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## NOTES ON THE COLLECTION OF MALLOPHAGA.

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Probably no groups of living things offer greater difficulties to the student of science than do the parasitic insects. The Mallophaga, or bird and mammal biting lice, stand as an example of this. At the present time there is no species of this order or suborder for which we have the complete life history. There is also a paucity of species descriptions, and host records. Much of the lack of knowledge concerning this group of insects is due, no doubt, to the difficulty of obtaining specimens and the greater difficulty of knowing exactly the host from which a given specimen is taken.

The method, which in the past has furnished us with the most of our material and which no doubt is still being used, questionable as it is, is the use of museum bird skins. It has been customary to examine painstakingly these dried skins for Mallophaga and to credit the Mallophaga found to the bird species examined. Many inaccuracies have surely crept into our literature from this procedure, as anyone familiar with the methods of bird collectors and taxidermists will readily appreciate.

It is at present recognized that in order to insure host accuracy, Mallophaga must be taken from the freshly killed bird.

The author, while working on a preliminary study of the Mallophaga of New York State under the guidance of Dr. Matheson of Cornell University, at first examined the feathers of some freshly killed birds for lice. Such examinations were always tedious and resulted in finding very little material. The birds were then skinned and prepared for the Cornell Ornithological Museum, the skins being made up as directed by Chapin, (23). This included wrapping the skins in cotton and leaving until they were dry. It was noticed, when the cotton was removed, that lice were found on the inside of the cotton wrappings. They were alive in many cases but the fluffiness of the material made the movement of the Mallophaga extremely difficult. The white background also made it very easy to pick off the lice by holding the cotton up to the light.

Because this method of collecting shows very distinctly that Mallophaga leave soon after the death of the host and because it assures positive knowledge of the host, the following procedure can be recommended.

As soon as the bird has been shot in the field, the wounds cared for and the throat plugged, wrap the bird in fresh cotton. Place the bird in a paper bag and label the bag with number, date, and locality. Skin the bird as soon as possible, prepare it, and wrap the skin in cotton, using either new cotton or that already used in the field. Place the skin in the same bag to dry. Care should be taken to keep the birds widely separated during drying because that is the period at which the Mallophaga are most active in leaving the feathers. The cotton may be examined as soon as the skin is dry or may be placed in the paper to await examination at a later date.

In addition to lice, the author has found mites and, in the case of mammals, fleas entangled in the cotton.

The above method, with the cooperation of Ornithologists and Entomologists, ought to stimulate and further our knowledge of this little known group of insects.

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