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21 Mountain Quail

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Mountain Quail

Oreortyx pictus (Douglas) 1829

OTHER VERNACULAR NAMES

CODORNIZ de Montana, mountain partridge, painted quail, plumed quail, San Pedro quail.

RANGE

Resident in the western United States from southern Washington and southwestern Idaho east to Nevada and south to Baja California. Also introduced in western Washington and western British Columbia (Vancouver Island). Introduced but of uncertain status in western Colorado.

SUBSPECIES (*ex A.O.U. Check-list*)

O. p. pictus (Douglas): Sierra mountain quail. Resident in mountain regions of extreme western Nevada west to the west side of the Cascade Range in southern Washington and south to the Sierra Nevada and inner Coast ranges of California.

O. p. palmeri Oberholser: Coast mountain quail. Resident from southwestern Washington south through western Oregon to northwestern San

Luis Obispo County, California. Also in southern Vancouver Island, British Columbia.

O. p. confinis Anthony: San Pedro mountain quail. Resident in lower California in the Sierra Juarez and Sierra San Pedro Martir.

O. p. eremophila van Rossem: Desert mountain quail. Resident in the mountains of southern and west central California in the Sierra Nevada south to the Baja California boundary and somewhat beyond and in extreme southwestern Nevada.

O. p. russelli Miller: Pallid mountain quail. Resident in the Little San Bernadino Mountains in Riverside and San Bernadino counties, California.

MEASUREMENTS

Folded wing: Adults, both sexes, 125–40 mm (males average 2 mm longer than females).

Tail: Adults, both sexes, 69–92 mm (males average 4 mm longer than females).

IDENTIFICATION

Adults, 10.6–11.5 inches long. The sexes are very similar in appearance. This relatively large western quail differs from all others in that both sexes have straight, narrow, and blackish crests composed of only two feathers, which appear with the juvenal plumage. The throat is chestnut, edged with black, and this is separated from the slate gray chest, neck, and head by a white line. Otherwise the birds are plain olive gray on the back, wings, and tail. The flanks are a rich, dark brown, with conspicuous vertically oriented black and white bars.

FIELD MARKS

The slender plumes and boldly patterned flanks will serve to identify mountain quail without difficulty. The California quail may occur in the same areas but has a shorter, curved crest of “teardrop” shape and dull brown flanks that are narrowly streaked with white. A loud, clear, whistled *quee-ark* or *plu-ark* is the advertising call of the male during spring.

AGE AND SEX CRITERIA

Females have slightly shorter plumes than males (average of twelve is

58 mm with a maximum of 66 mm, as compared to a minimum of 66 mm and an average of 72 mm for twelve males) which are also browner. Ormiston (1966) reported that nine adult females averaged 62.1 mm and ten males averaged 85.3 mm in crest length, but he did not find this difference statistically significant. McLean (1930) reported that in addition to having a longer crest, the male is more brightly colored beneath and the gray of the hind-neck is more sharply defined than is that of the female. Schlottbauer (1967) likewise noted that in females the brown back color extends to the top of the head, while in males the back of the neck is grayish blue. F. E. Strange* believes that the neck color is the most reliable criterion but has limited use with dark coastal birds.

Immatures have buff-tipped greater upper primary coverts, as compared with the uniformly gray coverts in adults (van Rossem, 1925). The two outer primaries are more pointed and frayed than the inner ones.

Juveniles have dull fuscous crest feathers (under 60 mm) of which the terminal third is banded with tawny drab (Ridgway and Friedmann, 1946) and have whitish chins surrounded by dark gray throats.

Downy young (illustrated in color plate 110) of this species are quite distinct from *Callipepla* downies and approach *Colinus* in some respects. Besides being slightly larger than any of these, mountain quail downies exhibit more whitish tones, especially on the sides of the head and body, and particularly just below the chestnut crown. The black-bordered chestnut color is also present on the back as a middorsal stripe, which in *Callipepla* is a pale buff or dull mummy brown. A second blackish stripe, separated from the middorsal stripe by a white line, occurs above the legs, and black is also evident on the upper neck region. There is a large blackish mark extending from the rear of the eye to the ear region, where it expands considerably in size.

