SPECIAL REPORT ON A WILDLIFE STUDY OF THE HIGH SIERRA IN SEQUOIA AND YOSEMITE NATIONAL PARKS AND ADJACENT TERRITORY

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The saddle horses and pack stock used on the trip were the personal property of the writer or of Mr. McLellan. Rather more than the usual daily mileage for travel of this sort was made, as we averaged twenty miles per day and on some days made thirty five. None of the expense of transportation, feeding or anyother maintenance cost of the animals was borne by the government.

Itinerary and Annual Leave

Originally it was calculated that hardly any more time would be required to travel directly through the mountains from the back country of Sequoia and Kings Canyon to Devils Postpile and the back country of Yosemite then would be needed to make the long, roundabout trip from the back country of Sequoia down to headquarters, thence by auto down into the San Joaquin Valley and north up the main highway to Yosemite, and then back into the high country again. The intent was to follow the John Muir Trail from Sequoia to Yosemite and thus gain a better knowledge of conditions in the high Sierra - in which the writer had never been before - than would otherwise be possible.

Actually it turned out that due to heavy snows and a late spring, considerable portions of the John Muir Trail were still impassable, necessitating long detours over difficult and seldom used trails, so that a week's time was lost from this cause. Accordingly, all time over and above that which would have been required to make the trip over the usual auto route through the San Joaquin Valley was charged by the writer to annual leave. The observations made during this leave period are an integral part of the whole picture, however, and have been incorporated in full into this report.

The detailed itinerary of the trip is given under the various areas treated below.

SEQUOIA NATIONAL PARK

Itinerary

The route was from Ash Mountain to Hospital Rock and thence up the Middle Fork of the Kaweah River to Little Bearpaw Meadow. From Little Bearpaw the High Sierra Trail was followed across the Chagoopa Plateau and up the Kern Canyon; on the Chagoopa Plateau a side trip was made northward up to Red Spur to investigate the "Kaweah Basin Reserve" and another side trip was taken from Big Arroyo into Little Five Lakes basin. From Kern Canyon the seldom used trail up Tyndall Creek was followed, via the Bighorn Plateau, to Shepherd Pass, and thence to Independence for supplies.

Ash Mountain - Hospital Rock Area

Trail Conditions. A well maintained stock trail connects Ash Mountain with Hospital Rock but it is very seldom used, and while there is no inducement to hikers to take this route because the automobile highways parallels it.

Middle Fork of the Kaweah

General Aspects. The Middle Fork of the Kaweah River traverses a precipitous transition zone country of rather high summer temperatures where dense chaparral growth and Canadian forest meet.

Wildlife. The steep densly forested, north-facing slopes on the south side of the river constitutes an inaccessable refuge for such forest dwellers as the cougar and fisher; in fact most of this area comprises the important "Fisher Reserve" which was recently set aside. On the same side of the river but higher up in the rugged granite country, is located the scencially spectacular Granite Creek Reserve which was set aside by the park administration for the study and protection of the golden trout (photos of these reserves were taken but were spoiled).

The chapparal-clothed south-facing slopes of the Middle Fork area afford abundant food and cover for deer, bear and grouse.

Bear. Droppings noted July 17 along the trail indicated a heavy diet of manzanita berries, with which the bushes are heavily laden at this season.

At Little Bearpaw Meadow a large male and two yearling cubs were present. The latter came to the edge of camp and showed interest in our grub. They had previously dug up partially buried garbage left by a previous camping party and had become camp-conscious as a result of this experience, although as yet they were not so badly spoiled as to attempt a raid on our supplies. If campers would burn all garbage, including tin cans (which would thereby

lose their odor of food), the majority of bears would not acquire the camp robbing habit. It is therefore suggested that CCC spike camps and similar work crew camps be required to burn all such refuse after each meal, thereby avoiding much of the trouble which they sometimes have at present.

Sierra Grouse. Covey of approximately five 3/4 grown young, with parent, noted on July 17 at Little Bearpaw Meadow.

Ground Squirrel. Present, but not abundant, at Little Bearpaw.

Coyote. Heard one howling on the night of July 17 at Little Bearpaw. The voice of the coyote when heard in the evening around the campfire adds the final touch to the wilderness setting. Its appeal to the park visitor under such conditions is often very great.

Trail Conditions. The Middle Fork trail is a good example of a wilderness trail — entirely adequate for stock or foot travel but not conspicuously artificial in appearance (Fig. 1).

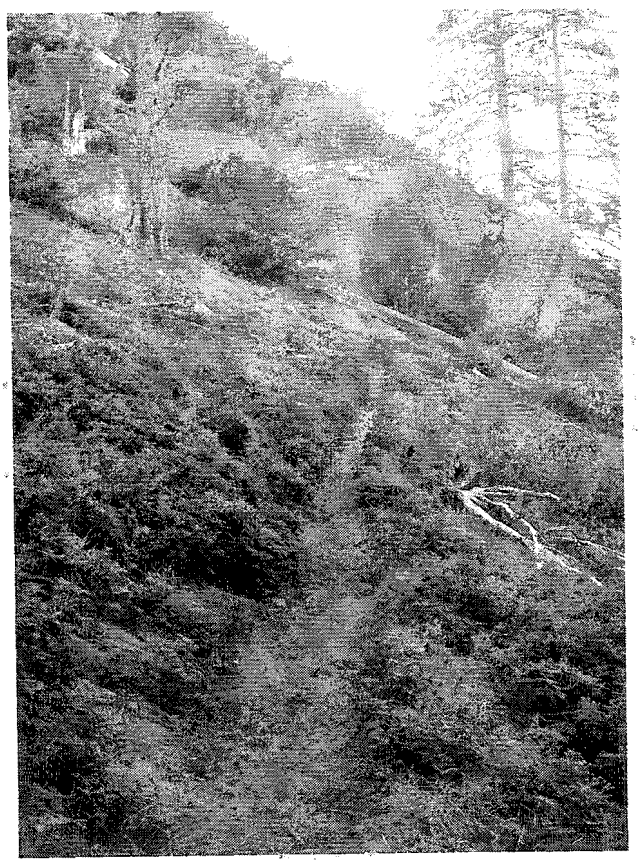

Fig. 1.

Middle Fork trail, Sequoia National Park. This simple trail is adequate for travel but is not conspicuously artificial. Transition between chaparral and coniferous forest is shown.

Special Report on a Wildlife Study of the High Sierra in Sequoia and Yosemite National Parks and Adjacent Territory

INTRODUCTION

Justification

From time to time in the past various comments - some of them in a rather humorous vein - have been made to the effect that whereas the regional field men of the technical branches are markedly active in making hurried visits to the headquarters of the parks and monuments in their large territories, yet such persons have often displayed but slight first hand knowledge of the surrounding park territory and only a limited grasp of the fundamental problems related thereto.

Since there seems to be no way of avoiding the necessity of submitting technical comments on local park problems from a more or less distant central office, it becomes the duty of those who have to make the comments to avoid this form of criticism by knowing the regions in question. It is for this reason, namely to become acquainted with a hitherto unfamiliar region, in which a large number of ECW projects have been initiated in the past that the writer made the present study.

Scope of Subject Matter

Without a doubt the present period is one of change on the High Sierra. Some of the conditions here recorded are the product of earlier, more primitive times and probably will not last much longer. For this reason the following report includes various observations which are not always directly connected with wildlife but which seem worthy of record so that they can be compared with later developments, and because they may be of use to persons not personally acquainted with the region. In treatment of subject matter the aim has been to avoid a narrow, strictly wildlife point of view in favor of the broader consideration of wilderness values.

Equipment and Assistance

The trip was made in company with Mr. A. B. McLellan who is a friend and neighbor of the writer and an experienced mountain man who lived for a considerable time in the Sierra Nevada years ago. Mr. McLellan kindly volunteered to go along for the pleasure of the trip. His detailed knowledge of trail conditions and the condition of the range fifteen years ago, when most of the country which we traveled was heavily sheeped or grazed by cattle, was especially valuable as a basis of comparison with conditions in the same places now.

The zigzags on the short cut trail up to Little Bearpaw Meadow are steep, but their very primitiveness contributes to the wilderness atmosphere in a way that a sophisticated, engineered pathway cannot do.

Administrative Problems. Superintendent White called attention at the beginning of the trip to the fire hazard condition in the Middle Fork area, pointing out that in this region, where the inflammable chapparal adjoins the forest, the danger of fire is particularly great, because considerable numbers of fishermen travel up and down the river. Superintendent White stated that a truck trail up the Middle Fork is necessary in order to give adequate fire protection to the area.

Big Arroyo and Chagoopa Plateau

General Aspects. From the Middle Fork Country one climbs rapidly upward toward the summit of the Great Western Divide, which rivals the main Sierran crest in height and spectacular beauty. In dizzy zigzags the High Sierra Trail scales the granite slopes, until the forest is left far below. At length it crosses the divide at Kaweah Gap around whose crags the thunder rumbles, and enters the long alpine meadow at the head of Big Arroyo. Chagoopa Plateau is a high spacious rather sandy table land, mostly forest-covered but also with many meadows, of which Sky Parlow Meadow is the largest, and several lakes and ponds.

Wildlife. Deer. Evidently rather common in Big Arroyo and on Chagoopa Plateau.

Kaweah Basin Reserve. It was hoped that a trip could be made into the remote Kaweah Basin Reserve, but the difficulties attendant upon penetrating this mountain-ringed area, to which no trail has ever been built, prevented the writer from crossing its barriers during the time at our disposal.

From the Chagoopa Plateau side a series of lofty ridges bar the way except at the southern end of Red Spur, where it appears that an entrance might be gained, through the thick timber (Fig. 2; see also Figs. 5, 9).

Mr. Joseph Dixon has stated that so far as he knows the only human beings who have entered the region in recent years are: Vernon Bailey (between 1930 and 1933), a fish planting crew (judged by the presence of fish to have entered some time prior to 1934), Branch of Forestry type mapping crew (1933), Joseph Dixon (1934). Several old-time mountain men at Independence, Florence Lake, and Kings Canyon who were interviewed by the writer knew the location of the Kaweah Basin very well but only one of them (Mr. Gates of Independence) had ever been in there.

As pointed out in a "Report on Research Reserves Proposed for Sequoia National Park" (October 9, 1935), the Kaweah Basin Reserve ideally fulfills the requirements of a research reserve. On the other hand, the inaccessibility imposed by its great natural barriers renders it unattractive to the passing tourist; moreover in the event that such a visitor should gain entrance to the area, he would find nothing there which was not abundantly available in the surrounding country. For these reasons it is earnestly recommended that

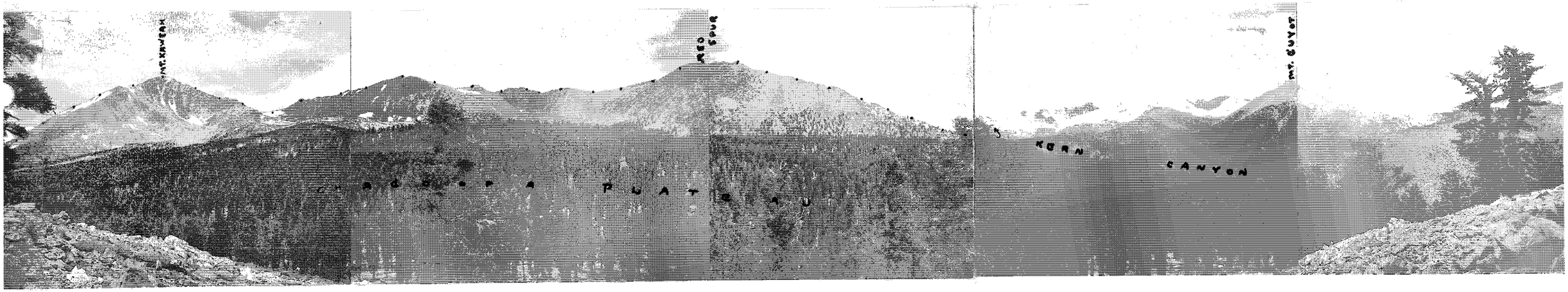

Fig. 2. View from the northern end of the Chagoopa Plateau, showing the mountain barrier which surrounds the Kaweah Basin Reserve (the latter here invisible). No trail penetrates this remote glacial basin, which lies on the other side of these mountains, with the result that its primeval conditions has remained practically undisturbed. Dotted line indicates location of reserve boundary along mountain crest.

for the sake of preserving intact a biological area which has existed with scarcely a change for untold centuries, no additional plants of fish be made in the Kaweah Basin.

Trail Conditions. Unlike the Middle Fork trail the High Sierra Trail is heavily traveled. The tread is wider, the gradient less steep, and evidences of artificial construction are more obvious (Fig. 3), but the greater elaborateness is largely imposed by the need of rock retaining walls when traversing the steep granite slopes. The tread is about three feet wide; anything wider than this would be superfluous, since a trail of sufficient width to permit pack animals to pass each other without one of them stepping off the trail would have to be 6 feet wide, which is a roadway. Provided proper clearance is allowed for the pack, the widening of a trail beyond three feet for the "safety" of pack or saddle stock would be superfluous because the animals

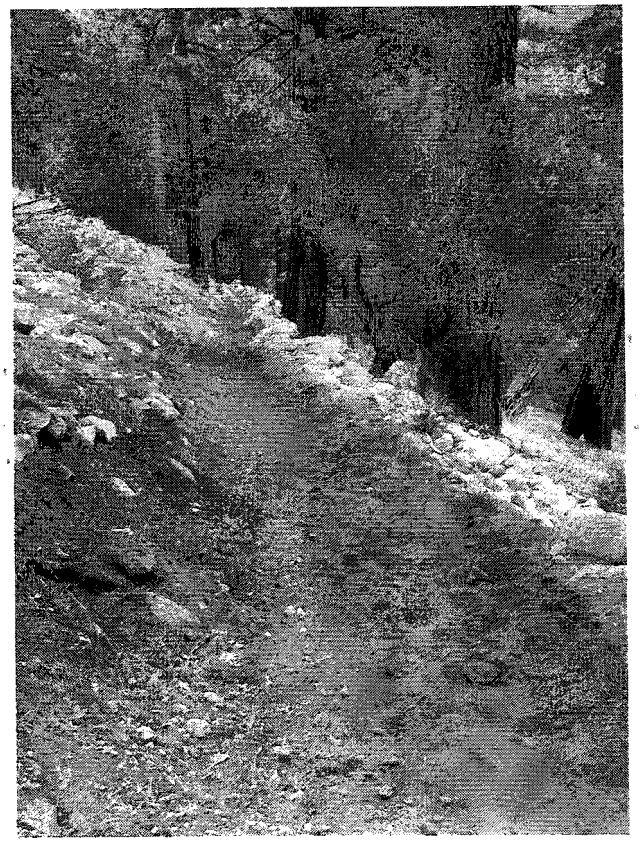

Fig. 3. High Sierra Trail on descent from Moraine Lake to Kern Canyon

tend to walk on the extreme outside edge of the trail no matter how wide it is.

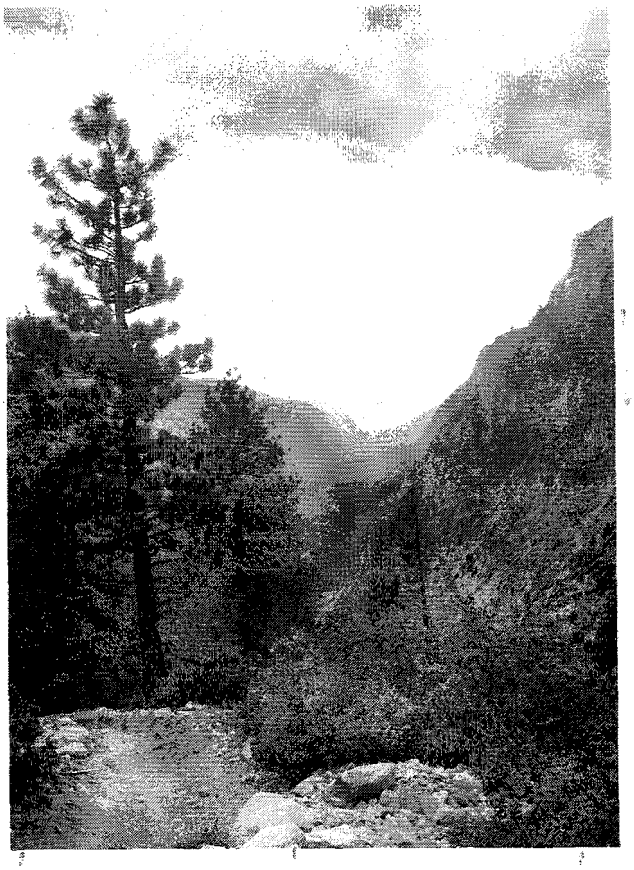

Fig. 4. Kern Canyon has a magical atmosphere of solitude which would be destroyed if an auto road were ever built into it.

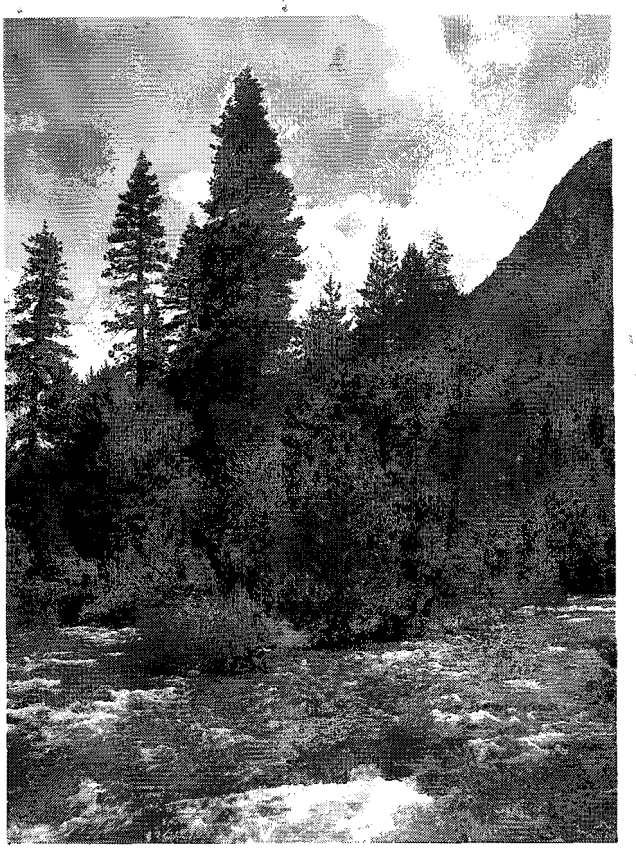

Fig. 5. Kern Canyon as seen from the bridge at Upper Funston Meadow. An idea is given of the charm of the place in its present primitive state.

Kern Canyon

General Aspects. Kern Canyon is a long, narrow, almost straight gorge which runs for many miles into the heart of the mountains between walls of nearly perpendicular granite (Fig. 4). At present it is a remote, unspoiled valley of restfulness and quiet. While perhaps not quite as spectacular as Kings Canyon it has about it a certain magical atmosphere of solitude (Fig. 5) which will be destroyed in the latter area with the completion of the automobile road. In its present primitive state (Figs. 6-8) Kern Canyon is unique; with a road up the center it would become just another mountain resort, inferior in scenic value to many of the others, definitely cheapened by citified sights and sounds.

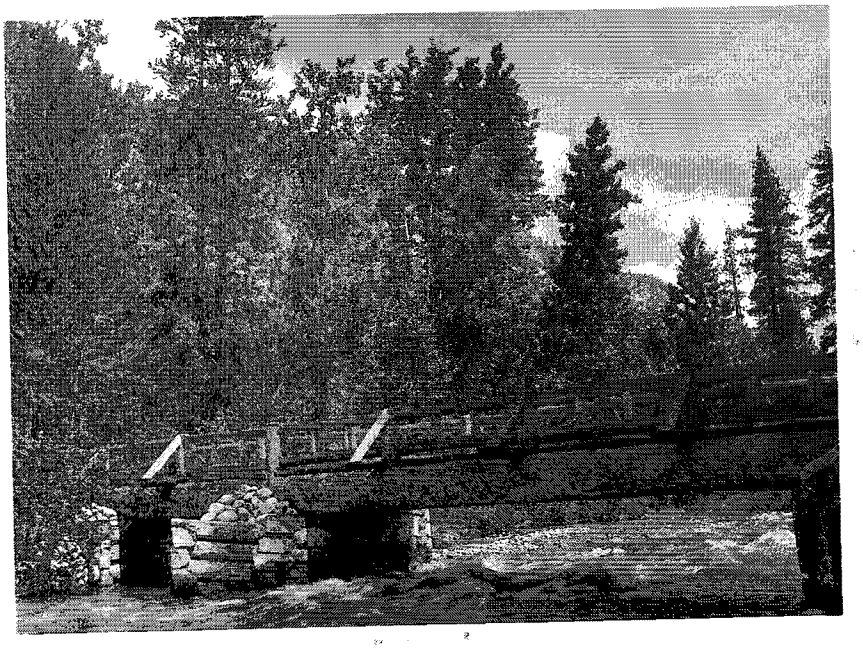

Fig. 6. The Kern River bridge near Upper Funston Meadow. Adequate, but not ornate, this bridge fits well into the primitive picture.

