Melanistic White-fronted and other Grey Geese

JAMES HARRISON, JEFFERY HARRISON and MICHAEL HUDSON

On 28th January, 1966, a shepherd, John Dockwrey, reported to Michael Hudson that there was a black goose grazing among the European White-fronted Geese *Anser albifrons albifrons* on the Thames fresh marshes at High Halstow, Kent. Next day Michael Hudson found it grazing in the same area with Whitefronts and we found it again on 2nd February, when we attempted to stalk it for a closer inspection and for photography, but the geese in whose company it was proved to be extremely shy. The bird was similar in size to the other Whitefronts, and fed with them. It was extremely conspicuous on account of its overall blackness, but when carefully inspected there was no doubt about its identity for the small white forehead marking was definitely visible. The rest of the head, neck, breast, belly, flanks, upper and under tail-feathers and primaries were uniformly black. The feathers of the mantle, wing-coverts and secondaries were slightly paler and those of the mantle showed paler edges giving the upper-parts the normal barred effect, although far less conspicuous than usual. The beak was pinkish-orange and legs a dark orange.

At first we wondered whether the bird could have been oiled, but quickly ruled this out, for it was quite obviously extremely fit. Furthermore, the white forehead would not have been clean, had the bird been oiled.

The bird was last seen on 15th February, 1966, when a flock of 468 White-fronted Geese was present at High Halstow.

In conversation with Count Léon Lippens and M. Thierry Robyns de Schneidauer, we learnt that a melanistic White-fronted Goose had been seen at Zwin, Belgium, between 10th and 15th March, 1965. It was in company with 13 other European White-fronted Geese, This bird was the same size as the other geese and was a beautiful brownish-black, without any trace of black bars on the breast or flanks. The white forehead mark was pale grey rather than white and the bill orange instead of pink. The feet and tarsi were a darker orange than normal.

The fact that the under tail-coverts of the Belgian bird were white would appear to distinguish it from the Kentish bird in which they were black, unless there was a colour change in the intervening moult.

The behaviour of the Belgian bird was normal as was the behaviour of the other geese towards the melanistic one. This was also true of the Kentish bird.

It is of considerable interest that two melanistic European White-fronted Geese were reported in 1967 at Walmsley Sanctuary, Wadebridge, Cornwall, by R. J. Salmon of the Cornwall Bird Watching and Preservation Society. They arrived in mid-January and remained for several weeks in company with other European Whitefronts.

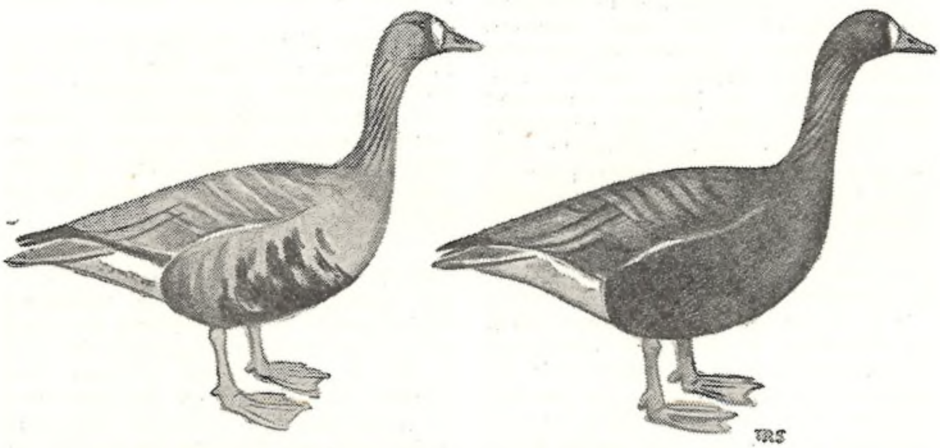

Figure 1. The Belgian melanistic White-fronted Goose (right) beside a normal adult Russian bird. *Drawing by Thierry Robyns de Schneidauer.*

They were described as being "far darker than any of the usual variations. They were all dark except for the tip of the tail—a dark grey-brown that in poor light looked black. The under tail-coverts and vent area were as dark as the rest of the body . . . the 'white front' was limited to an area above the bill and was not as bright as it should be . . . the legs and feet were orange."

