

A BREEDING AND MIGRATION SURVEY OF THE PEREGRINE FALCON

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DURING the last 30 years the Peregrine Falcon (*Falco peregrinus*) has been subjected to increasing interference by an expanding human population. Ratcliffe (1962) pointed out that Peregrines in Great Britain, after surviving direct persecution during World War II, have since 1950 shown an inexplicable severe drop in nesting success. The role of pesticides in the reduction of Peregrines in Great Britain was described by Cramp (1963), and other decimating factors by Ferguson-Lees (1963). While the species once bred widely in eastern United States (Hickey, 1942), D. Berger (unpublished data) found that they have become extinct in that region and are much reduced in the upper midwest region. Bond (1946) surveyed the breeding population of Peregrines in western North America and was optimistic about its future there.

In North America two important aspects concerning distribution and movements of this species have been largely overlooked by ornithologists. First, only occasional notes appear in the literature concerning the nesting of Peregrines in the Rocky Mountains from Colorado to Alberta. Second, their conspicuous fall migration on the shore of the Gulf of Mexico has not been studied. In this study, I attempted to determine the status of the Peregrine in the central Rocky Mountain region and to describe its migration on the Gulf Coast.

BREEDING STATUS

Methods.—A search of the literature and inquiries addressed to persons in the Rocky Mountain area yielded a list of suspected or known former nesting sites of Peregrines from southern Colorado to central Alberta, mostly east of the Continental Divide. I visited as many of these sites as possible between 27 April and 9 July 1964, traveling 8,756 miles by auto, 689 miles by boat, and 185 miles by light plane. Since Peregrines often nest in the vicinity of rivers, I traveled several major streams that flow eastward from the mountains and checked all cliffs found. Sometimes I fired a rifle at the cliff to flush any hidden falcon. All cliffs were routinely examined with binoculars or a 20× telescope and special attention was paid to those marked with excrement. In this paper, I purposely have not disclosed exact nesting localities.

Colorado.—In Colorado I traveled 1,550 miles by auto, visiting 12 of 18 known former nesting sites, and of the remaining 6, 3 were visited by other workers. Six of the 15 visited sites were occupied by pairs of Peregrines,

while one had a single falcon. Of the eight unoccupied sites, five were used at least until 1960, and another has evidently not been used since 1884. Two others were abandoned in the early 1950's. Below is a summary of nesting sites in Colorado.

1. El Paso County—occupied since 1947 (Knorr, 1959); occupied 1963, 1964.
2. El Paso County—occupied 1950, used by other species in later years (R. Stabler, pers. comm.); unoccupied 1963, 1964.
3. El Paso County—occupied 1884 (two specimens by Aiken, in Univ. of Colorado Museum); unoccupied in recent years.
4. Boulder County—occupied 1950 (French, 1951); occupied 1958 (banding record); unoccupied after 1960.
5. Jefferson County—occupied 1962, 1963; one adult present 1964.
6. Fremont County—occupied 1963, 1964.
7. Montrose County—occupied 1937 (Grater, 1937); occupied 1964.
8. Larimer County—occupied 1937 (Gregg, 1938); occupied 1959, 1960 (T. Ray, pers. comm.).
9. Archuleta County—occupied 1946 (Niedrach, 1946); occupied 1959 or 1960, and 1963, 1964.
10. La Plata County—occupied 1962 (T. Ray, pers. comm.).
11. Montezuma County—occupied 1963; unoccupied 1964.
12. Moffat County—occupied 1957; 1962, 1963 (C. White, pers. comm.).
13. Park County—occupied 1953 (D. Galvin, pers. comm.); unoccupied 1963, 1964.
14. Mesa County—adults seen 1963, occupied 1964 (J. Stoddart, pers. comm.).
15. Garfield County—occupied about 1960 (T. Ray, pers. comm.); unoccupied 1964.
16. Conejos County—birds seen about 1960 (H. Webster, pers. comm.); unoccupied 1964.
17. Douglas County—occupied 1960 (T. Ray, pers. comm.).
18. Douglas County—occupied 1962 (D. Galvin, pers. comm.); unoccupied 1964.

