRG 095, Box 27898, Federal Records Center, San Bruno, Calif.

⁴ A. A. Brown Correspondence. Brown was chief of fire control in Washington when these changes took place.

⁵ Pyne, *Fire in America*, pp. 118-119.

⁶ State of California, Division of Forestry, *Costs and Returns of Controlled Brush Burning for Range Improvement in Northern California*, by Arthur W. Sampson and L. T. Burcham (Sacramento: State Printer, 1954.) The controlled burning program was authorized by Sections 4880-4883, Chapter 9 of the Public Resource Code and enacted into law in 1945. This law authorized the Division of Forestry to issue permits for controlled burning. Control Burn Committees of landowners were organized to facilitate controlled burns under state law.

⁷ Correspondence, FRG 095, Box 27837, Federal Records Center, San Bruno, Calif.

⁸ Ibid.

⁹ Ibid.

¹⁰ Anderson Correspondence; C. A. Gustafson to E. P. Cliff, October, 3, 1952, and other records, FRG 095, Box 27837, Federal Records Center, San Bruno, Calif.

¹¹ Report by Simeri Jarvi, April 14, 1952, FRG 095, Box 03029, Federal Records Center, San Bruno, Calif. Carl Wilson Correspondence, October 18, 1987. Wilson visited the Hoberg's burn site with Harold Weaver and Biswell. He agreed with them that burning pine needles was easy and cheap. However, he discovered that the brush on the site had been cut, piled and burned before the light burn took place. This work was done by students, and the charge to the light burn project was nominal although the labor was considerable.

¹² Sampson and Burcham, *Controlled Brush Burning*.

- ¹³ Morford, *Wildland Fires*, pp. 119-120; Biddison Correspondence. Biddison took part in an early prescribed burning project in southern California national forests at Cajon Pass in 1950-1951. The purpose was to improve rangelands in the Summit Grazing Allotment.
- ¹⁴ "Narrative Report, 1950 Fire Season, Region 5," FRG 095, Box 21571, Federal Records Center, San Bruno, Calif.
- ¹⁵ *Ibid.*
- ¹⁶ *Ibid.*
- ¹⁷ Annual Fire Reports, Historical File, Modoc National Forest, Alturas, Calif.
- ¹⁸ Annual Fire Reports, Historical File, Los Padres National Forest, Goleta, Calif.
- ¹⁹ "Narrative Report, 1950 Fire Season, Region 5."
- ²⁰ K. O. Wilson, "Operation Redskin," *Fire Control Notes* 13 (July 1952); Clarence K. Collins, "Indian Fire-fighters of the Southwest," *Journal of Forestry* 60 (February 1962), pp. 87-91; Correspondence, FRG 095, Box 30424, Federal Records Center, San Bruno, Calif. Biddison Correspondence. In 1950 half of the Chilao Hotshot crew was Navajo and Hopi Indians from Sherman Institute in Riverside. Later a full crew of Native Americans was hired from Taos, New Mexico.
- ²¹ Collins, "Indian Fire-fighters."
- ²² Annual Fire Reports, Historical File, Plumas National Forest, Quincy, Calif.
- ²³ Annual Fire Reports, Historical File, Modoc National Forest, Alturas, Calif.
- ²⁴ "Narrative Fire Report, Conejos Fire," FRG 095, Box 21571, Federal Records Center, San Bruno, Calif.
- ²⁵ "Narrative Report, 1950 Fire Season, Region 5"; Reports of Regional Hotshot Crews, FRG 095, Box 21571, Federal Records Center, San Bruno, Calif.
- ²⁶ "Narrative Report, Wrights Creek Fire," FRG 095, Box 27838, Federal Records Center, San Bruno, Calif.
- ²⁷ Annual Fire Reports, Historical File, Mendocino National Forest, Willows, Calif.
- ²⁸ Morford, *Wildland Fires*, p. 122.
- ²⁹ Annual Fire Reports, Historical File, Cleveland National Forest, San Diego, Calif.
- ³⁰ Correspondence and copy of Jefferson's statement in a Society of American Foresters panel discussion, FRG 095, Box 27836, Federal Records Center, San Bruno, Calif.
- ³¹ "Report, Fire Control Meeting, Ogden Utah, January 1950," FRG 095, Box 27898, Federal Records Center, San Bruno, Calif. Chief Watts attended the Mather Field Conference of 1921 when he was a young forester.
- ³² "Narrative Report, 1951 Fire Season," Region 5, FRG 095, Box 21571, Federal Records Center, San Bruno, Calif.
- ³³ *Ibid.*
- ³⁴ "Report of the Porterville Board of Review, April 4, 1952," FRG 095, Box 27838, Federal Records Center, San Bruno, Calif.
- ³⁵ Annual Fire Reports, Historical File, Modoc National Forest, Alturas, Calif.
- ³⁶ "Southern Forests Fire Review, March 4, 1952," and Special Report Class E Fires, July 8, 1952, FRG 095, Box 27838, Federal Records Center, San Bruno, Calif.

