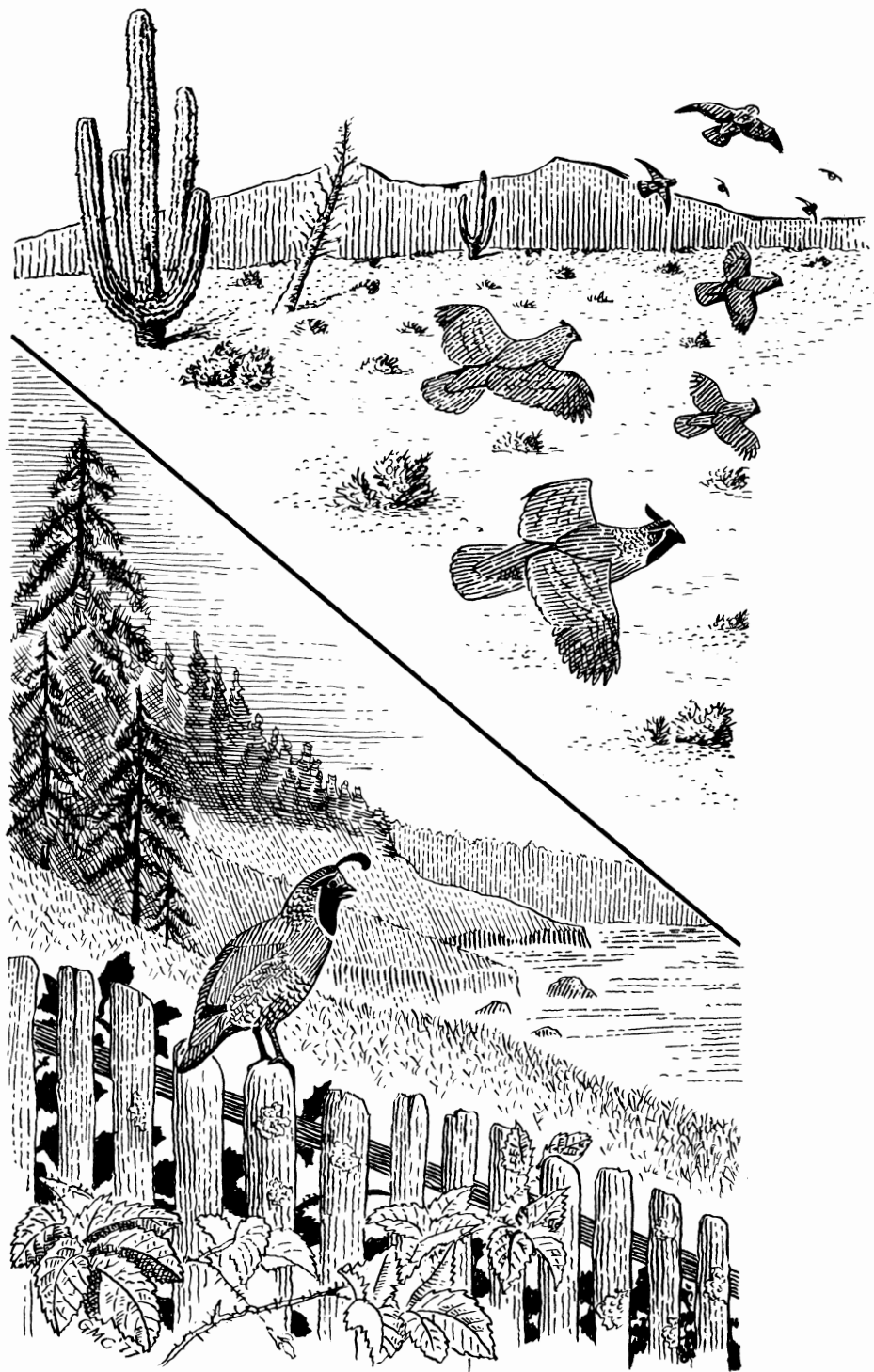


PART 1:
THE BIRD AND ITS HISTORY





1

THE SPECIES AND ITS DISTRIBUTION

CALIFORNIA'S STATE BIRD

Of all the birds native to the state of California, none is more universally enjoyed and appreciated than the California Quail. The handsome plumage, pert demeanor, and melodious calls are appealing to everyone fortunate enough to know the species, and it is not surprising that in 1931 the State Legislature by unanimous acclamation declared the California Quail to be the State Bird of California.