DISTRIBUTION AND HABITAT

The mountain quail is perhaps the most temperate-adapted of any species, inasmuch as it is the only United States quail species that barely extends its range into Mexico, and thus is limited to the extreme northern part of the Baja peninsula. Like the montane tree quails, it is larger than the species of the arid lowlands, although it does not quite reach the body size of *Dendrortyx*. Nevertheless, it occupies a comparable climatic zone, being found in dense brush, in coniferous forests, around the edges of mountain

*F. E. Strange, 1970: personal communication.



FIGURE 35. Current distributions of the mountain quail (shaded) and barred quail (hatched).

meadows, and sometimes on fairly high crests (Leopold, 1959). During the breeding season the vertical distribution of *pictus* and *eremophila* in California is from about 1,500 or 2,000 feet to 9,500 or 10,000 feet, although the coastal form *palmeri* occurs only up to 5,600 feet (Grinnell and Miller, 1944). The habitats of these three subspecies in California include brushy mountainsides, particularly those covered with chaparral vegetation, such as manzanita, snowbush, chinquapin, and similar broad-leaved hardwoods. Coniferous forest edges, open forests, or forests disturbed by logging or fires provide additional habitat for this species. The desert mountain quail extends its breeding range into sage, piñon and juniper vegetation where water is available locally (Grinnell and Miller, 1944), and the vertical range of mountain quail in the Sierra Nevadas extends lower on desert-facing slopes than on moister ones (Sumner and Dixon, 1953). Sumner and Dixon indicate that brushy areas of California black oak (*Quercus kelloggii*) and ponderosa pine (*Pinus ponderosa*) are favored breeding habitats, while the lower blue oak (*Q. douglasii*) zone is used in winter. McLean (1930) stated that the Sierra form of mountain quail is most often associated with white-leaved and mariposa manzanita (*Arctostaphylos vicida* and *A. mariposa*), often dropping down in winter to the chamise or greasewood (*Adenostoma fasciculatum*) zone. However, the coastal form is generally found in the dense undergrowth of the redwood (*Sequoia sempervirens*) belt.

In Washington, where the species was introduced in the late 1800s (apparently primarily from *palmeri* stock), it inhabits brushy burns and clearings, brushy canyon thickets, and areas near farms and woodland borders (Jewett et al., 1953). In Oregon the coastal race *palmeri* likewise inhabits cutover lands and edges of clearings in the humid forest zone, while the interior race *picta* is found in more open country (Gabrielson and Jewett, 1940).

The species was introduced into British Columbia in the 1870s and 1880s and currently persists only on Vancouver Island, where it is sometimes fairly common (Guiguet, 1955). In western Idaho the mountain quail may or may not be native, but it occurs along the lower parts of several river systems, including the Snake, Boise, Clearwater, and Salmon (Ormiston, 1966). It also occurs sparsely in the northern and western parts of Nevada (Gullion and Christensen, 1957), possibly also representing introduced stock. Beginning in 1965, a series of releases of mountain quail were made at the western edge of the Uncompahgre Plateau, Mesa County, Colorado (Colorado Outdoors, 15[6]:1, 1969). Subsequent sightings of the birds have indicated considerable survival, and a possible establishment of the species has been attained.

POPULATION DENSITY

Few estimates of population densities of mountain quail have been made. Edminster (1954) cited California research indicating an early spring density of one bird per three acres following a winter of high survival, and near water densities of up to one bird per two acres occurred.

In the fall, in areas where the average covey size is relatively high (eleven birds), the late summer and fall density of birds may reach one bird per five acres (*P. R. Quarterly*, April, 1950, p. 136).

HABITAT REQUIREMENTS

Winter habitat of the mountain quail typically consists of mixed brush and herbs, with the brushy species including such plants as chamise, Fremont silk-tassel, manzanita, scrub oaks, and other species (Edminster, 1954). Edminster judged that snow cover was not usually important in winter survival, since the bird can use shrubs and trees for sources of food when herbaceous vegetation is covered. Snow may, however, be important in the northern parts of the range or set an upper altitudinal limit for winter survival in mountainous country. In a winter of unusually cold weather and heavy snowfall, no noticeable decrease in wintering quail was seen in two California study areas (*P. R. Quarterly*, July, 1949, p. 307).

