When we threw the bread too far into the lake for the heron to reach it, he became very excited as he watched numerous small fish nibbling on it. Twice, on such occasions, the Green Heron leaped into the deep water and once came up with a fish in his beak. The fish evidently could see the heron standing on the wall, for they approached the bread more cautiously when it was near the heron than they did when it was thrown farther out into the lake.

Some insight into the steps by which the Green Heron developed this method of fishing was obtained by watching an American Egret (*Casmerodius albus*), which was also fishing along the wall at Lake Eola. When we threw a crumb near him, he would not eat or even touch it, but he did walk over opposite it. There he stood until some fish started nibbling on the bread and then expertly seized a fish. He would not touch bread thrown on the land, since he had not learned to place it in the water to attract fish. The Green Heron probably started in this way, but then having learned to associate bread with fish, went one step further and learned to place the bread in the water.

A clear indication that the Green Heron knew what he was doing was furnished by the following incident. While he was standing by some floating bread, several small fish broke the surface of the water several feet to his left. The heron immediately became excited, picked up his bread and moved it to almost the exact spot where the fish had appeared.

We observed this procedure for several hours on three consecutive days. Several people present agreed with us that the Green Heron was using the bread crumbs for fishing. —HARVEY B. LOVELL, *Department of Biology, University of Louisville (Contribution no. 13, New Series), Louisville, Kentucky, February 22, 1958.*

Escape diving by a Spotted Sandpiper.—On April 24, 1957, while Martin was sitting quietly in a boat on Wheeler Reservoir, in Limestone County, Alabama, about two miles downstream from the community of Triana, a Cooper's Hawk (*Accipiter cooperii*) emerged from brush along the bank and darted toward a Spotted Sandpiper (*Actitis macularia*) that was feeding along the shoreline. The sandpiper flew toward the opposite shore, with the hawk in hot pursuit and gaining. A few yards from the boat, with capture imminent, the smaller bird folded its wings and dived into the water, disappearing below the surface. The hawk wheeled back to the bank, alighted on a limb and turned its head from side to side, as if bewildered by the sudden disappearance of its intended victim. After only a few seconds' submergence, the sandpiper reappeared on the surface and immediately took wing. The hawk did not follow.

A careful examination of the literature on Spotted Sandpipers fails to reveal any previous description of escape diving, but the above incident indicates that the species will resort to this when hard pressed.—LEO M. MARTIN AND THOMAS Z. ATKESON, *U. S. Fish and Wildlife Service, Box 1643, Decatur, Alabama, March 25, 1958.*

White pheasants among Ring-necked Pheasants in South Dakota.—In the fall of 1955 one of the two large commercial pheasant growers in South Dakota showed me a white pheasant cock (*Phasianus colchicus*) which had been produced in his flock, and he asked if it would be possible to "start breeding for albinism." He stated that the cock had been mated to wild-colored hens in the spring, but no white offspring had hatched. In addition to the white cock, there was a lightly mottled hen in the flock. We picked up the abnormal birds for closer examination. When looking at the male's head, it was soon observed that he had dark-colored eyes; not pink eyes.

TABLE 1
BREEDING TESTS INVOLVING A WHITE PHEASANT COCK AND HIS DESCENDANTS

Year	Sire	Dam	Chicks	Wild	White
1956	White	Wild	16	16	0
1957	Wild (Sons)	Wild (Daughters)	41	32	9

True albinos are white with pink eyes and in many species, including birds, they will not transmit albinism to their offspring. Consequently, the dark eyes suggested that the white feather color could be genetic and that a flock of white pheasants might be possible. The owners planned to mate the white cock to the mottled hen for spring chicks. My request was to have him mated to normally wild-colored hens. Eggs from this latter mating were sent to South Dakota State College, Brookings.