Long before the Spanish occupation of California, the aboriginal inhabitants valued the quail as an important food resource. The Indians hunted and trapped quail for food and used the plumage to decorate their baskets and ceremonial clothing. During the era of land settlement, the bird became an important item of commerce, and millions were trapped or shot for the San Francisco market. With the subsequent dawning of the conservation era, commercialization was terminated but the species has continued to be utilized for sport hunting under rigid protective laws. Today the esthetic appeal of the California Quail is one of its great social values, the presence of a covey in an isolated canyon or in the immediate suburbs of a city adding a touch of interest and natural beauty to which hunters and non-hunters alike must respond.

A bird of such importance and universal appeal quite naturally attracted the early attention of naturalists and wildlife biologists. Over the years the California Quail has been observed and studied by scores of competent



Figure 1. Portrait of a male California Quail. C. W. Schwartz photo.

scientists who have published their findings in technical books and journals. Few American bird species have been more intensively investigated, with the possible exception of the closely related Bobwhite Quail in the eastern United States and some of the commonest garden songbirds. When the extensive literature on the California Quail is studied and distilled, two truisms emerge which constitute central themes of this volume:

(1) First, the local status and welfare of a quail population will be a direct function of the quality of habitat available for quail occupancy. Any area that supplies the necessary food, cover, and water required by the bird

for survival can support a quail population. Conversely, in the absence of proper habitat the bird cannot exist irrespective of protective laws or benevolent intentions.

(2) Secondly, in many situations it is possible to restore quail habitat where it has been destroyed or depleted by past land abuses. Generally speaking, the measures required to rehabilitate quail range are consonant with good soil and water conservation practice. The old adage that "good land use is good wildlife management" applies very nicely to the foothill ranges of the California Quail.

In the chapters which follow, I will attempt to summarize the accumulated knowledge about this bird—its distribution, habitat relations, natural history, and management.

NATIVE RANGE OF THE SPECIES AND ITS CLOSE RELATIVES

The California Quail, *Lophortyx californicus*, is the west coast representative of a group of closely related quails that range through the arid and semi-arid portions of southwestern North America. The species occupies virtually all of Baja California and California, except the Colorado and eastern Mojave deserts and the higher reaches of the Sierra Nevada and Cascades. Its native range includes a small portion of western Nevada and the southern tier of counties in Oregon. The species has been widely transplanted throughout the west and now occurs over most of Washington and Oregon, and in scattered localities of Idaho, southern British Columbia, Utah, and northern Nevada (Fig. 2).

The closely related Gambel Quail, *Lophortyx gambelii*, occupies contiguous range in the deserts of southeastern California, southern Nevada, Arizona, Sonora, the extreme northeastern corner of Baja California, and deserts to the east and south. Overlapping the range of Gambel Quail, and extending farther east and south is the Scaled Quail, *Callipepla squamata*. The Bobwhite, *Colinus virginianus*, overlaps the range of the Gambel Quail in southern Arizona and Sonora. The Mountain Quail, *Oreortyx pictus*, occurs widely through California, from northern Baja California into Oregon. Its range, like that of the California Quail, has been extended to the north and east by transplant. The Montezuma Quail, *Cyrtonyx montezumae*, is resident in portions of the pine-oak uplands of Arizona, New Mexico, Texas, and the central plateau of Mexico. There are, in all, six species of native quails in the western United States.

Some of these species are very similar in size, coloration, and general habits. For example, the California and Gambel quails are so alike as to be easily confused in the field. On the other hand, some species whose ranges adjoin or overlap are very different in both appearance and in habits—consider the Gambel Quail and Masked Bobwhite, both occurring originally