- ³⁷ Don Bauer to Regional Forester, April 13, 1953, FRG 095, Box 27838, Federal Records Center, San Bruno, Calif.
- ³⁸ "Narrative Report, 1951 Fire Season."
- ³⁹ Ibid.; "Narrative Report, Pony Peak Fire" and "Report of Northern Forests Board of Review, February 21, 1952," FRG 095, Box 21571, "Report of San Bernardino Hotshot Crew, November 1, 1951," FRG 095, Box 38540, Federal Records Center, San Bruno, Calif.
- ⁴⁰ George James Interview. Also, Rupert Asplund Interview. Asplund ordered the mules. Also, M. M. Nelson Correspondence, November 2, 1987.
- ⁴¹ "Narrative Report, Pony Peak Fire."
- ⁴² "Report of Board of Review, Marysville, California, February 12, 1952," FRG 095, Box 27838, Federal Records Center, San Bruno, Calif.;" Milk Ranch Fire Report," Historical File, Plumas National Forest, Quincy, Calif.
- ⁴³ "Fire and Trespass Report, Gaston Fire," Historical File, San Bernardino National Forest, San Bernardino, Calif.
- ⁴⁴ Biddison Correspondence.
- ⁴⁵ "Narrative Report, 1951 Fire Season."
- ⁴⁶ Ibid.
- ⁴⁷ "Report of Western Regions Fire Meeting, San Francisco, Calif., January 1952," FRG 095, Box 27898, Federal Records Center, San Bruno, Calif.
- ⁴⁸ Ibid.
- ⁴⁹ "Narrative Report, 1952 Fire Season, Region 5," FRG 095, Box 30424, Federal Records Center, San Bruno, Calif.
- ⁵⁰ Ibid. The Shasta and the Trinity Forests were combined in 1954.
- ⁵¹ "Special Reports, Class E Fires, July 8, 1952," Historical File, Aviation and Fire Management Staff, Region 5, San Francisco. The pleas of Region 5 and the severity of fire losses nationwide in the 1950, 1951 and 1953 fire seasons resulted in the Increased Manning Experiment of 1955-1959. Eight national forests in five regions were given increased funding to fully man their fire control needs. The Modoc, Klamath and Plumas in Region 5 were part of the test. After those five years, the average annual acreage burned per test forest was 50 percent less than for the same forests during the 1949-1954 period. The Klamath was the only test forest with increased burned acreage, due to the huge 80,000-acre Haystack Fire.
- ⁵² Correspondence, FRG 095, Box 27838, Federal Records Center, San Bruno, Calif.
- ⁵³ "Narrative Report, 1953 Fire Season, Region 5," FRG 095, Box 30424, Federal Records Center, San Bruno, Calif.
- ⁵⁴ "Narrative Report, Big Dalton Fire," Historical File, Los Padres National Forest, Goleta, Calif.
- ⁵⁵ Annual Fire Reports, Historical File, Cleveland National Forest, San Diego, Calif.
- ⁵⁶ Quote from Wilson, *History of Fire Research*, p. 24; Harry D. Grace, "Intensive Pre-planning for Fire Suppression," *Fire Control Notes* 12 (April 1951); "Narrative Report, Monrovia Peak Fire," Historical File, Angeles National Forest, Pasadena, Calif.
- ⁵⁷ "Narrative Report, Sulphur Fire," Historical File, Angeles National Forest, Pasadena, Calif.