In spring, the birds return to their breeding habitats and seek out suitable nesting areas. Edminster (1954) indicated that the birds prefer moderately open brush and tree cover on slopes. Woody cover shading from one-quarter to one-half of the ground was regarded as being best for nesting and roosting. Where the mountain quail nests in desert habitats, it is often associated with such woody plants as juniper (*Juniperus*), thornbush (*Lycium*), black brush (*Coleogyne*), and desert apricot (*Prunus*), and cover apparently is not a limiting factor (*P. R. Quarterly*, October, 1948, p. 408). Hillsides of at least a twenty-degree slope are used by birds to escape by running uphill, and such slopes serve purposes similar to that provided by plant cover. In desert areas the availability and distribution of water is probably important; the birds are apparently restricted to remaining no more than a mile from water (*P. R. Quarterly*, January, 1948, p. 11).

Nesting cover in various parts of the California range varies greatly as to plant species, but most such cover contains large shrubs, trees, or both, usually in dense growth formation. Mixtures of trees and shrubs may be more valuable than either alone, perhaps because of decreased density in the shrub layer. Small trees are more useful than are large ones for roosting, and the mast from trees such as ponderosa pine, firs, and oaks provides

important food. Roads in unusually dense cover may provide useful clearings where dusting may occur and young birds can dry out and warm up early in the morning (*P. R. Quarterly*, October, 1949, p. 459). Nesting range may possibly be selected on the basis of abundant green plant food, which may occur on flatlands adjacent to wooded hills (*P. R. Quarterly*, October, 1948, p. 408).

In the central Sierra Nevadas, nesting occurs both in the foothill chaparral belt and also at high elevations near timberline. The foothill nesting population is composed of a sedentary population, whereas the timberline nesting population moves upward every year from the foothills through a heavily vegetated forest zone where few quail nest. These birds nesting in higher elevations evidently are much more dependent on available free water than are the foothill nesters; their nests are usually no more than a few hundred yards from it, and they frequently visit watering places. However, the foothill residents may nest more than a mile from water and not visit watering places until after the young are hatched (*P. R. Quarterly*, October, 1949, p. 459).

Since chicks require water soon after hatching, its availability is an important aspect of brooding cover. Insects and succulent green vegetation are also likely to be abundant near water, as well as shady cover and safe roosting places. Miller and Stebbins (1964) never found adults more than a mile, or young more than half a mile, from water in the Joshua Tree National Monument, and usually they were much closer. They also knew of no nesting success except near springs. Edminster (1954) judged that few broods were raised more than a quarter mile from a source of water. Ormiston (1966) likewise considered that free water was an essential part of mountain quail habitat in Idaho.

Fall habitat needs of the mountain quail include suitable food sources. Edminster (1954) noted that oak-pine stands provide important mast sources, on which the birds feed until the weather forces them to lower elevations. In the western Sierra Nevada range the birds were found in stands of ponderosa pine, California black oak, and mountain misery (*Chamaebatia*) during September, and in early October they were seen in a variety of associations of mixed conifers, oak, and chaparral species where water was commonly present (*P. R. Quarterly*, April, 1950, p. 136).

FOOD AND FORAGING BEHAVIOR

Most of the limited data on mountain quail foods comes from fall collections, such as the analysis by Yocom and Harris (1952). Of thirty-three quail they studied in Washington, smooth sumac (*Rhus*) fruits and seeds

comprised nearly a quarter of the diet. Other important sources of fruit food include hackberry (*Celtis*), serviceberry (*Amelanchier*), grape (*Vitis*), gooseberry (*Ribes*), manzanitas, nightshade (*Solanum*), elder (*Sambucus*), Christmasberry (*Photinia*) and snowberry (*Symphoricarpos*). Seeds of trees including those of various pines, Douglas fir (*Pseudotsuga*), and black locust (*Robinia*) are used, as well as acorns, and a host of legume and other weed seeds are also eaten (Edminster, 1954). Tubers and roots are also used to some extent for fall foods and may comprise about 10 percent of the early fall diet but are not eaten much at other times of the year.

Winter foods of the mountain quail consist of acorns and seeds of a diverse array (Martin, Zim, and Nelson, 1951). In addition to acorn meats, pine seeds and greens may also be taken in fall and winter (*P. R. Quarterly*, April, 1948, p. 165).