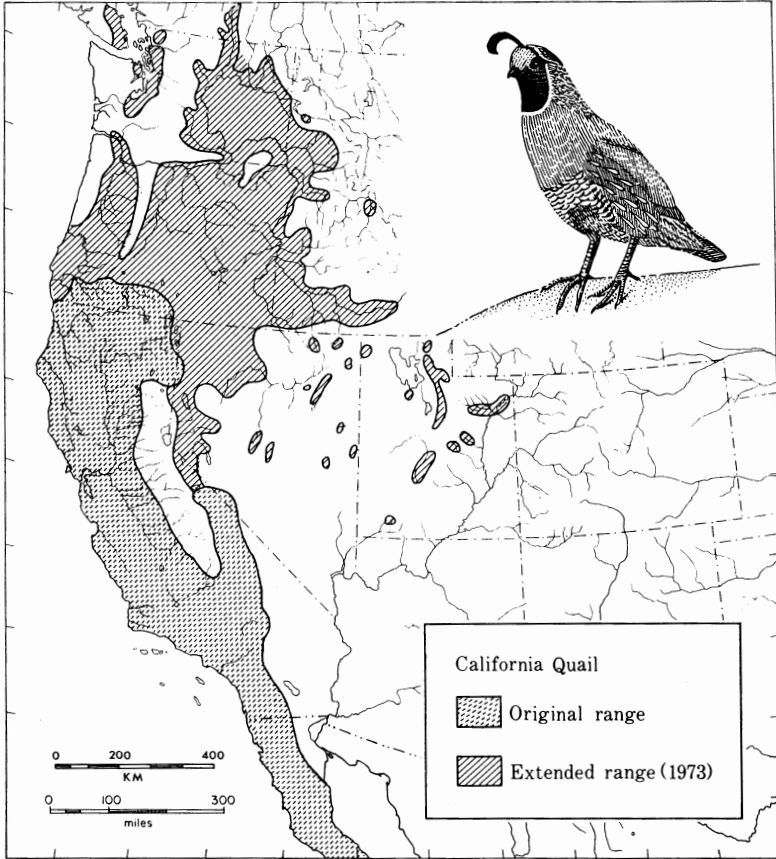


Figure 2. Original and present range of the California Quail in North America, north of Baja California. For range in Baja, see Fig. 4.

in southern Arizona (the Bobwhite is now locally extinct). The question arises, how did six species of quail come to evolve in the Southwest and what is their relationship to one another?

All the quails are classed as members of the large family Phasianidae, which according to Van Tyne and Berger (1976) embraces 174 species distributed in all continents of the world. The particular group of quails of concern to us here would seem to fall into four rather distinct groups representing independent phylogenetic lines. They are:

Lophortyx quails	<i>Lophortyx californicus</i>	California Quail
	<i>Lophortyx gambelii</i>	Gambel Quail
	<i>Callipepla squamata</i>	Scaled Quail
Oreortyx quail	<i>Oreortyx pictus</i>	Mountain Quail
Colinus quail	<i>Colinus virginianus</i>	Bobwhite Quail
Cyrtonyx quail	<i>Cyrtonyx montezumae</i>	Montezuma Quail

The group of *Lophortyx* species are obviously closely related, and in fact interspecific hybrids are known to occur (though rarely) between California and Gambel Quail and between Gambel and Scaled Quail. On the basis of this hybridization, Johnsgard (1973) lumps the genera *Lophortyx* and *Callipepla* into the single genus *Callipepla*, but this proposal has not yet been accepted by the Nomenclature Committee of the American Ornithologists' Union, so I shall use the traditional generic names given above.

The other three species represent quite distinct genetic lines with little in common either in habits or in general appearance. Presumably these four blood lines derived independently from some early common ancestor, and all persisted to fill different niches in this part of the North American continent.

Each species now claims as its own range a given geographic area with associated attributes of climate and vegetation. Each species, we say, is adapted to its native habitat. All individuals of the species are capable of breeding among themselves, but do not breed freely with members of other species.

In some cases, the ranges of western quails are allopatric (Fig. 3). That is to say they adjoin with a minimum of overlap. Thus the Gambel Quail supplants the California Quail along a fairly clear line extending from the Panamint Range in Inyo County to the Santa Rosa Mountains in Riverside County. To the west of this line only the California Quail occurs, whereas to the east the Gambel Quail is the sole occupant of appropriate desert washes. Along the border, the two species occur together, as for example at San Gorgonio Pass. There occasional hybridization takes place, attesting to the close relationship of the species. What, then, is the nature of the adaptation that fits each of these species to its particular native range?

By and large, we know very little about the specifics of range adaptation. Grinnell et al. (1918:540) states: "Efforts made to introduce the Desert Quail (Gambel) into northern California have met with failure. Belding (1890, p. 8) records the fact that although a number were once liberated near Folsom, Sacramento County, they all soon disappeared. A covey, numbering originally more than a hundred, kept on the State Game Farm at Hayward, slowly died off until not one was left. The bird seems unable to stand any departure from the warmth and dryness of its native desert territory." By virtue of this kind of trial-and-error evidence, plus the empirical fact that the two species maintain distinct ranges, we are led to accept the existence of adaptive differences, even though we are largely ignorant of their nature and sharpness.

