

vanced sexual and territorial cycle of behavior in female B as evidenced by the greater age of her young on May 27.

The utterances of female Bullock's Orioles while in defence of territory and in association with males in every way are comparable to the songs of males and may be considered as true territorial songs. The song of the female is similar to that of the male in rhythm, pitch, and quality except as regards the concluding notes of the song which in the female are slightly harsher in quality, range over lesser intervals of pitch and show important modifications of the rhythm as compared with those of the male. Before or during nest building the songs of females on occasion may be even more abundant than the songs of the males.

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THE STATUS OF THE GOSHAWK IN PENNSYLVANIA

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Ornithologists have for years regarded the American Goshawk (*Astur a. atricapillus*) as a rare and irregular visitor during the winter months in Pennsylvania. Occasional remarkable invasions have been noted, of course, such as those which occurred during 1905 and 1907, and from November, 1926, to March, 1927, when the species was very abundant (*Cardinal*, Vol. II, No. 2, July, 1927, 35). It appears from recent investigations, however, that the Goshawk is at least locally a fairly common and regular late fall migrant or winter visitor in this Commonwealth.

Prior to personal observation and study of the remarkable hawk migration which takes place each fall at Blue Mountain, near Dreherstown, Schuylkill County, it was noted that Goshawks were always mentioned among the birds of prey regularly observed in this region. It was believed at the time that those who made this report did not know the Goshawk, since the average hunter does not, as a rule, accurately distinguish the several members of the hawk tribe. On October 19, 1927, however, four Goshawks were killed at Blue Mountain. On October 22, sixteen more were killed, of the fifty or more that were seen; and these birds were not, apparently, part of an unusual invasion such as had occurred during the preceding fall. The hunters of the region recognized the birds as Goshawks at once, and were surprised to learn that their regular occurrence there was considered unusual. They sometimes called the birds "Gray Hawks," because the finely

barred underparts present, at a distance, a gray appearance. A little inquiry brought to light the fact that sixty-seven Goshawks had been killed at this mountain on one afternoon in mid-November, 1926, by one hunter. This, of course, happened during the height of an unusual invasion. The hawk-shooters near Drehersville state that Goshawks have been noted every late fall and winter for the past forty years, and that while they are not, as a rule, common in the region, they are not distinctly rare as are the Rough-legged and Duck Hawks, which sometimes occur.

Goshawks are not usually seen at Drehersville before November and sometimes not until late in the month. They do not linger in the region but continue flying on to the southward. It is remarkable that they have not been noted elsewhere, since they must winter somewhere

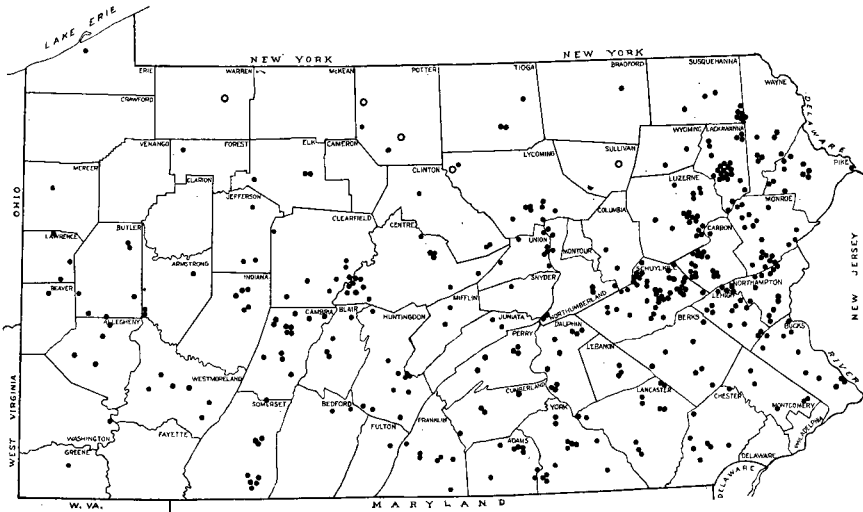


FIG. 17. Map of Pennsylvania showing the Goshawk invasion of 1926-27. (This cut is used by courtesy of the *Cardinal*).

in the region south of Schuylkill County. Apparently they arrive at Drehersville more or less in a body and then separate as they move on to the south and west. There probably is much variation from year to year in the number of birds which pass along Blue Mountain.