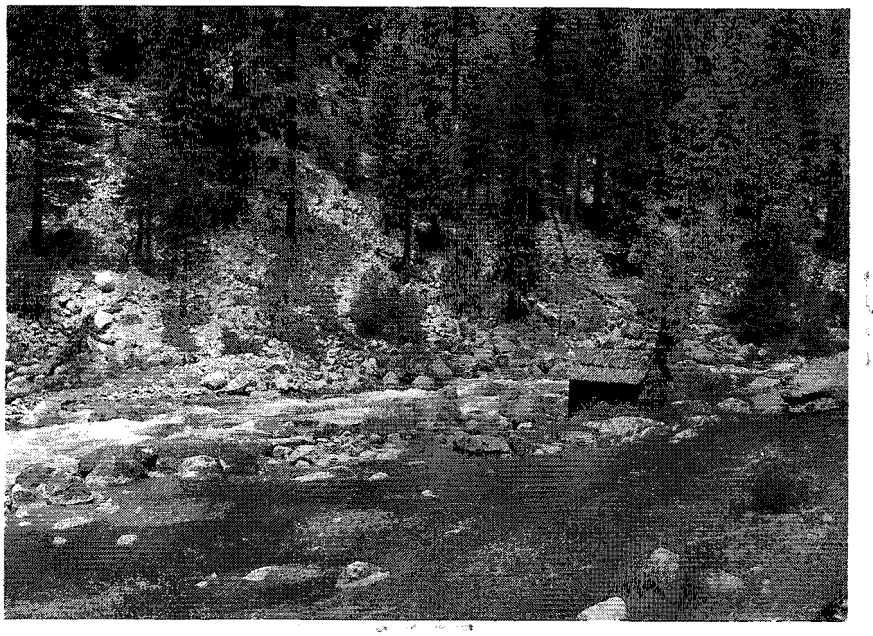

Fig. 7. The bath house at Kern Hot Spring, Kern Canyon. This simple little structure is made of unsquared timbers and shakes secured in the vicinity. The minimum of artificiality is presented.

Kaweah Basin Reserve. In traveling through Kern Canyon one skirts the Kaweah Basin Reserve on the east side, but the two thousand foot wall of the canyon constitutes an insurmountable barrier to any approach from that direction (Fig. 8). At the head of the canyon, where the torrential Kern-Kaweah River joins the Kern River, if one looks westward up the granite stairway down which the Kern-Kaweah tumbles, one sees the precipitous north boundary of the reserve, and also, in the far distance, the spire-like pinnacles of the Red Kaweah, Black Kaweah and Kaweah Peaks Ridge which form the formidable south-west boundary (Fig. 9).

Administrative Problems. Proposed FCW Projects. The projects to be described received wildlife clearance March 13, 1936, but it was desired that field studies should be made and additional information gathered regarding them as soon as possible.

No. 146-109 Buildings, Contact Stations. Of the 8 locations proposed the following were visited: Upper Funston Meadow, Upper Tyndall Creek, Big

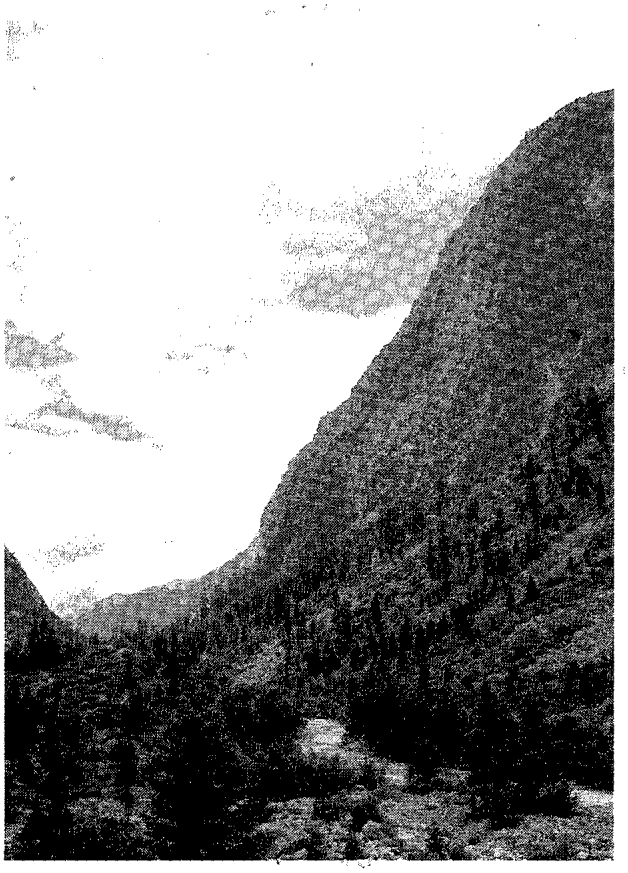

Fig. 8. View down Kern Canyon from about opposite Whitney Creek. The nearly perpendicular canyon wall forms an insurmountable barrier to penetration of the Kaweah Basin Reserve from the east.

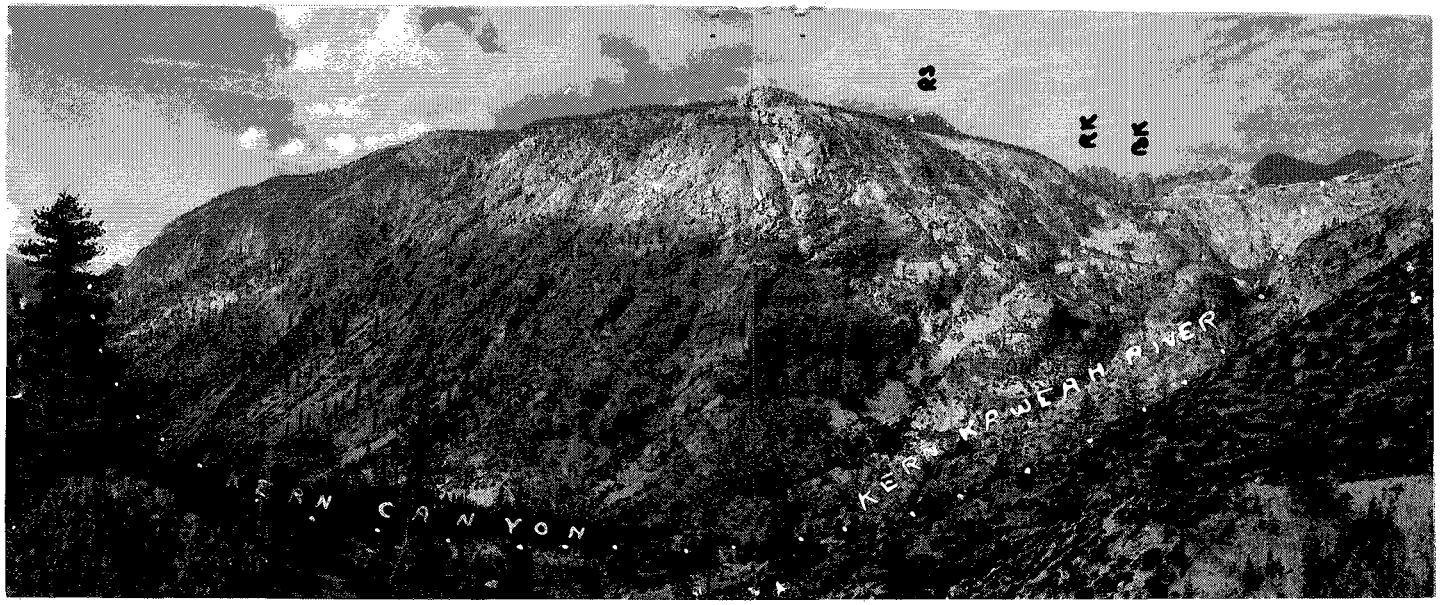

Fig. 9. View looking east from the High Sierra Trail two miles above Junction Meadow. Shows the fortress-like east and north boundaries (dotted line) of the Kaweah Basin Reserve. In the far distance (upper right) can be seen the formidable pinnacles which guard the basin from approach from the south-west; the wide angle lens of the camera used fails to reproduce the massive proportions and the awe-inspiring perpendicularity of these distant peaks (RS-Red Spur, RK-Red Kaweah, BK-Black Kaweah).

Arroyo, Junction Meadow and Bearpaw Meadow. There is no question of the need of these shelters on the part of the patrol men. The locations visited seemed suitable and free from wildlife objection; in most of them there is already a modest development such as fenced pasture, temporary shelter, or telephone station.

No. 147-301. Stream and Bank Protection - Kern River. It is stated in the project application (Jan. 15, 1936) that "floods during recent years have done inestimable damage in the Kern Canyon by obstructing old channels with gravel bars and log jams, cutting into meadows, valuable for pasture and filling deep holes once used as fish packs... The stream banks will be protected from further cutting".

The writer believes that the wording of the justification tends to create in the mind of the reader a picture of havoc of much greater extent than is actually the case. Of the three chief meadows involved, Upper Funston Meadow and Junction Meadow were studied, and the following comments are offered:

Upper Funston Meadow. This is a fenced tourist pasture comprising perhaps two acres of good feed (Fig. 10).

Fig. 10. Upper Funston Meadow. Shows good feed and little damage by flood conditions.

The meadow is bordered on the east side by the Kern River, but relatively little of it has been affected by changes in the stream channel. At the lower end of the meadow the river has changed its course from time to time, but numerous willow thickets and clumps of other trees have tended to control the course of the water to such an extent that only a small part of one edge of the meadow has been eaten away (Fig. 11). A number of logs have been

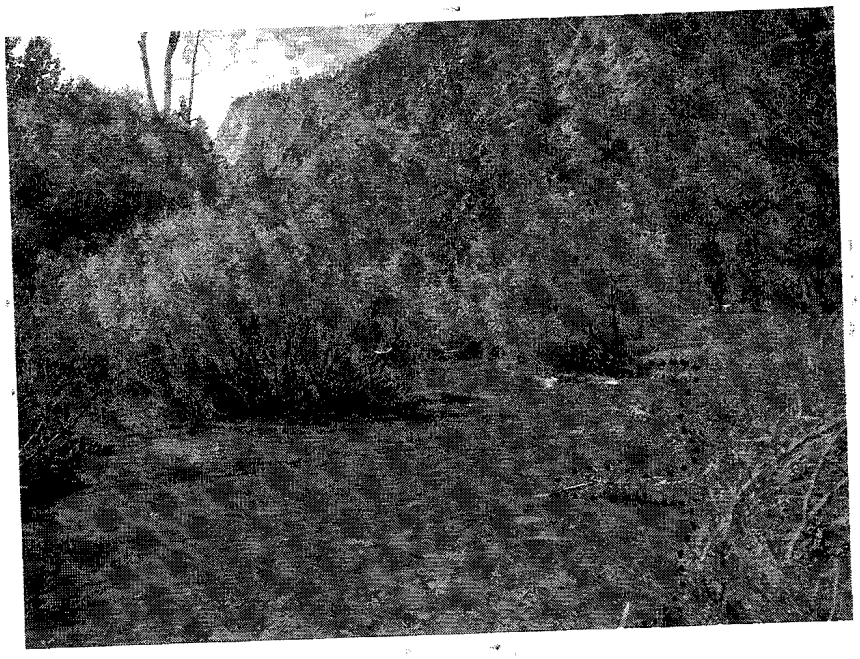

Fig. 11. Upper Funston Meadow, south east corner, showing slight extent of damage to the meadowland.

deposited at the extreme lower end of the meadow, but their presence hardly affects the use of the meadow for grazing purposes, at least at this time of year, because that end is too wet for stock and has not been used by the animals at all (Fig. 12).

Fig. 12. Southeast corner of Upper Funston Meadow showing presence of a few logs which have been deposited there by floods. This part of the meadow is too wet for stock, at least during most of the summer.

Junction Meadow. This meadow is at the present time vastly inferior to Upper Funston as a source of feed but its inferiority in this respect if it can be attributed to the activity of the Kern River at all, must have been caused by the moving of the stream farther away from the meadow, for the latter is some distance from the waters edge, and is quite dry. The meadow is watered only by a small, sluggish branch streamlet, and is hardly more than a swampy place in the forest. Much of the area is covered by charred logs which represent former standing timber that fell and lay undisturbed - not logs drifted in from above by flood waters. Large parts of the meadow have resprouted to timber again, which was chopped down when the trees were about 5 inches in diameter, leaving the ground thickly dotted with the small stubs.

Due to this accumulation of down logs and stubs (Fig. 13) the area is not easy for stock to negotiate; however, the ground is too dry and sandy to support a luxuriant growth of feed under the best conditions. In the neighborhood of the sluggish streamlet referred to, the ground is damper but the feed remains inferior and consists largely of false hellebore or "skunk cabbage" (Veratrum sp.) and associated plants such as Rudbeckia.

Fig. 13. Junction Meadow, showing charred fallen logs, and numerous small stubs indicating extensive forest reproduction. The feed here is of an inferior type and very limited in amount.

It seems unlikely that this naturally inferior meadow can ever be enlarged or improved to any great degree. Removal of down logs and possibly of a limited amount of standing timber might be justified if it should become necessary to keep the meadow set aside exclusively for government stock used on patrol work, but for ordinary tourist use the meadow can never be made safe, so that extensive improvement work for the purpose is not to be recommended. In any event there is sufficient feed in other parts of Kern Canyon and in immediately adjacent regions to meet the needs of the tourist. We ourselves found lots of feed without using either of the meadows mentioned.

On the basis of these observations it is recommended that very little be done to Upper Funston Meadow and Junction Meadow on the basis of meadow improvement. On the basis of fish & bird improvement it is probable that Supervisor of Fish Resources Rudows will desire to make specific recommendations, but in this connection it is urged that any alteration of the river be postponed until he has had a chance to personally review the situation, in November.

With regard to Lower Funston Meadow, which was not visited, no specific recommendations are offered. The tourist meadow, a quarter of a mile north of Kern Hot Spring, does not seem to have been damaged by the river.

Nos. L-5-404 and L-5-405 Excavating Channels - Kern River. These are directly related to the preceding project. They seem unnecessarily extensive and artificial for the present time of the meadows described above; it is recommended that Mr. Rudows be given opportunity to judge their necessity as related to fish preservation.

Nos. L-5-303 and L-5-304 Lake and Pond Development. Not studied. In view of what was learned at the Washington conference in January regarding the difficulty of planning stream improvement projects which result in real benefit to fish, it is desirable that all such work be postponed until Mr. Rudows can make specific suggestions on the ground (this was provided for in the letter of March 13, 1936 from Assistant Director Kirth to Superintendent White, and no work has been done to date). (* See also page 17b for information gained since the above report was writen).

Tyndall Creek and Bighorn Plateau

General scenery. The climb out of the Upper Kern River valley follows a seldom used trail and is quite steep. The end of the climb brings one to the top of the lofty, scenically gorgeous Bighorn Plateau which extends over thousands of acres and must at one time have been a prime feeding ground for the animals from which it derives its name.

Wildlife. Bighorn. Prior to the establishment of the park the Bighorn Plateau was heavily sheepped and very likely the native inhabitants were driven out by a combination of hunting, competition for food, and diseases introduced by bands of tame sheep. At the present time there is abundant

Fig. 14. Bighorn Plateau looking north toward Diamond Mesa and the main Sierran Crest. Originally a prime bighorn territory, the area was heavily sheeped before Sequoia Park was established. The bighorn remnants have never recovered from the invasion. Note abundant feed in foreground.

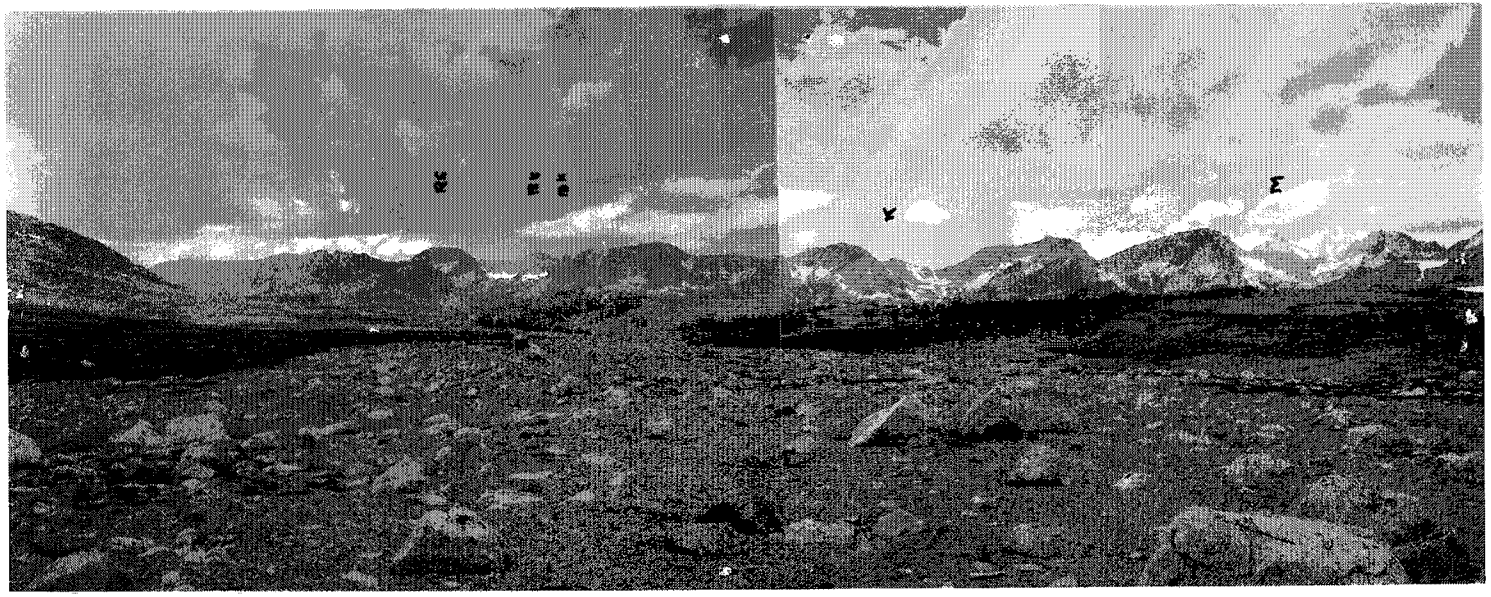

Fig. 15. Bighorn Plateau, looking west to the Great Western Divide — the backbone, scenically as well as physiographically, of Sequoia National Park. Once this was all bighorn range (M - Milestone Mountain, RS - Red Spur, RK - Red Kaweah, BK - Black Kaweah, K - Kern Ridge)

* Since the foregoing comments were prepared it has been learned that Projects 147-301, 148-404 and 149-405 were intended for application primarily to Lower Funston Meadow (not visited), where erosion damage is said to be excessive. Therefore, it should be emphasized that the above comments on condition at Upper Funston and Junction Meadows do not apply to Lower Funston Meadow.

Projects 150-903 and 159-903 are being held in abeyance.

feed (Fig. 14), but the bighorn remnants have never recovered from the invasion of their exotic relatives.

Looking westward across the Bighorn Plateau the observer sees one of the most spectacular regions in the park — the Great Western Divide, which, scenically as well as physiographically, is the backbone of Sequoia (see Fig. 15, in which the wide angle lens fails to do Nature justice). This mountain range also must have been a magnificent bighorn country, but now it is deserted. The main Sierran crest (Fig. 16) was another stronghold for bighorn, and it is here that the survivors still linger, as Mr. Dixon's investigations have shown.

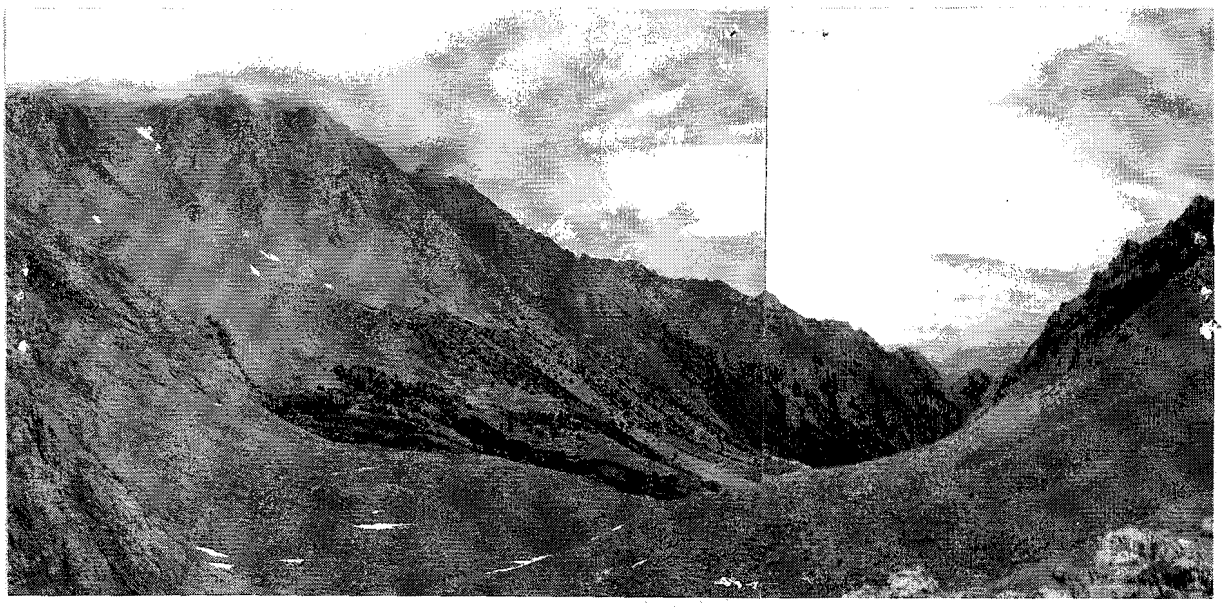

Fig. 16. The barren crags of the Sierran crest, seen looking through Shepherd Pass to Owens Valley. Ninety miles farther, beyond two more ranges of increasingly forbidding desert mountains, lies Death Valley. This is the best bighorn country left in California.

Fish. The Kern River above Junction Meadow, and the tributary Tyndall Creek, both of which lie off the beaten track, are plentifully supplied with the Kern Rainbow (Salmo gilberti).

Trail Conditions. The trail from the Kern Valley to the Bighorn Plateau is not much used and is one of the oldfashioned kind that goes straight up without benefit of engineered gradients. Although more work to climb, the feeling of isolation is greater.

