

## A COLLECTION SHOWING FOOD EATEN BY BIRDS.

BY EMERSON A. STONER.

*Plate VIII.*

THE educational possibilities ensuing from a collection of the stomach contents of birds arranged in a presentable manner first came to my attention some seven years ago. A drawer of my egg cabinet at that time held a few cardboard pill boxes, the contents of which proved of no little interest to my visitors. Among these boxes was one which held a considerable quantity of rice in the husks, which I had removed from the stomach and gullet of a Wood Duck which had been killed in the rice fields of the Sacramento Valley; these grains and husks being in fully as perfect condition as though they had been gathered by hand. Another pill box contained the skull and major bones of a meadow mouse (*Microtus*) taken from a Barn Owl. Another held many segments and mandibles of some 43 Jerusalem crickets (*Stenopelmatus*) which had been the meal of a Pacific Horned Owl.

These and other specimens which were accumulated later, I transferred from the pill boxes to glass-covered boxes filled with cotton, such as are shown in the illustration, thus protecting the specimens from dust, breakage, insects and disarrangement.

It is surprising how many items of stomach contents can be preserved simply by drying. A survey of my collection shows the following parts preservable with but little preparation:

- |  |  |
|--|--|
| 1. Mammals   | 2. Birds   |
| (a) Teeth  | (a) Bill   |
| (b) Claws  | (b) Feet and claws                                   |
| (c) Skull  | (c) Skull  |
| (d) Other bones                                    | (d) Other bones                                      |
| (e) Fur  | (e) Feathers   |
| 3. Insects   | 4. Vegetation  |
| (a) Entire insect                                  | (a) Small hard berries                               |
| (b) Leg segments                                   | (b) Nuts, acorns, etc.                               |
| (c) Wing cases                                     | (c) Seeds and grains                                 |
| (d) Other parts, such as mandibles,<br>heads, etc. | (d) Miscellaneous, as grasses,<br>flower-heads, etc. |

## 5. Other material

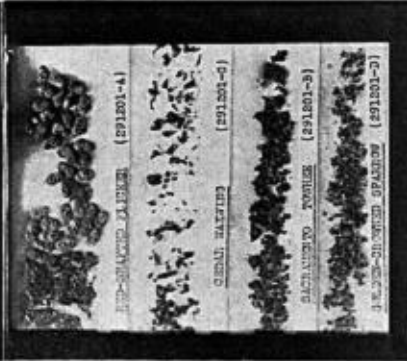
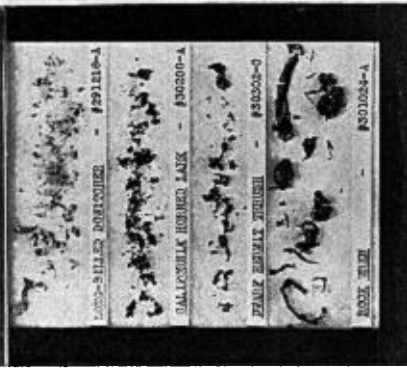
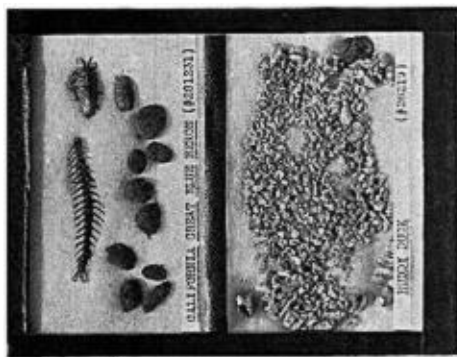
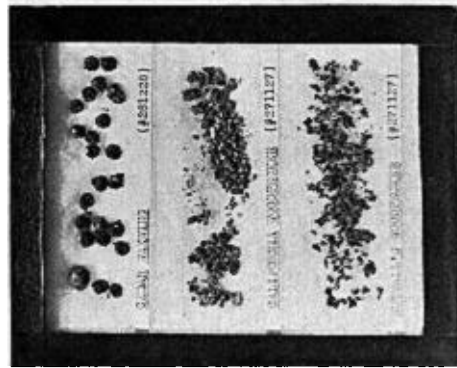
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|--------------------------|--------------------------|
| (a) Fish bones           | (e) Shells and barnacles |
| (b) Snake bones and skin | (d) Gravel               |
| (e) Miscellaneous        |                          |

