

However, so many mites are seen when a small amount of the dust from the bottom of a nest-box is examined under a microscope that an estimation of billions in each nest seems conservative. The mere emptying of the old nest-material does not get rid of these minute creatures, since they can find security by squeezing into the finest crevices. They are readily killed by kerosene or creosote. Dipping nest-boxes into such a germicide might prove advantageous, particularly when birds are likely to use the nest-box a second time in the same season.

No method of reducing the ectoparasite population of wild birds seems practical. Nevertheless, removing these parasites from the birds whenever observed will undoubtedly relieve the individual greatly. Ruffling the feathers will usually frighten out the flies, but it is a difficult task to capture the lice and mites. Various insect powders can be useful, but these are usually harmful to the eyes. Since the neck and head regions are favorite habitats for the ectoparasites, great care should be exercised in the use of such insecticides.

North Eastham, Cape Cod, Massachusetts.

THE MIGRATION OF THE WESTERN BURROWING OWL

(*Speotyto cunicularia hypogaea*)

By J. F. BRENCKLE

THE Western Burrowing Owl is found on the dry plains west of the Mississippi River to the Pacific Ocean, and from Panama and the Gulf of Mexico north to the southern margin of Canada, and east to Minnesota and western Iowa. It is migratory north of Oregon and northern Kansas. On this vast area but five stations have reported banding this bird, but a total of five hundred and seven bandings have been recorded and are here considered.

The banding records of Mr. Emerson Stoner (personal communication) indicate that little or no migratory movement takes place in California. He writes: "I have never considered that our nesting Burrowing Owls migrate, as there seem to be about the same number of birds here throughout the year. All the following were banded in or not over two miles from Benicia, Solano County, California." He has banded twenty-six during the past six years while studying their nesting-habits, and records three repeats, and one recovery.

No. 24451, banded May 9, 1930, was recaptured April 23, 1932, in the same field.
A514898, banded May 21, 1931, was found dead March 28, 1934, about six miles from place of banding.

A514900, banded April 23, 1932, was recaptured April 23, 1933, in the same field.
A514907, banded April 23, 1932, was recaptured April 23, 1933, in the same field.

Mrs. Anna Benson, of Fruita in western Colorado, reports banding two birds, one of which was found dead near by shortly after banding.

In the Dakota plains area we have known for many years that the Burrowing Owl did not remain with us during the winter. In "Birds of Minnesota," (Vol. I, p. 618) Dr. Roberts gives the dates of migration as April 10th to April 27th and October 7th. For our area I should give the earliest occurrence as April 1st, and October 20th as the latest. From banding recoveries now at hand a well-defined wintering area is definitely indicated in central Texas and adjoining Oklahoma.

Nesting and summer residence begins sparsely just north of the wintering area, and occurs oftener as we go northward to the Dakotas where we undoubtedly have the densest nesting population. Mr. William Wells, of Colony, Kansas, records only one pair of nesting Burrowing Owls in many years of observation. (*Oologist*, Vol. LII, September, 1935, p. 106.)

Mr. Burt Gresham of Winnipeg writes that the Burrowing Owl is not common in Manitoba. He banded two young on July 31, 1926. One of these, 368148, was shot at Spaulding, Nebraska, September 24, 1927, a year and two months after banding.

Mr. Glenn Berner of Jamestown, North Dakota, reports one interesting return and two recoveries from one hundred and one bandings during the years 1933 and 1934.

At my station three hundred and seventy-six Burrowing Owls were banded during the years 1931 to 1934, most of them within four miles of town, but a few as far as nine miles away. Eleven distant recoveries and one return have been recorded. There are also eighteen local recoveries due to death or injury of banded birds. Most of these casualties occurred at night, and were caused by cars on the highways near the nesting-sites. The roadways seem to be favorite hunting-places for these birds.

In evaluating the recoveries both the date and the place of recovery must be considered. The following nine recoveries clearly outline the wintering territory of the Great Plains residents.

No.	Date banded	By whom	Recovery	Where recovered
A515489	June 27, 1931	J. F. Brenckle	Captured January 7, 1932	Gunther, Texas
A544093	June 21, 1933	J. F. Brenckle	Killed by hail April 3, 1935	Snyder, Texas
A568860	June 25, 1933	J. F. Brenckle	Killed December 11, 1934	Lott, Texas
A568894	July 18, 1933	J. F. Brenckle	Killed October 11, 1933	Gasoline, Texas
A568899	July 18, 1933	J. F. Brenckle	Found dead October 14, 1934	Flatonia, Texas
A515484	June 27, 1931	J. F. Brenckle	Captured December 12, 1932	Edmond, Oklahoma
A544057	June 29, 1932	J. F. Brenckle	Found dead April 4, 1933	Willow, Oklahoma
B622725	July 9, 1933	Glenn Berner	Shot October 5, 1933	5 miles west of Moore, Texas
A544987	July 9, 1933	Glenn Berner	Shot October 5, 1933	10 miles west of Wichita, Kansas

The following two owls were evidently in migration to their winter quarters when captured:

368148	July 31, 1926	Bert Gresham	Shot September 24, 1927	Near Spaulding, Nebraska
A519449	July 1, 1931	J. F. Brenckle	Injured on road, October 1, 1931	Royal, Nebraska

The two following returns after an interval of one and two years are of interest:

A544999	July 11, 1933	Glenn Berner	Recaptured at same den August 1, 1934	Jamestown, North Dakota
A515497	June 29, 1931	J. F. Brenckle	Found dead in same field August, 1933	Northville, South Dakota

The following recoveries were trapped or shot after their spring arrival in the North:

A544070	July 10, 1932	J. F. Brenckle	Shot April 24, 1934	Near Columbia, South Dakota
A568858	June 25, 1933	J. F. Brenckle	Trapped and released April 29, 1934	MeVille, North Dakota
A568829	June 24, 1933	J. F. Brenckle	Trapped and released April 12, 1934	Kamrar, Iowa

Northville, South Dakota.

NIGHT LIGHTING WITH BOB-WHITE

(*Colinus virginianus virginianus*)¹

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AN extension of experiments on the modification of sexual cycles in starlings, ferrets, and pheasants, previously reported (Bissonnette, 1933, 1935, 1936a, b; Bissonnette and Csech, 1936a, b) was carried out with Quail (*Bob-white, Colinus virginianus virginianus*) to ascertain whether or not their sexual or breeding period could be moved forward into the earlier spring months by increasing the daily periods during which they were exposed to light in winter and early spring. Tests were also made of the fertility and hatchability of the eggs so produced, and of the number of eggs that might be obtained from a single female under these conditions. Pheasants had shown remarkable susceptibility to induction of early laying by alteration of the seasonal cycle of daily period of illumination coupled with a great increase in the number of eggs laid by females under experimental treatment (Bissonnette and Csech, 1936b). Over 103 eggs each were laid by three hen Pheasants between January 15 and June 29, 1936, and two of these hens were still laying intermittently at that time.

Controls consisted of several pairs of Quail of the Wisconsin strain of this species at the Shady Swamp Sanctuary, Farmington, Con-

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