The trail down Shepherd Pass, just outside the park, is well constructed, but at the time of the trip the higher portions were buried deep in snow, making it necessary to zigzag down over a steep, very loose talus slope. The large pack outfit run by Mr. Robinson of Independence had improvised a trail there (after having been forced to turn back, with the loss of three miles from an attempted crossing farther north) at the time that it crossed the mountains to pick up the Sierra Club at Giant Forest, a week before our visit. With every downward step that we took the loose rock slid underfoot causing one of our green mules to stagger off the trail into a pile of boulders, where she nearly broke a leg and by her struggles started a small avalanche which for a moment threatened to come down on top of the entire party.

Summary of Recommendations

The following recommendations are submitted for consideration:

1. That garbage at camp sites including tin cans be burned after each meal instead of being buried. When the garbage and tin cans are merely buried they are likely to be dug up by bears which learn in this way, often for the first time, to become camp robbers. While perhaps not always easy to enforce in out-of-the-way tourist camping spots this precaution ought to save the CCC spike camps and other work crew camps from numerous unpleasant experiences.

2. That no fish be planted in the Kaweah Basin Reserve, since this would upset the existing natural balance which is the chief reason for having the area set aside for study.

3. That no measures involving drastic change of the natural stream flow be taken at Upper Funston and Junction Meadow to improve pasturage, and that related measures for the improvement of fish environment be in accordance with suggestions to be made by Mr. Madson.

4. That no road shall ever be built into Kern Canyon or any other human development introduced there which would destroy the primitive atmosphere which now makes that area unique.

KINGS CANYON

It was the desire of the late George M. Wright that the writer become familiar with wildlife conditions in the proposed Kings Canyon National Park, and it was in accordance with this wish that a short trip was made last summer with the Sierra Club into the lower end of the canyon.

Since Kings Canyon lies directly between Yosemite and Sequoia, and is immediately adjacent to the latter, the present trip was routed so as to include a part of Kings Canyon which the writer had not visited previously.

Itinerary

The route was from Kearsarge Pass down Bubbs Creek to Kennyers and thence up Copper Creek through Granite Pass to the Middle Fork of the Kings River. The original plan was to follow up the Middle Fork to Cartridge Creek and regain the John Muir Trail once more, but Le Conte Canyon and Muir Pass were still blocked by deep snow, so that the long, circuitous route through Tehipite Valley, Crown Valley, and Hell-For-Sure Pass had to be followed, resulting in several day's loss of time and numerous unforseen minor mishaps.

Bubbs Creek Area

General Aspects. From Kearsarge Pass, on the Sierran Crest, one descends fairly gradually into the basin of the Kearsarge Lakes and Bullfrog Lake. This is a high, granite country of marvelous scenic beauty; thickly forested only on the bottoms of the valleys and gorges where the meager soil has slowly accumulated (Fig. 17).

The route down Bubbs Creek soon enters the forest zone, where it slopes downward more steeply, passing several small flower-studded meadows along the way. Finally, in the last mile it plunges downward 1,400 feet to the floor of Kings Canyon, accompanied by the roar of innumerable leaping cascades.

Wildlife. Ground Squirrel. Three young about 1/3 grown were seen at Charlotte Creek, and the species was present in small numbers from this point to the floor of Kings Canyon.

Rattlesnake. Plentiful along the Bubbs Creek trail in the vicinity of Charlotte Creek. They occupy the same territory as the ground squirrels and probably help prevent the latter from spreading; indeed it is possible that the frequently observed spread of ground squirrels into new areas, which is usually correlated with a considerable invasion of the area by man, has been promoted by the gradual extermination of rattlesnakes on the part of the human settlers.

Fish. Not nearly as abundant as in the upper Kern River, undoubtedly because of the larger number of people who pass up and down Bubbs Creek and

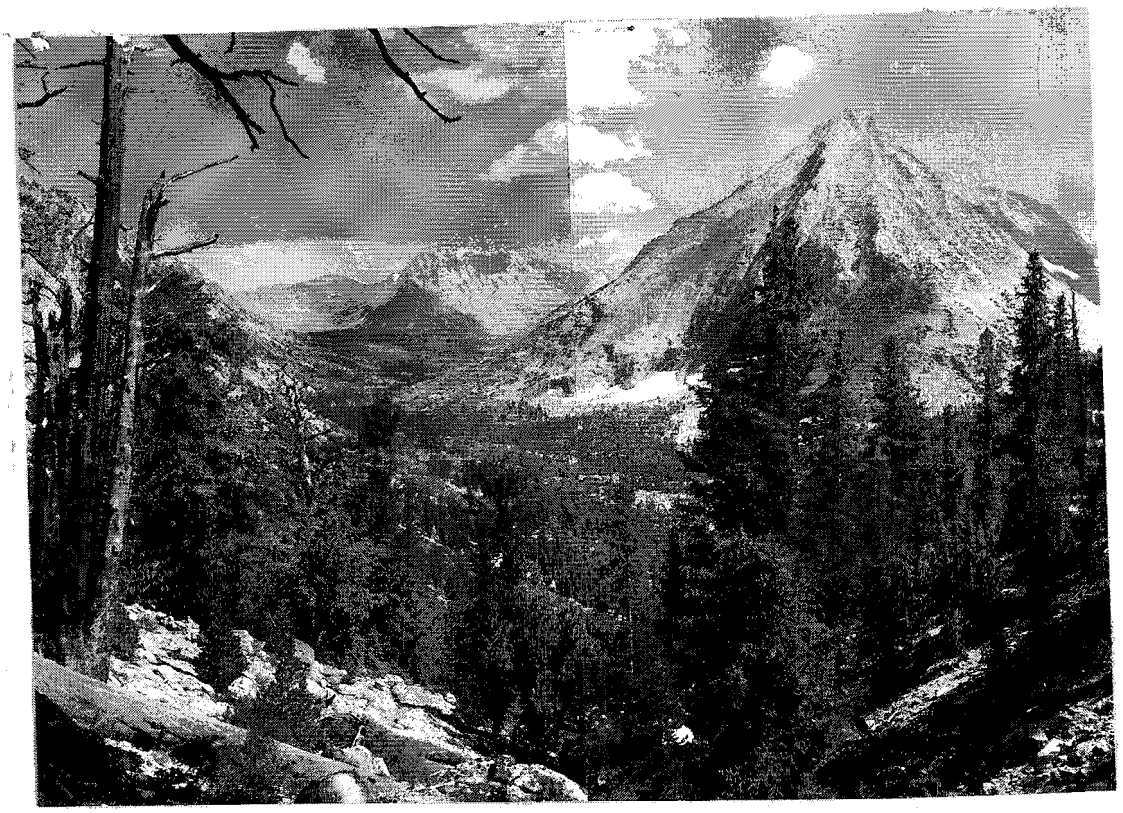

Fig. 17. East Vidette and Center Basin as seen looking southeast from the Bubbs Creek trail; Center Peak shown at far end of the valley. This view is typical of the high country in the proposed Kings Canyon National Park.

through the adjacent territory. So constantly does one meet people along the trails of this region that one finds it difficult to shake off the impression that a resort is not far off. Campers with tents and pack stock were present at Bullfrog Lake and at the upper end of Bubbs Creek; for this reason there was no feed available for our stock along the trail for a distance of about twenty miles.

Trail Conditions. The explanation of this state of relative human congestion lies in the presence of a good road from Independence to Onion Valley, which is only about three miles from Kearsarge Pass. A packers' camp is located at Onion Valley and the adjacent meadow is thronged with the automobiles of visitors who come up for pack trips of two or three day's duration.

Kings River Canyon

The Kings River Canyon is a glaciated gorge similar to Yosemite Valley but not so spectacular in scenic detail. The walls are neither as high or as sheer, and the breadth of the canyon at the bottom is not so great (Fig. 18); more important still, most of the floor of the canyon lacks the moisture which has

produced Yosemite's lush meadow land; it is sandy and dry, and when disturbed it envelopes the visitor in a cloud of dust. The Kings River Canyon cannot

Fig. 18. Sunshine and shadow in Kings Canyon, as seen from the zigzags down Bubbs Creek. This is an average view, being what the visitor ordinarily sees, and thus it furnishes a representative even if not a markedly picturesque impression of the canyon.

hope to rival Yosemite on the basis of scenic values; its appeal has rested on its claim of being the last great wilderness area left in California.

Since last summer's visit, the historic Kennyers, or what there was left of it, has burned down. Nothing remains now but the name on the U.S. G.S sheet and a few old hot water boilers and scraps of iron, and these latter are being cleared away by the Forest Service. At the height of its development fifteen or more years ago the old Kennyers homestead included, according to oldtimers, a hotel — of extreme small size and rustic simplicity, one would judge. A son of the original Kennyer who pioneered the region is now a U.S. Forest Service employee in the district.

Wildlife. Rainbow trout are abundant in Copper Creek except in a zone 100 yards long where the main trail crosses the stream; in this zone no fish at all were seen.

Deer. Two does were seen July 25 at Kennyers. Deer are common in this

vicinity, according to the observations of this year and last year.

Trail Conditions. The Bubbs Creek trail and the trail through Kings Canyon are well traveled and in good condition.

Granite Basin Region

General Aspects. The trail up Copper Creek to Granite Basin and thence down Dougherty Creek to Simpson Meadow is infrequently used. It traverses a strikingly scenic country in which wilderness conditions have been very little upset. Leaving the floor of the Kings River Canyon, it winds steeply

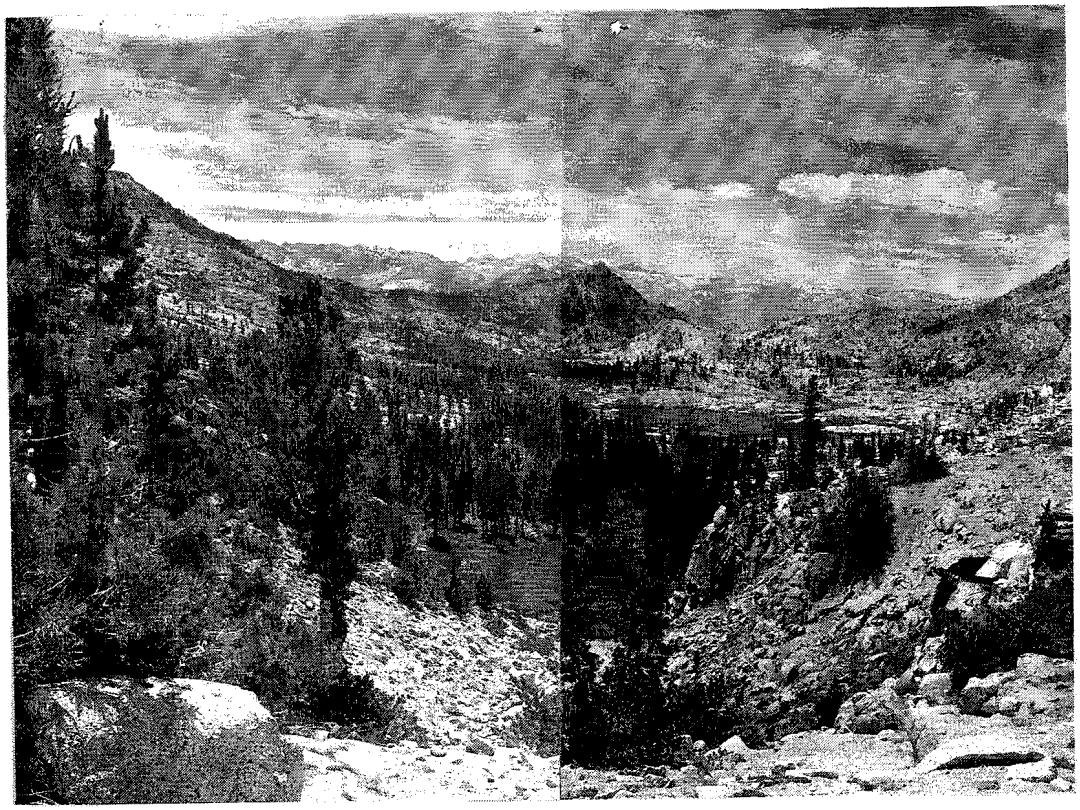

Fig. 19. Granite Basin as seen from the north rim. This is a prime beauty spot and an unspoiled natural garden. The so-called "granite buck" is rather common in this basin.

and interminably upward through mixed chaparral and forest; from time to time a small wet meadow, waist high with luxuriant grass, or a grove of quaking aspens, marks the presence of a streamlet tributary to Copper Creek,

and affords a brief rest from the long, hot climb.

Granite Basin is a great bowl of dazzling rock whose whiteness is relieved by acres of green meadow and numerous small lakes (Fig. 19). It is a fine refuge for grouse and deer by reason of its inaccessibility.

From Granite Pass the trail drops down into the lush Dougherty Meadow and from that point descends with increasing steepness through dense forest until, in a climax of zigzags, it reaches the floor of Middle Fork canyon.

Wildlife. Ground Squirrel. One seen at Tent Meadow, July 25, 1936.

Deer. A fine buck and several does seen on July 25 at Granite Basin, also numerous tracks.

Sierra Grouse. A family group seen at Granite Basin on the above mentioned date. One 3/4 grown youngster showed characteristic lack of sophistication by flying toward us when startled, so that it missed colliding with one of the mules by only a few inches.

Western Goshawk. At Dougherty Meadow on July 25, 1936, a very large accipiter flew hurriedly into a small fir tree under which I was standing. Immediately upon alighting, however, it saw me and hastily darted away. The brief glimpse which I got made me feel pretty sure that the bird was much too large to be a female cooper hawk; moreover the altitude (10,000 feet) at which the record was made is a further indication that the bird was not a cooper hawk but a goshawk. Although identification was not positive, the observation seems worth recording.

Fish. In the vicinity of Dougherty Meadow, both meadow grass and bunch grass feed is abundant. This abundance of vegetation is associated with an abundance of insect life, which in turn is conducive to an abundance of fish. Rainbow trout in Dougherty Creek were excessively abundant, doubtless for this reason together with the fact that Dougherty Creek lies off the beaten track.

Trail Conditions. Because it is little used, the Granite Pass trail is not kept up much, and has never been laid out on an engineered gradient. Nevertheless it is not difficult or dangerous if one does not try to make great speed, and its simplicity enhances the wilderness feeling.

The descent from Granite Pass to Dougherty Meadow shows rather severe erosion of a type which is common to these alpine regions. The moist, flower-bedecked sod is easily cut and trampled by live stock, and due to the short growing season, together with the heavy precipitation, such scars tend to spread and deepen instead of healing (Fig. 20). The tendency of the stock to take short cuts down the zigzags serves to multiply the number of gulleys. Erosion was also noted on this trail at lower elevations where the soil was markedly sandy and vegetation sparse.

Fig. 20. Gulleys formed at Granite Pass by stock trails. This type of damage is common in alpine regions, where the soil is easily scarred and slow to heal.

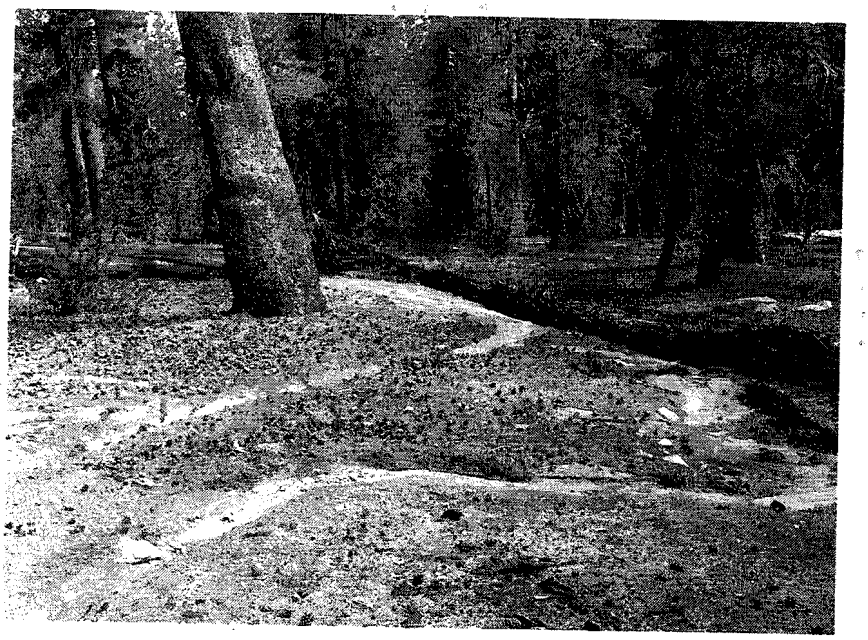

Fig. 21. Fallen log serving as a soil saving dam at the head of an incipient gulley — a lesson against extensive forest clean up.

In forested regions, on the other hand, fallen logs often serve as soil-saving dams which hold back excessive run-off and check incipient gulleys at their commencement. This process was clearly evident along the trail from Dougherty Meadow to Simpson Meadow (Fig. 21), and served to call to mind once more some of the dangers of excessive forest clean up.

Middle Fork of the Kings River

General Aspects. The proposed Kings Canyon National Park includes two main forks of the Kings River. The South Fork flows through what is known as the Kings River Canyon, as described above; it has received much more publicity than the Middle Fork and is commonly thought of as the heart of the Kings River wilderness area. Actually, the less well known Middle Fork canyon is fully as outstanding from a scenic point of view (Figs. 22-24), and will soon be, if indeed it has not been for a long time, a more primitive piece of wilderness than the better advertized Kings River Canyon.

Fig. 22. Typical view of the Middle Fork Gorge, north wall, as seen from the zigzags on the Dougherty Creek trail. The central mass is thought to be Mt. Woodworth. The floor of the canyon lies some 2500 feet below the bench from which this picture was taken.

Like the Kings River Canyon, the Middle Fork Canyon is a long, narrow glaciated gorge, fed by a series of plunging cascades which unite to form a broad, swift-flowing river. It is less dusty, and quite as scenic, if not more so (Fig. 23); the celebrated Tehipite Dome, which rises like a gargantuan tombstone 3413 feet above the canyon floor recalls the more striking aspects of

Fig. 23. A typical portion of the Middle Fork canyon; view from the junction of Dougherty Creek trail and main canyon trail, looking east. Note how the presence of occasional dead snags contributes to the wilderness atmosphere

Yosemite Valley (Fig. 24). Above all there is an atmosphere of the truly primitive about this canyon which the more exploited Kings River Canyon can not help losing when the road is completed. Various U.S. Forest Service representatives, both during the trip and at subsequent meetings, have stated that the Middle Fork canyon will be protected from future development as part of the huge "High Sierra Primitive Area" which has been set aside to preserve wilderness conditions.

The maintenance of the canyon intact will at least be made easier by the fact that at the mouth of the gorge the narrow walls rise nearby straight up for more than 3000 feet, imposing an almost insuperable obstacle to road building; in fact it has not been possible to push through even a foot trail, and one is cut off from all direct communication with the adjacent Kings River Canyon and the General Grant Country. According to the local old-timers, only two men have succeeded in getting through this gorge, and they were prospectors whose grub supply ran out during the winter forcing them to make the attempt. That they were able to get through was due to the fact that the country was buried in snow and ice, with the river at its seasonal low point.

(* But see page 28a)

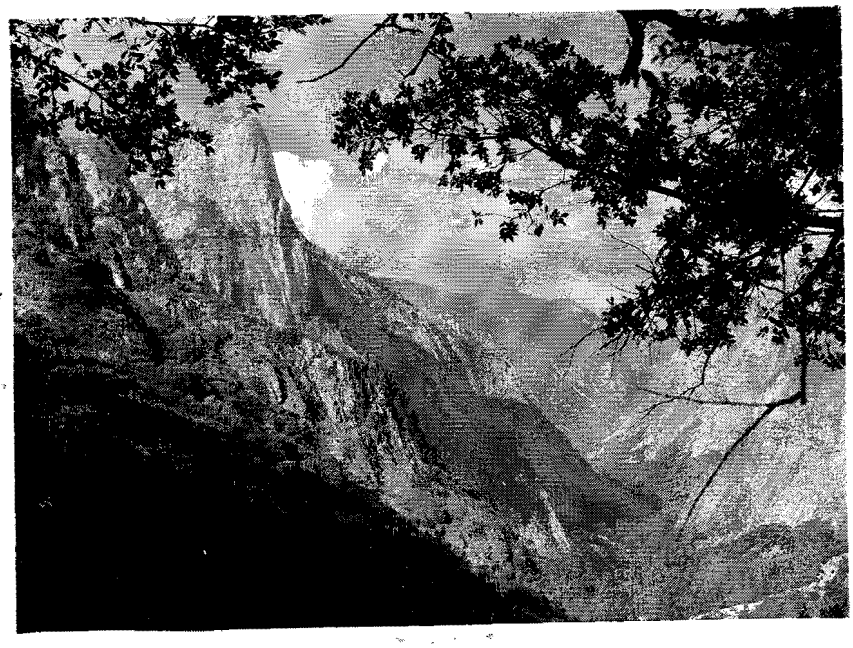

Fig. 24. The Middle Fork canyon as seen from the zigzags out of Tehipite Valley, looking east; the celebrated Tehipite Dome is seen on the left. This is truly the heart of the Kings Canyon wilderness region.

At the time of our visit the John Muir Trail from Cartridge Creek to Grouse

* Superintendent Guy Hopping of General Grant National Park has since informed the writer that one or two other persons have succeeded in passing through the gorge.

Meadow was practically impassable, and Muir Pass was completely blocked by snow. A Forest Service man was working on the trail, but had not yet been able to accomplish much; one party had tried to make the crossing a few days previous, but had been forced to turn back.

The blocking of Muir Pass left the long, exceedingly circuitous route through Tehipite Valley, Crown Valley and Hell-For-Sure Pass as the only other available route through the high country. The way led over various obscure, seldom used trails which received little or no annual maintenance, so that the time consumed was far beyond what had been anticipated.

