

their posterior margins are finely denticulated as in the preceding species. The form and position of the fins is the same as in *G. punctatus*, but their rays are slightly coarser and proportionally fewer in number, though it is difficult to ascertain with accuracy their numbers in the various fins. The articulations of the rays are also a little closer, but the configuration of the joints is the same, these being emarginate distally, convex proximally, and with a little furrow parallel with their anterior and posterior margins, but I have not observed any additional furrows or striæ than those near the bases of the dorsal and anal as in the Wardie species.

*Geological Position and Locality.*—A considerable number of examples of this species have occurred in the Blackband ironstone at Venturefair Colliery, Gilmerton, and are contained in the Edinburgh Museum of Science and Art, and in the private collection of the author. A fragment in the Hunterian Museum of the University of Glasgow, from the ironstone of Possil, also a member of the Carboniferous Limestone series, though higher in position than that of Gilmerton, is probably also referable to the same.

##### 5. On the Ruff (*Machetes pugnax*). By Professor Duns.

The exceedingly beautiful bird now on the table was forwarded to me on the 1st of September last by Mr Wilson, Edington Mains, Chirnside, Berwickshire. It had been shot two days previously. Mr Wilson says, "On comparing it with all the Waders figured by Bewick (the only work of the kind which I possess), I find none that correspond; whence I infer that it is really a *rara avis*." He adds, "When noticed by the edge of the pond by my children it had a young one with it, which they saw it feeding. The young one, they said, was much lighter in its plumage, but was old enough to fly strongly." The note led me to expect a full-grown female wader and young one. But the size of the bird and its general features of maturity showed it to be a male, in full winter plumage. Its companion, described as young, doubtless from its size, seems to have been the female, or reeve, which is little more than half the size of the male. In this respect the ruff differs from most of the sub-family *Tringinae*, in which the females are generally larger than the males.

The ruff is polygamous. After the breeding season a separation takes place between the sexes, which continues till the approach of the following spring. The example now before us is thus exceptional, as occurring along with one female long after the breeding season was past, which is late in the spring, or in May. At one time these birds were met with in great numbers in the low-lying districts of Norfolk and Lincoln, where they bred. Even in these localities they are now seldom met with. There are no instances on record of their nesting in Scotland, where they are even more rare than in England. "On the east coast of Scotland," says Macgillivray, "they usually appear about the middle of September and depart in about a fortnight; but I have never seen an adult male killed there, the little flocks that occur being young birds and females." "Except in a very few instances," says Mr Gray, "I have never met with the ruff in the western counties. One or two occasionally penetrate as far as the Clyde, but these are mere stragglers."\* The forms now noticed appeared at a considerable distance from the coast, in a district, however, which at one time must have presented as good nesting ground as could be found in Norfolk or Lincoln, but which by drainage and many other features of high farming has become almost free from conditions suitable to their habits. It would almost seem as if some birds have a transmitted instinct towards certain localities, which at long intervals finds high expression in certain pairs. Might not this account for the occasional occurrence of the bittern, the night heron, and many other forms in districts where they are now regarded as stragglers? I know, moreover, one locality where the names of places show how common the raven had been at one time, but where only one pair is known to have appeared in forty years. Many instances of this kind might be given. The habits of the ruff have been, I might almost say, so exhaustively described by Montague, Rennie, Selby, and others, as to make it unnecessary to refer to them here. I have, however, placed on the table other specimens than that now noticed, with

\* Dr John Alexander Smith has noticed specimens from Carnwath, Alloa, Portobello, and Fenton Barns, East Lothian. As many as a dozen were recently seen near Grangemouth by Mr Harvie Brown, five of which were shot.

the view of indicating the relative size of male and female, of pointing out the profuse and almost grotesque ornamentation of the males at the breeding season, and of showing the wide variation in the plumage of male birds especially. During the breeding season numerous papillæ, or fleshy tubercles, appear on the face, a couple of ear tufts slope gracefully to the hind head, and a large frill or ruff of elongated feathers surrounds the neck. These features continue till about the middle of June, when the birds moult. They then put on the autumn and winter garb. It is next to impossible to find two males ornamented alike. But it is known that the colouring of the frill first assumed is retained through all the changes of plumage that follow in after years. If red originally, it will have that colour as successive breeding times come round. If black, or white, these colours reappear in their season. The fact is curious and interesting from the physiological point of view. The theory of sexual selection does not help to explain it. The birds are polygamous, and the male has to fight to obtain the female. It is not, however, the size or colour of the frill, but the strength of beak and of leg that conquers. Then what is it that determines the colour of the frill in different birds of the same species, and what keeps the hue persistent throughout all the yearly changes of plumage? The questions are easily put. One would like if they were as easily answered.