Knowledge of the status of this species in Schuylkill County, together with continued reports from many parts of the Commonwealth concerning the depredations of Goshawks to game and poultry during the winter of 1927-28, incited interest in a special investigation similar to that made during the preceding winter, and Goshawks were again found to be present in considerable numbers throughout Pennsylvania.

It is not probable that many of the 1927-28 birds were the same individuals which visited the State in 1926-27, though there is a possibility that birds which found abundant food during the former year returned, bringing with them their hungry fellows.

On the accompanying maps are plotted the Goshawk records for the winter of 1926-27 and of 1927-28. Examination of these brings to light some interesting facts: first, that the total number of records for 1927-28 is not much smaller than that for 1926-27, yet no special invasion is thought to have occurred during the more recent year. It may be that the great interest of taxidermists, sportsmen, and game protectors has something to do with the number of records accumulated during 1927-28, since much discussion was aroused by the abundance of the birds during the preceding year; second, that certain counties in eastern Pennsylvania have numerous records during both years, and that many counties, such as Fayette, Crawford, and Tioga, have very few records for either year. While this absence of records may be due partly to actual scarcity of birds, it is also partly due to the unpopularity or inaccessibility of certain sections as gunning grounds, though not, necessarily, to the scarcity of game, since small game, such as is killed by the Goshawk, is well distributed throughout the Commonwealth.

In a general way the 1927-28 invasion, if we may so refer to it, was much more extensive than that of the preceding year. Comparatively more birds were found in the central and western counties, notably so in Huntingdon, Somerset, and Forest Counties. The two maps clearly show, it appears to me, that the birds regularly come into Pennsylvania at about the northeastern corner. Evidently they follow a fairly well defined course southward, probably along one of the ridges of the Alleghanies. Upon reaching the latitude of Blue Mountain, Schuylkill County, most of them do not continue to fly directly southward but veer off to the west as far as northern Dauphin County, and then continue south and west. This procedure is more evident in the 1927-28 map than in that for the former winter.

It is reasonable to assume that the abundance of Goshawks in Pennsylvania during 1927-28 indicates a continued shortage of food supply in the North Country, though it may be that the migratory habit is more quickly revived or developed than we have supposed and that birds which move southward during one winter repeat their migration merely through the more or less involuntary following of a racial tendency to move southward toward an ancestral home with the advent of cold weather.

During the 1926-27 season, 424 of the six hundred or more Goshawk records were established as reasonably authentic; during the following year 349 records were gathered. Most of these records are of birds which were shot. A few sight records were considered authentic, and several birds were trapped. The precursors of the 1927-28 migration appeared in September and October. Three September records are all from northern counties so there is a possibility that these birds were locally nesting individuals: on September 15, Mr. Edward Shaw took a female in central Forest County; on September 18, Mrs.

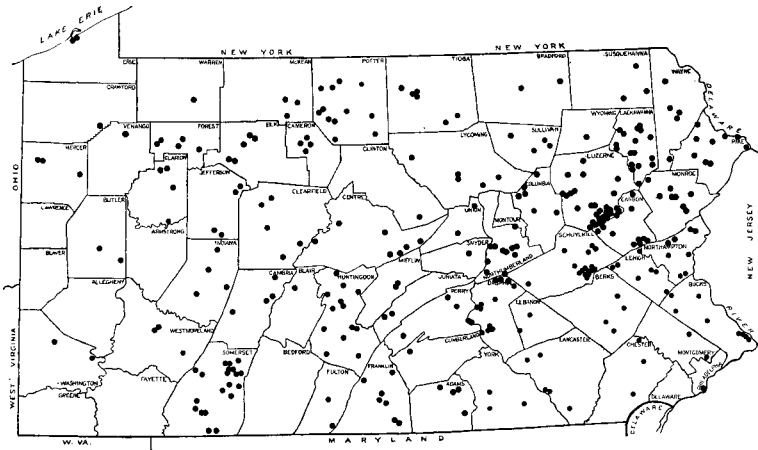


FIG. 18. Map of Pennsylvania showing the Goshawk invasion of 1927-28.

P. Banner caught a male in a steel trap, near Rowland, Pike County; and on September 25, Mr. John H. Lohmann, Jr., saw one in Dark Swamp, Pike County.

The October records indicate that no Goshawks had yet reached the southern tier of counties; by the middle of the month they had come to Schuylkill County, however, and they continued to arrive in great numbers. October records are scattered through Luzerne, Forest, Sullivan, Lehigh, Schuylkill, Northumberland, Lackawanna, Huntingdon, Indiana, and Dauphin Counties, indicating that by this date the birds had scattered considerably to the westward—or, perhaps, that some of them had come directly south or southwest across New York.