Wildlife. Ground Squirrels. A few at Simpson Meadow and in adjacent territory, but not many. The absence of abnormal numbers of ground squirrels furnishes a good guage of the primitiveness of regions like this. For example, there is hardly any doubt that ground squirrels will greatly increase in the Kings River Canyon when the road is completed and the natural enemies of the ground squirrels are driven away.

Bear. Present, but have not had an opportunity to become garbage feeders; therefore they are still wild and do not molest the few camps which are present.

Martin. Fairly common, according to "old-timer" Blodgett, of Visalia, who has spent the last 8 summers in this region (he knew the late Walter Starr, who wrote the "Guide to the John Muir Trail and the High Sierra Region"; he also knows Norman Clyde and other mountaineers of prominence, and probably represents a good cross section of local opinion concerning the administration of the region and its development.

Wolverine. Blodgett said that he had never seen one alive, but that their tracks may be seen frequently in the vicinity of Woods Creek.

Fish. Said to be exceptionally abundant in the Middle Fork and tributaries.

Trail Conditions. The trail which follows the Middle Fork down the canyon is decidedly primitive (Fig. 25). One section, known as Hells Half Acre, threads its difficult way across the base of a wide talus slope covered with giant boulders; in some places, where the boulders are too big to get around, one is forced into the river for short stretches. This granite country wears out horse shoes at a terrific rate and if a shoe is pulled off, the hoof wears down to the quick in a few hours.

The zigzags up out of Tehipite Valley rise about 3400 feet in two miles, and are quite the most viciously steep zigzags that the writer has ever encountered. By the trailside were the bones of some horse that had failed to make the grade; one of ours was staggering pretty badly before the climb was finished.

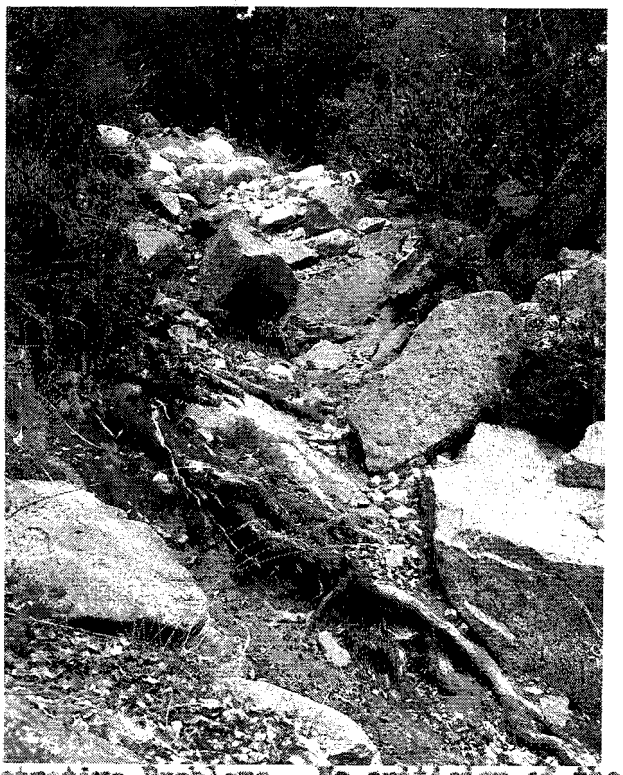

Fig. 25. Boulder-strewn trail in the Middle Fork canyon, showing typical primitive condition. The steepness is not adequately shown, however, due to lack of special photographic equipment; the effect can be most nearly approached by holding the picture over one's head at an angle of 45 degrees.

Administrative Problems. No criticism of the administration is intended by the above observations as to trail conditions, which are given here as a matter of record for comparison with future conditions; as explained by District Ranger Jim Poore, very little money is available for trail maintenance in the more out of the way sections.

Certainly this primitive type of trail does not do violence to the wilderness values as would a rocked up engineered trail of excessive width. Probably a middle course between these two extremes is possible, but if not, then the present un "improved" type would seem preferable in this intentionally maintained primitive area. If one does not insist upon traveling fast there is little danger on this type of trail - certainly much less than is present when one attempts to cross a paved automobile highway.

It was found that there is a certain amount of feeling among local campers and oldtimers against the establishment of a Kings Canyon National Park because:

(1) it is felt that the National Park Service would promote extensive building construction by public utility operators, build elaborate trail systems and bring in great crowds of people,

(2) hunting, would be forbidden

(3) household pets, particularly dogs, could not be brought in to spend the vacation with the family, as is now permissible (in the various discussions which took place the writer considered it advisable to preserve complete anonymity and to utter no expressions of opinion; this anonymity was maintained from the time Sequoia was left until the Devils Postpile was reached).

SIERRA NATIONAL FOREST

Itinerary

From the Middle Fork of the Kings River the route paralleled the Crown Creek drainage, passing Hay Meadow, Dry Meadow, and Johnson's Cow Camp. From Johnson's Cow Camp the trail crossed Scepter Pass, the Devils Punch Bowl, Hell-For-Sure Pass, and entered Goddard Canyon, where it joined the John Muir Trail as the latter descended from the snow bound alpine country. A detour was made to Blaney Meadows and Mono Hot Spring (at Florence Lake) for supplies, and the John Muir trail was reached again by the way of Vermilion Valley, from which point it was followed the remainder of the way to Devils Postpile and Yosemite National Park.

Crown Valley and Black cap Basin

General Aspects. After climbing out of the Middle Fork canyon the way leads through long stretches of only moderately precipitous Canadian zone country characterized by miles of heavily forested slopes, numerous small, shallow grassy valleys, and occasional bare granite ridges and glacial cirques. The most outstanding feature of the country was the difficulty, regarding which we had been warned previously, of locating the main trail. The region is grazed by cattle and sheep, and their well-worn trails, some of which have been blazed, together with a general scarcity of trail signs, caused us to make several unintentional detours.

Wildlife. Deer. Quite numerous in the vicinity of Johnson's Cow Camp, which is also gradually becoming a dude ranch, although no road leads to it as yet.

Trail Conditions. Scepter Pass is apparently quite unused and the trail is now hardly more than a game trail down over the rocks. What little travel there is in this country follows an alternative trail (not named on Walter Starr's map) to the west. The blazed trail into Black cap Basin ends in a box canyon and was taken by a mistake arising from the lack of signs together with sheep trails.

Administrative Problems. Grazing. The minimum of damage by live stock was observed throughout this whole forest district, doubtless because the range is not overcrowded. The wet meadows are trampled and cut by cattle to some extent, but the stock is well scattered and forms relatively few clearly marked trails. Even the sheeped areas showed little damage, and there was still enough feed for our stock in some of the box canyons. Possibly feed conditions were better than normal at the time this visit was made, for, as noted below, under Weather, this has been an unusually wet summer.

Hell-For-Sure Pass and South Fork of San Joaquin

General Aspects. From Black cap Basin one rises gradually to Bench Valley

and the Devils Punch bowl. The dense forest drops behind and again the country becomes predominantly granite, with an alpine meadow or a barren glacial tarn in each rocky basin. Hell-For-Sure Pass marks the climax of a tortuous clambering over the rocks; although not as lofty as many passes, the grim desolation of the scene (Fig. 26) together with the almost ladder-like ascent over slippery boulders justifies its name.

From Hell-For-Sure Pass the trail drops rapidly into the deep, narrow Goddard Canyon, down which the South Fork of the San Joaquin flows for about a dozen miles until it enters the artificial Florence Lake, which is a resort country.

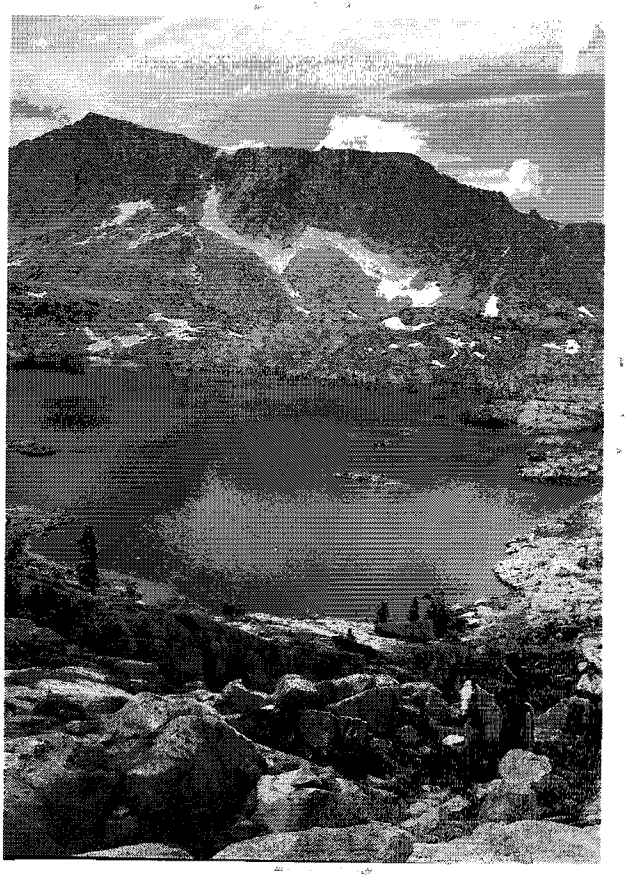

Fig. 26. Barren alpine country as seen looking west from halfway up Hell-For-Sure Pass. There are few zigzags on this trail, as it goes almost straight up over the boulders. A broken pack saddle and some bones told of one horse that failed to make it.

Trail Conditions. From Bench Valley the trail leads to the Devils Punch Bowl, which is a glacial basin over whose narrow rim a snow-fed lake spills into a small valley about two hundred feet below. The trail leads out across this rim, which is only about 20 feet wide, and it is necessary to wade the stock through the overflow from the lake. Although perfectly safe at the time of our crossing the rock ledge which forms the rim is smooth and slopes slightly so that at times of high water it is dangerous to make the crossing. One party had three horses washed over the rim a year or so ago, and the total number of stock lost to date is 45 according to Mr. Johnson, at Johnson's Cow Camp.

The Hell-For-Sure Pass trail is not much used and maintenance work must be still less frequent. The ascent over the boulders is so steep in places that one must be careful to keep the stock well spaced out, otherwise a slip on the part of one animal might throw the next one below over backwards off the trail. A broken pack saddle tree and some old bones told of one horse that fell down to rise no more.

The loose rock on these mountain trails (Fig. 27) will often wear out a set of horse shoes in one week, besides pulling many off. After we had used up all our spare horse shoes we used the many cast-off shoes strewn along the trails, cutting the big ones down with a cold chisel and shaping them over a boulder. The zero hour of the trip came one late afternoon near Hell-For-Sure Pass in a pouring rain when we found ourselves on the wrong trail, with all the stock partly barefooted and too sore to go on without shoes except one horse, thirty miles of rocky trail between us and the

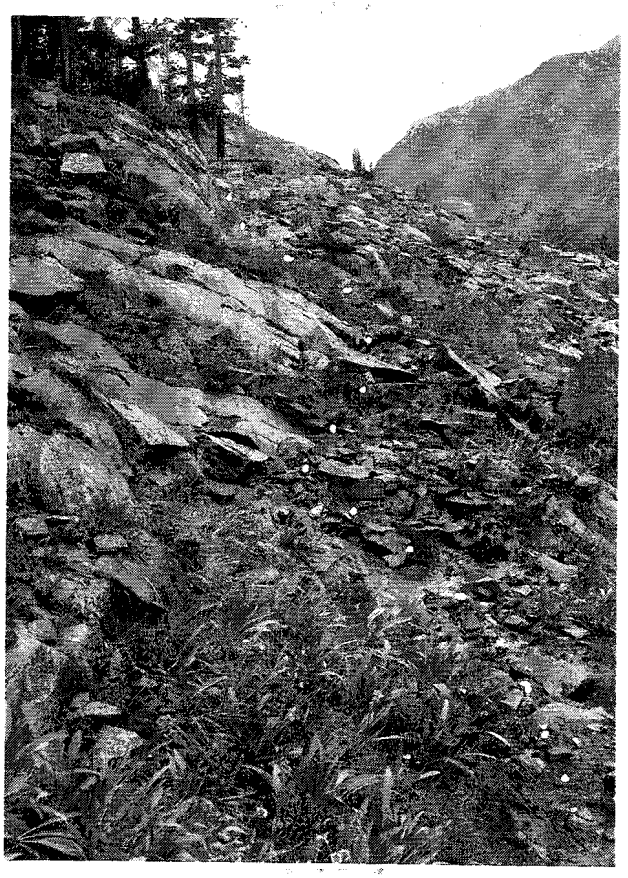

Fig. 27. Hell-For-Sure Pass trail, east side, showing nature of terrain and lack of clear definition of the route. Loose rock like this will often wear out a set of new horse shoes in one week, besides pulling many off.

nearest known habitation, and our supply of horse shoe nails exhausted. Luckily some nails were discovered at a nearby sheep camp.

The trail down Goddard Canyon is much more heavily traveled than the Hell-

For-Sure Pass trail; two parties, one with seven and the other with 9 head of stock were passed, as well as two other parties with tents. A University of California geology student stated that still another party had been camped for two weeks waiting to get through Muir Pass; someone else had lost all their grub and outfit fording the San Joaquin River which was greatly swollen by the continuous rains.

The trail crosses the San Joaquin three times in about six miles. At least one of these crossing was formerly provided with a suspension bridge, but at the present time it is necessary to ford them all. The water came well above our horses' bellies and was quite rough, but none of the animals was forced to swim.

These conditions affecting mountain travel are mentioned for their possible value in throwing light on National Park Service trail conditions.

Florence Lake - Vermilion Valley Region.

General Aspects. From Fresno an automobile highway was built far in to the heart of the Sierra so that dams could be built at Huntington Lake and Florence Lake. The road is heavily used and the surrounding area has become a popular resort with facilities for camping, boating, and packing (Cesmer's Pack Outfit).

Vermilion Valley to Devils Postpile

General Aspects. From the populous Mono Hot Spring the trail climbs slowly through typical Canadian zone woodland and meadows until the forest drops behind at Silver Pass, where the snow banks linger well into the summer. From this point one drops down again into the forest, which continues with unbroken regularity to the Devils Postpile

Wildlife. Rainbow trout were very abundant in Cascade Creek. This is just far enough north of Mono Hot Spring and south of Reds Meadow so that it is reached by few fishermen.

Trail Conditions. The John Muir Trail is practically a highway compared with the seldom used trails over which we had previously traveled; it is, of course, a main artery of mountain travel and is well kept up throughout most of its length.

DEVILS POSTPILE AND VICINITY

Itinerary

From the Devils Postpile a detour was inadvertently made into the Minaret Creek basin owing to the partial obliteration of the old trail, now abandoned, to Shadow Lake and the Lack of signs. From Shadow Lake the route was by way of Thousand Island Lake, Island Pass and Donohue Pass to Yosemite.

Reds Meadow and Devils Postpile

Reds Meadow and Devils Postpile lie in a long rather narrow valley, at an average elevation of about 7500 feet. Much of the valley is forested like the surrounding ridges but there are numerous wet meadows and an occasional sandy flat. A good road connects the area with the main Owens Valley highway, so that this mountain region is frequented by hordes of visitors. A large Forest Service camp ground, together with a bath house and a store are present and heavily used. The Devils Postpile is an 850 acre tract of forest land immediately adjacent to Reds Meadow and the Middle Fork of the San Joaquin River. Its jumbled piles of post-like basaltic columns have given it its name, and constitute its chief distinction. Its trails are broad and well used, and since the area is one of considerable human concentration, it probably serves its most useful purpose as a kind of outdoor museum.

Trail Conditions. The main trails are wide, easy, engineered pathways.

The Minarets, Banner Peak, and Vicinity

General Aspects. From Reds Meadow the maps show two trails which diverge northward, and after running parallel to each other for about 8 miles, converge again at Shadow Lake.

The west fork of this route is now practically abandoned and was unfamiliar to local residents when we questioned; it was so obscure that we lost it in a swampy jumble of down timber and inadvertently followed an abandoned mining road instead. The old mining road traverses the wooded Minaret Creek basin, dotted with numerous small lakes, and affords many a gorgeous glimpse of the glacier draped Minarets which tower over the valley like gigantic cathedral spires (Fig. 24). At a little under 10,000 feet the forest dwindles away, and one comes upon the abandoned Minaret Mine. Six years ago the region must have presented a scene of noisy, populous activity, but now the wilderness is slowly reclaiming the place. The only sounds are the murmuring of the wind in the pines and the soft roar of the snow fed streamlet — sounds which only serve to intensify the vast glacial silence.

Leaving the deserted mine, an almost invisible trail threads the alpine meadow and then abruptly zigzags to the crest of Volcanic Ridge where the old Albino claims are located (altitude 11,000). From the abrupt escarpment of Volcanic Ridge the view is breath-taking in the extreme. To the south and east lies a tumultuous sea of snowy crests, most of them lying within the huge Sierra National Forest "Primitive Area". On the west one is confronted by the jagged wall of Mt. Ritter, Banner Peak (Figs. 29, 30) and the Minarets — gigantic monuments

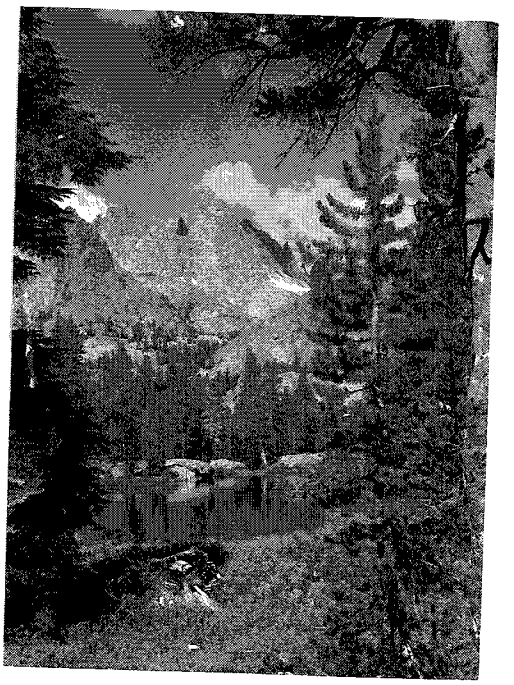

Fig. 28. Glimpse of the needle pointed Minarets as seen from the abandoned Minaret Mine road. The wide angle lens fails to do justice to these spire like crags.

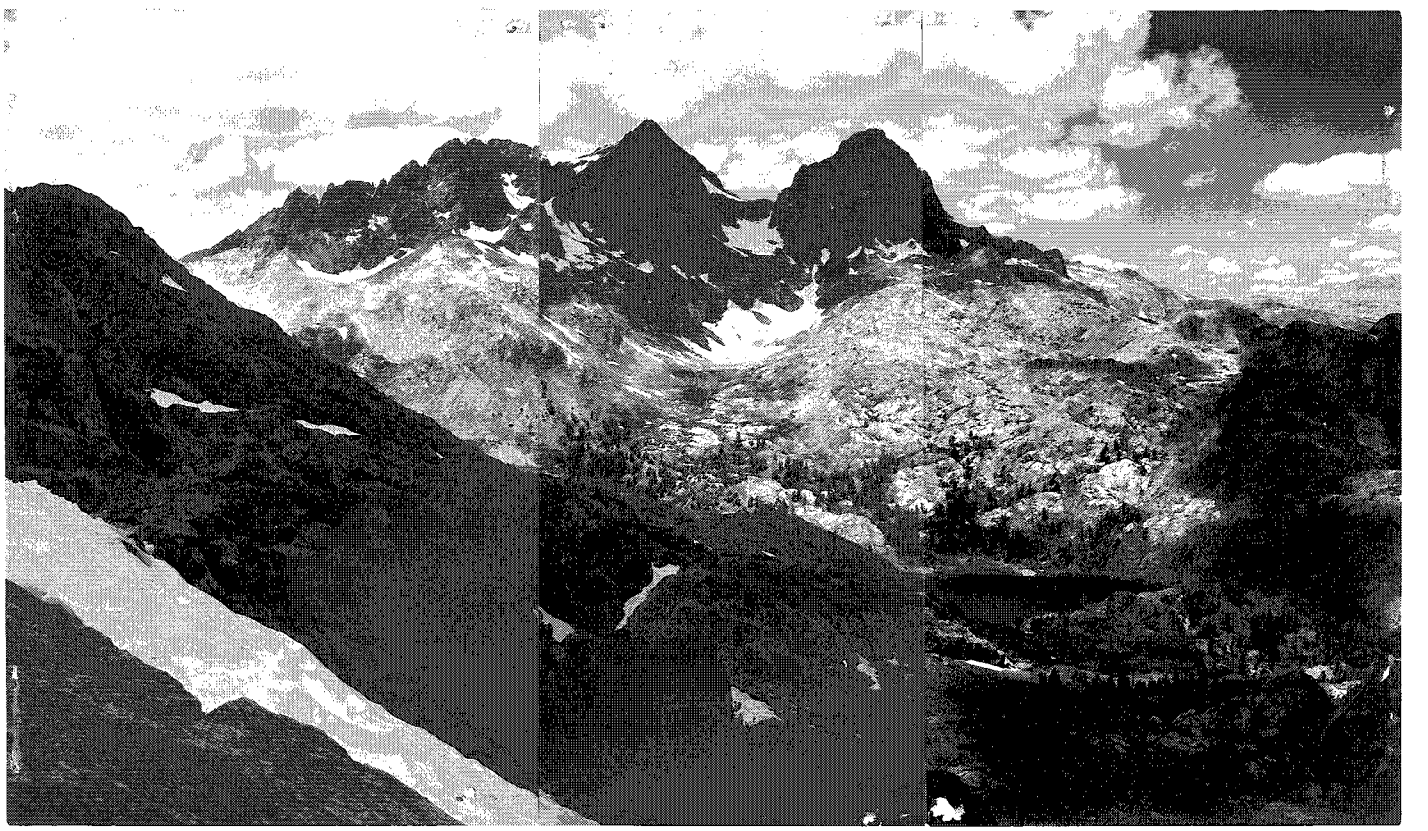

Fig. 29. Mt. Ritter (left) and Banner Peak (right) as seen from Volcanic Ridge. The wilderness atmosphere is unspoiled.

whose frozen breath, sweeping across snows which never melt, seems to have congealed the flow of Time itself. To the north one looks out over empty space; the rocky ledge drops away almost under foot to Shadow Lake lying far below where the John Muir trail shows as a narrow ribbon, only a mile distant as an eagle might make it, but nearer twelve for plodding mankind. This part of the Sierra, although not more wild than many others, was certainly the most magnificient covered by the present trip, from a scenic point of view. The feeling of awe and reverence which this region engenders would be shattered by the intrusion of any artificial human structure; to build anything in such a priceless place would be nothing short of sacrilege. With buildings and highways practically everywhere else in California, there should be no question as to the necessity of really protecting occasional wilderness fragments such as this from the advancing tide of "improvement". At present the area lies just outside the U.S. Forest Service "Primitive Area", and about 5 miles from the east boundary of Yosemite.