- ⁵⁸ Narrative Report, Fish Fork Fire and Air Operations Report, Fish Fork Fire," Historical File, Angeles National Forest, Pasadena, Calif. Also, B. L. Rasmussen to C. A. Gustafson, September 22, 1953, FRG 095, Box 30424, Federal Records Center, San Bruno, Calif. Biddison Correspondence. Helicopters ferried water in five-gallon cans for use in hoselays on Bichota Ridge. The Chilao Hotshots spent 21 days on this fire.
- ⁵⁹ John Caragozian, "Notes from Fire Camp," *FSX Newsletter* 39 (February 1985) M. M. Nelson Correspondence. Nelson recalled a later episode when cult members were mixing borate for Joe Ely's air tankers. He had escorted new Regional Forester C. A. Connaughton to the Jet Fire in the San Bernardino Forest. When Connaughton saw the cultist mixing crew he observed, "You have more than one way of getting God on your side."
- ⁶⁰ "Narrative Report, Barrett Fire," Historical File, Angeles National Forest, Pasadena, Calif.
- ⁶¹ Biddison Correspondence.
- ⁶² Carl Wilson, "The Monrovia Peak Fire," *FSX Newsletter* 38 (May 1984.)
- ⁶³ *Ibid.*; Biddison Correspondence. Biddison recalled that television sets were brought to fire camp for New Year's Day. Some of the crews wanted to watch football games, but the Native American crews took over the sets and watched cowboy and Native American dramas instead.
- ⁶⁴ Rattlesnake Fire folder, Historical File, Mendocino National Forest, Willows, Calif.
- ⁶⁵ *Ibid.* The names of those who lost their lives were as follows: Allan Boddy, Sergio Colles, Benjamin Daniel, Paul Gifford, Harold Griffis, Cecil Hitchcock, David Johnson, Robert Mieden, Darrel Noah, Howard Rowe, Ray Sherman, Daniel Short, Stanley Vote*, Stanley Whitehouse, and Robert Powers*.
*Forest Service personnel. Anderson Correspondence. Anderson relieved Ewing as fire boss of the Rattlesnake Fire early in the morning of July 10th. He recalled that the wind shift was later found to be the normal shift from daytime upslope winds to evening down slope winds. The fire accentuated the wind movement and speed.
- ⁶⁶ *Ibid.*; Anderson Correspondence; After completing his prison term, the young man who set the fire later rebuilt his life despite considerable adversity.

Chapter XV: A New Age in Fire Control Begins: 1954-1955 _____

- ¹ Pyne, *Fire in America*, pp. 477-479. Pyne has a good description of the transition of prewar fire control research into the research of mass fire. Also, Wilson, *History of Fire Research*, p. 7. Also, A. A. Brown Correspondence. Brown wanted to remain chief of fire control, but Watts urged him to take the job as director of fire research. He did.
- ² The Mann Gulch tragedy was followed by the death of eleven firefighters on the Inaja Fire, Cleveland National Forest, in November 1956. The Malibu Fire, which destroyed 120 expensive homes in December 1956, further dramatized the danger of fire in southern California. The fires occurred two years before a national political election. In California, Congressman Clair Engle, from northern California's First District, planned to run for the U.S. Senate. Engle had cosponsored the controlled burn legislation in the state legislature in 1945. He had little name recognition in southern California and decided to investigate the Forest Service's handling of fire control in general and the Inaja Fire in particular. Word reached the Region 5 office that Engle intended to take the Forest Service to task. George James, who was in charge of information and education in the regional office, Dick Droege of the Angeles and others met with Engle's assistants. James et al. convinced the assistants that a positive fact-finding investigation would be more to Engle's benefit. The investigation gave Engle a chance to bask

in the southern California limelight and also revealed the need for more fire control funding in southern California forests. Engle was elected in 1958, and southern California received more fire control funds. This account is based on the interview with George James and Pyne, *Fire in America*, pp. 404, 410-411. Also, Wilson, *History of Fire Research* pp. 8, 13-14.