It is tempting to speculate as to whether these two geese were the Belgian and the Kentish birds in company together, in which case, the former would have developed dark under tail-coverts in the interval, but this is quite possible.

The presence of these melanistic geese led us to collate some of our views on the melanistic patterning which many of the grey geese exhibit. The most characteristic feature is the black barring of the breast and belly, which is most highly developed in adults of the White-fronted and Lesser White-fronted Goose *Anser erythropus*. The extreme is shown by the Greenland White-fronted Goose *Anser albifrons flavirostris*, in which the under-parts may be almost entirely black. Black barring is not confined to these two species, for it is also a common feature in adult Greylag Geese *Anser anser*. In these, the bars are much smaller and narrower, but may be widespread over the breast and belly. Much more rarely, minimal black barring may be seen in geese of the Bean/Pink-foot complex, *Anser fabilis/brachyrhynchus* for an adult Pink-footed Goose, which was shot by James Harrison in Angus in January, 1950, had an unmistakable black bar upon the upper breast.

Although first year geese lack any black barring, some 10-20 per cent of European White - fronted Geese, *Anser albifrons albifrons*, show a general flecking with individual dark feathers, which is much more marked in juvenile Greenland White-fronted Geese, a high percentage of which have almost uniformly dark under-parts. A similar condition, although much less obvious, can be seen in some juvenile Greylags and Pink-footed Geese. Juvenile White-fronted Geese also have a black facial band, which is a characteristic identification feature for this species.

The darkest upper-parts are also seen in the Greenland White-fronted Goose and this includes a marked diminution in the amount of white bordering on the tail-feathers. The Greenland White-fronted Goose may also show dark barring in the mantle-feathers, a character which has not been previously recorded. A particularly good example of this feature was found in a female which was shot at Loch Ken in January, 1966. It is obviously only a short stage from a bird such as this to one exhibiting almost complete melanism, such as the one described from Kent.

Melanism has also been recorded in the Greylag Goose. A bird seen on 6th March, 1964, at Newburgh, Aberdeenshire, by Dr. G. E. Dunnet (*Scottish Birds* 3 : 92) had a black belly and under-parts, while the upper-parts including the head and neck, were dark brown with individual black feathers, appearing to have lighter edges. The outer tail-feathers were the only white plumage on the bird. The legs were very much darker than normal, but the bill appeared normal in colour.

Two other melanistic Greylags are recorded in the same issue of *Scottish Birds*. Both were seen at Maybole, Ayrshire, on 15th March, 1964, by G. A. Richards. One was dark brown on the back, breast and belly, with slightly lighter feather edges giving a normal pattern on the back. There was some white on the under tail-coverts. The grey leading edges of the wings were freckled with brown.

The second bird was black-brown on the head, neck, back, breast and belly, with a nigger-brown back pattern. There was a little white on the upper tail-coverts.

It seems that all the adult grey geese mentioned have a tendency to produce a melanistic pattern, which reaches its normal extreme in the Greenland White-fronted Goose. Exceptionally, the melanism may be so extensive as to be almost total. There is a similar tendency for the juveniles to produce dark mottled under-parts.

It seems highly unlikely that any external factor could be found to explain the development of this melanistic pattern. The controlling mechanism is almost certainly genetic. This suggests that the grey geese of the genus *Anser* were preceded in the evolutionary tree by the black geese of the genus *Branta*.

We are most grateful to Colin Willock for the specimen of the adult Greenland White-fronted Goose, showing the black mantle bar; to Bryan Sage for checking his records of melanism and to Count Léon Lippens and M. Thierry de Schneidaur for telling us of the melanistic Whitefront in Belgium, and the latter for allowing us to reproduce his excellent sketch of this bird.

A bigamous Greylag gander

JEFFERY HARRISON

Since the summer of 1964 one or two pairs of Greylag Geese *Anser anser* have taken to nesting on islands in Lord Hollenden's lake at Leigh, near Tonbridge, Kent. These birds originate from the W.A.G.B.I./Wildfowl Trust experimental gravel pit reserve near Sevenoaks, to which they return in autumn with their offspring.

