

## SOME OBSERVATIONS ON HORNED OWL NESTS

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In the spring of 1939, several nests of the Horned Owl (*Bubo virginianus*) were observed by the writer on the San Joaquin Experimental Range, Madera County, California. This locality, in the low rolling foothills of the Sierra Nevada, is sparsely wooded with digger pine, blue oak, and interior live oak. Over most of the area rodents are not subjected to control by man, and their abundance probably constitutes a circumstance favorable to the occurrence of horned owls.

In October, 1938, a horned owl census was attempted. On an area of 1920 acres, 20 owls (6.6 per square mile) were counted as their presence was revealed by their hooting to observers walking along parallel courses one-quarter of a mile apart; the time and approximate location of each owl heard was recorded. It seemed probable that the owl population exceeded the number heard hooting, as several were seen which did not call during the time the count was being made. On April 4, 1939, a count of 25 was obtained on this same area, and on November 27, 1939, 24 were counted.

Varied types of nesting sites were chosen by the several pairs of owls observed. One was the hollow in the dead and enlarged portion of the trunk at the top of a growing blue oak. No nesting material had been gathered; the eggs were lying in a slight depression in the loose mass of dry woodrat feces which had accumulated there. One side of the hollow trunk had rotted away down to the level of the nest floor, so that an owl could be seen from the ground as it sat on the nest.

Another nest was a large mass of heavy sticks, possibly gathered in part by the owls themselves. It was in an extremely exposed and conspicuous situation in the crotch of a broken-off pine snag, about 25 feet above the ground. Three other occupied nests were high in live pine trees; each was in a crotch against the main trunk. These nests were loose platforms of twigs. A sixth nest was in a live oak in the close-set twiggy branches near the peripheral foliage, which effectively sheltered it from above. This latter nest originally may have been that of a woodrat which later had been appropriated by the owls.

A nest found on March 28, 1938, on a large horizontal branch of a pine, about ten feet out from the main trunk, in an exposed situation, contained half-grown young. A pair of owls had been observed using this same nesting site in 1937.

In 1939, the first nest was found on March 7, and it then contained two eggs. On March 30, the young were newly hatched. On each of the next two nights, prey was brought by the parents and the young grew noticeably. On the morning of April 2, both young were dead, evidently as the result of a sudden cold rain during the night, which had soaked and chilled them while the mother was away from the nest. On the night of April 4, one of the parent birds was heard hooting and clucking at a point near the nest tree. On April 6, it was found that new items of prey had been brought to the nest since the death of the young. In another nest, on March 8, the female was incubating two eggs. On March 25, the young had hatched and prey was lying beside them. Six visits were made by the observer while the young were in this nest, and on three of these occasions there was fresh prey. On April 16, the young appeared to be nearly ready to leave the nest.

A nest first investigated on April 1, had two eggs on that date. On April 16, the young had hatched and appeared to be several days old. On April 20, one young had disappeared and no trace of it could be found. Evidently it had been taken by some predator. On April 29, the other half-grown young had likewise disappeared and the

nest seemed to be deserted. While no clue as to the identity of the nest robber was left in either instance, the red-tailed hawk seemed the most probable culprit among the bird and mammal predators occurring locally.

Another nest already contained half-grown young on April 14, when it was found. Judged by their behavior, these young were nearly ready to leave the nest on May 5; they were not found there on subsequent visits. During the three week period elapsing between the discovery of the nest and the leaving of the young, the nest was visited on each of thirteen days, and on ten of these occasions it was found to contain prey totaling 19 items.

An adult owl was discovered sitting on another nest on March 8. On March 23, an observer climbed nearly to the nest before the adult flushed. Two eggs were still unhatched. On April 8, the female owl flushed from the nest when the observer had approached within twenty feet. It perched in a nearby tree. The male owl then appeared in another tree and the two gave low hoots at short intervals, answering each other; the male also snapped his bill. Both parents flew by the observer, passing within a few feet, and then perched only a few yards away, still snapping their bills and hooting. There were young in the nest, and they appeared to be at least a week old. They showed signs of distress when exposed to the sunlight after the mother flushed, and as she lit on the edge of the nest in returning, they crowded against her breast seeking shelter from the intense rays of sunlight. At the next visit, on April 12, the observer found the young were visible from the ground, and they seemed to stand high in the nest. The reason for this became apparent when the observer climbed to the edge of the nest; the bowl was filled with a pile of dead animals, in various stages of decomposition, all brought by the parents since the observer's previous visit four days before. They filled the nest bowl up to its rim with a soggy mass of decaying flesh. Swarms of flies were buzzing about. Large maggots partly filled the decomposing bodies and also carpeted the bottom of the nest; many had entangled themselves in the downy plumage of the nestlings. The nest contained remains of 16 mammals, including 10 woodrats (all adults), 3 adult kangaroo rats, 2 young cottontails, and 1 young ground squirrel. On April 13, both young owls were dead, evidently as a result of the unsanitary conditions created by the mass of decaying flesh in the nest. Ear infections present in both young owls, evidently had been caused by entry of maggots into the ear orifices.

Thus, of the five nests observed, three were failures from a different cause in each instance, namely, weather, predator, and unsanitary conditions created by uneaten prey. From the different nests a total of 67 prey items were recorded, distributed as follows: no. 1, 8 kangaroo rats, 1 cottontail; no. 2, 10 woodrats, 4 kangaroo rats, 3 cottontails, 3 ground squirrels, 1 gopher; no. 3, 4 woodrats, 2 kangaroo rats, 2 ground squirrels, 1 cottontail; no. 4, 4 cottontails, 3 ground squirrels, 1 kangaroo rat, 1 gopher; no. 5, 9 woodrats, 4 cottontails, 3 ground squirrels, 2 kangaroo rats, 1 gopher. Rodents and rabbits comprised all of the 67 items: 23 (34 per cent) were woodrats (nearly all of them adults), 17 (25 per cent) were kangaroo rats, 13 (19 per cent) were cottontails, 11 (16 per cent) were ground squirrels, 3 (5 per cent) were pocket gophers. Of these species, gophers were by far the most abundant on the areas where the nests were situated; kangaroo rats were also abundant; ground squirrels were considerably less numerous than either, with an average population of perhaps 2 or 3 per acre. Cottontails and woodrats were much less numerous than any of the other species, and their predominance among the prey items indicates definite selection on the part of the owls. It was noteworthy that in the course of these observations, no birds of any kind were brought to the nests by the owls. Quail were moderately abundant on the area with a population

estimated at about one per acre (Glading, Calif. Fish and Game, vol. 24, 1938, p. 319), but apparently these and other species of birds do not constitute an important part of the owls' diet in this area during the spring months. The absence of smaller rodent species among the recorded prey is also noteworthy. Three species of *Peromyscus* (*maniculatus*, *boylei*, *truei*) were all common, and two species of *Perognathus* (*californicus* and *inornatus*) also occur on the area. It seems likely that rodents of rat or squirrel size are a type of prey most easily obtained by the owls, and perhaps preferred by them. On the Experimental Range, where such prey was present in abundance, birds, smaller rodents and reptiles, although also abundant, seemed to be little used. The presence of several ground squirrels among the items recorded furnished evidence that diurnal foraging is a fairly common habit with these owls.

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