As greens become available in late winter and spring, they are heavily utilized and may make up from 25 to 40 percent of their diet. Leaves and, later on, buds and flowers are used through the summer, and collectively comprise about a quarter of the annual diet. The yearly average of food from animal sources is only about 3 to 5 percent, with fruit, mast, and seeds making up most of the remainder of the total food intake (Edminster, 1954).

Judd (1905a) provided an analysis of foods from the crops of twenty-three mountain quail collected in California, of which only 3 percent by volume came from animal sources. Grain comprised 18 percent, seeds of legumes, weeds, and grasses totaled 47 percent, fruit comprised 8 percent, and miscellaneous vegetation made up the remaining 24 percent.

The most complete study on mountain quail foods so far available is that of Ormiston (1966), which was based on forty-eight adult samples collected from spring to fall, and twelve samples from young birds. During spring, two early-maturing annual herbs, chickweed (*Holosteum*) and microsteris (*Microsteris*), were the most important foods, with the birds consuming the developing seed heads. Chickweed and blue-eyed Mary (*Collinsia*) seed heads were found in May samples, and barley (*Hordeum*) occurred in large quantities in one May sample. Underground bulblets of fringe cup (*Lithophragma*) were found in May samples and evidently became increasingly important in late summer and early fall, when they made up nearly half of the sample volumes. Seeds of grasses, hawthorn (*Crataegus*), pines, and sweet clover (*Melilotus*) were also important fall food sources. Large weedy species such as thistles (*Cirsium*), ragweed (*Ambrosia*), and teasel (*Dipsacus*) provided important fall seed sources as well.

Foods of young mountain quail collected by Ormiston contained only

7.5 percent animal matter, and Lahnum (1944) reported that 20 percent of the food contents of ten young quail was of insect origin, so it would seem that a surprisingly small amount of the food taken by young quail is of animal matter. Flower heads of chickweed and miner's lettuce (*Claytonia*) were the major foods of chicks under a week old, while older chicks began to consume fringecup bulblets, and seeds of miner's lettuce and various woody plant species. By the time the chicks were eight weeks old they fed largely on the dry seeds of various herbaceous species and also continued to feed on fringecup.

By fall, with the ripening of the acorn crop in California, the birds once again begin to concentrate on it. Miller and Stebbins (1964) described how unripe acorns are shelled by the mountain quail. At the green base, where the shell is still soft, the bird opens a hole and tears or cuts away enough of the rest of the covering to extract the meat. Quite possibly the birds pull such green acorns from the trees before they would normally fall to the ground.

MOBILITY AND MOVEMENTS

The unique vertical migration of the mountain quail is no doubt a reflection of the fact that it breeds at higher elevations and in an associated cooler climate than do any of the other North American quail species found in the United States. The migrational movements are fairly leisurely and are normally undertaken on foot, although the birds will sometimes fly across canyons (Leopold, 1959). In the west Sierra Nevada slope the total migratory movement may be twenty miles or more (*P. R. Quarterly*, January, 1951, p. 9).

While in the wintering habitat, daily movements are not great; one study indicated that the maximum was about one thousand yards per day, and the minimum about four hundred yards, as the birds moved from roosting and loafing areas under scrub oaks to forage in low brush (*P. R. Quarterly*, January, 1948, p. 11).

By late February, movement back to the breeding areas begins, with the coveys remaining intact until the nesting range is reached. At this time the males become intolerant of one another, and dispersion of pairs occurs.

Ormiston (1966) found that during the summer daily movements were limited and did not exceed half a mile unless the birds were disturbed. In his study area in Idaho he found little evidence of major seasonal movements, with marked birds remaining within a one-square-mile area at all seasons. The longest move recorded for any marked individual was about one mile, including a 700-foot movement upslope. Sumner and Dixon

(1953) observed surprisingly long flights of about half a mile by disturbed birds, while Miller and Stebbins (1964) saw a bird fly 150 yards upslope at a twenty-five-degree angle.