A recent paper by Henderson (1971) gives some clues as to the nature of the specific adaptations of different quails to local environments. Gambel and Scaled Quails were tested in a laboratory environment to measure resistance to high temperature and deprivation of water. Evaporative water loss rates were similar at 25, 30, and 35°C. However, at temperatures of 40

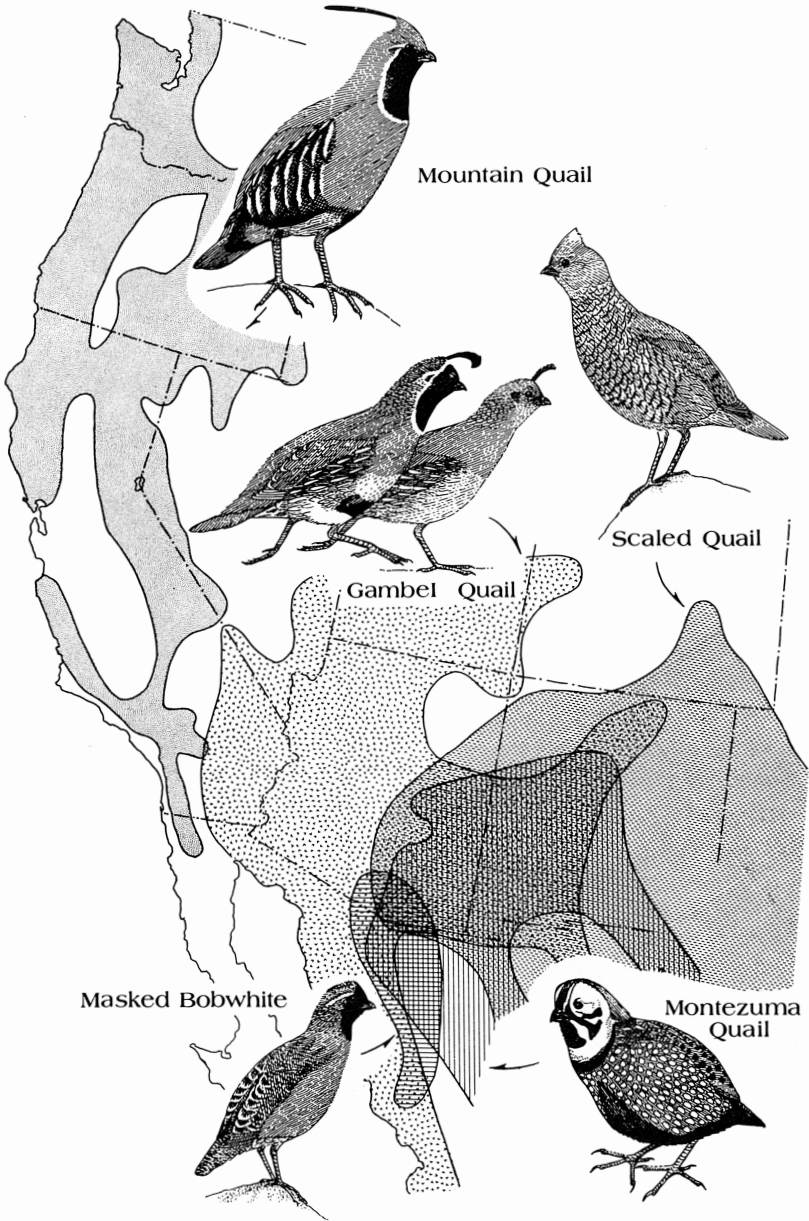


Figure 3. Ranges of five species of western quails. The California Quail range is shown in Fig. 2.

and 45°C Gambel Quail lost significantly higher percentages of water through evaporation than did Scaled Quail, meaning they had a more efficient cooling system. Both species were able to tolerate an ambient temperature of 40°C without ill effects, but at 45°C Gambel Quail survived better than Scaled Quail. Oxygen consumption values were similar at 30°C, but at 40° the values were significantly higher for Gambel Quail. Henderson (p. 436) concludes: "These results indicate that Gambel Quail are better adapted, physiologically, to hot arid environments than are Scaled Quail. This is quite plausible since Gambel Quail inhabit extreme desert areas while Scaled Quail are confined to more mesic areas with more moderate temperatures."

Several species whose ranges overlap (see Fig. 3) are separated on ecologic rather than geographic grounds. That is to say, they occupy different habitats in the same general area. This situation is well illustrated by the relationship between the California Quail and the Mountain Quail. The ranges of these two species overlap substantially. But on the ground there is actually a fairly clear differentiation of habitat with much less overlap than the map would indicate. The Mountain Quail occurs largely in conifer or oak timber, or in dense chaparral. The California Quail utilizes these cover types but usually frequents openings or edge situations rather than continuous dense cover. In some areas, Mountain Quail make substantial vertical migrations, moving well up into mountain forests in summer, dropping down to lower snowless zones in winter. On the west slope of the Sierra Nevada, for example, these seasonal movements may extend over distances of 50 miles or more. In winter the two species often are associated on the same ranges, and at times may even occur in mixed flocks. Yet it is clear that the Mountain and California quails are differently adapted and have evolved to utilize different habitats in close proximity to one another with a minimum of overlap or competition.