Since it was impossible to descend Volcanic Ridge with stock, the west fork of the trail to Shadow Lake had to be retraced as far as Reds Meadow, and the well traveled east fork followed instead. The latter route traverses a long, narrow partly wooded valley down which flows a branch of the infant San Joaquin River, then it climbs abruptly a stair like formation past thundering waterfalls and brings the mirror like surface of Shadow Lake suddenly into view. From Shadow Lake the way lies through alpine meadows, past Garnet and Thousand Island Lakes, overhung by frowning mountains, then through the low Island Pass (Hudsonian life zone) and into the Rush Creek basin which is characterized by extensive Canadian zone forests and numerous meadows. Even in August the nights are decidedly cold, the temperature probably falling to 40° F or even lower. Thousand Island Lake is considered an impossible camp site by local people because of the cold winds which sweep down from the glaciers; although feed is plentiful, stock refuse to stay there if turned loose (Fig. 30)

Wildlife. California Gull (Larus californicus). On August 5, a large white bird which could hardly have belonged to any other species was seen from Volcanic Ridge as a tiny speck sailing low over Shadow Lake. Since the California Gull has been recorded as breeding at Mono Lake, which is only about 20 miles distant, air line, this observation is not as unusual as it might seem at first.

Trail Conditions. The obscurity of the old west fork trail from Reds Meadow to Shadow Lake has already been mentioned; it is blocked in scores of places by tangled masses of prostrate trees blown down by winter storms. On the calm windless morning, when the writer was riding along this trail, a little behind the pack stock, something suddenly whizzed through the air in a great arc and struck the earth with a resounding report. On reaching the spot it was found that a dead tree had just crashed down across the trail between the writer's horse and the rest of the stock in front; if those in front had been traveling a little slower at this point on the trail, or if the writer had traveled a little faster, the result would have been most unlucky for someone.

The east fork of the trail to Shadow Lake coincides in part with the John Muir trail, and is by comparison with the west side, a boulevard. At Garnet Lake the

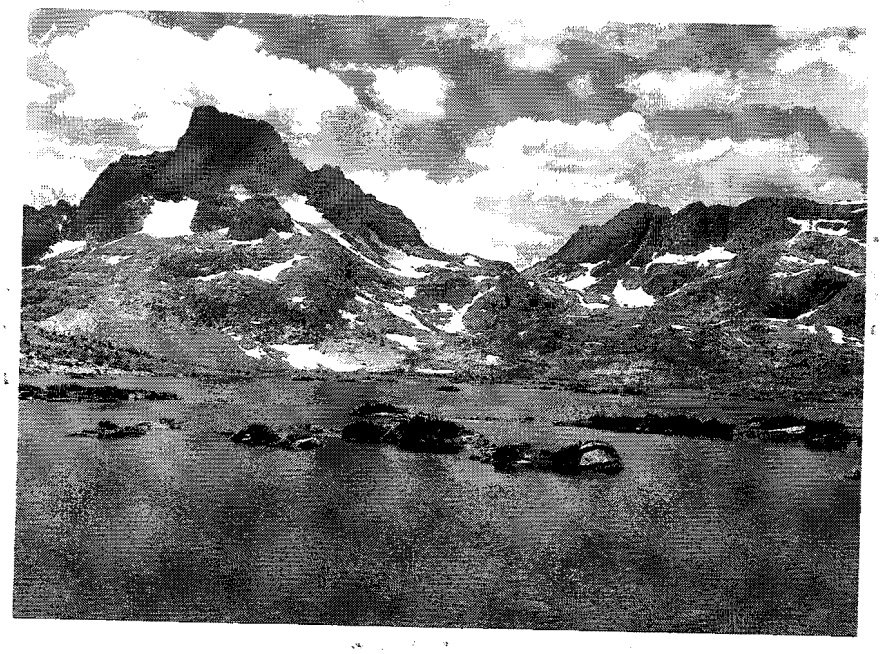

Fig. 30. Banner Peak as seen from across Thousand Island Lake. This magnificent piece of wilderness is too cold for camping and too priceless to be exploited.

trail was temporarily lost owing to the fact that there are few signs in the region; under such circumstances, however, a mountain man can usually find the trail again without retracing his route even though he is a stranger in the country, if a good map is available, or if the topography is sufficiently varied so that among the various possible routes certain ones obviously are more logical than others.

Although no live stock is grazed in the meadows of this region, the John Muir trail, in common with various other trails, is traveled so frequently that the short, velvety alpine grass is continually cut and gashed, and because of the very short growing season, has little chance to heal. This condition leads to the formation of unsightly gullies which may prove difficult to eradicate (Fig. 31).

The Donohue Pass trail into Yosemite had only been open a short time and the section east of the pass was especially tough for stock. The last mile to the top traverses a barren glaciated slope so thickly strewn with granite blocks as to be more adapted to travel by goats than by horses; in crossing it some care was necessary to avoid breaking legs.

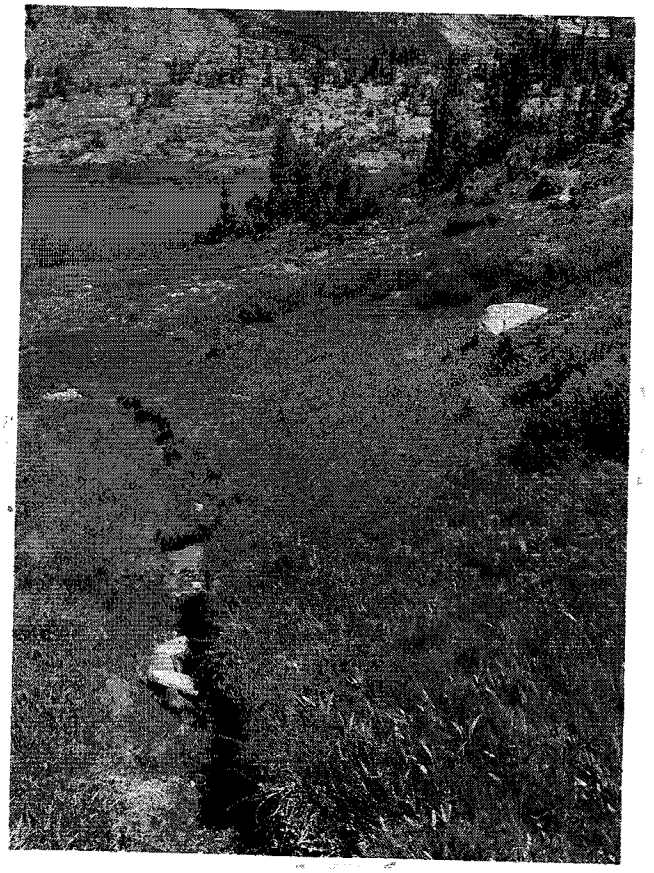

Fig. 31. Gulley formation caused by heavy travel on the John Muir Trail, near Garnet Lake. The picture fails to show adequately the brilliant red blossoms of Castilleia which dot the green carpet in great profusion.

YOSEMITE NATIONAL PARK

Itinerary

From Donohue Pass the route was to Tuolumne Meadows, followed by a side trip to the floor of Yosemite Valley via the Tenaya Lake trail, and return. From Tuolumne Meadows the trail down the Muir Gorge was followed to Pate Valley, thence via Rancheria Mountain to Hetch Hetchy and Lake Eleanor Reservoirs, at which point the park boundary was crossed and the return to San Francisco headquarters made by bus.

Lyell Canyon and Tuolumne Meadows

General Aspects. Lyell Canyon is a high-walled spacious valley, some ~~some~~ nine miles long; its nearly level floor is largely meadow land dotted with numerous clumps of conifers which give it a fine park-like aspect; the Lyell Fork of the Tuolumne River flows down the middle of the valley. Tuolumne Meadows represents the same sort of country on an even more lavish scale (Fig. 32); the almost level floor of this high river valley (alt. about 8700 ft) approaches a mile in width at some points, and its fertile soil supports a luxuriant growth of grass and associated vegetation.

The Lyell Canyon trail is traveled by crowds of people and the forage in the canyon is grazed to a limited extent. Tuolumne Meadows is traversed by the Tioga Pass automobile road, which handles a steady stream of traffic. There are several lodges and stores, a gas station, postoffice, numerous campgrounds, and a large number of other buildings adjacent to the meadow areas, which is also rather extensively grazed. The whole region is heavily used by a large human population (Figs. 35-36) so that no atmosphere of primitive wilderness can be expected.

Wildlife. Needle miners and other insect enemies of conifers. Along the south side of Tuolumne Meadow needle miners (and possibly bark borers also) have killed 50% of the trees on the hill slopes (Fig. 33); the slopes on the north side of the meadow are similarly affected. This epidemic started around 1916, I was informed, and seems now to be a matter of historic rather than practical interest as far as preventative measures are concerned. The dead forest still stands, but the new growth is very dense and vigorous and has attained a height of 10 feet or more (Fig. 34). Although perhaps not esthetically appealing to persons unused to the sight of so much dead timber, it cannot be said that the forest is in any danger of extinction; on the other hand the countless dead snags provide shelter for many wild creatures. The fire hazard is undoubtedly great.

Rainbow trout were noted as quite abundant in the Lyell Fork of the Tuolumne River; however, they are said to be difficult to catch because constantly pursued by large numbers of fishermen.

Administrative Problems. The building of roadways through park areas presents problems which chiefly concern various technical branches other than the Wildlife Division. Aside from the comparatively rare direct injury to plant

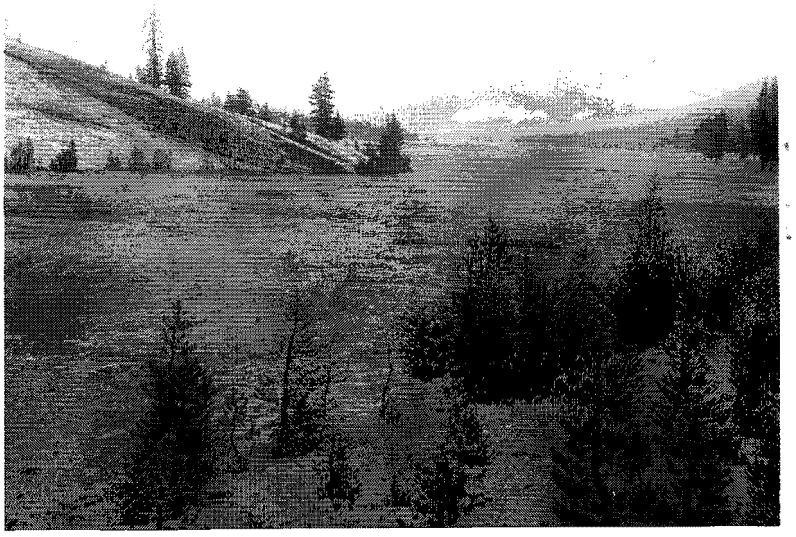

Fig. 32. Tuolumne Meadow as seen from the Tioga Road during a heavy rain.

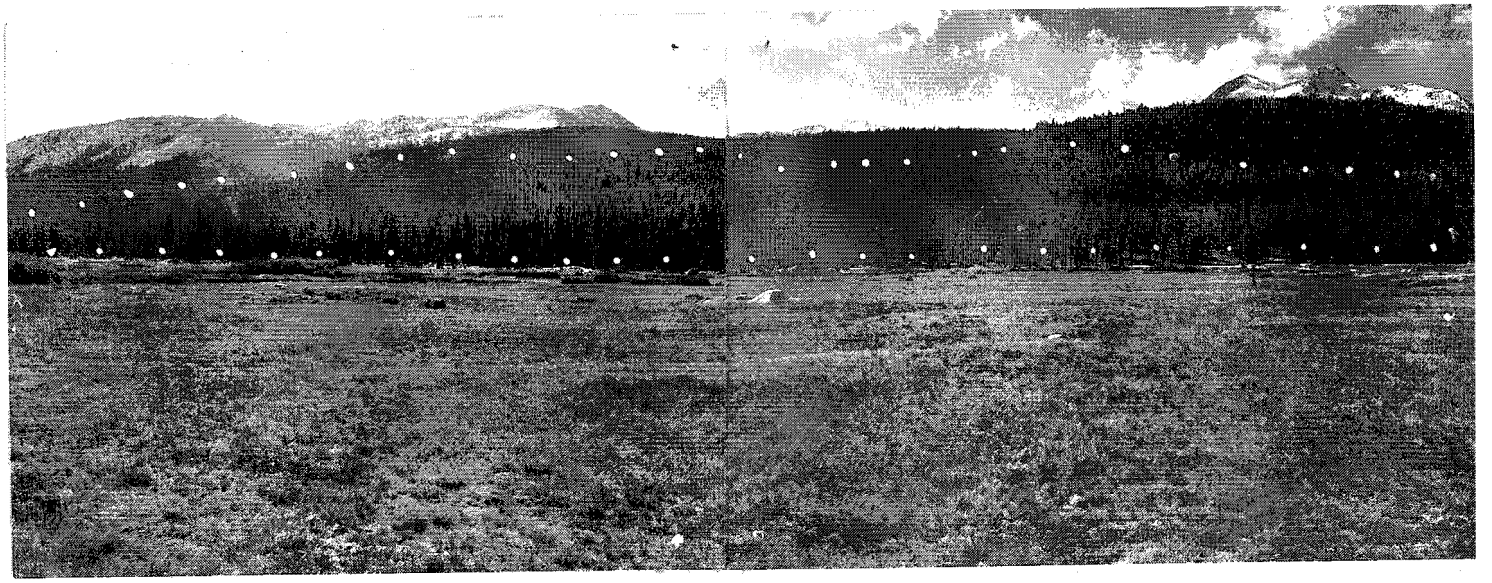

Fig. 33. Hill slopes on south side of Tuolumne Meadows, as seen from Soda Spring. More than fifty percent of the trees were killed in former years by insect attack, but reproduction of young growth is heavy. Dotted lines indicate major areas of dead timber.

and animal life, the only other aspect of road construction requiring comment is its effect on the primitive picture. The construction of a road often involves a much greater disturbance of the original environment than is implied by just a narrow line drawn on a map, and it must often be difficult for those who have to make final decisions on road questions from a distance to picture the total amount of disturbance necessarily involved in addition to merely laying out a road bed through the country.

The construction of the new Tioga Road is mentioned here not with any thought of criticising the manner in which the project, once it had been decided upon, has been handled, but because it illustrates the complex, irrevocable, and perhaps partly unforseen chain of disturbances which is set up as soon as an elaborate highway of this type (Fig. 35) is authorized. The same line of thought applies even more forcibly in the case of the Hetch Hetchy dam construction project mentioned below.

At the junction of the new and old Tioga roads a dredge is removing huge quantities of rock and sand from the Tuolumne River (Figs. 36, 37). The material is crushed and sifted (Fig. 38) and deposited in an enormous stock pile (not photographed) at the edge of the forest (the river is considerably muddied by these opeations, but seemingly not enough to injure fish life). (continued on p. 43)

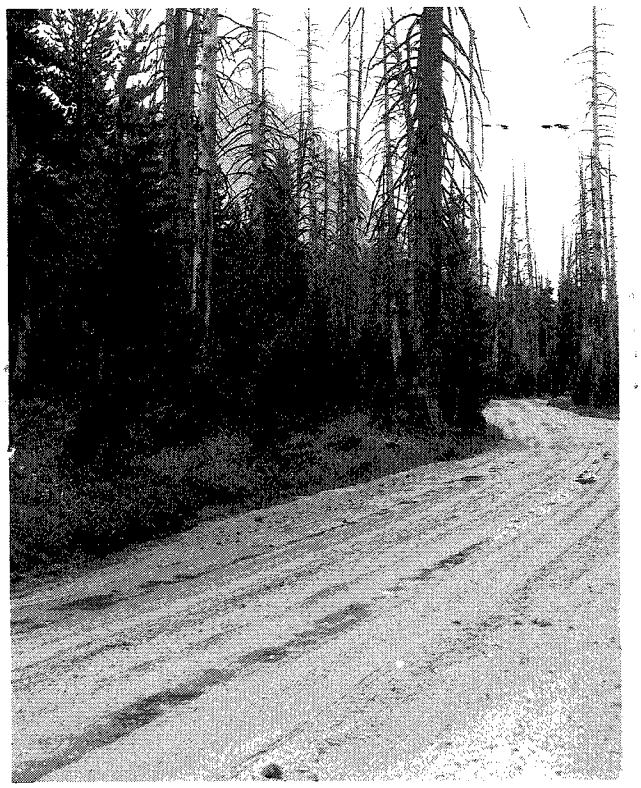

Fig. 34. Forest killed by insect attack during the outbreak which started about 1916; view taken from the old Tioga Road (new road will be a broad, paved highway) near Tuolumne Meadows. It will be noted that reproduction is vigorous and extensive so that the forest cannot be said to be in danger of extinction.

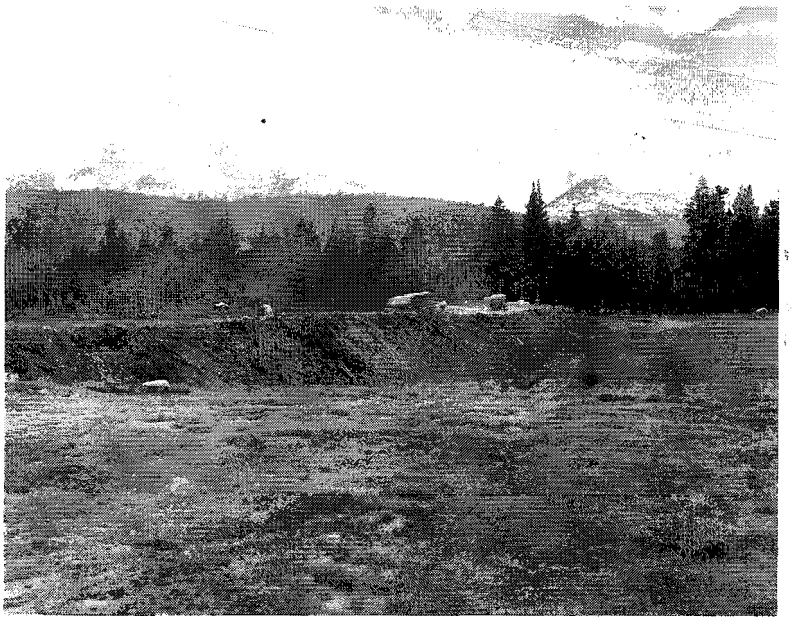

Fig. 35. New Tioga Road where it crosses Tuolumne Meadows on a long, high fill.

Fig. 36. Machinery used to dredge up, crush and sift gravel obtained from the Tuolumne River; the finished product is used in constructing the adjacent Tioga Road.

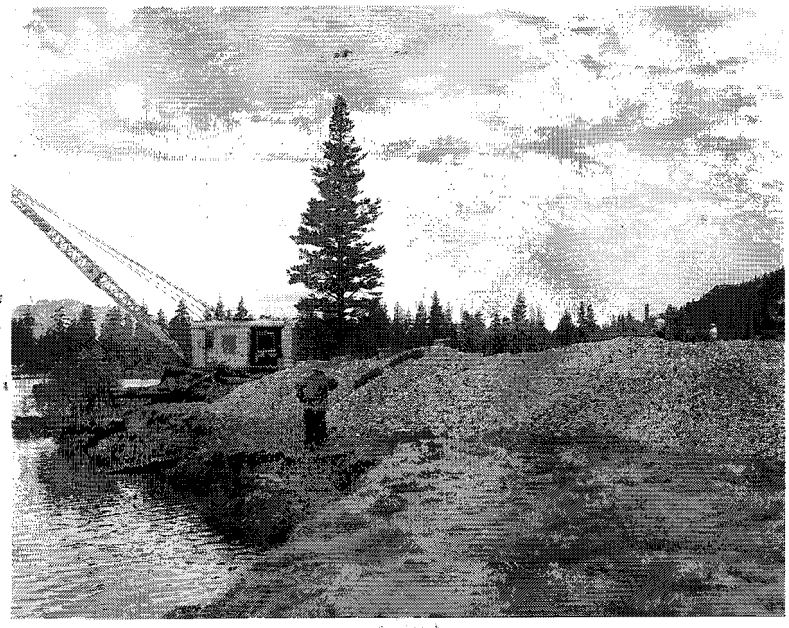

Fig. 37. Closer view of operations shown in Fig. 36. Rock and gravel for the road is dug out of the river.

