

THE SPECIALIZED FEATHERS OF THE SAGE HEN

WITH ONE ILLUSTRATION

By ALLAN BROOKS

The curious bristly feathers on the breast of the male Sage Hen, *Centrocercus urophasianus*, have for long excited my curiosity and interest, together with a strong doubt that the worn appearance of these feathers was actually the result of strenuous wear. If other observers have had a similar doubt, I have come across no published evidence of it. Only very recently in the Canadian Field Naturalist for December, 1929, Mr. F. Bradshaw has quoted Bond's account of the nuptial display of this grouse as being the cause of the "worn" breast feathers. Dawson in the "Birds of California" also gave credence to the act which he described as "taking a belly-buster."

On the other hand, Captain Bendire and Mr. L. E. Burnett have both described the nuptial display and emphasize that the bird blows himself out in a very erect position, and Finley's excellent photographs confirm this.

In the autumn of 1926 I was able to put into execution my long-desired plan to take birds in absolutely fresh plumage and settle the question definitely. The only region in Canada where the Sage Hen now exists is the valley of Frenchman's River, in extreme southern Saskatchewan. Through the courtesy of Mr. Bradshaw, then Chief Game Warden of that Province, I obtained a permit to take six specimens; also he placed at my disposal all the information he was able to supply as to where they might be found. My main object was to take male birds before they had completed their molt so as absolutely to verify the condition of the new breast feathers.

On September 27 I arrived at Mr. Harry Otterson's ranch on Frenchman's River; and I must here express my gratitude to Mr. Otterson, both for his hospitality and for much information bearing on the bird I was in quest of. Frenchman's River, sometimes called the White-mud, at that time of the year a small and easily fordable stream, winds its sinuous course through a valley of moderate width, the floor of which is overgrown in many places with a rank growth of sage-brush, in others with a dense growth of willow and cottonwood of small size, with a good deal of underbrush and also stretches of grass-land.

The Sage Hens are not found in the high sage-brush of these bottoms but on the first benches where, in places, a scantier and lower growth of sage occurs. Nor were they ever seen on the higher prairie levels even where there was sage. I found the birds fairly easily on the morning of the 28th, but they were obviously scarce and only one covey of young birds was seen besides a number of males. They were not at all wild nor was the roar of their wings on rising at all as described by so many writers; in fact they seemed to me to rise more quietly than any other species of grouse that I have met, which means all of the American grouse and some of the Old World species.

I did not take my full quota of six birds, being satisfied when four had been shot. These I picked out as an old male, a young male, an old female and a young female. On dissection these proved to be a two-year-old male, two old females and a young female of the year. Later, other males were flushed, including two fine old birds; these were followed up and studied and sketched at close range of a few yards. No importance is attached to observations made on such short acquaintance, but the following records of physical characters are of interest.

1. *Character of breast feathers supposed to owe their abraded appearance to wear in the sexual display.* These feathers in the two-year-old male are absolutely new, most of them have their bases in a pink sheath, yet the shape and character of the feathers is exactly as in a male of similar age in extremely worn plumage taken in Mono County, California, August 8. The accompanying illustration is a photograph of three feathers taken from corresponding parts of the neck and breast of these two birds. The only appreciable difference is that the feathers of the worn-plumaged birds are tipped with the gummy residue from the sage leaves.

So the long-accepted theory to account for the extraordinary character of these feathers must be set aside. The feathers of the breast and neck of the male sage grouse are specialized feathers only.

2. *Inflatable gular sacs.* These in other American grouse, *Dendragapus*, *Pedioecetes* and *Cupido*, consist of a thickening of the skin of the apterium on each side of the neck and are confined to adult males only. In *Centrocercus* the bare spaces are in front of the apteria and completely surrounded by the feathering of the breast and neck. In the relaxed condition of an autumn bird they present the appearance of an oval-shaped bare spot. In the two-year-old male this bare space measures 45 mm. by 25 mm., in color dark olive gray, the skin thickened and covered with a plexus of veins beneath a tough integument. (According to all observers this

