THE SPAN OF THE NESTING SEASON OF BIRDS IN BUTTE COUNTY, CALIFORNIA, IN RELATION TO THEIR FOOD

WITH ONE ILLUSTRATION

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During the years 1928 to 1930, the writer was actively engaged in collecting birds' eggs in the vicinity of Oroville, Butte County, California. Trips were made afield each week end, and on occasional afternoons during the week, from the first of February to the first week in June, for the sole purpose of locating nests with fresh eggs. The period each year from June 10 to September 1 was not spent in this locality, though occasional trips were made to this area during that period.

The section under consideration is situated at the eastern edge of the Sacramento Valley near the mouth of the Feather River Cañon; it includes also a small territory, ten miles to the northwest on the Oroville-Chico Highway, known as Dry Creek. Both the Upper Sonoran and the Lower Sonoran life-zones are represented, the former in the foothills to the east and the latter in the low semi-arid waste lands to the west. A small portion of the area, in which collecting and observing were done, is under cultivation, oranges and olives being the chief crop, but by far the larger part consisted of the willow-cottonwood habitat at Dry Creek, the ceanothus—digger pine—blue oak habitat in the foothills, the numerous valley oak habitats, the large areas of rolling, grassy terrain, and the cottonwood-sycamore habitat lining each bank of the Feather River.

The purpose of this study was twofold: (1) to show the range of season of the nesting activities of birds in this locality; and (2) to see if there is any correlation between the nesting season and the type of food generally consumed. To accomplish the latter the birds have been segregated into four groups. Only records of sets actually taken with fresh or slightly incubated eggs, and of sets inspected that were known to be in a similar condition, are included in this study. Thus, several species found in this area during their nesting season, but whose nests were never located, are excluded.

	No. of nests	First date	Last date	Average date
FLESH-EATING BIRDS				
California Great Blue Heron	31	February 17	March 24	March 12
Anthony Green Heron	1	May 6	.....	.....
Turkey Vulture	1	April 17	.....	.....
Cooper Hawk	4	April 8	April 30	April 15
Western Red-tail	2	March 31	April 16	.....
Barn Owl	7	March 25	April 20	April 9
California Screech Owl	7	March 8	May 9	April 15
Pacific Horned Owl	3	February 8	March 1	Feb. 18
Western Belted Kingfisher	1	May 31	.....	.....
OMNIVOROUS BIRDS				
Desert Sparrow Hawk	10	March 31	May 9	April 18
Road-runner	1	April 6	.....	.....
California Jay	5	March 31	April 26	April 15
Yellow-billed Magpie	31	March 31	May 9	April 15
Western Crow	25	April 9	May 3	April 24
California Shrike	2	April 6	April 15	.....
Bicolored Red-wing	10	April 20	May 6	April 28
Tricolored Red-wing	10	May 1	May 9	May 6
Brewer Blackbird	6	April 16	May 3	April 20
Nevada Cowbird	7	April 28	June 6	May 6

	No. of nests	First date	Last date	Average date
INSECT-EATING BIRDS				
Killdeer	4	March 3	May 6	April 16
Red-shafted Flicker	4	April 15	May 16	May 1
California Woodpecker	13	March 31	May 28	April 20
Nuttall Woodpecker	4	April 20	May 12	April 28
Arkansas Kingbird	6	May 9	May 24	May 15
Ash-throated Flycatcher	2	May 8	May 25	.....
Black Phoebe	9	April 1	May 1	April 10
Tree Swallow	2	May 28	June 3	.....
Bank Swallow	1	May 31	.....	.....
Barn Swallow	12	April 24	April 30	April 30
Northern Cliff Swallow	3	April 12	May 9	May 1
Plain Titmouse	10	March 30	May 12	April 8
Slender-billed Nuthatch	3	March 28	April 3	April 1
San Joaquin Bewick Wren	1	April 20	.....	.....
Western Robin	1	April 22	.....	.....
Western Bluebird	4	April 28	May 3	May 1
Western Gnatcatcher	6	April 28	May 21	May 6
California Bush-tit	15	April 1	May 1	April 12
California Yellow Warbler	2	May 30	June 6	.....
Western Meadowlark	9	March 30	May 12	April 18
Bullock Oriole	2	May 6	.....	.....
Black-headed Grosbeak	3	May 1	May 31	May 15
VEGETABLE AND SEED-EATING BIRDS				
Common Mallard	1	May 1	.....	.....
Wood Duck	1	April 30	.....	.....
Valley Quail	2	May 18	May 24	.....
Western Mourning Dove	2	May 21	May 22	.....
House Finch	9	April 16	May 9	April 28
Willow Goldfinch	10	April 28	June 16	May 6
Sacramento Spotted Towhee	1	May 1	.....	.....
Sacramento Brown Towhee	9	April 20	May 20	May 1
Western Lark Sparrow	15	April 24	May 21	May 1
Modesto Song Sparrow	1	May 1	.....	.....

The tabulations given above for the Nevada Cowbird are of eggs found in nests of other species: 5 in nests of Western Gnatcatcher; 1 in nest of Western Lark Sparrow, and 1 in nest of Bicolored Red-wing.

In all, 333 nests with fresh eggs were found, grouped as follows: Flesh-eaters, 57; omnivorous feeders, 107; insectivorous feeders, 118; vegetable- and seed-eaters, 51.

The nesting seasons of these four groups follow each other in the above order with the flesh-eaters showing the greatest span of period, from February 8 to May 31. (See fig. 29.) The omnivorous and insectivorous groups began active nesting after March 15, with the latter extending its period to June 6. It is of interest to note that the vegetable- and seed-eaters did not begin egg laying until the other groups had reached the composite peak of the season.