By the same token, the Montezuma Quail, Scaled Quail, Gambel Quail and the Masked Bobwhite are ecologically separated, although their gross ranges overlap.

SUBSPECIES OF CALIFORNIA QUAIL

The ancestral range of the California Quail, extending nearly 1300 miles from north to south and 300 miles from west to east, embraces some very distinctive eco-types. It is a reasonable presumption that segments of the total California Quail population are in turn differentially adapted to local habitats. Even though all individuals are members of the one species and there is no known barrier to their free interbreeding, still the local populations are not identical in appearance or in habit. Taxonomists label recognizable sub-populations of a species as geographic races or subspecies, and designate them by a trinomial Latin name. Thus the Valley California Quail, *Lophortyx californicus californicus*, occupies most of central California,

TABLE 1.
Average weights of California Quail from various parts of the native range.*

<i>Subspecies</i>	<i>Locality</i>	<i>Nearest parallel of latitude</i>	<i>Average weight (grams)</i>	<i>Number weighed</i>
<i>L. c. brunnescens</i>	Contra Costa Co., Calif.	38°	187.8	321
<i>L. c. brunnescens</i>	San Mateo Co., Calif.	37°	189.5	652
<i>L. c. californicus</i>	Yolo Co., Calif.	38°	175.6	64
<i>L. c. californicus</i>	San Luis Obispo Co., Calif.	36°	177.0	227
<i>L. c. californicus</i>	Los Angeles Co., Calif.	34°	157.3	29
<i>L. c. plumbeus</i>	Baja California	31°	157.7	57
<i>L. c. achrusterus</i>	Southern Baja California	28°	150.6	32

*Data derived in part from Sumner (1935:249)

whereas the Coast California Quail, *L. c. brunnescens*, is the form occurring along the humid coastal strip. Differentiation of subspecies has traditionally been based on morphologic characters that are observably different in preserved museum specimens. Birds of the race *brunnescens*, for example, are larger and demonstrably darker and more richly colored than the pale birds of the race *californicus*. The assumption is implicit that there are many other subtle genetic differences between subspecies that adapt them to their local habitats, and the morphologic differences are merely "markers" for the physiologic and behavioral adaptations that may be functionally far more important. Nevertheless, it is on the basis of the "markers" that most or all subspecies of birds have been described. Table 1 illustrates a gradation in size, the larger birds occurring in the north and along the coast, the smallest in the south and inland, following "Bergmann's Rule."

There has been considerable criticism of the fad to attach trinomial names to scarcely recognizable sub-populations of birds. Mayr (1951:94) observed that, "Instead of expending their energy on the describing and naming of trifling subspecies, bird taxonomists might well devote more attention to the evaluation of trends in variation." Nevertheless, the concept that sub-populations do differ genetically is a valid one, and whether we recognize this fact through use of trinomials or through some more descriptive device is not crucial to our consideration of the California Quail. I will use the recognized designation of subspecies, as authenticated by the Checklist of North American Birds, published by the American Ornithologists' Union (1957).

There follows a brief synopsis of the seven recognized subspecies of *Lophortyx californicus* whose ranges are depicted in Figure 4.

1. *L. c. californicus*. Valley California Quail. The most widespread race, its range extending from San Diego County, California, north into southern Oregon (excepting only the coastal strip from San Mateo

County to the Oregon border), the Central Valley, and adjoining slopes of the coast ranges and Sierra Nevada.

2. *L. c. brunnescens*. Coast California Quail. West slope of the coast ranges from San Mateo County to Del Norte County.
3. *L. c. canfieldae*. Inyo California Quail. East slope of the southern Sierra Nevada in Inyo and Mono Counties, California, and the adjoining fringe of west-central Nevada.
4. *L. c. catalinensis*. Catalina Island California Quail. Native only on Santa Catalina Island, Los Angeles County. Introduced on Santa Rosa and Santa Cruz Islands.
5. *L. c. plumbeus*. San Quintín California Quail. Southern San Diego County south into northern Baja California to approximately latitude 30°N (El Rosario).
6. *L. c. decoloratus*. Grinnell California Quail. Baja California, from latitude 30°N (El Rosario) south to latitude 25°N (El Refugio).
7. *L. c. achrusterus*. Cape California Quail. Southern tip of Baja California, from latitude 25° to Cabo San Lucas.