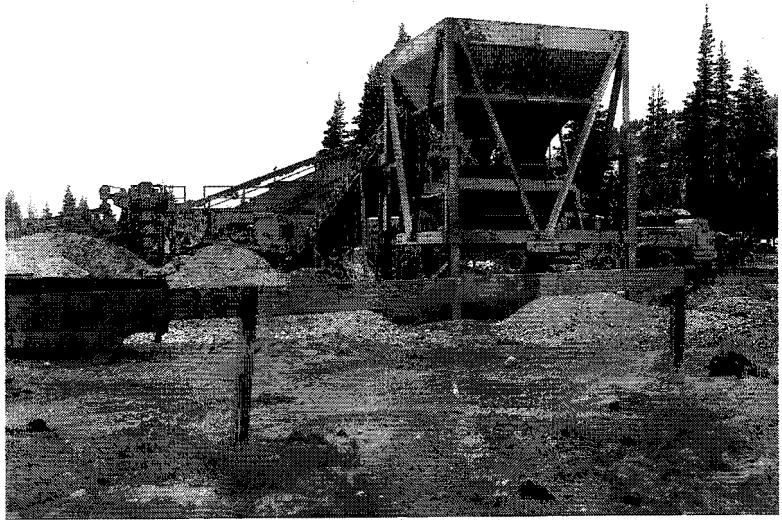

Fig. 38. Closer view of operations shown in Fig. 36. Rock and gravel dug out of the river is separated here.

Of course most of the disfiguring machinery and structures used in the road building will be removed when operations are completed, but some of the scars will be slow to heal, and others cannot but remain permanently. The road and its appurtenances are symbolic of the permanent change from the primitive Tuolumne Meadows of fifteen years ago to the mechanized sophistication of modern times.

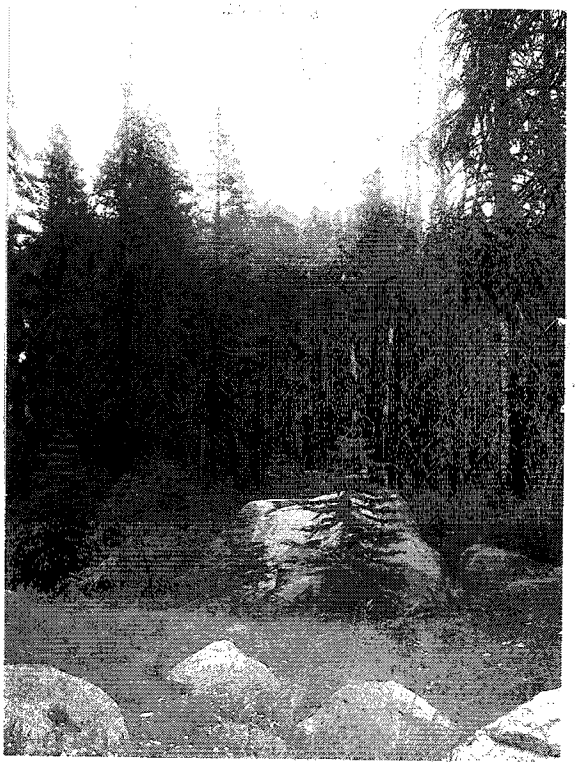

Fig. 39. Forest along the Tenaya Lake trail which was damaged by insect attack at an earlier period. Reproduction is now very heavy and dense.

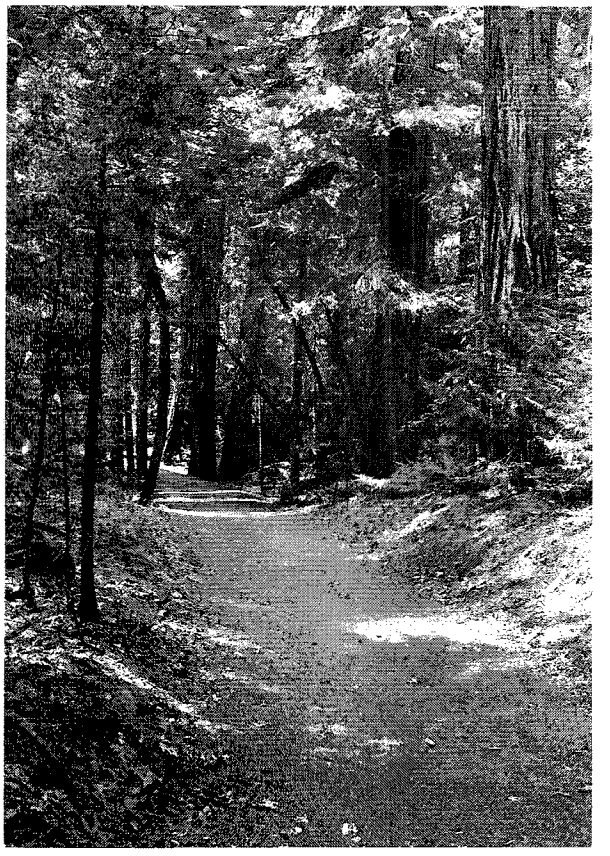

Fig. 40. Trail in vicinity of Mirror Lake, floor of Yosemite Valley.

Tenaya Lake Trail

Wildlife Aspects. Insect damage to trees. As in the case of the Tuolumne Meadows region, part of the forest along the Tenaya Lake trail suffered heavy loss from insect attack at one time. However, reproduction is now very vigorous and dense (Fig. 39).

Muir Gorge and Grand Canyon of the Tuolumne

General Aspects. Muir Gorge and Grand Canyon of the Tuolumne comprise nother of those narrow, glaciated gorges with which this region abounds (Fig. 41). From the populous Tuolumne Meadows one descends slightly to Glen Aulon, which is a tent cabin resort; thereafter the canyon walls close in and the trail drops rapidly to the bottom of Muir Gorge, passing a number of attractive waterfalls en route.

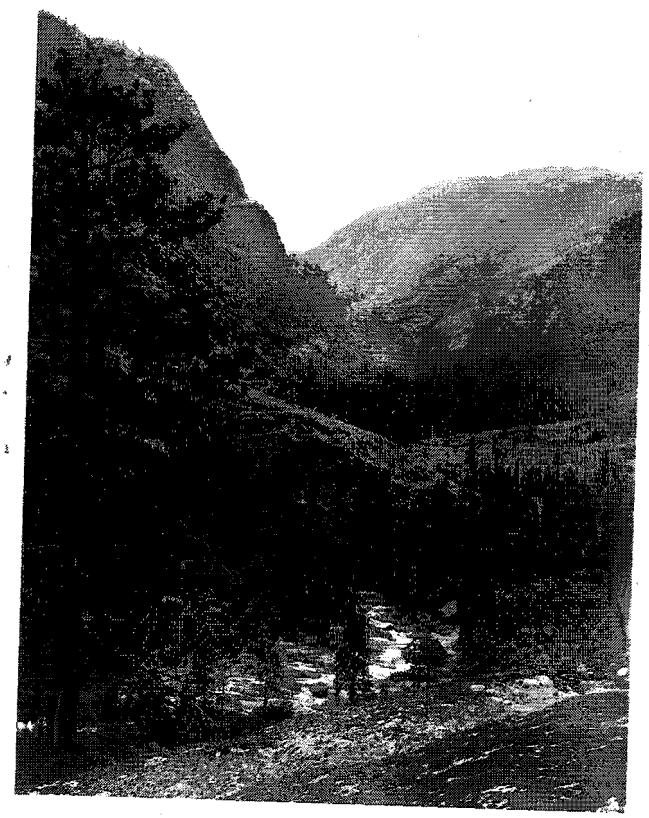

Fig. 41. Muir Gorge — a region of attractive waterfalls and swirling pools heavily patronized by hikers and fishermen.

The canyon is heavily traveled as far down as Waterwheel Falls by hikers of both sexes and all ages, and by fishermen. Below Waterwheel Falls the number of day hikers decreases, but campers with tents are still in evidence. To any point in the canyon it is only a day's short trip either from Tuolumne Meadows or White Wolf.

Wildlife. Rainbow trout were observed to be very numerous in the Tuolumne River below Waterwheel Falls.

Trail Conditions. All the trails encountered in Yosemite during this trip were carefully engineered exceptionally safe and well maintained. The exotic Downy Brome Grass (Bromus tectorum) is present in many places along the trail in the Grand Canyon of the Tuolumne. Probably it was introduced with feed brought in for pack and saddle stock.

Rancheria Mountain

General Aspects. At Pate Valley the trail leaves the Grand Canyon of the Tuolumne, climbs 4,000 feet to the top of Rancheria Mountain, then descends into the canyon again in the vicinity of the Hetch Hetchy Reservoir. Rancheria Mountain is a roughly triangular, forested plateau with an average elevation of less than 8500 feet. Extensive meadows and bunch grass flats (Fig.44) and an abundance of water made this area, together with the adjacent Pleasant Valley, a good grazing country in former days; hence its name. There is nothing spectacular about the region, but the absence of heavy travel and the freedom from a multiplicity of human structures have resulted in the preservation of much primitive charm.

Wildlife. Bear. A dropping composed almost entirely of manzanita berries was observed on the trail near Pate Valley on August 10. On August 11 a very fat brown yearling cub was encountered on the trail to Pleasant Valley. It turned off the trail with manifest reluctance and showed very little fear.

Ground Squirrel. One seen on Rancheria Mountain August 11, 1936 the first in many days.

Lake Fauna. Most of the lakes encountered in the Sierra Nevada were comparatively barren of plant and animal life, and many were situated at such high altitudes as to be completely lifeless, at least as regards visible forms. Table Lake, near Pleasant Valley, is a marked exception (Fig. 42). Evidently its lily pad-covered waters presents an unusually favorable combination of prolonged moderate temperature and various chemical constituents which promote plant growth. The plants, in turn support a large insect population, which constitutes a food supply for numerous vertebrates. Unfortunately there was not time to study the animal life of the lake. Ranger Patterson, stationed at Miguel Meadow, states that there were several similar lakes in the region.

Trail Conditions. Portions of the Rancheria Trail are relatively little developed or formalized, although everywhere entirely adequate even for heavy use. Contrasting with this simplicity, however, most of the trail has been developed beyond what would seem necessary for safety or the requirements of

Fig. 42. Table Lake, near Pleasant Valley. Such luxuriant plant growth is unusual in the lakes of the Sierra Nevada.

maintenance. In Section 16, where the slope is very moderate, the trail is 4 feet wide, with rocked up embankment (Fig. 43); farther up, on the level plateau itself, the trail is not marked by the usual inconspicuous blazes but instead is lined for long distances with parallel rows of small boulders, reminiscent of the rows of stones commonly used to mark the paths in backyard gardens (Fig. 44).

Rancheria Mountain lies just out of range of the commercialized Hetch Hetchy area (see below) on the west, and just beyond the heavily used Grand Canyon of the Tuolumne, Glen Aulin, and Tuolumne Meadows on the east; the Rancheria Mountain region is infrequently traveled, and presents the closest approximation of wilderness atmosphere encountered in the park during the trip; the lines of stones along the trail interject a note of studied artificiality into an otherwise attractive picture, and are all the more functionally unnecessary.

Hetch Hetchy, Miguel Meadow and Lake Eleanor

General aspects. Hetch Hetchy Valley represents the climaxial lower end of the Grand Canyon of the Tuolumne; its narrow floor and glacier-polished walls remind one forcibly of the Kings River Canyon. Orginally, Hetch Hetchy Valley must have been even more attractive than the Kings Canyon, however, because the floor of the former was covered with a meadow of great luxuriance.

When the City of San Francisco won its long fight to appropriate Hetch Hetchy for its own use, the wilderness was necessarily ruined, as the opponents of the project had forseen. The trees were chopped down and cleared from the floor of the valley, then, following the construction of the dam, the meadow was submerged (Fig. 45).

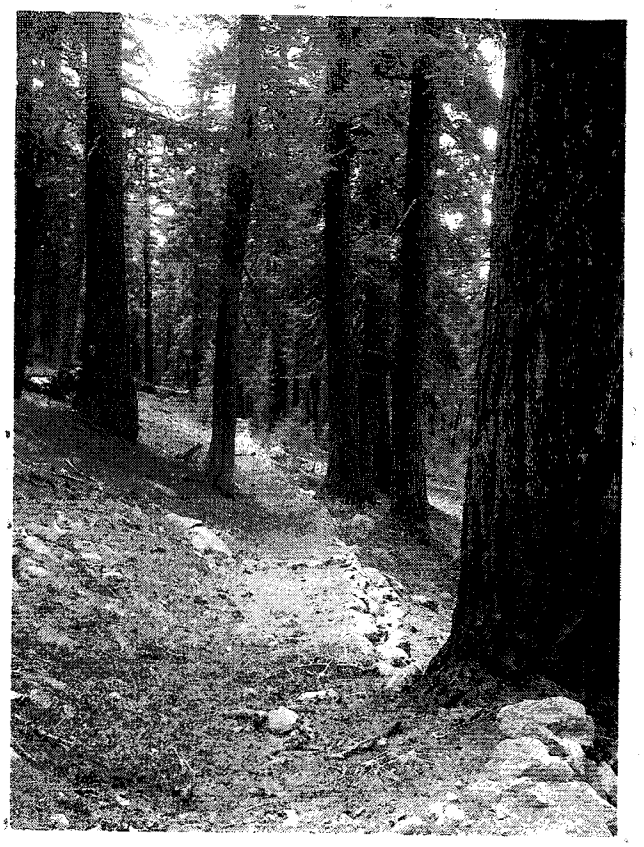

Fig. 43. Rancheria Trail in Section 6, showing tread 4 feet wide, and rocked up embankment

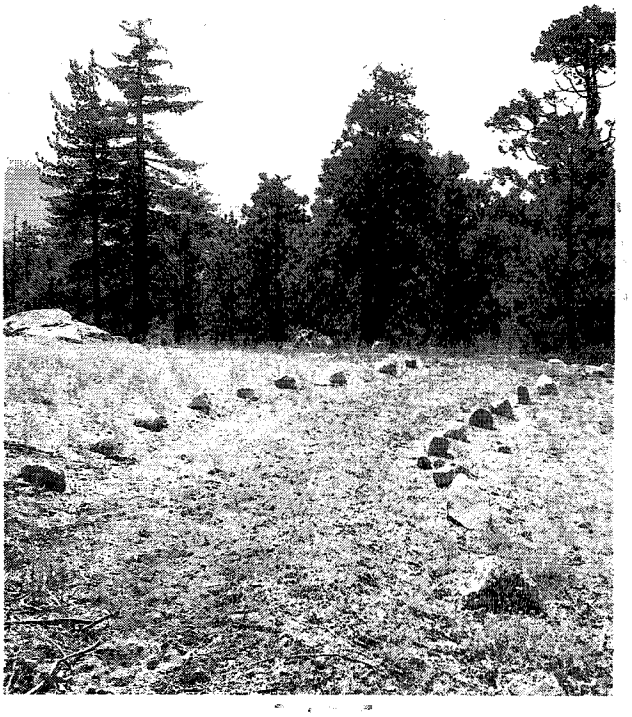

Fig. 44. Rancheria Trail on the mountain top. These rows of stones are unnecessary as trail markers and interject a note of studied artificiality into an otherwise primitive scene.

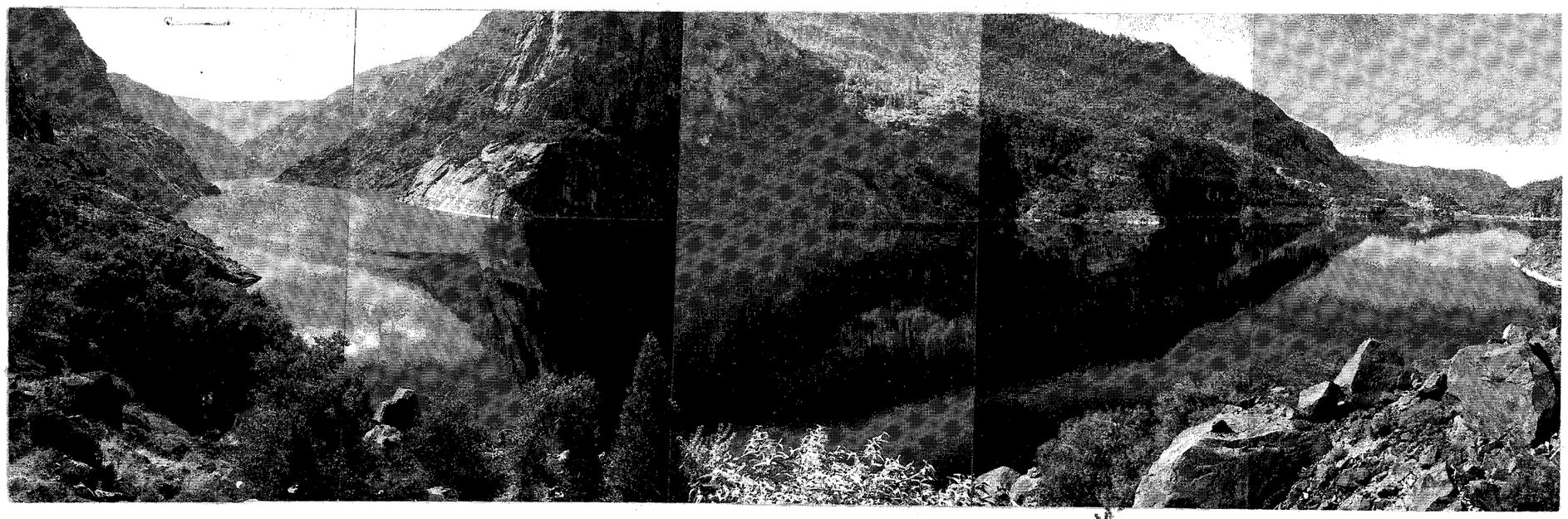

Fig. 45. Hetch Hetchy Reservoir as seen from opposite Kolana Rock. The dotted line indicates a previous water level; when the present construction is completed, the level will be 85 feet higher yet. K- Kolana Rock; D- O'Shaughnessy Dam; E- excavation in side of mountain to obtain rock for cement work.

At the present time the dam is being raised an additional 85 feet, which, it is said, will back the water up nearly to Pate Valley. Evidences of engineering skill are to be seen everywhere; rock for cement work is being blasted from the side of the mountain (Fig. 45) and picked up with a power shovel; the adjacent slopes are criss-crossed with roads for the trucks, and a 700 foot tunnel has been built to permit passage of one of these roads through a solid rock shoulder. The scene is one of great activity; motor boats cross from one shore to the other, a gigantic tramway, supported on steel towers, extends through the forest to Miguel Meadow, several miles away, and conducts a ceaseless stream of raw materials to the dam site (Fig. 46); the roar of operations can be heard for miles.

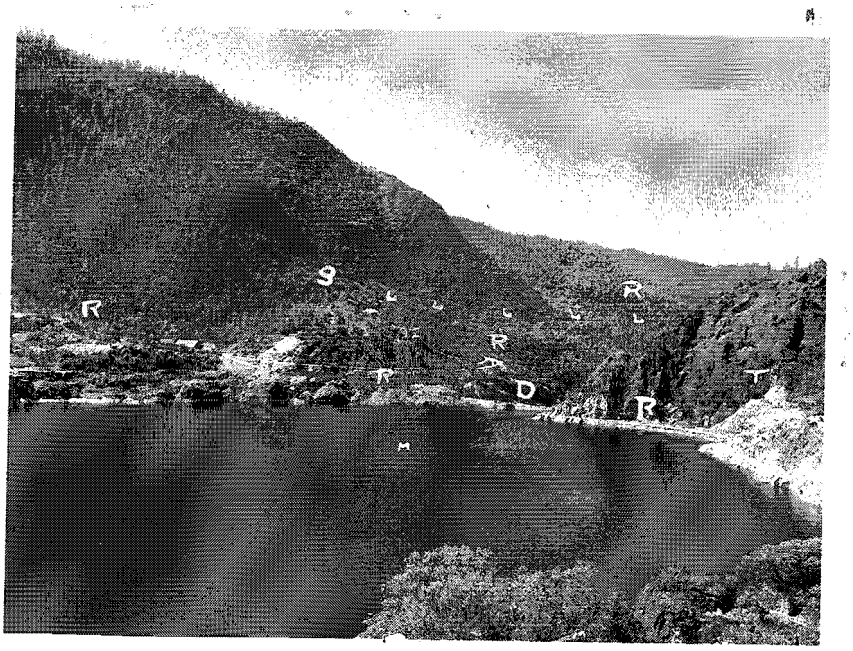

Fig. 46. Vicinity of O'Shaughnessy Dam, showing roads (R), tunnel (T), motor boat (M) one of the steel towers supporting the tramway (S), the transmission line (L), and other developments. D — the dam itself, which is being raised an additional 85 feet.

Miguel Meadow was once a fine large meadow near the center of a densely forested plateau; its rather dry, sandy soil supported a luxuriant stand of forage (Fig. 47) of a type much superior to that found on wet meadows. At the present time this meadow is being dug up by power shovels (Fig. 48) to furnish sand for the O'Shaughnessy Dam addition.

The sand is hauled by trucks to the end of the meadow where it is loaded onto a gigantic cable tramway with buckets spaced 650 feet apart, by means of which it is conducted to the dam site 1800 feet lower and 3 miles distant in an air line (we were told that the tramway was 10 miles long, but this does not appear to be corroborative by the map). The entire meadow will be extirpated by this project,

Fig. 47. Miguel Meadow just prior to annihilation. The entire area is to be dug up to furnish sand for the O'Shaughnessy Dam; the resulting hole will be flooded so as to make an artificial lake. Shows ramp for trucks at end of meadow.

Fig. 48. Closer view of the destruction of Miguel Meadow.

and the resulting hole is to be flooded with water to form an artificial lake so as to conceal the scar.

Lake Eleanor is another artificial reservoir with widely fluctuating water level; however, unlike Hetch Hetchy, a portion of the present body of water, was originally a natural lake. The dam, the caretaker's house and associated buildings, a road, and a work camp have obliterated any wilderness values.

Wildlife. Fish. Lake Eleanor is an important egg taking station. The water level falls about 25 feet during the summer, but the original sump retains enough water to enable the fish to survive.