There is little movement in the summer during brood-rearing; Ormiston (1966) noted that when birds were young, coveys remained in a two- or three-acre area for several days at a time. However, there is a movement toward areas of available water. In late July of 1947 a concentration of several thousand mountain quail occurred at Jackass Spring, Panamint Mountains, Inyo County, California. A similar but smaller concentration occurred at various springs in Joshua Tree National Monument the same month, with a minimum of 730 birds at twelve watering points, or an average of 60.8 birds per spring. When a small amount of rain fell in August, the birds immediately left the springs and were found later two or three miles from water, feeding on new plant growth produced by the rain. Banded birds were seen from one to five miles away from the point of banding during August and September (*P. R. Quarterly*, January, 1948, p. 11). In succeeding years, birds may return to the same water hole. Of seventeen banded birds observed at watering holes a year after banding, most were at the same water hole and none was more than a mile away from the point of banding. Only about 10 percent of the birds banded one summer were seen the following one (*P. R. Quarterly*, October, 1948, p. 408).

Mountain quail probably need to visit water sources only once a day and can hold up to 12 cc of water in their crops (*P. R. Quarterly*, January, 1948, p. 11). In the Jackass Spring area such watering usually occurred after 10:00 A.M., and most usage was near noon. However, in other areas, the birds were seen to come in at all hours of the day but especially during early morning. Ormiston (1966) noted that coveys were usually found near streams between 8:00 and 10:00 A.M., and after they finished drinking they fed, dusted, and finally moved to heavy cover to spend the hottest part of the day. A second period of feeding occurred from late afternoon until just before dark, when the birds went to roost in heavy cover, probably on the ground.

Miller and Stebbins (1964) reported a similar late afternoon visit to water holes during late summer. The birds would arrive on foot in coveys of six to twenty, walking single file, and approach the spring with great caution. When frightened the birds invariably move uphill and prefer to run rather than to fly unless the cover is unusually open.

In the Sierras the movement back down the mountains toward the winter habitat starts in late August or early September, and by the first of October the birds are usually gone from elevations above five-thousand feet, regardless of the weather conditions that may be prevailing (Bent, 1932).

SOCIAL AND REPRODUCTIVE BEHAVIOR

As in all New World quail, the covey forms the basis for the social group for nearly the entire year. Except where drought conditions cause groupings, most coveys are probably basically family groups. In the Sierra Nevada, covey size has been reported to average 7 birds, and in the San Gabriel Mountains 5 birds represented an average covey size (*P. R. Quarterly*, April, 1950, p. 136). The average of twenty-one coveys from late summer through winter at Joshua Tree National Monument was 9.1 birds and ranged from 3 to 20 (Miller and Stebbins, 1964). Coveys consisting of family groups would be expected to average a pair and up to perhaps as many as 10 young, probably averaging about 5 in well-grown broods, assuming a 50 percent brooding loss. Unsuccessful adults probably join such family groups, thus increasing their numbers. In unusually dry years, little or no nesting occurs, and at such times fairly large coveys consisting entirely of adults may be seen in early summer (Leopold, 1959).

In California the mating season begins in March at low elevations or early April higher in the mountains, and mate selection occurs while the birds are still in coveys (McLean, 1930). The onset of mating may be recognized by the location call of unmated males, which is usually uttered from a prominent stump, rock, or branch in a break in the woody cover. This call, a clear whistle that drops slightly in pitch toward the end, and sounds like *quee-ark*, *kyork*, *queerk* or *plu-ark*, can sometimes be heard for three-quarters of a mile (McLean, 1930). Grinnell and Storer (1924) indicate an average interval between calls of about 6 or 7 seconds, and a recorded series in the Cornell University Laboratory of Ornithology's Library of Natural Sounds averaged 8.5 seconds apart over a 6.7-minute period. The head is quickly thrust upward and thrown back and the crest suddenly erected as each call is uttered. Although the call, or a whistled imitation of it, may stimulate other males to respond (Dawson, 1923), it should not be regarded as a territorial proclamation signal. Rather, as in the other quails, it simply represents the announcement of the location of an unmated male, to which available females might be attracted.

As in the other quail, pair formation is probably a fairly simple process, but it has not been described adequately and I have not personally observed it. The strong similarity in the sexes would suggest that sexual recognition in this species may be more difficult than in the genera *Callipepla* or *Colinus*, and one might expect that initial male responses to females would be largely aggressive. The striking flank markings would suggest that lateral displays are important visual signals, and a male hybrid mountain × California quail in my collection has a strongly developed frontal display (without wing-spreading) that exhibits the throat markings very well.