Sixteen chicks with the wild-type pattern hatched from the 24 eggs which were received the following spring; none was white. (At the pheasant farm, three young white cocks were reared in 1956.) These findings suggested several possible explanations:

(1) the white plumage condition might not be transmissible, as with albinism;
(2) white plumage might be inherited in a simple manner, but be recessive;
(3) white might be inherited but have low penetrance; that is, it might not show up in some birds which were carriers;
(4) white plumage might be limited to the males;
(5) perhaps the young birds had normal (wild-type) natal and juvenal plumage which would be replaced by white adult plumage.

When the 16 birds hatched in 1956 matured it was easy to discount the last-mentioned possibility. Only by breeding for another generation and/or increasing the numbers of birds could the other four possibilities be tested adequately.

During the hatching season of 1957 additional data, as shown in Table 1, were accumulated. Inasmuch as several white pheasants hatched, possibility no. 1 was excluded. When two of the young white pheasants were identified as females, possibility no. 4 was also excluded. The F_2 ratio of whites to wild-type, 9:32, was next subjected to a chi-square test in order to predict whether the mode of inheritance was presumably due to the random assortment of a simple recessive gene, or to a more complex mechanism involving a gene (or genes) with a low penetrance value. A value of $\chi^2_{(1)} = 1.29$ with a probability of approximately .24 indicated that the best aforementioned hypothesis was no. 2; that a simple recessive gene gave rise to white plumage when homozygous.

Since becoming interested in the white-plumaged pheasants, the records of several isolated, wild individuals have come to my attention. During the past few hunting seasons there has usually been at least one hunter who has reported seeing and/or shooting a

TABLE 2
DEAD EMBRYOS FROM 15TH TO 24TH DAYS OF INCUBATION

	Ring-neck	White
South Dakota	7	1
New York	35	10
Total	42	11

wild white pheasant. In 1956, one was killed at Mansfield, South Dakota. In 1957, one was shot in the Huron area and one was sighted between Flandreau and Lone Tree. Other areas from which white pheasants have been reported are east of Brandt, in Deuel County, and south of Sioux Falls. In addition to these reports, there have been accounts of mottled or pied pheasants. In Bruckner's report dealing with white pheasants (1941. *Auk*, 58:536) it was stated that some individuals which were heterozygous for recessive white had a few white feathers.

Thus it is evident that white pheasants are more prevalent in eastern South Dakota than has been previously reported. And there is good reason to believe that these pheasants are white because of the homozygous condition of the recessive gene rather than because of the rarely-occurring albinism. A stabilized equilibrium of heterozygotes can

FIG. 1. A newly-hatched brood of pheasant chicks showing six with wild-type and two with white down.

be, and undoubtedly is, maintained despite the disadvantages resulting from the white color. Inasmuch as it has been determined that the white is present from the time of hatching (Fig. 1) until adulthood, the mutant birds are extremely vulnerable to predators. The protective coloration enjoyed by chicks with wild-type down and plumage will allow them to blend with the natural backgrounds. However, the white pheasants remain conspicuous and it would be expected that most of them would become eliminated by hawks and other predators before they are able to fly. Their only possible claim to protective coloration would be when there was snow on the ground and this does not normally occur during the growing season.

It is not known how the recessive white gene was introduced into the wild population of this state. Possibilities include mutation, accidental escape of confined white pheasants which interbred with the wild, or purposeful release of white pheasants. However, it is reasonable to predict that there will not be established a large population of wild white pheasants so long as they are subjected to the normal rigors of nature. Further, the frequency of the mutant gene could not increase in the wild population unless there resulted a heterozygote superiority. If for some reason, or reasons, the homozygous normal-plumaged birds were less "fit" than were the heterozygotes, it might reasonably be expected that white pheasants would be seen more frequently in the wild. Similarly, if the white pheasants possessed a superiority advantage, or advantages, one would expect to see an increase of the gene frequency in the wild population. The only possible advantage which has been detected yet, is in late embryonic mortality. In Table 2, the data from South Dakota and New York are combined, showing proportionally more dead Ring-necked Pheasants than would be expected on the basis of the 3:1 ratio. There is

evidence that an unexpected preponderance of heterozygous wild mice (*Mus musculus*) occurs in nature (Dunn and Morgan, 1953. *Proc. Nat. Acad. Sci.*, 39:391).