- ³ “Report of Fire Control, Fire Research and Safety Meeting, Ogden, Utah, January 1950”; Pyne, *Fire in America*, p. 480; Brown Correspondence. Brown recalled a telephone call from Dr. Green of Johns Hopkins University. Green wanted the Forest Service to join the Armed Services Special Weapons Project to investigate blast and fire effects on forests and the environment. Brown agreed and assigned Wallace Fons, George Byram, Charles Buck and others of his small staff to the project. Their performance was so impressive that the Defense Department funded 80 positions in Brown’s Division for this type of research.
- ⁴ Pyne, *Fire in America*, pp. 481-482; M. M. Nelson Correspondence; Wilson, *History of Fire Research*, p. 10. Wilson describes a meeting between Arnold and Mace where the Firestop concept was discussed. Detailed information about Operation Firestop is found in news releases and progress reports in FRG 095, Box 30424, Federal Records Center, San Bruno, Calif.
- ⁵ Wilson, *History of Fire Research*; Wilson Correspondence.
- ⁶ *Ibid.*; FRG 095, Box 30424, Federal Records Center, San Bruno, Calif. The December 2, 1953 drop test is described in a two page report.
- ⁷ *Ibid.*; The Operation Firestop progress reports are supplemented by the “Region 5, Aerial Activities Report -1954”; Also, M. M. Nelson Correspondence. The first use of a lead plane was to guide the TBM to its target on the Jameson Fire. Also, Wilson Correspondence. Wilson was division boss of the section of fireline on which the drop occurred. He and his men were not impressed with the results but continued to hope that air tankers would improve.
- ⁸ FRG 095, Box 30424, Federal Records Center, San Bruno, Calif. The reorganization is described in a report titled, “Report of Investigative Meeting—California Forest and Range Experiment Station, April 25-27, 1955.” Also, in the same place, a limited lightning storm investigation is described. This project, called California Skyfire, used lookout observations in 1954 and 1955 to see if there was a pattern to lightning occurrence. In the late forties and early fifties, attempts were made to induce rain from thunderstorms through use of cloud seeding. Results were inconclusive.
- ⁹ *Ibid.* The description of the Region 5 air unit is based on annual reports of aerial activities, especially the 1954 report cited in note #7 above.
- ¹⁰ *Ibid.*; Biddison Correspondence. Biddison recalls a study by Russell Bower, who was in the Division of Fire Control in the late 1950s, that showed an increase in initial attack times because crews waited for the helicopter to take them to fires rather than using conventional means.
- ¹¹ “Helitack Report, April 9, 1956,” FRG 095, Box 30425, Federal Records Center, San Bruno, Calif.
- ¹² *Ibid.*
- ¹³ *The Sierra Ranger* 6 (January 1918).
- ¹⁴ Ely wrote several accounts of the beginnings of air tankers at Willows. This version is based on Joseph B. Ely, “‘A Whole New Way to Fight Fire’: The Development of Air Tankers in California,” *Journal of Forest History* 27 (April 1983), pp. 76-85. Also, M. M. Nelson Correspondence. Nelson made the “chance remark” to Modoc Forest personnel. He thought crop dusters might be used to spray fires in the Modoc’s cheat grass country. Ely took the idea a step further in getting the Noltas to adapt their plane to drop unconfined water.

¹⁵ Personal recollection.

¹⁶ Wilson Correspondence. Sodium calcium borate was discontinued as a retardant about 1958. It is a soil sterilant and required up to 4 pounds to make a gallon of slurry. Bentonite clay was used as a retardant until about 1961 when diammonium phosphate came into use. Also, Biddison Correspondence. The first use of the Willows Air Tanker Squad in southern California was on the McKinley Fire, San Bernardino Forest, in 1956. Brown Correspondence. As Brown points out, the most important mission of air tankers was (and still should be) initial attack to hold a small fire until ground forces can arrive. News media promotion and a feeling that "bigger is better" encouraged conversion of very large aircraft to air tankers. Adaptability of these craft to initial attack is questionable.

¹⁷ DeWitt Nelson, *Management of Natural Resources in California*, pp. 170-171.

¹⁸ *Ibid.*; Philip Intorf Correspondence. The title of the Los Angeles County Department of Forestry and Fire Warden was changed to Los Angeles County Fire Department after World War II. The rank and file of the department wanted to be paid the higher wage scale enjoyed by City of Los Angeles firemen. Forestry jobs were lower paid, so the title of Forestry was removed from the department's title.

¹⁹ Correspondence in FRG 095, Boxes 27836, 27838, 30424 and 30425, Federal Records Center, San Bruno, Calif.