By early November the southernmost counties were reached, birds being recorded as follows: Chambersburg, Franklin County, November 1; western York County, November 5; Parker Ford, Chester County, November 7; York Springs, Adams County, November 11; and Benton, Lancaster County, November 17. No Goshawks were taken in

Somerset County before January, 1928, suggesting that the migration westward was gradual. Lack of records from Bedford County has not been satisfactorily explained.

By far the greatest number of records were made during November, 1927, while the hunting season was on. Goshawks were taken during this month in almost every county where any records were made, thirteen birds having been taken in eleven different counties on November 1.

Twenty-three birds were taken in December, and thirty-one in January, 1928. Twenty-seven were taken in February from all parts of the State, these records not indicating any withdrawal of the hawks to the northward. The eleven March records are chiefly from central or northern counties, it is true, but this does not necessarily indicate a northward movement.

The 1927-28 invasion extended into the spring much later than did that of the preceding year, when only five records were made during February, the latest being February 23, 1927, Osceola Mills, Clearfield County. This lingering of the birds was perhaps due to the protraction of cold weather during the spring of 1928, and doubtless also to the continued abundance of food supply.

All of the specimens secured during the winter of 1927-28 were in adult plumage save one, an immature female *with red eyes*, taken November 17, 1927, at Emporium, Cameron County, by Mr. Arthur G. Logue. Among the specimens whose sex was determined it was found that males and females occurred in about equal numbers.

Of the 349 records which we believe to be authentic, twenty-eight were ocular records. The stomachs of fifty-six specimens taken were not examined by the taxidermists who skinned them. Of the 266 stomachs examined, sixty-one were empty. In the 205 stomachs and crops which contained food, some of them holding the remains of two or more creatures, were found flesh, feathers, fur, or bones of the following: 81 Ruffed Grouse (*Bonasa umbellus*); 55 cottontail rabbits (*Sylvilagus floridanus*), 29 domestic chickens, including several White Leghorns, a Rhode Island Red hen, and a Barred Plymouth Rock rooster; 16 Bob-Whites (*Colinus virginianus*); 13 Ring-necked Pheasants (*Phasianus colchicus*); 10 gray squirrels (*Sciurus carolinensis*), one of the black phase; 3 red squirrels (*Sciurus hudsonicus*); 2 chipmunks (*Tamias striatus*); 2 white-footed mice (*Peromyscus* sp.); 1 domestic pigeon; 1 Meadowlark (*Sturnella magna*); 1 Cardinal (*Richmondia cardinalis*); 1 Song Sparrow (*Melospiza melodia*); and 8

small birds the species of which were not determined. Three contained unidentifiable flesh and fur. Three stomachs each held the remains of two Ruffed Grouse; one, a Bob-White and a cottontail; one, a chicken and a cottontail, and so on. Six birds which were killed while attacking poultry, or pursuing prey, had much food in their stomachs. Eight birds were killed while chasing or killing poultry, two while killing grouse, and two while chasing squirrels. Three birds were killed while carrying prey a few feet above the ground: one, a female, was carrying a large Rhode Island Red hen; one, a full grown cottontail; one, a young cottontail; one, a grouse. Many of the birds which had eaten grouse and Bob-whites had swallowed the feet *entire*, and mandibles were also found in almost every case. Not many feathers were found in the stomachs—evidence that Goshawks pluck their prey rather carefully before eating it. The crop alone of one individual held over twelve ounces of grouse flesh. One male, shot by Mr. Charles Mack, on February 14, 1928, at Slatington, Lehigh County, is thought to have killed twelve hens before it was captured.

During the winter of 1928-1929, very few Goshawks were noted anywhere in Pennsylvania. According to the records of the Game Commission at Harrisburg, only seven sight records of the species were made, and no specimens were taken. During the following winter, however, the species was noticeably commoner. Seventy-six specimens were received for bounty payment at the Game Commission office in Harrisburg, and twelve sight records were found to be authentic. During the recent winter (1930-1931), twenty-eight specimens were received for bounty payment at Harrisburg, and three sight records were authenticated.

Summing up our knowledge of this species in Pennsylvania, we may regard it as a rare summer resident of the more northern, mountainous counties, individuals which nest doubtless remaining throughout the year in one locality so long as food is available; as a regular late fall migrant in the region of Blue Mountain, Schuylkill County, and perhaps elsewhere; and as an irregular winter resident, sometimes abundant, and apparently becoming somewhat more regular of late years.

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