

My friend's description suited the Oyster-catcher exactly, and as he said the negro had saved the head and wings of the bird, I at once went to his place and found that these remnants had actually belonged to *Hamatopus palliatus*.

The bird was shot in an open field on January 3, 1924. The location is on top of the divide between the Notaway and Meherrin rivers, and miles from any stream too large to step across. It is 100 miles west of Norfolk, and about 135 miles from the ocean. The elevation is 380 feet.—JOHN B. LEWIS, *Lawrenceville, Brunswick County, Va.*

Viability of Seeds passing through the Alimentary Canals of Pigeons.—There is considerable literature on the food of birds, which has special reference in most cases to the economic aspects of the food preferences of particular species of birds. The seed-eating birds are known to carry seeds on their feet, feathers and in their beaks. Seeds carried in such ways may fall on places suitable for germination. Proctor (1896) observed that Thrushes and Warblers regurgitated seeds from the fruits they had eaten. The experiments described in the present paper were undertaken in attempting to determine if there is a possibility that certain seeds may pass through the alimentary canal of a bird and still retain their viability. It is understood, of course, that all birds might not give the same results as Pigeons.

Six Pigeons (*Columba livia* L.) were kept for the experiments and when not in use were allowed freedom of movement in a large, out door wire cage (6 feet high, 10 feet long, 4 feet wide). When not under experimentation, the birds were fed a mixture of corn, wheat and millet, and were given plenty of water, grit and salt.

The experimental cages, each of which contained one bird, were made of wire and wood and were 12 inches high, 18 inches long, and 10 inches wide. While in these cages, the birds were fed only cracked corn and the seeds to be tested. J. M. Bartlett (1911)¹ states that corn shows a higher digestibility in birds than any other grain. Since this is the case, digested food was easily distinguished from the test seeds.

The floor of the experimental cage was covered with heavy brown paper to catch the excreta. In all the tests, the birds were not fed the day before the trial, so that their crops were relatively empty when the test seeds were given. The fact that the digested and undigested portions of the food are excreted together makes a serious obstacle in performing experiments with birds and greatly increases the amount of necessary analytical work. This probably, in part, accounts for the small amount of work that has been heretofore undertaken in this line.

The seeds used in the experiments were apple, grape, strawberry, and cherry, as representative of types possessing relatively resistant seed coats. Only one type of seed was used at a time and the seeds were forced into the

¹Ann. Rept. Maine Exper. Station Bull., 26, pp. 317-336.

crop by means of a glass rod. The birds were then placed in the experimental cages and left for sixty hours. Kaupp and Ivey (1923)¹ studied the length of time required for food to pass the entire digestive tract in fowls and found that eleven hours were sufficient. The pigeons were therefore kept in the experimental cages long enough to assure the passage of digested seeds. The excreta were examined carefully by teasing under a binocular microscope.

Of the forty apple seeds fed to the pigeons, two seeds were regurgitated and all the rest were thoroughly digested. Brown flakes of seed coats were found here and there in the excreta.

Similar results were experienced in the trials with strawberry seeds. No trace could be found of any portion of the seeds.

Grape seeds, however, gave slightly different results. Of the forty seeds, four retained their shape, but were soft and flaky. The other seeds appeared in the excreta in pieces of various sizes, all soft and flaky. Although the seeds appeared incapable of germination, they were planted, but none sprouted.

Five cherry seeds were fed to each of two birds and all but one were regurgitated within a few hours and the other was regurgitated a day later. Birds that eat a number of large seeded fruits probably regurgitate most of the seeds, as Proctor (1896) observed. The above result suggested that if a smaller number of seeds was fed that they might be retained rather than regurgitated. One cherry seed was fed to one Pigeon and was retained and located in the gizzard after three weeks had elapsed. The seed was markedly smaller in size and showed that it had been used in the gizzard as grit, gradually wearing and dissolving away, until the seed became small enough to pass out with the feces. M. R. Curtis (1914)² found the same result in observing the ability of chickens to digest pieces of aluminum.

It would appear, then, that the combination of the mechanical grinding of the gizzard and the action of the digestive juices changed the seeds to such an extent that they would not germinate.

Although some birds may be able to pass seeds through the digestive tract without rendering them incapable of germination, the writer's experiments indicate that the Pigeon could not (judged by the four seeds tested) be included in the list of such birds. The voided seeds were crushed and digested beyond power of germination. The Pigeon, therefore, cannot feature in reforestation resulting from the distribution of seeds that have been voided in excreta and there may be some doubt as to whether other birds are able to do so.—MARY SAYLE, *University of Wisconsin, Madison, Wisc.*

Black Vulture (*Coragyps urubu*) nesting in Maryland.—April 28 to May 6, 1921, Mr. Herbert W. Brandt, Cleveland, Ohio, and the writer collected oological material in St. Mary's County, Maryland. Our work

¹Jour. Agric. Res. 23, pp. 721-725.

²Ann. Rept. Maine Agric. Exper. Sta. Bull., 29, pp. 314-318.