With a confined rearing program, such as is practiced at the pheasant farms, it should be possible to easily establish a flock of pure-breeding white pheasants. With a limited number of white birds, the fastest way would be to mate the white cock, or cocks, to heterozygous hens. Half of the progeny would be white. As numbers increased, the most efficient breeding program would involve mating white hens with white cocks.—WALTER MORGAN, *Department of Poultry Husbandry, South Dakota State College, Brookings, South Dakota, March 1, 1958 (contribution no. 405, Journal Series, South Dakota State College Agricultural Experiment Station).*

Recent observations on the Sharp-tailed Sparrow in southern Michigan.—The Sharp-tailed Sparrow (*Ammospiza caudacuta*) is a rare migrant through Michigan. Norman A. Wood (1951. "The Birds of Michigan," p. 485) listed eight fall specimens, two fall sight records, and one spring specimen, dating from 1878, 1879, 1893, and from the 1930's. There have been very few additional reports of the species in Michigan prior to 1955, and some of these sight records have not been completely satisfactory. Spring records are particularly scarce, but Mr. James B. Fleugel has informed us (letter, September 5, 1957) that he has found Sharp-tailed Sparrows several times in recent years. These were at Grand Beach, Berrien County, Michigan, in the sand dune area bordering Lake Michigan, at the Indiana state line. Fleugel banded individual Sharp-tailed Sparrows there on May 14, 1954, April 28 and April 29, 1956.

Shortly after dawn on September 24, 1955, Mumford flushed a Sharp-tailed Sparrow from a marsh at McIntyre Lake, in extreme southwestern Livingston County. On the afternoon of the same day he saw it, or another individual, in the area. In both cases the bird perched within a few feet of him and allowed sufficient examination to permit a positive identification. In the same marsh on September 28, 1955, Laurence C. Binford, Mumford, Zimmerman, and Richard L. Zusi saw two of these sparrows and eventually captured one in a Japanese mist net. This bird, an immature female, was preserved as a specimen (U.M.M.Z. 150,884). Binford, Robert P. Kirby, Mumford, and Lawrence H. Walkinshaw saw three birds in the area October 8. The observers of September 28 returned to the marsh on October 9 and captured two more Sharp-tailed Sparrows. These were photographed in color, banded, and released. Another individual was seen but could not be flushed into the nets. No Sharp-tailed Sparrow was found by us on October 15, our last visit to the marsh that season.

On September 16, 1956, Gerald L. Brody, Paul Slud, and Mumford found one brightly plumaged Sharp-tail near the site of the first 1955 observations. One week later (September 23), Binford, Kirby, Mumford, Slud, and Zusi failed to find the species in that area. However, Binford, Brody, and Mumford saw three and collected an adult female (U.M.M.Z. 151,955) there on October 7. We could find none there on visits made on October 14 and 21, 1956.

The 1955 specimen appeared indistinguishable from three skins of *A. c. altera* Todd at hand, and Mr. W. E. C. Todd, who kindly examined this and the 1956 specimen, wrote us (letter, June 17, 1957) as follows: "Concerning one (your No. 150,884) there cannot be the slightest doubt; it is an immature *Ammospiza caudacuta altera*, agreeing as it does exactly with our No. 92431 from James Bay, September 21. The second specimen, an adult female, is not so well defined, but on the whole it is nearer *A. c. nelsoni*, with which I would provisionally place it." *A. c. altera* has not previously been recorded from Michigan, although Peters (1942. *Ann. Carnegie Mus.*, 29:205) listed a specimen of