The bones of birds and mammals are very often found to be already cleaned by the digestive processes. Should there be flesh on the bones, it can be removed by scraping, or boiling and then scraping. Boiling in a solution of water and peroxide will whiten bones making them quite presentable. Pieces of animal skin with fur I have tanned to keep them soft and pliable. A little powdered arsenic sprinkled lightly on insect or other animal matter will preserve it from insect attacks.

The contents of each stomach should be kept separate, and labelled with the name of the bird and a reference number to the note book in which is kept the record of date, locality, and other notes in connection with the obtaining of the bird. Too many data open to view along with the specimens, in my opinion, detracts attention from the exhibit itself, while full data readily available for further reference, either in the note book or on the bottom of the box, or both, offer an ideal arrangement.

Now as to the source of specimens for such a collection. While, of course, these must of necessity come from dead birds, personally I would not advocate the killing of any bird for the sole purpose of increasing the collection. What specimens I have are the result of investigations made upon birds found already dead, those brought to me by friends and persons who know I am interested in bird study, and a few which I take for preparation into scientific skins. Of the birds found already dead, no small number may be found along the highways, after having met accidental death in the traffic; there are others killed and left by irresponsible hunters; some killed by a severe cold spell, by collision with telephone wires and similar obstructions, by poison campaigns, etc. All too often a hawk is found hanging on a fence,—mute evidence of what is usually an illegal and ignominious act.

With reference to the identification of material removed from stomachs, this analysis is not always a simple matter as there is required the knowledge necessary to identify not only birds, but mammals, insects, botanical material, etc., while there is often only



GLASS-COVERED BOXES OF STOMACH CONTENTS.

a portion of the object to be identified. Among the material that I have collected I have found that a good portion, at least in a general way, can be identified, especially if one is familiar with the country from which the bird came. The food of two Red-tailed Hawks, is found to consist of ground squirrels, identifiable by the bones, teeth, fur and an entire claw; also there is an entire Jerusalem cricket and an extra mandible, and three gopher teeth. A Prairie Falcon had eaten two birds, one identifiable from the feathers as a Red-shafted Flicker, and the other by the feathers, bill, feet and claws, as a Song Sparrow. A California Great Blue Heron had fed upon a small fish, two pill bugs (*Isopoda*), and several balls of fur indicating a small mammal. A Cedar Waxwing had fed upon berries from a pepper tree. A Red-Shafted Flicker had fed upon poison oak berries exclusively. A Ruddy Duck had eaten barnacles, one whole, and many broken, with a few pieces of gravel to aid digestion. The Western Grebe stomach contained many of the bird's own feathers,—a peculiar but characteristic trait of the grebes,—and a few small fish bones. A Rock Wren held a single grasshopper in segments. A Western Mourning Dove collected from a grape vineyard held only grape seeds. The above identifications were not at all difficult. However, in cases where there is doubt, submission of the specimens to the proper department of one of the universities or government bureaus will usually furnish the information desired.

It is admitted that some items of food cannot be preserved in the manner referred to herein. If these are identifiable, however, such items can be listed in the notes. Examination of such a collection evokes much interest among persons who would not take the trouble to read an itemized list of foods eaten by different birds. This awakening of interest might be stated as the main object of almost any exhibit collection,—to assist in disclosing the secrets and bringing the wonders of nature to the attention of the public. And, of course, there is also the fund of information which comes first hand to the collector himself.

*Benicia, California.*