In one California study, male crowing was first heard on February 20, and the first pair seen February 26. By March 6, a total of seven pairs had been located, but some coveys were still present. These all broke up by the end of March (*P. R. Quarterly*, July, 1949, p. 307). As males become antagonistic toward one another, the population spreads out, with a nesting pair occupying from five to fifty acres (*P. R. Quarterly*, January, 1950, p. 10). In the Joshua Tree area, April is the period of nesting (Miller and Stebbins, 1964), with a probable average hatching date in 1948 of May 7 (*P. R. Quarterly*, October, 1948, p. 408). However, in the central Sierras, nesting is from mid-June to mid-July (*P. R. Quarterly*, January, 1948, p. 10). The average clutch size of eleven nests was 10 eggs in one study in the Sierras (*P. R. Quarterly*, January, 1948, p. 10). Grinnell, Bryant, and Storer (1918) summarized literature references on clutch sizes of this species and added their own observations. If two clutches of 19 and 22 eggs are excluded as being the probable result of two females, the average clutch size for twenty-nine clutches would be 8.7 eggs. A few of the smaller clutch records were probably of incomplete clutches, thus 9 to 10 eggs would seem to be a typical clutch size for mountain quail.

Nests are usually well concealed, often being placed under fallen pine branches, amid weeds or shrubs at the base of large trees, beside large rocks in the shade of shrubs, or in masses of shrubby vegetation (Bent, 1932). Nests are usually located near paths or roads and are probably always within a few hundred yards of water. The incubation period is twenty-four to twenty-five days.* The male takes an active role in nest and brood defense and will perform distraction displays such as injury feigning (Bendire, 1892). Males also regularly exhibit brood patches (Miller and Stebbins, 1964), indicating that they might assist with incubation, particularly if the female should be killed. One California study indicated that most broods were led by a single adult, which might be of either sex (*P. R. Quarterly*, October, 1948, p. 408), but broods tended by both adults averaged larger than those with only one present.

So far, there is no evidence that two broods are ever normally raised in mountain quail, although unsuccessful pairs will often make a second or even third attempt to nest (Leopold, 1959). One California study indicated that eight of fourteen nests under observation were successful, and the hatching success of the eggs in successful nests was 95.8 percent (*P. R. Quarterly*, January, 1948, p. 10).

Vocal Signals

The unmated male announcement call is undoubtedly the best-known

*F. Strange, 1970: personal communication.

of the mountain quail vocalizations. Miller and Stebbins (1964) noted that the male's whistled call may also occasionally be heard in October from birds in flocks, which might be a reflection of a fall resurgence of sexual activity. An important covey-maintenance call is the assembly or rally call, used to reunite separated birds. This is a loud *cle-cle-cle* or *kow-kow-kow* series of notes (Miller and Stebbins, 1964; McLean, 1930), which are quite distinctly different from the brief assembly calls of *Callipepla* or *Colinus* and more closely approach the repeated call notes of *Philortyx*. The alarm note is a *scree* (Miller and Stebbins, 1964), or a shrill *t-t-t-r-r-r-rt* (Haskin, in Bent, 1932), rapidly delivered in a sharp crescendo and accented like a barnyard fowl's cackle.

A variety of other calls have been described as associated with enemy avoidance. The male is said to utter a shrill *quaih-quaih* while performing distraction displays (Bendire, 1892). The call of the female with young that stimulates them to "freeze" is a nasal *kee'-err* and a hen-like *kut, kut, kut*, while a low *whew, whew, whew* is uttered as they rush for cover (Hoffman, 1927). The hand-held distress call of both sexes is a loud, repeated *psieuw*.

EVOLUTIONARY RELATIONSHIPS

Holman (1961) regarded the scaled quail as the nearest relative of the mountain quail, with somewhat lesser affinities to the other crested quails ("*Lophortyx*") and to the bobwhites. Certainly the occurrence of wild hybrids between the mountain and California quail would suggest a moderately close relationship between these two species, but I would suggest that *Oreortyx* was derived from a pre-*Callipepla* type prior to the separation of gene pools into the currently extant species. It would seem likely that *Oreortyx* developed in the mountains of southwestern North America in a semiarid woodland or chapparal habitat after being isolated from stock adapted to more arid habitat such as that of the Gambel quail. Apparently the mountain quail had a considerably more widespread distribution in pre-Columbian times, since its remains have been found in cave deposits of New Mexico (Howard and Miller, 1933).