Eight of the 15 visited sites were on cliffs more than 70 meters high on the tops and sides of mountains. Five were on lower cliffs, usually in the vicinity of a river, and two sites were in canyons whose vertical walls were over 300 m high.

Since most of the sites were visited only once, data on prey and nesting success are scanty. A Peregrine at one of the canyon sites was seen feeding on a Mourning Dove (*Zenaidura macroura*).

Only five young are known to have fledged from the six occupied sites in 1964, but there may have been three or four more.

Wyoming.—During fieldwork on the Prairie Falcon (*Falco mexicanus*) in Wyoming from 1959 to 1962, I did not encounter nesting Peregrines. Hence in this study I visited only a few likely places and three known former nest-sites in this state. No Peregrines were found in the deep canyon of the North Platte River between Pathfinder and Seminoe Reservoirs. Similarly I saw none in the deep Wind River Canyon south of Thermopolis, Wyoming. A former site in Jackson Hole, Teton County, active in 1958 (W. Higby and

R. Ballou, pers. comm.) has not been occupied since. Another locality in the same county where they had been seen was vacant. Peregrines nested in Yellowstone Canyon, Yellowstone National Park, in the 1950's (D. Beal, pers. comm.), but I could not find them there in 1961, 1962, or 1964. At another site in Yellowstone Park, active about 1960 (W. Fischer, pers. comm.) I saw an adult in 1964 and heard a second calling, but could not locate a nest.

Montana.—Between 2 and 10 June I visited 10 former nest-sites of Peregrines and floated 209 miles of the Yellowstone, Missouri, and Marias rivers in areas where they have been reported. I saw only a single adult. It roosted on a cliff that was used by Peregrines in 1911 (Saunders, 1911) and is now used by nesting Prairie Falcons. From the information on hand, it is impossible to determine when these sites were abandoned. Below is a summary of the history of the sites.

1. Gallatin County—occupied 1959 (C. White, pers. comm.); unoccupied 1964.
2. Gallatin County—occupied 1911 (Saunders, 1911); single adult 1964.
3. Park County—occupied 1959 (C. White, pers. comm.); apparently unoccupied 1964.
4. Park County—occupied 1963 (ibid.).
5. Sweet Grass County—occupied to 1956, lone adult 1957 (R. Elgas, pers. comm.); unoccupied 1964.
6. Stillwater County—occupied about 1940 (ibid.); unoccupied 1964.
7. Stillwater County—occupied about 1940 (ibid.); unoccupied 1964.
8. Cascade County—occupied early 1940's (R. L. Meredith, pers. comm.); unoccupied 1964.
9. Cascade County—occupied early 1940's (ibid.); unoccupied 1964.
10. Chouteau County—occupied about 1950 (ibid.); unoccupied 1964.

I did not visit three other Montana sites active in 1954 and 1955, 1962, and 1963, respectively, (J. Craighead, pers. comm.), or three others in Blaine County from which specimens were taken in the early 1900's (AMNH coll.). I also did not look for an old site in Prairie County (Cameron, 1907).

Alberta.—In Alberta I floated 478 miles of the Bow, Red Deer, North Saskatchewan, Pembina, McCleod, and Rosebud Rivers, and flew at low level 185 miles of the Athabasca River. Between 11 June and 3 July 1964 I visited 17 of 21 nesting sites, and another worker visited 2. Many more apparently suitable cliffs were observed. Six of these 19 sites were occupied by pairs, while an unmated adult male was found at one and a lone adult female at another. Of the 11 unoccupied sites, six were used at least as late as 1959. The following are the data on the Alberta sites.

1. Bow River—active 1962, male found dead (T. Ray, pers. comm.); female present 1964.
2. Old Man River—occupied 1959, unoccupied 1962 (ibid.).