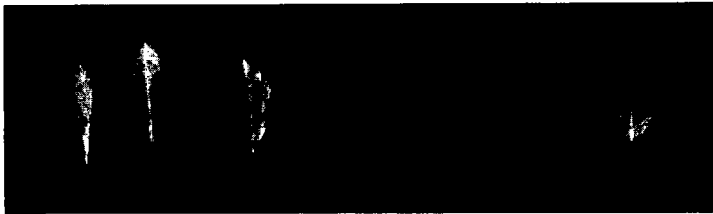


Fig. 73. FEATHERS FROM SAGE HEN, *Centrocercus urophasianus*: AT LEFT, FROM NECK OF NEWLY MOLTED BIRD; AT RIGHT, FROM SAME POSITION ON BIRD OF THE SAME AGE IN VERY MUCH WORN PLUMAGE. THESE LATTER ARE THE STIFF, BRISTLY FEATHERS FROM SIDE OF NECK; COMPARE WITH THE BLUNT-ENDED NEW FEATHERS.

skin is of a yellow color in the breeding season.) In the female the naked spaces are 25 by 13 mm., the formation in every way similar to that of the male but the thickened skin not so specialized. In the juvenile female the naked spaces are smaller but quite distinct.

3. *Head.* The anatomy of this is distinct from other grouse: The eye is larger in proportion, the skull very strong, in the male the frontals rise abruptly from the bill to a considerable height, quite different from the gradual rise in all other grouse. Brain-case small, its walls thick and cellular. Nostrils embedded in the center of the dense nasal fossae and can be completely closed by these, giving an ample protection in cold weather.

4. *Heart.* Very large as in all dark-meated birds, in the male measuring 50 by 41 mm., in the female, 42 by 31 mm. These grouse are heavily charged with blood, more so than in the different species of Ptarmigan even; the main arteries are of large diameter.

5. *Stomach.* A thin-walled sac, 65 mm. in diameter when moderately full of food; proventriculus small; oesophagus simple, its walls very thin; intestines of large diameter. No parasites.

6. *Food.* All four stomachs were charged exclusively with sage leaves. Close to, and in some cases growing among, the sage bushes were berry-bearing bushes of several species, notably bull-berry in full fruit; yet none had been taken.

7. *Colors of soft parts.* Iris burnt umber. Bill blackish, slate gray at the base of the high culmen. Feet olive brown, more plumbeous on soles, claws blackish. Comb over eye dull Indian yellow. Gular spaces olive gray (dark). Colors the same in both sexes.

8. *Weights.* Male, 5 lbs.; females, 2 lb. 10 oz., 2 lb. 8 oz., and 2 lb. 6 oz. All in good order. It will be noted that these weights are a long way below those given by all authors. A very old male in good order would probably weigh one pound more than the above, possibly two, but I would certainly class the weight of five pounds for a female as impossible.

Numerical status. It is obvious that the Sage Hen more than any other bird in Canada needs protection of a thoroughly practical sort. That much used term "in danger of complete extermination" has been so abused (it has been applied again and again to the commonest species of hawks and owls, the extermination of which is an utter impossibility) that I hesitate to use it; but as far as Canada is concerned the complete disappearance of this, the finest grouse in America, is only a matter of a decade or so unless special protection is provided. The species is protected at all seasons by law but many of the residents undoubtedly break this law or are ignorant of it. A proper scheme of education in the local schools, emphasizing that this is the only place in Canada where this grouse still exists, should be organized at once.

But by far the gravest menace is the increase of the Magpie. Mr. Otterson who is an old timer in the region told me that this bird was unknown when he first came to the district and that its abundance is only a matter of the last few years. The nesting grounds of the Sage Hen are in the scantiest sage-brush (see Bradshaw's recent paper in the Canadian Field Naturalist). To anyone who knows the nest hunting capacity of the Magpie the wonder is that any broods at all are raised. No protection will be of any account unless a vigorous and continued campaign of destruction is instituted against the Magpie, and Crows also should be attended to.

Conclusions. There is no question that the long-accepted theory of the abrasion of the breast feathers of the male Sage Hen is an absolute error; but much work is still required before the life history of the species can be regarded as at all complete. What are the functions of the gular sacs in the female birds? Does this grouse drink "like a cow" as old cattlemen describe? What color are the sacs in the old male when not inflated? These change color radically when inflated in *Pedioecetes* and one species of *Dendragapus*. There are obvious plumage changes in the male from the juvenile to the mature and very old birds that are not recognized in any work that I have seen. These and other problems present a good field for effort, and it is to be hoped that some young ornithologist will be allowed to work the problems out. It is our largest and most conspicuous birds that are most in need of study both in the field and from a systematic standpoint.

Okanagan Landing, B. C., January 28, 1930.