No doubt this sequence of the nesting seasons of the groups is, as a whole, dependent to a large extent not only upon climatic conditions, but upon the abundance of available food with which to rear the young. The climate in this region is such that approximately 89 per cent of the total precipitation of 28.33 inches (annual mean) falls during the months of November, December, January, February and March, which, plus a rather high mean temperature early in the calendar year (54.3° F. for March), insures an early growth of vegetation. Due to the high tempera-

tures of the summer months (80.2° F. for July) and the sparsity of rainfall (0.03 inches for July), the herbage is dead and seared from the middle of May to November, except in proximity of streams and irrigated regions. This combination of fac-

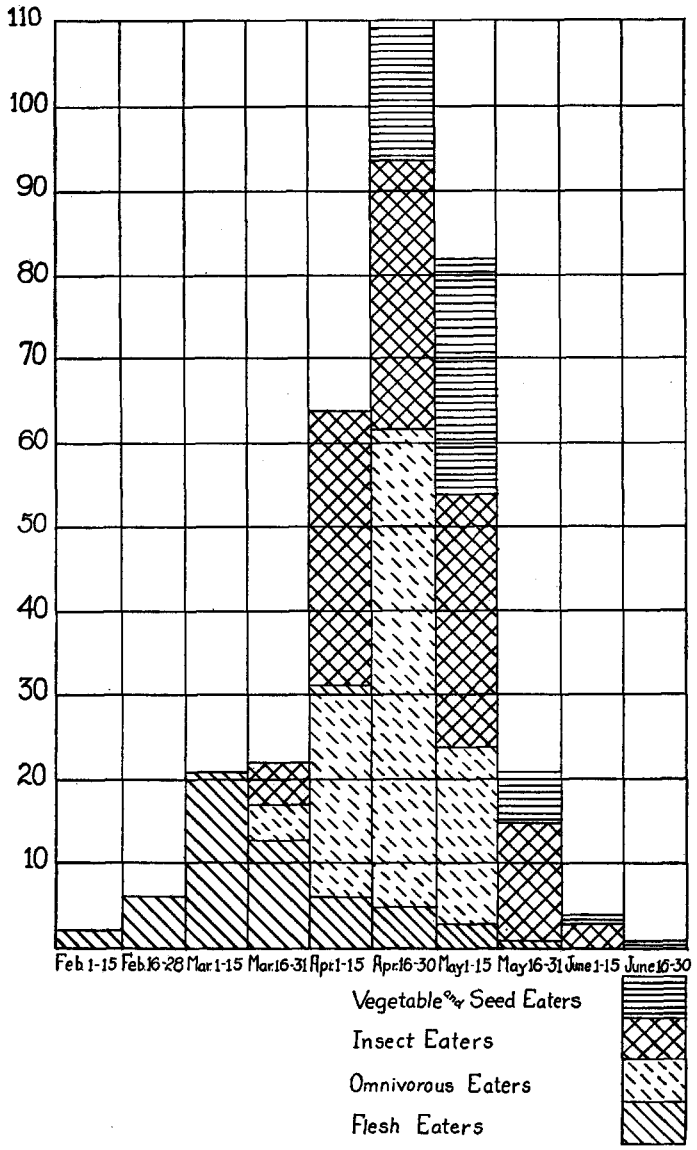

Fig. 29. COMPILATION OF THE NUMBER OF SETS OF FRESH EGGS OF BIRDS TAKEN OR OBSERVED DURING EACH TWO WEEKS PERIOD FROM FEBRUARY 1 TO JUNE 30, NEAR OROVILLE, BUTTE COUNTY, CALIFORNIA.

tors tends to shift the nesting season of the whole avifauna to the more temperate portion of the calendar year, namely, March, April and May.

Hibernating insects do not emerge in this locality in any considerable numbers, nor are caterpillars and other larvae abundant until the early part of April; and by

the middle of May there is an abundance of seeds available. The appearance of these elements, insects and seeds, tends to show a close correlation with the nesting activities of the birds for which they constitute the chief articles of diet. (See fig. 29.) The flesh-eaters are probably less dependent upon seasonal fluctuations of food supply than any of the other groups, for rodents and rabbits, as well as birds which occasionally form items of their diet, are available at all seasons. The rodents and rabbits are undoubtedly more easily captured in the earlier part of the season when herbage is short. This factor may account for some of the early nesting activities of this group, but one can not thus explain the following records: Western Red-tail, April 20; Cooper Hawk, April 30; California Screech Owl, May 9. These records are of fresh eggs. The fact that rodents and rabbits are more numerous later in the season, due to reproduction, and the fact that the young of these are more inclined to wander than the adults and are probably less alert, would, it seems to the writer, tend to counterbalance the effects of higher herbage and fully foliated shrubs in the foraging activities of this group of birds.

From the above, one can infer that there is a decided positive correlation between the nesting season of these birds, when taken as groups, and the type of food consumed. Of course there are numerous instances of overlapping of individuals in different groups, but one must talk in terms of averages when making such inferences.

CONCLUSIONS

1. The birds in the vicinity of Oroville, Butte County, California, begin nesting activities in February, reach their peak the last two weeks in April, and decline rapidly after May 15.

2. The flesh-eating birds, as a group, begin nesting first and have the longest span of nesting season; the vegetable- and seed-eating birds, as a group, begin nesting last and have the shortest span of season; the other two groups are intermediate.

3. The four groups follow one another in their nesting activities in an order that tends to indicate a positive correlation between the availability of food used for young birds and the time of nesting.

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