3. Rosebud River—occupied 1933–37 (Salt, 1939); occupied 1957 (W. Salt, pers. comm.); unoccupied 1964.
4. Red Deer River—occupied in 1927–39 (ibid.); occupied in 1950's (ibid.); unoccupied 1964.
5. Red Deer River—occupied 1939 (ibid.); unoccupied 1964.
6. Red Deer River—occupied 1963 (W. McKay, pers. comm.); unoccupied 1964.
7. Red Deer River—occupied 1939 (K. Wood, pers. comm.); occupied 1963 (ibid.); occupied 1964.
8. Red Deer River—occupied 1919 (Taverner, 1919); apparently unoccupied 1964.
9. Sturgeon River—occupied 1960 (A. Oeming, pers. comm.); unoccupied 1964.
10. N. Saskatchewan River—occupied 1960 (ibid.); unoccupied 1964.
11. N. Saskatchewan River—occupied 1960 (ibid.); unoccupied 1964.
12. N. Saskatchewan River—history unknown; occupied 1964.
13. N. Saskatchewan River—history unknown; occupied 1964.
14. N. Saskatchewan River—occupied 1963 (W. McKay, pers. comm.); male present 1964.
15. N. Saskatchewan River—occupied 1962, 1963, 1964 (H. Dick, pers. comm.).
16. N. Saskatchewan River—occupied 1962, unoccupied 1963, occupied 1964 (ibid.).
17. Pembina River—history unknown; occupied 1964.
18. McCleod River—occupied 1930's (F. Beebe, pers. comm.); unoccupied 1964.
19. McCleod River—occupied 1930's (ibid.); unoccupied 1964.
20. Athabasca River—occupied in recent years (A. Oeming, pers. comm.); unoccupied 1964.
21. Calling River—history unknown; pair reported 1964.

The six occupied sites contained 14 young. Food remains found on or below the nesting ledges were a Starling (*Sturnus vulgaris*), a Robin (*Turdus migratorius*), a Mourning Dove, a Spotted Sandpiper (*Actitis macularia*), and Franklin's Gulls (*Larus pipixcan*). One nest had only numerous remains of Franklin's Gulls.

All of the nesting ledges were on dirt banks less than 13 m high and two of the active nests were on sheltered ledges on banks less than 4 m high.

MIGRATION

Methods.—From 10 to 14 October 1964, I counted, trapped, marked, and banded migrating Peregrines on a 36-mile section of beach on the Texas coast, and from 15 to 17 October I made additional studies on a similar 37-mile beach 30 miles farther north. I drove back and forth along the beaches throughout each day, counting falcons and attempting to catch all seen. In all, I drove 1,052 miles. During the count period weather was uniformly fair and warm, usually with moderate daytime onshore winds.

Observation of migrants.—On the south beach nine Peregrines were seen in 698 miles of travel, or one bird per 78 miles. Of these, five were trapped, marked, and banded. On the north beach I saw 43 Peregrines in 354 miles of travel, or one every 8 miles, and caught 10. Contributing to the low count

on the south beach were frequently passing automobiles; the north beach was deserted. Overall, Peregrine sightings averaged one every 20 miles of travel. All trapped birds appeared in excellent health, with fully developed pectoral muscles showing no signs of weight loss.

Occasionally marked Peregrines were resighted or retrapped. Since the positions of the dye mark and the wing hole (see Enderson, 1964) were varied on birds of the same age and sex, it was usually possible to recognize individuals at a distance. An immature female, banded on the south beach on 11 October and resighted there on 16 October, was retrapped near the point of banding by another worker on 17 October. Another immature female, banded on the south beach on 13 October, was retrapped on the north beach on 17 October about 80 miles farther north. An immature female, banded early on 15 October on the north beach, was retrapped there late that afternoon. Another immature female, banded on 15 October on the north beach was retrapped there early on 16 October, resighted in late afternoon, and again resighted the next day. Still another immature female was caught on 16 October on the north beach and seen again later the same day. These observations indicate that many individuals do not move rapidly through the area but may spend several days in one locality.