The characters which are used to differentiate these seven subspecies relate to slight differences in coloration and size which I will not attempt to describe here. Suffice it to say that accompanying the differences visible on preserved specimens may be some very significant behavioral and physiological differences that do not show at all. For example, a factor of undoubted importance in adapting a quail population to its home environment is the matter of timing of the breeding season. As will be brought out in another chapter, breeding behavior is initiated in quail, as in most birds, by seasonal changes in day length. This celestial trigger prepares the birds to produce chicks at the time of year most likely to be favorable for their survival. But the proper time for chicks to hatch may be very different in the deserts of Baja California than in the cool pine-sage uplands of Modoc County, or in the wet redwood-chaparral of Del Norte County. We presume, therefore, that each of these local populations has its own adjusted response to the lengthening days of spring; otherwise they would not have succeeded in persisting year in and year out through geologic ages.

MIXING GENETIC STRAINS THROUGH RESTOCKING

The concept of local genetic adaptation assumes considerable management significance when one considers the extent to which non-native breeding stocks have been liberated to augment dwindling wild populations. The peak of quail restocking in southern California occurred in the period 1933 to 1941. Liberations were obtained from three principal sources:

1. Birds reared on game farms.
2. Wild-trapped quail imported from Baja California.
3. Wild-trapped quail from refuge areas in southern California.

Presumably the original game farm stocks were derived from birds trapped somewhere in southern California, where the Los Serranos Game