²⁰ "Mountain Center Fire Report," 2/27/50, FRG 095, Box 27838, Federal Records Center, San Bruno, Calif.

²¹ Clar, *California Government and Forestry*, 2:284. Also, the "Middle Mountain Fire Report, 9/12/47," in which a forest officer indignantly describes a slipshod job of controlled burn preparation by a Division of Forestry assistant ranger. The fire escaped and burned 410 acres of the Mendocino Forest.

²² Sophisticated communications and joint dispatching for all wildfire agencies in the Los Angeles-San Bernardino basins was introduced in the late seventies with Region Five's Firescope program. Common terminology for all types of emergencies was also developed and eventually applied nationwide.

²³ Don Bauer to Robert W. Cermak, October 25, 1985. An example of the Council's lobbying efforts was the attempt to increase fire control funding for southern California forests in fiscal year 1956. A November 23, 1954, letter from Region 5 detailed all aspects of funding needed to do "an adequate job of fire protection" in the southern California national forests. The total was \$2,375,000 compared to an actual budget in FY1954 of \$1,178,000. The Council and other organizations convinced Congress to increase the budget for the southern California forests. Of course, each time a large fire occurred in the Angeles or San Bernardino Forests, the council's case for fire protection was enhanced. Also, Wilson, *History of Fire Research*, p. 10.

²⁴ "Narrative Report, 1954 Fire Season, Region 5," FRG 095, Box 30425, Federal Records Center, San Bruno, Calif.; Correspondence, fire prevention plans and reports, FRG 095, Box 27837, Federal Records Center, San Bruno, Calif. The fire prevention job required many meetings with railroad and lumber company employees. Persistent and determined work by men at all levels of the organization, from forest supervisor to fire prevention aid, reduced man-caused fires, but it was hard to maintain the effort year in and year out.

²⁶ "Narrative Report, 1954 Fire Season, Region 5"; M. M. Nelson Correspondence. Nelson served on the Board of Review for the Tunnel Number 6 Fire. The crew boss was unable to locate the men when the fire threatened because they were hidden in the brush.

²⁷ "Panorama Point Fire Report," Historical File, San Bernardino National Forest, San Bernardino, Calif. A pictorial display of the burned slopes above San Bernardino was used to justify more fire control funding to the House Appropriations Committee.

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- ²⁸ "Narrative Report, Devil Fire," Historical File, Los Padres National Forest, Goleta, Calif.
- ²⁹ "Narrative Report, 1955 Fire Season, Region 5," FRG 095, Box 03425, Federal Records Center, San Bruno, Calif.
- ³⁰ Ibid.
- ³¹ Morford, *Wildland Fires*, pp. 114-118.
- ³² Ibid., p. 115.
- ³³ Ibid., p. 118.
- ³⁴ "Narrative Report, 1955 Fire Season, Region 5," "California A-Flame" leaflet, FRG 095, Box 30425, Federal Records Center, San Bruno, Calif.
- ³⁵ Ibid. Also, "Narrative Report, McGee Fire," History File, Sequoia National Forest, Porterville, Calif.
- ³⁶ "Narrative Report, Refugio Fire," Los Padres National Forest, Goleta, Calif.
- ³⁷ J. S. Barrows to M. M. Nelson, October 6, 1955; "Conclusions and Recommendations—Regional Board of Review—Region 5—1955 Fire Season—March 14, 1956," FRG 095, Box 30425, Federal Records Center, San Bruno, Calif.
- ³⁸ "California A-Flame."

Bibliographic Note

A standard bibliography was not prepared for this history. Since it is narrative in form the notes for each chapter provide a list of sources in a generally chronological order. The chapter and subchapter headings and index also are clues to the location of sources in the book. The main source of documents for this history was the Federal Records Center (National Archives) at San Bruno, California. At the time this history was written the Forest Service was storing its official historical records there but retained ownership of them pending agreement with the archivists on how to fit them into the system used at San Bruno. Before 1958 Forest Service files were designated using an alphabetical system, hence the fire control records I consulted were mainly filed under the letter F and were mostly those of the regional office. There were 32 regional office alphabetical file boxes with the F designation at San Bruno. Each forest's files were stored separately. I was unable to consult those in the record centers, but I visited eight different forest headquarters and was given access to their historical records. The rest of the forests in Region 5 provided records at my request as well as additional relevant written material.