Finally, on 14 October 1964 I trapped an adult female on the south beach which had been banded there as an adult on 10 October 1962 by E. Skov. This bird was apparently migrating along the same route used 2 years before.

Although Peregrines were observed 52 times, 8 of these were clearly resightings, hence no more than 44 individuals were seen. These included 20 immature females, 16 adult females, 6 females of undetermined age, and 2 immature males. No adult males were encountered. These frequencies contrast with observations in Wisconsin, where of 131 migrant birds identified as to age and sex since 1947, 61 were immature females, 5 adult females, 53 were immature males, and 12 were adult males (D. Berger, pers. comm.).

Most of the Peregrines were seen sitting on the beach, on a piece of driftwood, or were seen after being flushed; nearly all that were not caught flew inland until lost from view. I saw no evidence of a north-to-south movement in the actions of the birds, and none flew from sight over the ocean. Sixty-five per cent of the falcons observed were seen before 10:30 AM, although I looked for them throughout the day. I found it interesting that although the last trip up the beach each evening, just before dark, flushed all the falcons inland, I saw many birds in the first trip down the beach the next morning. These falcons had arrived either late the previous evening, just before dawn that morning, or in the night. This was most conspicuous on the north beach where more Peregrines were seen. For example, on 16 October I saw 10 Peregrines in the first trip, one on the return, and 6 in the afternoon. On

movement of another Peregrine, banded in Denton, Texas, in October and recovered in Wisconsin in January, is difficult to explain. Probably it was caught elsewhere and transported, since Denton seems an unlikely place to capture a migrating Peregrine. The Panamanian recovery in Figure 1 was actually made at sea near that country. A Peregrine banded in North Carolina on 1 February and recovered at Key West in May is the only bird in Figure 1 banded after 7 November.

Of the remaining 29 records of migrants, 11 are of birds recovered within a few months near the point of banding and 18 are of migrants banded in the fall and recovered after the following spring. These latter records are listed in Table 1. The birds were presumably southward bound when banded and most were recovered on some subsequent northward or southward leg of their migration, or while wintering in South America.

Distribution of wintering peregrines in the United States.—Figure 2 shows the locations of Christmas Count sightings of Peregrines recorded for the years from 1947 to 1963 in Audubon Field Notes 2 (2) to 17 (2). (Since it represents a summation of records over a 16-year period the figure presents a slightly distorted picture.) Over much of the country the Peregrine Falcon winters very uncommonly, but in coastal areas Peregrines are often seen on Christmas Counts and are probably regular winter residents there.

On the eastern seaboard, from Virginia northward, 14 Peregrines were seen on the 1960 counts, 13 in 1961, 13 in 1962, and 9 in 1963. Of these 49 sightings, 14 were made within a few miles of New York City. These must be winter residents from the Arctic because local permanent residents became extirpated by 1961 (Herbert and Herbert, 1965).

Birds seen in the interior were very frequently associated with large rivers or waterfowl refuges, e.g., Monte Vista and Bear River National Wildlife Refuges in southern Colorado and northern Utah, respectively. Peregrines seen in the Puget Sound area are presumed to have been Peale's Falcons (*F. p. pealei*) (Beebe, 1960:177).

DISCUSSION

Reduction of the Breeding Population

Coincident with the apparent extirpation of the Peregrine population in eastern United States and in the upper midwest area is a reduction of this species in the Rocky Mountain region. Of 47 reported sites visited in this study in 1964 only 13 had pairs of Peregrines while 4 more had single adults. Judging from records in the literature (Cameron, 1907; Taverner, 1919), Peregrines once nested along rivers coursing eastward from the mountains across the plains in Montana and Alberta. I found only a single unmated Peregrine in this type of habitat. Equally conspicuous is the reduction of