At the Hetch Hetchy Reservoir, also, old waterlines visible on the canyon walls above the present water surface, together with the presence of a zone devoid of vegetation, indicate that the water level fluctuates at least twenty five feet. Such extreme fluctuations prevent the establishment of any important aquatic food plants, as pointed out by Dr. Richard M. Bond in a wildlife memorandum dated November 12, 1935.

Trail Conditions. The writer was told that original contract bids for the construction of the O'Shaughnessy Dam called for the building of a four foot wide, oiled trail all the way around the reservoir at the high water line.

Administrative Problems. The drastic alteration of natural conditions which has taken place in this region has profoundly disturbed many forms of wildlife. From a broader view-point, however, the accompanying destruction of wilderness values is much more serious, and this consideration alone would fully justify the determined opposition which the Service has offered to the exploitation of the of the area. Probably the endlessly ramifying consequences of huge projects such as this are not clearly seen by those who have to make final decisions on them from remote headquarters. Who could foresee the full extent of wilderness destruction, including all the roads, trails, tunnels, maintenance stations, tramways, stock piles, borrow pits, mountainside scars, power lines, abandoned camps, and meadow obliterations, implicit in the drawing of a tiny segment of line, representing a dam, across this canyon?

Although the destruction of Miguel Meadow will be concealed by filling the hole with water — which is doubtless the best choice of expedients — of course this circumstance can not be used as an argument in favor of the Hetch Hetchy project, since the purpose behind the establishment of the park was to preserve natural conditions and this perquisite is not met by artificially rearranging the scenery to make a pretty picture. Perhaps the sacrifice of this area in Yosemite may help prevent other raids on the national parks such as the threatened construction of a tunnel through Rocky Mountain National Park.

WEATHER CONDITIONS

Although the annual climatic cycle throughout most of California is characterized by cool rainy winters alternating with hot, dry summers, the climate of various large mountain masses rising above 8000 feet constitutes an exception to this rule. To higher portions of Sierra Nevada, in particular, are subject to frequent summer thunderstorms which exert a pronounced effect upon the vegetation and thus secondarily upon the associated wildlife.

All residents and habitual visitors whom we encountered in the mountains agreed that the rains have been heavier and more prolonged than usual this summer, and that forage conditions are the best in at least ten years. Certainly feed was abundant nearly everywhere, and was by no means used up even in the vicinity of the sheep camps. Perhaps this very abundance, however, has resulted in an unduly favorable impression as to the effects of grazing in the region.

Rain fell during 16 of the 28 days spent by the writer in the high country. Usually the sky would be somewhat overcast in the morning but with no actual rain, then shortly after lunch the air would become noticably colder and rain would commence to fall, often coming down very hard for three or four hours to the accompaniment of a prodigious crashing and rumbling of thunder among the mist encircled crags. Toward evening the downpour would subside, and during the night little or none would fall, which was decidely convenient.

These recurrent afternoon showers kept the porous, mountain soil reeking like a sponge, so that the high meadows were still covered with flowers and green grass, whereas usually by that time of year the feed commences to dry up.

FORAGE CONDITIONS

A summary of forage conditions observed on this trip is given herewith:

TRAIL	LOCATION OF FORAGE	TYPE OF FORAGE	QUALITY	AMOUNT	FENCED PASTURE
		Sequoia National Park			
Middle Fork of Kaweah River	Little Bearpaw Meadow (other localities in this vicinity said to be good, but not visited)	wet meadow	good	2 or 3 acres	Present
Big Arroyo to Upper Funston Meadow	Big Arroyo almost throughout; Sky Parlor Meadow and elsewhere on Chagoopa Plateau	bunchgrass and wet meadow	fine	unlimited	Present in Big Arroyo

Trail	Location of Forage	Type of Forage	Quality	Amount	Fenced Pasture
Kern Canyon from Upper Funston Meadow to Tyndall Creek	Upper Funston Meadow	wet meadow	good	about 10 acres	Present
	Kern Hot Spring	wet meadow	fair	2 or 3 acres	Present
	Kern Canyon between Kern Hot Spring and Junction Meadow	bunchgrass	good	limited; sporadic	none
	Junction Meadow	wet meadow	poor	1 or 2 acres	none
	Junction of Tyndall Creek and Kern River	bunchgrass	good	limited	none
Tyndall Creek to Shepherd Pass	Bighorn Plateau and vicinity	bunchgrass and wet meadow	good	unlimited	none
		Owens Valley			
Shepherd Pass to Independence	base of the hills	bunchgrass	good	several acres	none
Independence to Onion Valley	base of the hills	bunchgrass	good	limited	none
Onion Valley to Bullfrog Lake and vicinity	Onion Valley	wet meadow	good	appropriated by pack stock concession	none
	Vicinity of Bullfrog Lake	wet meadow	fair	appropriated by campers	none
		Kings Canyon National Park			
Bubbs Creek	Vidette Meadow	wet meadow	fair	2 or 3 acres; appropriated by campers	present

Trail	Location of Forage	Type of Forage	Quality	Amount	Poison Parsnip
	Junction Meadow	wet meadow	rather poor	2 or 3 acres	present
Kings River	Vicinity of Ken Ayers	bunchgrass	good	many acres, but feed very sparse	none
	Summit Meadow (across the river; privat ly owned; not visited.	wet meadow	good	said to be a very large meadow	present (?)
Kings River Canyon to Middle Fork Canyon via Granite Basin	Tent Meadow	wet meadow	good	1 or 2 acres	present
	Granite Basin	wet meadow and fine bunchgrass		unlimited	none
	Dougherty Meadow and vicinity	wet meadow and bunch grass	fine	unlimited	none
Middle Fork Canyon	Simpson Meadow	wet meadow	good	10 acres or more	none
		Sierra National Forest			
Tehipite Valley to Johnson's Cow Camp	Hay Meadow	wet meadow	fair	3 or 4 acres	present
	Dry Meadow	wet meadow	good	5 or 6 (?) acres	present
Johnson's Cow Camp to Goddard Canyon via Helli-Per-Pure Pass	Various meadows between Crown Mt. and Scepter Pass	wet meadow	fair	many acres rather heavily used by cattle	none
	Scepter Pass to Blackcap Basin	wet meadow; a little bunch grass	fair	numerous meadows, rather heavily used by cattle.	none

Trail	Location of Forage	Type of Forage	Quality	Amount	Fenced Pasture
	Devils Punch bowl	wet meadow and bunchgrass	fair to poor	hundreds of acres, but the country is sheeped	none
	East side of Hell-For-Sure Pass	bunchgrass	fair	large acreage, but sheeped	none
Goddard Canyon to Florence Lake	Several meadows in Goddard Canyon	wet meadow	good	an aggregate of perhaps 25 acres	present in at least one
	Blaney Meadows	wet meadow and bunchgrass	fine	many acres	present
Florence Lake to Silver Pass via Vermillion Valley	Jackass Meadow (or Florence Lake)	wet meadow and bunchgrass	said to be good	several acres	present
	Mono Meadow	wet meadow	good	25 or more acres	present
	South side of Silver Pass	wet meadow	fair	many years, but grazed by cattle	none
John Muir Trail from Silver Pass to Devils Post Pile	Cascade Valley	wet meadow and bunchgrass	good	about 20 acres	none
	Deer Creek	wet meadow and bunchgrass	good	several acres	none
	Reds Meadow	wet meadow	fair	many acres privately owned; 7 or 8 acres of public pasture	present
Devils Postpile to Volcanic Ridge	Numerous small meadows	wet meadow	good	aggregate of perhaps 400 acres	present poor shape

Trail	Location of Forage	Type of Forage	Quality	Amount	Fenced Pastur
John Muir Trail from Devils Postpile to Tuolumne Meadows	Pumice Flat	bunchgrass	good	many acres	none (7)
	Between Pumice Flat and Shadow Lake (Agnew Meadow lies east of here).	bunchgrass	good	limited and sporadic	none
	Shadow Lake	wet meadow and bunchgrass	good	15 or 20 acres	none
	Garnet Lake and ~~Shadow Lake~~ Thousand Island Lake	wet alpine meadow	poor; stock won't stay	limitless	none
	Rush Creek	wet meadow and bunchgrass	good	limitless	none
	Lyell Canyon	dry meadow	fine	limitless	none
	Tuolumne Meadows	dry meadow	very fine	many acres	none
Tuolumne Meadows to Pate Valley	Pate Valley	dry meadow	fair, but largely exhausted	1 or 2 acres	none
Rancheria Mountain	top of the plateau	dry meadow	good	many acres	none
Hetch Hetchy to Lake Eleanor via Beehive	Beehive	wet meadow	good	10 or more acres	none
	Miguel Meadow Ranger Station and Swamp Lake (The main Miguel Meadow is being obliterated)	wet meadow	good	several acres	present

WILDERNESS PROBLEMS

Necessity of Preserving Fragments of Wilderness

Up until about fifty years ago, several large wilderness areas still remained in California; today, however, the original concept of a wilderness as a vast natural area, scarcely charted and practically uninhabited, finds almost no counterpart in

reality. Only a few isolated fragments have escaped the advancing network of boulevards, roads and trails which is being constantly extended to capture them, and at present the majority even of these fragments seems doomed. They have been painstakingly mapped, and an elaborate system of sign posts and trails has been introduced over which thousands of people circulate each summer; sheep and cattle graze over much of their area and fish planting crews regularly penetrate their fastness to distribute added inducement to further invasion. It is significant that with the disappearance of the original large natural areas the term "wilderness" has tended to become debased and is now frequently applied to undeveloped tracts of a few hundred acres, or even a half dozen acres, even though these may be entirely surrounded by land subjected to intensive human use.

No one denies the value of wilderness contact as an antidote for the physical and mental shocks caused by the noisy confusion, the purposeless speed and the narrow artificiality of modern mechanized existence. The chief differences of opinion seem to occur over such questions as how far a wilderness area can be pared down in size and still retain its wilderness atmosphere, and how large a crowd can be turned loose in a wilderness without destroying its essential qualities. Persons who argue these points sometimes fail to take into account that although wilderness atmosphere is a very real thing and can be most keenly felt, it is scarcely measurable in terms of mere measures, and is more easily and permanently destroyed through excessive human development than by fire; indeed, ultimate recovery from the last mentioned catastrophe is the rule, but in the case of possible recovery from the former, experience offers practically no hope.

Now that the wilderness is almost gone, the need for preserving some of the remaining fragments is all the more imperative.

Present Trend of Destruction

With the exception of certain desert regions (which represent a peculiar type of wilderness not found elsewhere) the only important wilderness fragments remaining in California are located along the crest of the Sierra Nevada. This mountain axis is now traversed by approximately 20 roads between Lassen National Park and Tehachapi Pass; only that portion of the mountain mass lying between Tioga Road and Walker Pass has escaped the process of dissection, and even in this last untraversed region the pincher-like extensions of additional roads have eaten far into the heart of the mountains in three localities, with the ultimate intent of cutting entirely through the Sierrian backbone.

The present status and intended future of these three roads is well shown on the 1936 road map of the Standard Oil Company of California; their completion will split the largest remaining wilderness region into three fragments and will considerably reduce the size of the next largest remaining area as well (Fig. 49). One of these roadways is the Kings River Canyon highway, now anticipated as a <u>through highway</u> to Owens Valley. Perhaps this engineering dream may be postponed for years (the Forest Service is said to be definitely against it at present) but that it will fail of ultimate fulfillment once the idea has been planted in the public mind seems hardly likely. Another of these proposed roadways, from Camp Nelson to Lone Pine, will pass so close to Sequoia National Park that the construction of a road into the Kern (continue on page 59)

Canyon will possess overwhelming attraction to an engineer. It will be noted that already these state highways have been given their future designating numbers!

A prominent government official has stated that no spot in California is now more than 10 miles from some road.

Unfortunately the construction of a road into virgin country represents only the first step in the endlessly ramifying process of "developing" the country; from this point of infection attendant highway maintenance stations, gas stations, lodges, stores, cabins, camps, pack outfits, dude ranches, fire protection roads, telephone and power lines, reservoirs, sewerage systems and new trails keep spreading out, and push the wilderness frontier farther and farther back into the mountains. Then, if the area is pared down beyond a certain point, or even if the trails become exxessively boulevard-like or numerous, and carry great throngs, the elusive wilderness flavor vanishes, often quite suddenly.

The Wilderness Problem in the National Parks

The Problem of Use. The problem of how to let the public use the parks while still keeping the latter natural is one whose magnitude is everywhere recognized. What may not always have been so clearly felt, however, is that there is a positive saturation point beyond which further concentration of people will destroy the very thing which they seek, and that in some areas this saturation point has already been exceeded.

In wilderness areas the saturation point is very easily exceeded, but this factor is largely compensated by the unwillingness of the great majority of people today to venture as far away from their automobiles as wilderness penetration demands. Of those few who do enter the wilderness, a still smaller number are willing to leave the beaten path; the remainder will seldom be so numerous as to destroy the wilderness atmosphere -- this destruction is largely accomplished by efforts to coax large numbers of less venturesome individuals into the wilderness by the construction, even in remote places, of ready-built camp sites and extensive systems of easy trails, which require the exercise of a minimum amount of energy and ingenuity on the part of the visitor.

The Pressure for Further Development. Probably no one is more keenly aware of the pressure for further development than the unfortunate park superintendent, who must constantly, even if not always successfully, try to stem the tide of demands for further penetration of natural areas. In view of the threatened disappearance of most of the remaining wilderness area, however, it would seem imperative to call a final halt to this type of "improvement" before it is too late.

Already those who want more roads, more public campgrounds, more gas stations and more trails to scenic points have obtained these improvements for themselves throughout approximately 99 percent of all recreational areas in California, including most of the choicest portions of the national parks. On the basis of relative numbers of persons involved, this may be an equable division; real unspoiled wilderness is neither demanded nor fully appreciated by the uncritical majority, which is usually well satisfied with large semi-wild outdoor regions which have been made safe for the uninitiated, comfortable for the infirm, and accessible for those who take their vacations while in full flight. In any event, however, the minority which can appreciate a wilderness should not be deprived of the remaining one percent. If the unhealthy tension of modern life continues to increase, as many think it will, the value of the few real remaining wilderness areas will increase beyond all price for those who periodically need to be treated to solitude and unspoiled beauty in order to retain a normal perspective.

Possible Direction of Solution. The thought has been expressed during the

last year or two by a number of conservationists and wilderness-minded folk that perhaps the Service will be unable to withstand the pressure for development until every corner of the parks has been invaded and the wilderness values submerged. Such persons have explained their opposition to the addition of the Kings Canyon, Mount Olympus and similar areas to the National Park system on the ground that they consider the regions in question to be safer from human interference under their present status. Perhaps it is in recognition of this point of view that the Forest Service has reserved from future development eighteen "Primitive Areas", comprising 2,000,000 acres, which it is said will be maintained in a primeval condition for all time. The largest of these areas is the "High Sierra Primitive Area" which extends from the Devils Postpile to Sequoia National Park (this area is not entirely homogeneous even now, however, as regards wilderness conditions, and with the completion of the Kings Canyon and Florence Lake-Sabrina Lake roads would be split into three pieces; (see Fig. 49).

Notwithstanding the pessimistic attitude referred to, a more hopeful view of the wilderness problem seems possible. In California (and various other states) an extensive and truly outstanding system of state parks is being created. The idea of providing additional municipal and county parks is also in the air. These local parks cannot hope as a rule to include large areas of wilderness land. Usually they have been purposely located near great human population centers so as to serve the largest possible number of individuals. They do not compete with the national parks; they supplement them. To the local parks properly belongs the function of handling huge crowds; preservation of truly primeval features is a goal which is striven for, but it is usually definitely secondary. To the national parks, on the other hand, properly belongs the function of preserving superlative natural regions, including wilderness areas, as little changed as possible for the benefit of posterity; attentiveness to the pleasure and comfort of the people is of course an equally important function, but if it means the pleasure and comfort of absolutely unlimited numbers of people, this second function is likely to destroy the first. A partial solution of the problem created by this dual function would seem to lie in: (a) realization that the national park areas cannot hope to accommodate unlimited numbers of people and that soon a line will have to be drawn against further development, particularly of roadways (b) promotion of more extensive state, county and municipal park systems to share the recreational burden (c) definite recognition of remnant wilderness areas and establishment of a code of administration designed to protect them from all but the very simplest maintenance activity.

Fig. 49. Map showing present status of wilderness areas in the Sierra Nevada, and the effect of constructing proposed state highways No. 168, 180 and 190; [redacted] boundary of present wilderness areas; [redacted] wilderness areas as reduced by the proposed road construction.

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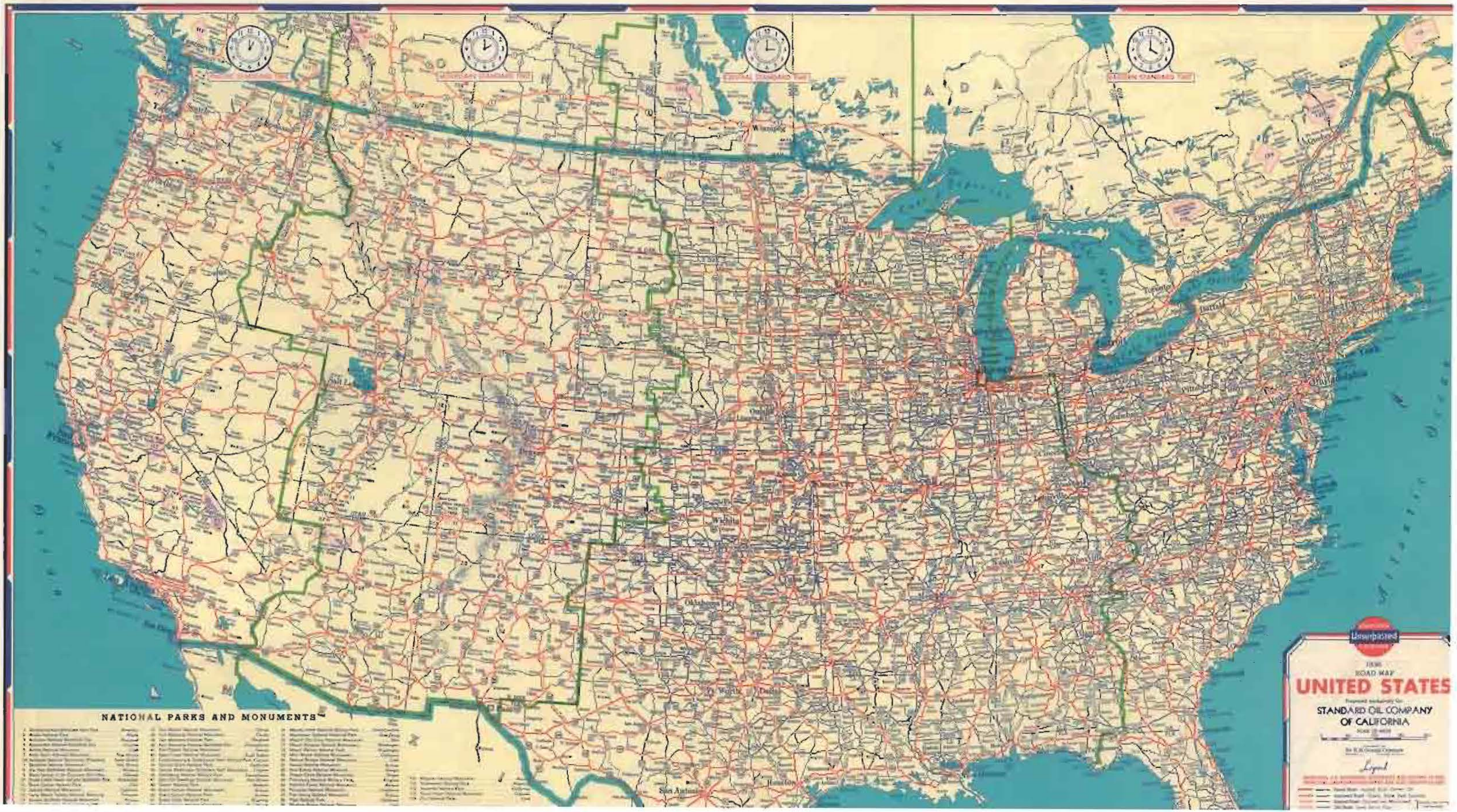
CALIFORNIA MILEAGE CHART

