

It is to be noted that in practically all of these articles, the work of a single worker or station is represented. There is a notable lack of coöperative attack or report upon a particular species or topic. A number of difficulties usually are encountered in trying to bring together data from scattered stations on a given species or subject, but in a field where coöperative effort is especially needed to present a broad picture, it would seem that effort in this manner would be more worth while than a series of disconnected papers.

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GENERAL NOTES

Differential Erosion of Gastroliths in a Mourning Dove.—While doing a post mortem on a Mourning Dove (*Zenaidura macroura carolinensis*), I thought I saw bird-shot in its gizzard. Examination of all the gastroliths under a dissecting microscope disclosed the following facts about them.

There were two chief kinds. The first were grains of quartz, the largest one 5 mm. in diameter in its longest axis. They were uneven in their outlines, and the more transparent white and yellow ones showed internal fracture-lines or crystal-faces which accounted for the irregular surfaces. During the wearing-down process, cleavage occurred along one of the internal planes, so that only occasionally did any of the well-worn ones begin to approach a spherical shape. Even the most perfect of these, however, would have only partially rounded zones, the result being oval or kidney-shaped bodies.

The second kind, resembling bird-shot, were black cinders worn down into perfect spheres. All of these averaged smaller in size than the quartz gastroliths, indicating that they wore down not only more evenly but also more quickly. Some of the cinders showed an admixture of quartz sand. In these cases the sand particles protruded from the cinder, again showing that the sand offered greater resistance to the eroding process. A pure slag cinder of homogeneous structure wore down into a perfect sphere, its further reduction in size being continued in spherical form. Its surface was pitted with small holes which were gas bubbles trapped when the slag congealed. The margins of these holes probably make good cutting edges during the process of trituration by the gizzard. The cinder spheres, seen under the microscope, looked like close-up photographs of the moon, the gas bubbles corresponding to lunar craters.

One gastrolith was evidently a piece of brick, and there was one child's white bead 2 mm. in diameter.—C. BROOKE WORTH, Rockefeller Institute for Medical Research, Princeton, New Jersey.

Chimney Swifts Destroy Many Insects.—Interesting results were obtained from an experiment conducted during the past summer to determine the approximate number of insects a family of Chimney Swifts (*Chaetura pelagica* Linnaeus) might consume in a day. Authorities tell us that insects form a large part of the Chimney Swift's diet, but none of them state this information in quantitative terms. The results obtained indicated that the Chimney Swift is perhaps our most valuable bird as a destroyer of large numbers of insects.

The experiment began when three young Chimney Swifts, which had fallen into a neighbor's fireplace, were entrusted to my care on August 7, 1939. They were soon doomed to a diet of hamburger and water because my ability to catch enough insects to satisfy these little wide-mouthed creatures was extremely limited.

Forbush (*Birds of Massachusetts and Other New England States*, 2, 1927 : 314) says "When they cannot obtain their food from the air, both old and young must perish." However, these young swifts appeared to thrive on small pellets of hamburger and an occasional drink of water.

They were fed at two hour intervals and about six times each day. Feeding time was always amusing as they would clamber from the "strawberry basket" nest onto my mother's hand and then with a persistent, almost deafening, undulatory, rasping clamor, increasing in volume, wait for the morsels of hamburger. The following figures were obtained on the ninth day of their stay with us:

| Bird | Approximate Age | Body Weight | Weight of Food Taken at One Feeding |
|-------|-----------------|--------------|-------------------------------------|
| No. 1 | 3 weeks | 21.55 grams* | 1.95 grams lean hamburger |
| " 2 | 2½ " | 18.50 " | 1.40 " " " |
| " 3 | 2 " | 18.40 " | 1.25 " " " |

* Approximately 30 grams equal one ounce.

The above figures alone do not convey to the reader the value of Chimney Swifts as insect destroyers. With the above facts in mind further experimentation was made. It was found that 82 house flies weighed one gram. Knowing that the Chimney Swift's diet is largely, if not entirely insects, the approximate number of flies necessary to satisfy each baby swift is easily determined as follows: No. 1—160 flies; No. 2—115 flies; No. 3—103 flies.

The above gives the total number of flies required to satisfy the birds at one feeding. The total number of flies (378) multiplied by the number of feedings per day (6) gives a total of 2,268 flies, the equivalent of which the mother bird would have to supply for her young. This number of flies (2,268) is equivalent in weight to 4.60 grams of lean hamburger. It is little wonder that adult Chimney Swifts spend virtually all of their outdoor life in the air. A conservative quantitative estimate would place the number of insects devoured by a pair of Swifts with a brood of three young at 5,000 to 6,000 insects per day. Many of the insects utilized as food are, however, not as large as the house fly.

Biological Survey bands numbered 39-173672, 39-173673, and 39-173674 were attached to a leg of each bird by Mrs. Frederick Morse Cutler, 43 Butterfield Terrace, Amherst, Massachusetts. The youngest of the lot died on August 27, presumably due to its accidental immersion in dish water. On the following day the two older birds took their departure. There were no other chimney Swifts around at the time of their liberation, and the subsequent fate of these little orphans is not known.—GORDON T. WOODS, Amherst, Massachusetts.

Group Return of White-throated Sparrows.—On July 1, 1938 I set a Government sparrow trap at the edge of a fir thicket, not quite twenty yards from where the waves were dashing themselves upon the rocks at high tide. It was in the town of Millbridge on the coast of Maine.

The next day a White-throated Sparrow (*Zonotrichia albicollis*) was captured and banded 38-129075. two days later, a much more brightly marked White-throated Sparrow entered the trap and was banded 138-100527. On July 11, a third one was captured and was banded 138-100529. These three birds repeated often, either singly or together, throughout the summer.

Returning to Maine for the summer of 1939, the same trap was set again in the same location.

As the sun was setting on the evening of July 6, 1939, I visited the trap. It held three birds, all White-throated Sparrows, each with a band on its left leg. They were 38-129075, 138-100527, and 138-100529. They had returned together.—G. HAPGOOD PARKS, 99 Warrenton Ave., Hartford, Connecticut.