The San Bruno records included USDA. Forest Service or other federal agency printed and/or typewritten reports, correspondence, research bulletins, newsletters, and accounts. Some of these were by the U. S. Bureau of Forestry and the U. S. Geological Survey and predated the establishment of the Forest Service. Especially valuable were the reports by George B. Sudworth on the central and southern Sierra forests and by John B. Leiberg on the northern Sierra which were in my personal files. San Bruno records also contained material by Leiberg and others about southern California and coast range forests that were developed as part of a cooperative agreement by the U. S. Bureau of Forestry with the state of California. Copies of individual fire reports, inspection reports and boards of review revealed actual operations which did not always fit the ordained scheme of things.

Other important sources were the reminiscences or diaries of early forest rangers or other personnel. Some of these were in San Bruno, others in individual forest files. R. L. P. Bigelow's diary was perhaps the most detailed of these documents. Early regional and forest histories were important references. S. B. Show wrote or co-wrote a series of histories of forests, fire control or organization management in Region 5 that were basic to understanding fire control history and his personal bias.

Robert W. Ayres wrote histories of fire control and timber management and William S. Brown also wrote several histories, some as co-author with Show. Several other more recent forest histories compiled by forest historians provided both information and clues about other sources. Russell Bower's *History of the Klamath National Forest* was especially helpful because Bower lived some of the described events and because it bridged the gap between the end of this history and several years thereafter. Notable among forest sources was Sierra National Forest volunteer, June English. Her collection of material and photos from the earliest days of the Sierra Forest Reserve and Sierra National forest formed the core of the story of the early Forest Service in the Sierra Nevada. After her death, her extensive collection was given by her daughter to the Henry Madden Library, California State University, Fresno. Research bulletins, newsletters, memoirs, typewritten accounts and oral interviews were found in the Bancroft Library and University of California Forestry Library which has now been incorporated into the main library at Berkeley. Other material was available at the Butte and Yuba County Libraries and the Meriam Library at California State University, Chico.

Among other very important sources were the letters from retirees that added details and a personal touch to the government reports. They included correspondence with A. A. Brown, Carl Wilson, Joe Elliott, C. A. Abel, and Edward S. Kotok, son of Edward I. Kotok. Interviews, some audio-taped, were another reference. One of the most entertaining was by "Gus" Nash-Boulden, long time forest supervisor in southern California, who lived to age 100. Some of these have been transcribed and entered into the Region 5 Oral History files. Where possible each chapter was reviewed by retirees who had lived the events described. The Region 5 retiree newsletter, *The FSX Newsletter*, was the full of many stories and recollections of events described in the text.

Many published works were consulted as background for the general social and economic situation that sets the stage for several chapters. However, twenty years ago there were few historical works specifically about forest fire. Stewart Holbrook's *Burning an Empire* was a popular history of the subject and valuable as background to the issues surrounding fire control. Stephen J. Pyne's *Fire in America: A Cultural History of Wildland and Rural Fire* had just been published in 1982 when I began on this history and was a landmark in historical writing about forest fire.

When I needed help I could usually find some description or source that Pyne had discussed. I didn't always agree with him, and some of my descriptions of people and events differ from his, but he pioneered a subject that he knew about first hand, unlike some later authors on the subject. C. Raymond Clar's two volume history of *California Government and Forestry* was invaluable for linking the development of fire control in state government to what took place at the federal level. *Forests and Men* by William B. Greeley told his story of forestry and fire control from the early days and his role in establishing cooperative fire control. Ronald F. Lockmann covered elements of the early development of forest conservation in southern California in his *Guarding the Forests of Southern California*. Of the published memoirs, probably Coert duBois' *Trailblazers* has most to do with fire and its control and management.

Gifford Pinchot's *Breaking New Ground* is fundamental to understanding the attitudes that governed the early Forest Service and to some extent the later Forest Service as well. Lee Morford contributed a history of wildfires in the Klamath country. J. W. Robinson and others wrote helpful local history, biography and travel books, especially about southern California. Many works about forestry and conservation discussed fire control in passing, but Stephen Pyne was the first to gather the strands of the history of fire into a single fabric.

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