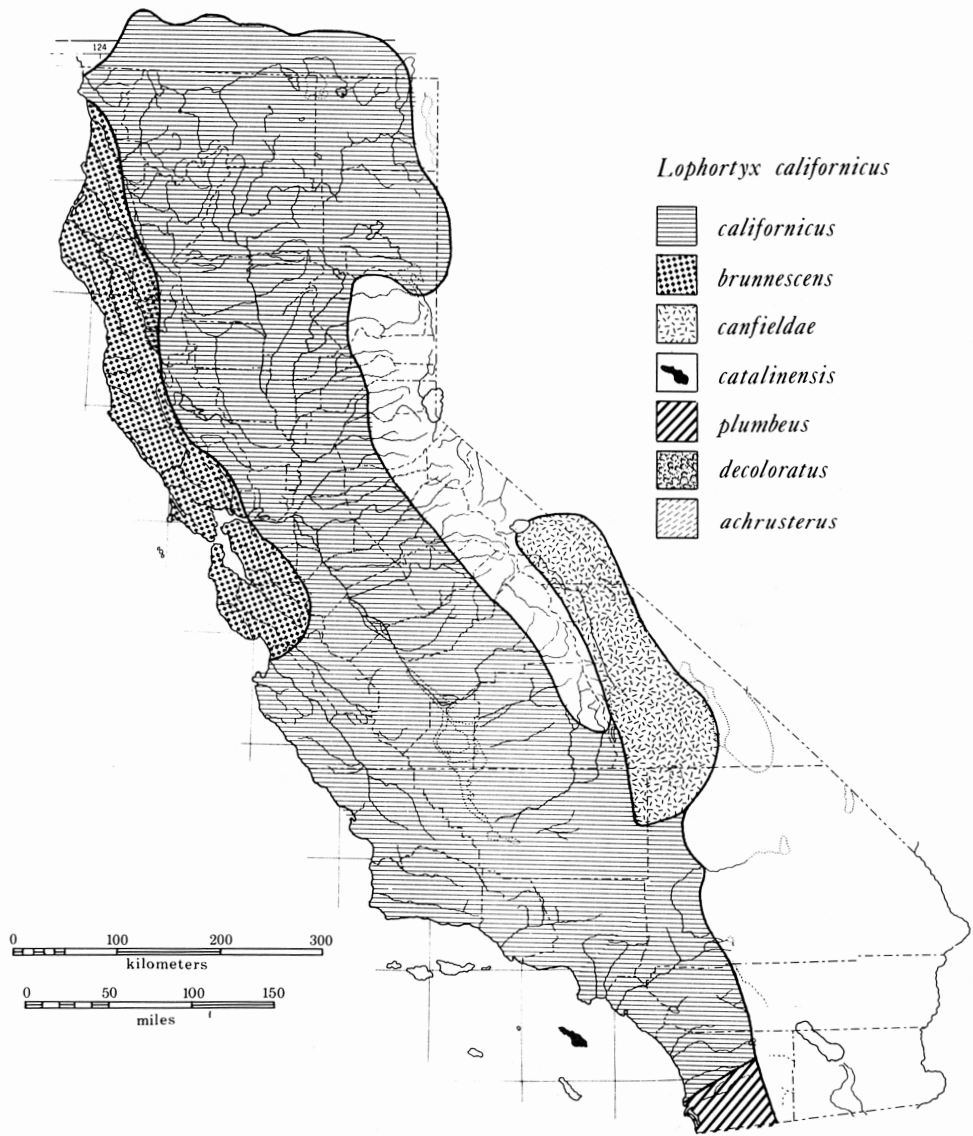
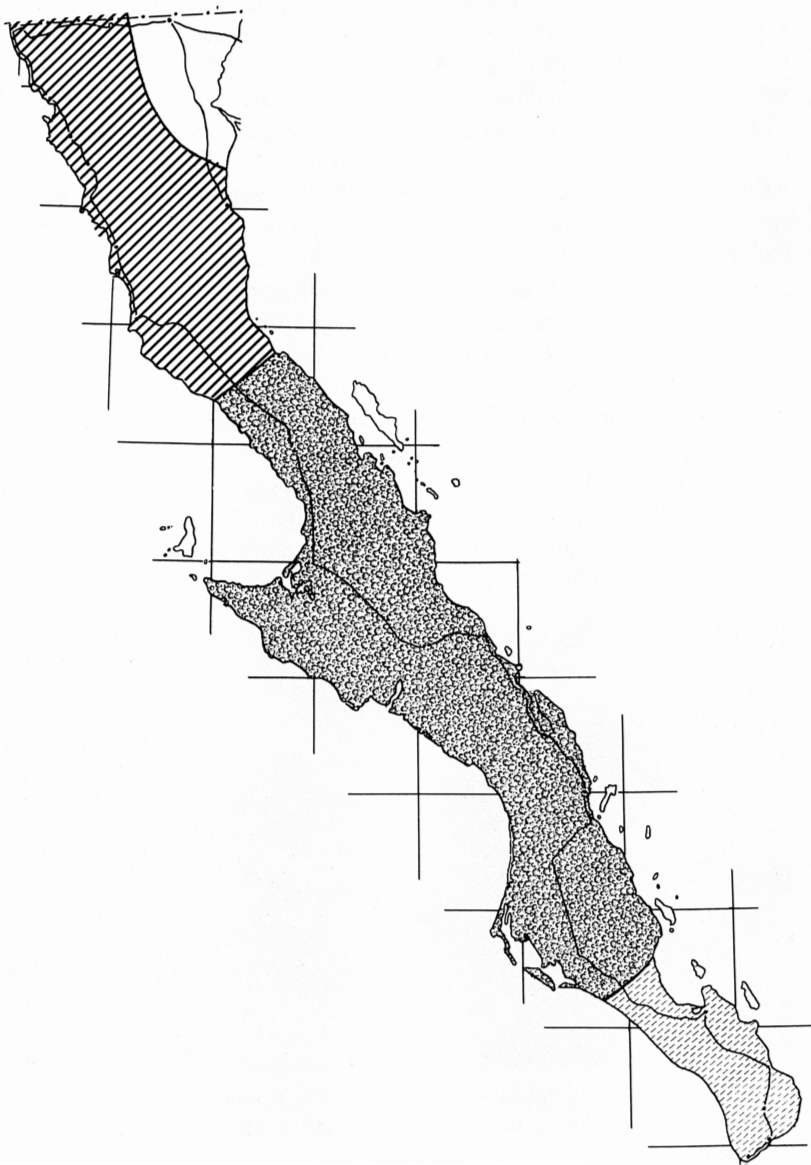


Figure 4. Original distribution of the subspecies of California Quail.



Farm was located. Likewise, wild-trapped native birds would be of more or less local genetic strains. The possibility of mixing non-adaptive genetic strains was greatest with the imported Mexican stocks.

True (1934) gives a fascinating account of the beginnings of the Mexican importation program (mentioned further in Chapter 3). In the autumn of 1933, the California Department of Fish and Game approached the Mexican Department of Agriculture for permission to import wild-trapped California Quail. By December of that year, a permit had been arranged to export from Mexico 100,000 quail, and the first truckload of birds cleared the border on December 23, 1933. That winter, 8,297 live birds were imported, and, after a recovery period at Los Serranos Game Farm, 7,517 were released in the wild, while 780 were held as game farm breeding stock. The point of origin of this population was near the village of San Telmo, Baja California, about 200 miles below the international border. The subspecies of quail in that area is *Lophortyx californicus plumbeus*, the San Quintín California Quail. Here, then, we have evidence of a non-native genetic strain being liberated in southern California and additionally being propagated on the game farms for subsequent liberation.