	Bakersfield	Barstow	Beatty	Chico	Crescent City	Eureka	Fresno	King City	Long Beach	Los Angeles	Marysville	Merced	Modesto	Monterey	Reno	Redding	Redlands	Riverside	Sacramento	San Bernardino	San Diego	San Francisco	San Jose	San Luis Obispo	San Mateo	Santa Barbara	Santa Cruz	Santa Rosa	Stockton	Truckee	Vallejo	Ventura	Yosemite (Mail) E. Pk.	Yreka
Alturas	586	560	295	227	380	360	429	355	612	600	346	426	387	440	198	160	599	599	176	197	664	600	215	374	613	598	647	347	359	220	385	183	405	132
Bakersfield	•	137	311	375	664	388	197	195	124	112	304	161	199	220	348	366	106	106	263	109	128	272	221	188	240	162	254	339	251	232	257	269	296	317	351	388
Barstow	137	•	235	328	591	516	266	262	146	134	441	289	336	386	466	503	105	105	426	165	276	413	358	325	377	299	391	304	388	369	394	422	426	454	344	483
Beatty	311	235	•	488	823	814	247	358	376	339	390	192	177	334	322	488	294	382	154	249	373	202	278	278	370	320	345	341	320	209	297	441	335	670
Chico	375	328	150	177	1000	913	452	532	344	339	535	388	340	417	350	551	429	764	188	432	851	180	240	323	442	551	610	173	383	618	853	852	892
Crescent City	664	591	823	•	1000	789	704	832	692	680	87	598	771	808	197	860	772	69	78	85	971	530	831	677	715	492	598	156	144	148	144	149	298	177
Eureka	664	591	823	295	•	98	547	521	788	768	332	495	452	464	332	440	394	295	225	219	482	338	360	278	425	708	652	533	537	623	366	286	549	780
Fresno	429	266	247	532	832	547	360	428	422	423	177	328	260	330	262	551	335	81	82	226	382	283	236	257	326	509	390	260	273	268	154	18	284	87
King City	355	262	358	432	832	521	428	•	222	223	180	69	128	58	262	551	335	333	144	302	382	283	236	257	326	509	390	260	273	268	154	18	284	87
Long Beach	124	146	376	368	788	762	341	298	•	20	418	287	307	318	338	366	417	142	317	110	120	296	297	257	326	509	390	260	273	268	154	18	284	87
Los Angeles	112	134	339	400	768	662	319	317	20	•	418	277	333	341	338	366	417	142	317	110	120	296	297	257	326	509	390	260	273	268	154	18	284	87
Marysville	354	452	426	47	100	777	417	384	408	408	•	161	175	233	133	615	508	98	117	91	278	448	284	130	170	481	398	134	57	91	98	198	219	298
Merced	193	208	424	388	826	668	98	148	296	277	161	•	80	133	141	808	518	198	265	215	133	331	252	180	229	113	299	220	180	84	220	126	254	85	368
Modesto	199	206	328	372	805	689	90	139	303	312	175	80	•	112	170	810	49	259	240	17	158	384	298	229	270	510	398	134	57	91	98	198	219	347
Monterey	220	306	386	408	826	668	98	139	303	312	233	133	112	•	170	810	49	259	240	17	158	384	298	229	270	510	398	134	57	91	98	198	219	347
Reno	348	466	322	350	197	332	262	262	338	338	133	141	170	170	•	551	335	333	144	302	382	283	236	257	326	509	390	260	273	268	154	18	284	87
Redding	366	503	488	551	860	440	551	551	366	366	615	808	810	810	551	•	615	780	731	803	1014	808	843	679	737	1008	880	892	893	1008	780	892	893	1008
Redlands	106	105	294	764	69	295	81	333	417	417	508	198	259	259	335	780	•	105	731	93	93	96	96	96	96	780	780	780	780	780	780	780	780	780
Riverside	106	105	382	769	85	225	82	333	417	417	508	198	259	259	335	780	105	•	731	93	93	96	96	96	96	780	780	780	780	780	780	780	780	780
Sacramento	176	426	154	188	78	219	226	144	317	317	98	265	240	240	144	803	731	731	•	731	731	731	731	731	731	731	731	731	731	731	731	731	731	731
San Bernardino	197	165	249	715	85	219	82	333	417	417	508	198	259	259	335	780	105	105	731	•	93	96	96	96	96	780	780	780	780	780	780	780	780	780
San Diego	664	426	373	882	894	850	447	358	120	120	584	405	409	405	364	1014	820	820	820	820	•	820	820	820	820	820	820	820	820	820	820	820	820	820
San Francisco	272	272	202	551	830	338	283	283	296	296	284	252	298	298	283	808	96	96	96	96	96	•	96	96	96	96	96	96	96	96	96	96	96	96
San Jose	215	276	278	831	677	360	236	257	257	257	130	180	229	229	144	843	96	96	96	96	96	96	•	96	96	96	96	96	96	96	96	96	96	96
San Luis Obispo	374	325	278	323	442	278	326	326	326	326	170	229	270	270	257	737	96	96	96	96	96	96	96	•	96	96	96	96	96	96	96	96	96	96
San Mateo	613	377	370	442	715	425	326	326	326	326	170	229	270	270	257	737	96	96	96	96	96	96	96	96	•	96	96	96	96	96	96	96	96	96
Santa Barbara	240	304	320	509	708	509	326	326	326	326	170	229	270	270	257	737	96	96	96	96	96	96	96	96	96	•	96	96	96	96	96	96	96	96
Santa Cruz	647	391	345	610	598	652	390	390	390	390	198	299	310	310	257	737	96	96	96	96	96	96	96	96	96	96	•	96	96	96	96	96	96	96
Santa Rosa	347	339	341	173	156	533	260	260	260	260	134	180	229	229	144	843	96	96	96	96	96	96	96	96	96	96	96	•	96	96	96	96	96	96
Stockton	359	251	320	442	715	425	326	326	326	326	170	229	270	270	257	737	96	96	96	96	96	96	96	96	96	96	96	96	•	96	96	96	96	96
Truckee	220	232	209	148	148	268	154	154	154	154	98	154	154	154	154	892	780	780	780	780	780	780	780	780	780	780	780	780	780	•	780	780	780	780
Vallejo	385	296	297	144	149	286	284	284	284	284	198	284	284	284	284	893	780	780	780	780	780	780	780	780	780	780	780	780	780	780	•	780	780	780
Ventura	183	317	441	852	892	18	284	284	284	284	198	284	284	284	284	893	780	780	780	780	780	780	780	780	780	780	780	780	780	780	780	•	780	780
Yosemite (Mail) E. Pk.	405	351	335	873	813	284	87	284	284	284	198	284	284	284	284	893	780	780	780	780	780	780	780	780	780	780	780	780	780	780	780	780	•	780
Yreka	132	388	670	177	780	284	87	284	284	284	198	284	284	284	284	893	780	780	780	780	780	780	780	780	780	780	780	780	780	780	780	780	780	•

The figures given in the squares where the columns intersect is the shortest distance between the two points, computed over the most direct U. S. Numbered, State or Major traveled road. Mileage on ferry lines not included.


Burbank
Glendale
Pasadena
Monrovia
Los Angeles
Beverly Hills
Santa Monica
Culver City
Inglewood
Compton
Whittier
Fullerton
Anaheim
Long Beach
Santa Ana
LOS ANGELES
AND VICINITY


Richmond
Berkeley
Oakland
San Francisco
Alameda
San Leandro
Hayward
Daly City
Burlingame
San Mateo
SAN FRANCISCO
AND VICINITY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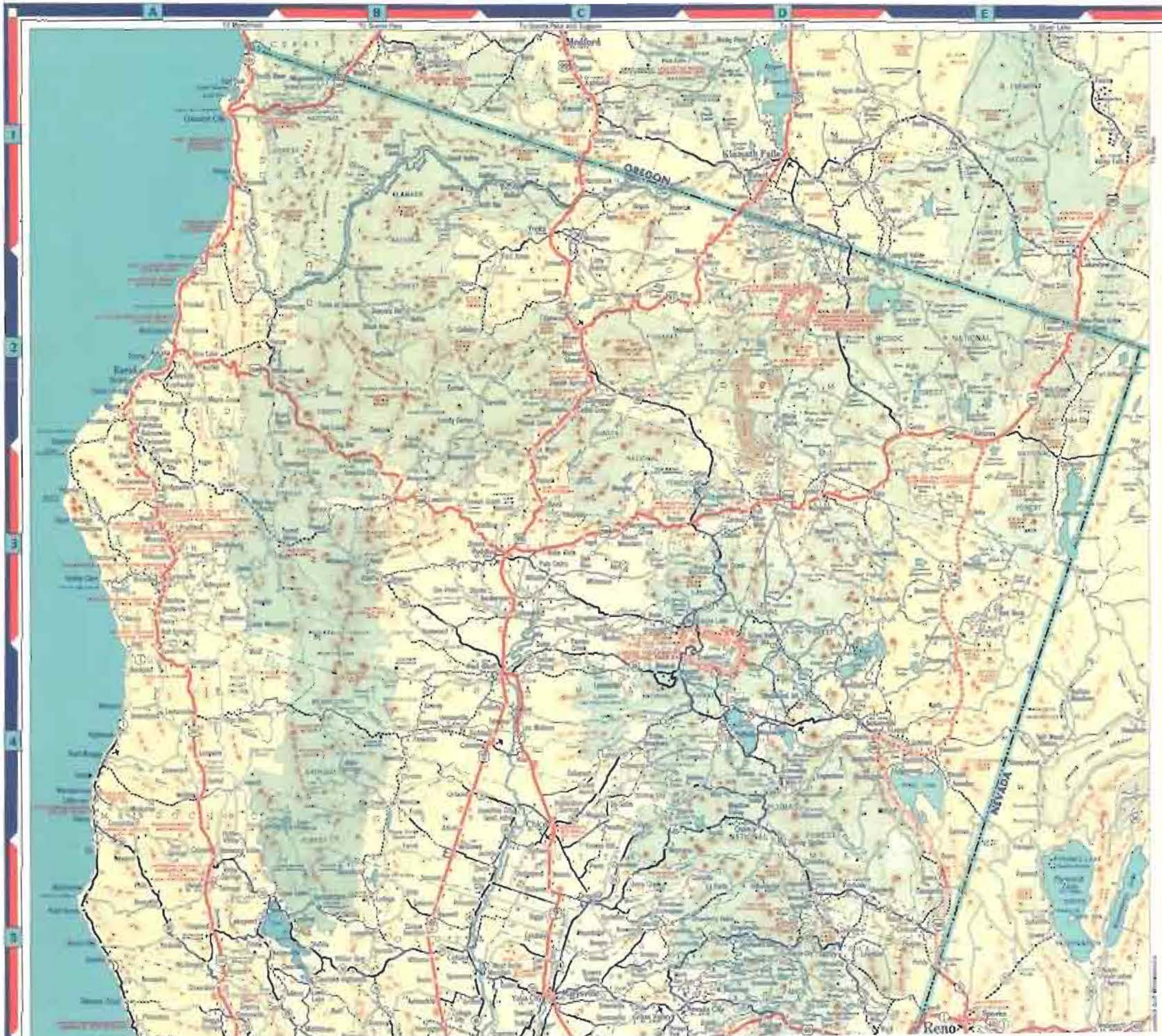

ESTIMATED POPULATION (1934) 6,158,000

CALIFORNIA

AREA, 155,652 SQUARE MILES

CITIES AND TOWNS
*1932 U. S. EST. (Census not taken since 1930 or Census)

Alameda *28,300	H-7
Albany, 5,566	H-7
Alhambra *33,000	D-10
Alturas, 2,328	I-2
Anaheim, *11,800	D-14
Antioch, 5,278	I-13
Arcata, 1,709	A-2
Auburn, 2,661	C-5
Avalon, 1,897	D-14
Azusa, 4,469	F-13
Bakersfield, *26,800	D-11
Berkeley, 82,592	H-7
Beverly Hills, *30,300	B-12
Big Bear Lake, 363	E-14
Big Creek,	G-5
Big Pine, 549	F-9
Bishop, 3,108	F-9
Blue Lake, 355	A-2
Blythe, 1,020	H-15
Bodega,	A-1
Bodfish,	E-11
Boonville, 331	A-1
Boulder Creek, 525	A-6
Bradley, 150	B-10
Brawley, *10,200	G-16
Brea, 2,626	E-13
Brentwood,	G-8
Bridgeport, 701	E-7
Bridgeville, 100	A-3
Buellton,	D-3
Burbank,	B-12
Burlingame, *14,000	H-7
Burney, 227	B-3
Butte City, 362	C-3
Butte Meadows,	B-4
Byron, 469	F-8
Calabasas,	F-11
Calexico, 5,295	I-16
Calico,	C-9
Calipatria, 1,064	G-16
Calistoga, 1,506	B-6
Camptonville, 217	E-5
Canoga Park,	B-11
Canby, 512	E-3
Carlsbad,	I-13
Carmel, 2,290	A-6
Carpinteria, 815	B-6
Cedarville, 718	I-2
Ceres, 982	G-9
Chester,	D-4
Chino, 1,961	F-13
Chowchilla, 1,116	E-10
Chula Vista, 847	I-13
Claremont, 3,989	E-13
Cloverdale, 1,719	B-4
Clovis, 1,318	G-9
Coalinga, 4,571	E-11
Colfax, 1,252	C-5
Colma, 1,000	H-7
Colusa, 2,112	D-4
Corona, 3,508	F-13
Coronado, 3,000	I-13
Corte Madera, 1,000	H-6
Cotati, 1,000	B-3
Covelo, 1,000	A-3
Crescent City, 2,000	A-1
Culver City, 1,000	B-12
Cupertino, 1,000	H-8
Daly City, 1,000	H-7
Davis, 2,437	D-5
Del Loma,	E-7
Del Monte,	A-6
Delhi,	G-8
Desert Center,	G-13
Dinuba, 2,964	G-7
Dixon, 1,002	E-6
Downey Park,	E-14
Duncanhuan,	D-3
Durham, 782	D-5
Douglas City,	B-3
Dunsmuir, 1,650	D-3
Dunsmuir, 2,533	C-2
Durham, 289	D-5
Dyerville,	A-3
Eastmont,	D-11
El Cajon, 7,906	I-13
El Centro, 5,414	I-16
El Cerrito, 3,870	H-7
El Dorado,	C-5
Elk,	A-3
Elk Grove, 540	E-6
El Nido,	C-8
El Segundo, 2,109	D-14
Emeryville,	H-7
Encinitas, 1,000	I-13
Escalon,	G-9
Escondido, 3,031	I-13
Etna, 1,179	B-2
Eureka, *16,000	A-2
Exeter, 2,305	D-10
Fairfax,	A-6
Fairfield, 1,321	E-6
Fallbrook,	I-13
Farmersville,	G-10
Fort Bragg, 3,022	A-4
Fort Dick,	A-1
Fort Jones, 302	D-2
Fort Ross,	A-6
Fortuna, 3,230	A-2
Fowler, 1,371	G-9
Franklin,	C-6
Fremont,	H-8
Freestone,	A-4
Freshwater, 750	A-2
Fresno, *52,000	G-9
Fruit,	D-9
Fullerton, *12,000	D-14
Fulton,	A-6
Galt, 1,311	C-7
Garberville, 341	A-3
Garland,	C-2
Garvida,	C-2
Gerberville, 423	A-3
Gilroy, 3,202	B-8
Glendale, *72,000	D-13
Glendora, 2,361	E-13
Glenn,	C-5
Glennville,	D-11
Gloria, 519	C-12
Glorietta, 913	B-6
Gordon,	A-6
Gridley, 1,123	D-5
Grover City,	D-2
Guadalupe,	A-6
Grass Valley, *8,000	C-5
Greenfield,	B-9
Greenfield,	D-11
Greenwood,	C-6
Grossley, 1,941	G-7
Grimes,	D-5
Groveland,	D-6
Guadalupe,	A-6
Guerneville,	B-10
Gustine, 1,016	E-9
Half Moon Bay,	A-7
Hamilton City,	D-4
Hamlet,	A-6
Hammond,	E-10
Hammond, 2,108	D-12
Hanford,	B-15
Harrington,	B-12
Hartman,	A-3
Hat Creek,	D-3
Hawthorne, 6,396	D-14
Hayward, 9,530	H-7
Healdsburg, 2,276	A-6
Helena,	B-3
Hemet,	C-14
Hilgard,	C-14
Hollister, 3,220	A-3
Holmes, 1,371	G-9
Holtville,	I-16
Hopland,	B-4
Hornbrook, 313	C-1
Humboldt,	A-2
Huntington Beach, 4,206	D-14
Hyampom,	B-3
Hydesville, 1,157	A-3
Hollywood, 132,784	D-13
Holtville, 1,758	G-16
Hoopa,	A-2
Hopland, 800	A-5
Huntington, 323	C-1
Imperial, 1,022	H-16
Independence,	F-9
Indio, 1,000	G-13
Inglewood, 1,000	B-12
Inverness,	A-6
Inyokern,	F-9
Ione, 1,000	D-6
Irvine,	D-14
Isleton, 1,000	E-6
Jackson, 1,000	C-6
Jamestown, 1,000	D-6
Jenner,	A-6
Johannesburg,	F-9
Julian,	I-13
Kelseyville,	B-5
Kenwood,	B-6
Kerman, 1,000	G-8
Kernville,	E-11
King City, 1,000	B-9
Kingsburg, 1,000	G-9
Klamath,	A-1
Klamath Falls,	C-1
La Canada,	D-13
La Crescenta,	D-13
La Grange, 300	C-6
Laguna Beach, 1,981	D-14
La Habra, 2,222	D-14
Lake Arrowhead,	E-13
Lakeport, 1,376	B-5
La Mesa, 2,513	I-13
La Mirada,	D-14
Lancaster, 322	E-11
Las Cruces,	B-10
Lathrop,	C-8
La Verne, 2,882	E-14
Laytonville,	A-4
Lebec,	D-11
Leggett,	A-3
Lemoore, 1,399	D-10
Lewiston,	B-3
Likely,	E-3
Lincoln, 2,094	C-6
Lindsay, 2,879	D-10
Linden, 142	C-7
Little Lake,	C-1
Littlerock,	E-12
Livermore, 3,159	H-7
Livingston, 913	G-8
Lockeford,	C-7
Lockwood,	B-10
Lodi, 8,508	C-7
Loma,	A-2
Lomita, 2,545	B-12
Lone Pine,	F-10
Long Barn,	D-7
Long Beach, *142,000	D-14
Longvale,	A-4
Los Alamos, 600	B-12
Los Angeles, *1,224,100	D-13
Los Banos, 1,825	G-8
Los Gatos, 2,188	B-8
Lost Hills,	C-11
Lower Lake, 526	B-5
Loyalton, 857	E-5
Lucerne,	B-5
Ludlow,	G-13
Madalina, 213	E-3
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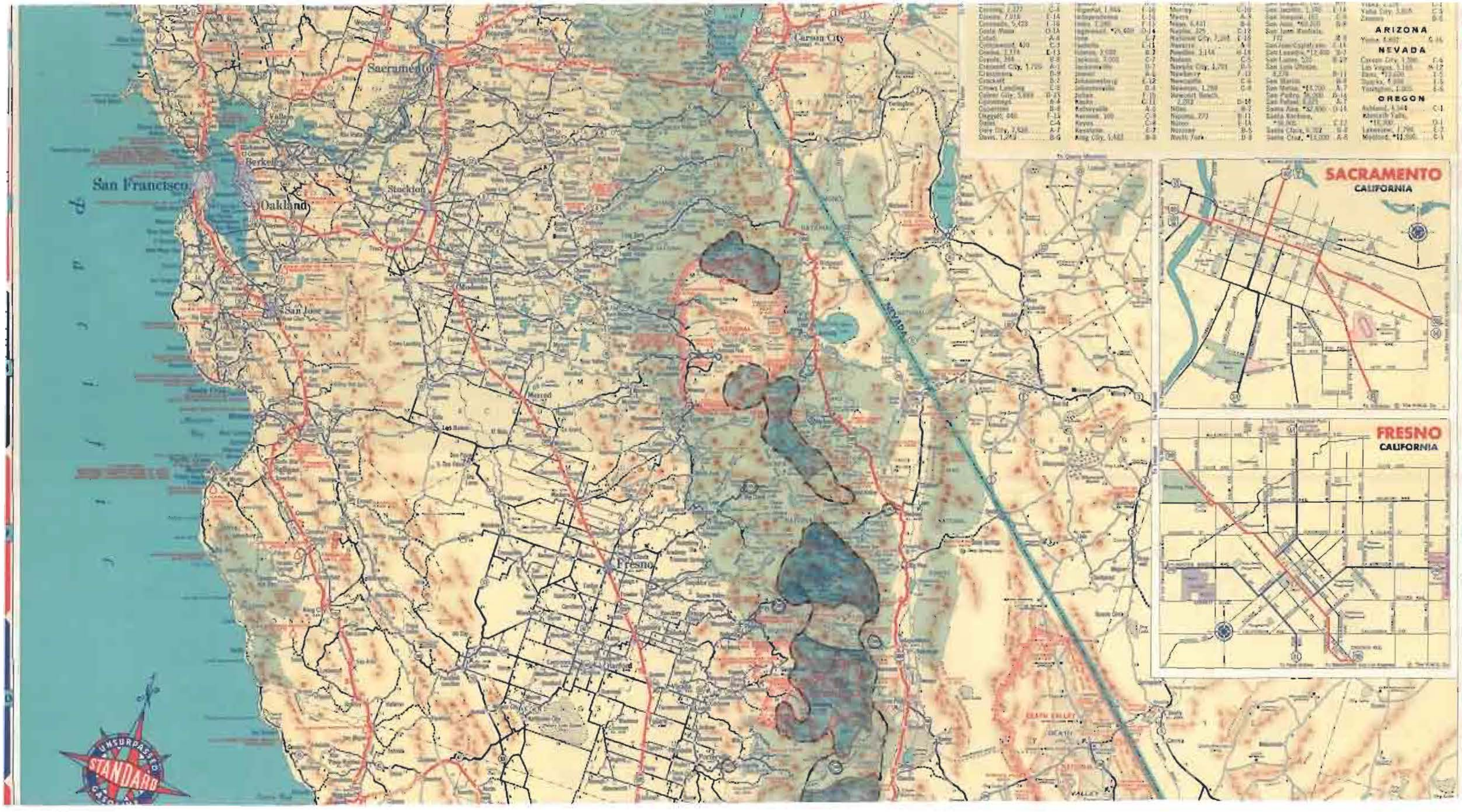
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ROAD MAP

CALIFORNIA

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OF CALIFORNIA

SCALE OF MILES

0 10 20 30 40

Legend

U.S. NUMBERED HIGHWAYS ARE SHOWN IN RED

Paved Road - Asphalt, Brick, Concrete, Oil

Improved Road - Gravel, Stone, Shell, Sand-Clay

Graded Road - Drained and Maintained

Dirt Road - Subject Dirt or Mud

Roads Under Construction

State Highways

U.S. Numbered Highways

Mileages between Points

Mileages between Towns and Junctions

State Parks

Points of Interest

Principal Airports

National Forests

Trails

Elevations

Los Angeles

Long Beach

San Bernardino

Riverside

San Diego

Santa Clara

Gulf of Santa Catalina

Santa Barbara Channel

San Pedro Bay

Brawley

Mexicali

MEXICO

ARIZONA

SAN DIEGO
CALIFORNIA

SAN JOSE
CALIFORNIA

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