TABLE I
RECORDS OF MIGRANT PEREGRINES BANDED IN THE FALL
AND RECOVERED IN OR AFTER THE NEXT FALL

Banded		Recovered	
Date	Locality	Date	Locality
1. 7 October 1937	Wisconsin	7 October 1939	Wisconsin
2. 28 September 1938	Wisconsin	30 June 1946	Manitoba
3. 26 September 1939	North Dakota	11 January 1941	Oklahoma
4. 15 October 1939	New Jersey	25 October 1942	Maryland
5. 18 October 1939	Maryland	5 November 1944	Bolivia
6. 1 October 1941	Wisconsin	10-20 November 1942	Tennessee
7. 7 October 1941	Wisconsin	5 May 1947	central Ontario
8. 6 November 1946	Virginia	5 October 1947	Virginia
9. 11 October 1950	Washington, D.C.	1-10 October 1957	Ecuador
10. 7 October 1951	Maryland	8 May 1953	Columbia
11. 2 October 1952	Maryland	16 February 1957	Uruguay
12. 26 October 1952	Texas	20-30 September 1953	Texas
13. 25 October 1953	Maryland	29 November 1954	Virginia
14. 13 October 1954	Texas	21 June 1955	Texas
15. 8 October 1955	Wisconsin	Spring 1961	Alabama
16. 8 October 1955	Maryland	22 March 1959	Ecuador
17. 5 October 1956	Maryland	November 1959	Greenland
18. 10 October 1957	Maryland	4 September 1958	Greenland

Peregrines in a once forested region of central Alberta. On one river they were to be found about every 10 miles in the 1920's (K. Wood, pers. comm.); I found only one occupied site on a 95-mile section of the stream. However, four Prairie Falcon nest-sites were found. This new resident has apparently been able to invade the area in recent years due to the clearing of trees and resulting conversion of the region into suitable habitat. Possibly Prairie Falcons have been able to occupy the limited nesting sites at the expense of Peregrines, because the former species winter nearby in southern Alberta and perhaps choose nest-sites before the arrival of Peregrines in the spring. On another river in Alberta, a 22-mile section had six pairs of Peregrines in 1958 (A. Oeming, pers. comm.), but I found no birds there in 1964. At two adjacent but very remote sites in Montana which were active in the early 1940's (R. Elgas, pers. comm.), I found no evidence of recent occupancy.

The causes of this reduction are largely unknown. Egg collectors have visited some of the Alberta sites regularly for the past several years. Oil survey crews have traveled the rivers in Alberta during the last decade and have been blamed for shooting Peregrines. The young from several sites in Alberta have been taken into captivity. In Colorado, falconers have recently



FIG. 2. Composite of Audubon Christmas Count Sightings of Peregrines from 1947 through 1963.

become aware of the presence of nesting Peregrines but only one young was taken in 1964. Pesticides apparently have had harmful effects on the Peregrine population of Great Britain (Cramp, 1963), but it is difficult to understand how they could have affected Peregrines in the region studied where the similar Prairie Falcon seems to be thriving. The two species presumably take similar prey in Alberta, except that Prairie Falcons probably capture more small mammals.

There is no question that Peregrines in the eastern United States were greatly molested by man. Of 58 nestling Peregrines banded in that region and later recovered, 45 were recovered before reaching 2 years of age, the age of sexual maturity. And of the 58, 31 were shot, trapped, or poisoned. Certainly many of the others, recovered by unknown means or found dead or injured, were directly molested. Herbert and Herbert (1965:83, 90), referring to the 1949-55 period of decline of Peregrines near New York City, state that nesting birds were molested by road building, falconers, and shooting, and that nesting failure, particularly the abandonment of clutches before hatching time, was conspicuous. However, in the war years, when these deterrents were less, nesting was more successful than at any time since around 1930. Correspondingly, D. Berger (unpublished data) found that nesting sites in

eastern United States became unoccupied after first, failure of the birds to hatch eggs, and second, in subsequent seasons, failure to lay. Irrespective of the possibility of pesticide poisoning, it seems apparent that direct human interference was a major factor in the decline in the eastern United States and that this factor is now operating in the region I surveyed.

