

Savannah Sparrow, Henslow's Sparrow, Chipping Sparrow, Field Sparrow and Song Sparrow as found in Michigan.

Dr. Sutton emphasizes the fact that the juvenal plumage is rarely a complete plumage, some of the body feathers usually being replaced by those of the first winter plumage before the flight feathers are fully grown. This fact is well-known to those who have tried to collect specimens in "full juvenal" plumage and they, like the reviewer, have doubtless come to the opinion that in some species at least such specimens simply do not exist! In order to properly depict the early body plumage Dr. Sutton has been compelled to use birds with "stubby" tails and short wings. The same thing is true, moreover, with later plumages and molts and in the case of shore-birds it is often possible to find specimens with feathers belonging to three different plumages.

In this connection it has always seemed to us that our nomenclature is at fault for we sometimes use the term "plumage" to indicate a set of feathers belonging to the same sequence and at others the dress in which the bird may be at a given time, often comprising feathers belonging to different sequences. A full feathered autumn bird freshly molted is really in the same "plumage" as a spring specimen in which the feathers have suffered marked wear, even though its appearance has been materially altered by the latter process.

Dr. Sutton, quite rightly, criticizes certain authors for their statements regarding the length of time that the juvenal plumage is worn. The finding of birds in this plumage at the beginning and the end of summer is no proof that the same individual had retained this plumage throughout that period. As a matter of fact, the duration of the juvenal plumage is, as he points out, probably quite short.

Perhaps the most important point brought out by Dr. Sutton's studies of young birds is the apparent additional partial plumage that the Cardinal assumes as the juvenal plumage is lost and before the "first winter" dress is acquired. So far as I am aware no previous author has called attention to such a plumage. Dr. Sutton suggests that this may be in fact the "first winter plumage" crowded forward from the usual time and that the familiar winter plumage is really the nuptial plumage acquired in autumn instead of in spring. He supports this theory by the argument that it is unusual for a bright plumaged bird to have no more of a molt in spring than that which the Cardinal shows, the spring dress of which differs from the winter garb mainly by wear. We are not prepared to endorse this line of argument however, since a number of dull plumaged birds have a complete spring molt and we have been unable to find any connection between the brilliancy of plumage and the amount of the molt.

In the case of the Savannah Sparrow Dr. Sutton finds two "phases" of juvenal plumage, one much duller than the other. There are many other interesting points brought out in his detailed discussion of the several species which limited space prevents us from taking up. Our readers should see the paper in its entirety as it is one of the most notable contributions to the study of plumages and molts that has appeared for many years, and shows that the last word has not yet been said upon this fascinating subject.—W. S.

**Chapman on the Courtship of Gould's Manakin.**—Dr. Chapman always makes good use of his winter sojourns to Barro Colorado and he has just published a study<sup>1</sup> of the life history of Gould's Manakin as observed in 1932 and 1935

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<sup>1</sup> The Courtship of Gould's Manakin (*Manacus vitellinus vitellinus*) on Barro Colorado Island, Canal Zone. By Frank M. Chapman. Bull. Amer. Museum Nat. Hist., LXVIII, Art. VII. Pp. 471-525. September 30, 1935.

which is the most interesting account of bird behavior that we have read for many a year—admirably presented; based on most careful observation and teeming with suggestion.

After a brief résumé of the peculiarities and distribution of Manakins in general and a description of the peculiarly modified wing feathers of the males of certain species, by the aid of which they make the characteristic snapping sounds, our author discusses the activities of the species to which he has given particular attention.

The males at the beginning of the mating season clear the leaves from small areas in the forest making little "courts" to which they endeavor to attract the females. There are usually four or five males located within some thirty feet of one another and when a female arrives in the neighborhood they begin a display with rapid flitting across their respective courts and constant emission of the snapping sounds. If the female is in the proper sexual condition she responds to one of the males and joins in his "dance" which in the complete fulfillment of the demonstration results in coition. She seems to come in contact with the male only on the court as she alone builds the nest and rears the young, so that there is no real pairing of the birds as in most other species. Dr. Chapman gives many details of his interesting observations as well as the results of introducing stuffed birds on the court, and also discusses many other factors which may influence the behavior of the birds.

His final summary as to the development of peculiar structures and the object of the Manakin's complicated behavior is presented as follows: "that natural selection, working through the performance of the fundamental sexual relation, has developed specialized structures and coöperative habits which, rigidly followed throughout an extended breeding season, overcome the high mortality of tropical nest-life and produce a successful species."

He quotes the published observations of several ornithologists on different species of Manakins, and while we do not suppose that he intended this as a complete list of such contributions we wonder if he has overlooked Mr. Ernest G. Holt's interesting account of the competitive "dance" of three males of *Chiroxiphia caudata* before a single female, published in 'The Auk,' October, 1925, which he does not mention.

This paper of Dr. Chapman's should be read by all interested in bird behavior especially with reference to sexual activities.—W. S.

**Sumner on Protective Coloration.**—In three interesting publications<sup>1</sup> Prof. Sumner discusses the problem of protective coloration from several angles and presents the results of important experiments in this field. Specimens of *Gambusia patruelis*, the mosquito fish, which has the faculty of changing its tone of coloration in accordance with its surroundings, were placed in black and white aquaria and the resultant black and white fishes were then placed together in equal numbers in similar aquaria and a Penguin and a Night Heron introduced into each. In the pale tank 61% of the fishes eaten were black and only 39% white, while in the black tank 74% of white fishes were eaten and only 26% black.

Prof. Sumner rightly claims that this is pretty positive evidence of the protective value of chromatic adjustment of fishes to their backgrounds. In the course of his discussion Thayer's claim that all colors of animals are of concealing value, comes in for sharp criticism but high value is placed on the same author's demonstration of the optical principles underlying concealment. McAtee's conclusion, in the case of

<sup>1</sup> Does "Protective Coloration" Protect? Proc. Nat. Acad. Sciences XX, No. 10. October, 1934. Studies of Protective Color Change, III. Ibid. XXI, No. 6. June, 1935. Evidence for the Protective Value of Changeable Coloration in Fishes. Amer. Naturalist, LXIX, May-June, 1935.