What was the effect of this genetic mixing? Was the experiment in importation considered a success or failure? Unfortunately the history of this era in California's quail management program is obscure. Liberations from the game farm and from Mexican imports continued for a few years, but the number of birds liberated declined during the interval from 1936 to 1940 and apparently ceased some time thereafter. Richardson (1941) summarizes 791 band returns from some 65,000 quail banded and released in a nine-year period terminating in 1940. He does not draw any general con-

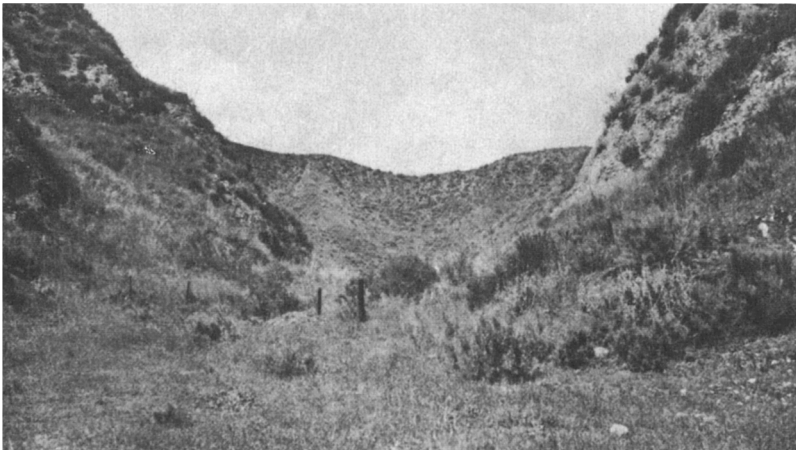


Figure 5. Typical quail habitat on Newhall Ranch, Ventura County. Cover grows on the background slopes, food on the more level terrace in the foreground. P. McBean photo.

clusions about the success of the quail restocking program, but it is significant perhaps that the endeavor was soon abandoned.

Whatever genetic maladaptations may have arisen from release of Mexican quail in California would have been quickly eliminated by natural selection favoring the adapted strain of the native stock. Presumably the Mexican quail crossed freely with the local birds, producing after a few generations an assortment of hybrids grading in characters from one parent stock to the other. Such a heterozygous population, exposed to the selective forces of the California environment, would in time surely revert toward the characteristics of the native race. Any ill effects of genetic mixings, therefore, can be viewed as temporary.

EXTENSION OF THE CALIFORNIA QUAIL RANGE THROUGH TRANSPLANTS

The California Quail has been successfully introduced to many areas where it was not native. Most notable is the extension of range in the Great Basin area, east and north of the ancestral range. As can be seen in Figure 2, the species now lives successfully in a very extensive area in Washington, Oregon, western Nevada, western Idaho, and in scattered localities in British Columbia, Utah, and eastern Nevada.

Transplants of California Quail to sites in the Great Basin were initiated at a surprisingly early date. The history in Nevada is elucidated by two newspaper accounts called to my attention by Bill Rollins of the Nevada Department of Fish and Game. The first of these appeared in the Carson City *Daily Appeal* on June 24, 1865:

QUAIL.—We were out in the hills about five miles from here, yesterday, and while riding over a wood-cutter's road in a little ravine that divides the bluffs west of the Mound house, scared up a hen quail and a dozen or more young ones, quite big enough to scamper away and hide in the sagebrush. These are the first quail we have known of in these parts. It is to be hoped that these birds may be suffered to escape the sportsman's gun. Indeed, they will escape from any *sportsman*, for all who are worthy of that title know and respect that section of the game laws of this State which protects quail and provides a penalty for persons found guilty of killing them. Where this solitary bird came from is a matter of conjecture. We believe it is decided by those who ought to know, that the quail is not indigenous to this part of the State. It is probable that the one we saw yesterday is an estray from somebody's cage. We are afraid that Madame Quail will find this a hard country to raise a family in.

An explanation for this occurrence is found in a second news release printed in the *Gold Hill Daily News* of Virginia City, May 4, 1878:

California Quail are becoming plentiful in several valleys in the western part of Nevada. The first of these birds were introduced into this portion of the country in 1862. On the 17th day of May of that year Lance Nightingale and Robert E. Lowery turned loose 22 California quail at Sol Giller's ranch, 4 miles east of Huffaker's