In the Rocky Mountain region, the Peregrine exists only where very local conditions are favorable. Not adapted to arid regions, it is found there near rivers or reservoirs where shorebirds and waterfowl are found, and where land birds are vulnerable to attack over water. Other pairs are found on the highest cliffs, often on mountains, where high-flying land birds may be taken as prey. Finally, that Peregrines in these local favorable areas are not more numerous than they are may be due in part to the fact that the young disperse into surrounding unfavorable regions and are frequently lost.

It is very difficult to estimate the number of pairs of Peregrines breeding in the region surveyed. Judging from the frequency with which I found pairs and from the amount of suitable habitat, it seems very unlikely that more than 25 pairs nest in Colorado and Wyoming. Mountainous regions of Montana probably have no more than this. Alberta has more pairs, perhaps as many as 60, considering the large rivers in northern Alberta. However, along the Athabasca River, I saw little evidence of nesting and no occupied sites.

Migration and wintering

Apparently distinct from the dwindling population of weakly or non-migratory Peregrines breeding in the temperate areas of North America is a large, highly migratory population of Peregrines breeding in the Arctic (Cade, 1960). These latter birds are commonly referred to as "arctic" or "tundra" Peregrines (Beebe, 1960:150). Of 67 Peregrines evidently banded as nestlings and 3 others banded as adults, presumably at nest-sites, in the United States and southern Canada, only one was recovered south of central Georgia or southern California (in Mexico), and none north of southern Canada. In sharp contrast, 19 of 68 presumed "arctic" migrants, banded in the fall in the United States, were recovered in the West Indies, Central America, and South America as far south as southern Argentina; another four were recovered in Canada or Greenland (Figure 1 and Table 1) while most of the remaining 45 were either banded on the Gulf Coast or showed marked movement to the south.

The evidence for an annual round-trip migration from the Arctic to southerly wintering regions and back is scanty, particularly in regard to immature birds. Only three records of "arctic" birds, banded as nestlings, show fall movement from the breeding grounds into more temperate regions, but relatively few "arctic" nestlings have been banded. On the other hand, four adults, presumably banded as migrants, were recovered substantially north

of the banding points (see Table 1, records #2, 7, 17, and 18). The first two, recovered in spring, were probably at their nest-sites.

Cade (1960) thinks it possible that Peregrines do not return to the Arctic until they are 2 years old; he has not seen yearlings in Alaska. Actually, only two adults have been recovered in the Arctic. There are four records of immatures being recovered in Central or South America in April and May, and two others in those months recovered in southern United States. However, these may have been moving northward since even adults do not arrive in the Arctic until mid-May (Cade, 1960).

Peregrines do winter in the United States, and the majority shown in Figure 2 must be "arctic" birds since the local residents became greatly reduced in the last 15 years (D. Berger, unpublished data). Supporting this contention are records of 11 birds, banded in, or in one case, just prior to, the migration and recovered in the United States in December, January, or February. One other was banded in North Carolina in February bringing the number of records of U.S. wintering "arctic" Peregrines to 12, or about one-sixth of the 68 migrant recoveries. Wintering "arctic" Peregrines are in evidence in south Texas until March (R. L. Meredith, pers. comm.).

The first migrating "arctic" Peregrines apparently reach north-central United States in early September. On the shore of Lake Superior, through several seasons, one observer recorded the first migrant on 11 September (R. Widmeier, pers. comm.). In Wisconsin, of about 360 sightings of Peregrines in 12 nonconsecutive years in the period 1951-64, only three birds were seen in the first week of September (D. Berger, pers. comm.). The bulk of the migration occurred there in the period between 22 September and 5 October when 218 were seen, and the migration is nearly over by the last week of October when only three were seen. Judging from banding data, the flight southward across the United States requires 1 or 2 weeks, placing the majority of migrating Peregrines on the Gulf Coast in the first half of October. This agrees with observations in that region (D. Slowe, K. Riddle; pers. comm.).

SUMMARY

In spring and early summer, 1964, I visited 47 of 52 known nest-sites of Peregrine Falcons in the region from Colorado to central Alberta, mostly east of the Continental Divide. Of the 47, only 13 were occupied by pairs of Peregrines, including 6 in Colorado, 1 in Wyoming, and 6 in Alberta. I saw an unmated bird in Colorado and in Montana and two in Alberta. I did not visit three other recently used sites in Montana. Of the 8 unoccupied sites in Colorado, 5 were used as late as 1960, and in Alberta, 6 of 11 unoccupied sites were used as late as 1959. Five young are known to have fledged from the Colorado sites, and I saw 14 young in the six occupied Alberta sites.

From 10 to 17 October 1964 I counted, marked, and banded Peregrines on the Texas Gulf coast. In this period I drove 1,052 miles and saw 52 Peregrines, or about one per

20 miles. Five immature females were resighted up to 6 days after release, showing that some Peregrines do not move quickly from the area. One went about 80 miles northward from the banding point. Since eight resightings were made, only 44 individuals were seen, and these included 20 immature females, 16 adult females, 6 females of undetermined age, and 2 immature males. It appeared that Peregrines moved to the seashore in the night because few were seen just before sunset and many were seen at dawn.

Banding records indicate many Peregrines, presumed to be "arctic" birds, migrate to Central and South America to winter. Migrants reach the northern border of the United States in the first week of September and dwindle to only a few by the last week in October. Peregrines winter rarely in the United States, except in coastal areas. They are especially conspicuous on the Atlantic and Gulf Coasts, and most must be "arctic" birds since the eastern resident population has virtually disappeared.

The reasons for the reduction of nesting Peregrines in the Rocky Mountain region are largely unknown, but I think that direct human interference is a major deterrent.

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LITERATURE CITED

- BEEBE, F. L.
1960 The marine Peregrines of the northwest Pacific coast. *Condor*, 62:145-189.
- BOND, R. M.
1946 The Peregrine population of western North America. *Condor*, 48:101-116.
- CADE, T. J.
1960 Ecology of the Peregrine and Gyrfalcon populations in Alaska. *Univ. California Publ. Zool.*, 63:151-290.
- CAMERON, E. S.
1907 The birds of Custer and Dawson Counties, Montana. *Auk*, 24:241-270.
- CRAMP, S.
1963 Toxic chemicals and birds of prey. *Brit. Birds*, 56:124-139.
- ENDERSON, J. H.
1964 A study of the Prairie Falcon in the central Rocky Mountain region. *Auk*, 81:332-352.
- FERGUSON-LEES, I. J.
1963 Changes in the status of birds of prey in Europe. *Brit. Birds*, 56:140-148.
- FRENCH, N. R.
1951 Duck Hawk nesting in Colorado. *Condor*, 53:54.
- GRATER, R. K.
1937 Preliminary survey of the Big Horn at the Black Canyon of the Gunnison National Monument, typed manuscript, National Park Service.
- GREGG, H. R.
1938 Birds of Rocky Mountain National Park. Rocky Mountain Nature Association, Estes Park, Colorado.
- HERBERT, R. A., AND K. G. S. HERBERT
1965 Behavior of Peregrine Falcons in the New York City region. *Auk*, 82:62-94.

HICKEY, J. J.

1942 Eastern population of the Duck Hawk. *Auk*, 59:176-204.

KNORR, O. A.

1959 The birds of El Paso County, Colorado. University of Colorado Series in Biology, No. 5.

NIEDRACH, R. J.

1946 Duck Hawk nesting in Colorado. *Auk*, 63:253.

RATCLIFFE, D. A.

1962 Breeding density in the Peregrine (*Falco peregrinus*) and Raven (*Corvus corax*). *Ibis*, 104:13-39.

SALT, W. R.

1939 Tale of a hawk bander. *Bird Banding*, 10:115-121.

SAUNDERS, A. A.

1911 A preliminary list of the birds of Gallatin County, Montana. *Auk*, 28:26-49.

TAVERNER, P. A.

1919 The birds of the Red Deer River, Alberta. *Auk*, 36:1-21.

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