In 1966, five geese appeared in spring, two pairs and a lone bird. In view of the fact that we did not wish to build up a large population with a tradition for nesting on this lake, the clutch from pair A was removed and hatched under a broody hen. They subsequently relaid and reared two young on the lake.

Pair B duly hatched off three goslings. When they appeared on the water as a family unit in mid-May, they were promptly joined by the lone bird, which proved to be a female. After only a few days in company, the gander of pair B deserted his family and separated off in company with the lone goose. By June 6th they were found to have a clutch of six eggs, which were also taken and hatched elsewhere. After this both of these adults returned to the reserve to moult. Meanwhile, the deserted goose successfully reared the three goslings by herself and returned to the reserve with them in September after the flightless period.

I can find no references in the literature to such an event occurring in Greylag Geese. In the strictest sense, this is an example of successive polygamy, as defined by Armstrong (1964), in which the male establishes more than one pair bond. This state of affairs is rendered all the more likely if a situation occurs in which more than one mature goose is present in a restricted habitat. This is exactly what happened with these Greylags.

I am most grateful to Mr. Peter Beagley, head gardener to Lord Hollenden, for bringing these happenings to my notice and indeed for establishing the true state of affairs. I am also extremely grateful to Lord Hollenden for allowing me to study his lake and for the use of his boat.

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Drake Harlequin escorting its family

JEFFERY HARRISON

On 5th August, 1966, at Grund, Skorradalur, West Iceland, a drake Harlequin *Histrionicus histrionicus* was found still in full plumage, closely escorting its duck and four ducklings, which were then about a month old. This family party was found in the river at its outflow from the loch. When first seen the family was resting on the rocky bank in company with about 25 other female Harlequins. These flew off, leaving the family swimming in the river. It was found again in the same place on 11th August, when we returned through the area.

Even at this date, the drake showed no signs of moulting into eclipse plumage, but it was flightless, for the primaries were missing on the right side, although present on the left. We had already noted this, when it was first seen. Possibly this may have been traumatic, for there was a single strand telegraph wire crossing the river close by at ten yards height which must take its toll of Harlequins. Even if this was so, there was still nothing to prevent the bird from swimming down river to the open sea about five miles away to moult.

According to Bengston (1966) the normal behaviour of drake Harlequins in Iceland is to leave the nesting area from mid-June to early July and to return to sea, part of the journey being made by swimming down river. Once at sea the birds quickly moult into eclipse plumage.

Two facts make this event most unusual. First, that the drake should have remained in company with the female and young, and second, that it should have failed to moult into eclipse plumage. The second fact is highly likely to be dependent upon the first.

Such an event has not been recorded before in Harlequins and no such thing has ever been seen by Dr. Finnur Guðmundsson or Mr. Sven-Axel Bengtson in Iceland. Bengtson, however, once observed a solitary pair of Harlequins at the end of June in a river near the mountain Herðubreið in north-east Iceland. The male was still in full nuptial plumage. He queries whether there is a growing tendency for males to remain longer with their mates when the pairs are isolated.

Hochbaum (1959) has recorded this behaviour in the Ruddy Duck *Oxyura jamaicensis* and on rare occasions in the Mallard *Anas platyrhynchos*. He considers that it occurs when the period of reproductive activity in the drake overlays the incubation and brood periods. Harrison and Harrison (1965) have also recorded this behaviour in the Mallard. It is perhaps of interest to note that the Eider drake *Somateria mollissima* in Iceland very frequently stays in close attendance on its incubating duck and may escort its family for a short while after hatching. This does not occur in other Eider populations.

Acknowledgements

I am most grateful to Dr. Finnur Guðmundsson and Mr. Sven-Axel Bengtson for their information on Harlequin behaviour.

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Techniques for rapid extraction of ingested food from wildfowl viscera

D. F. W. POLLARD

Summary

Details of equipment and application are given for two methods for sampling wildfowl viscera. The first method, suitable for use on grazing species, relies on dry extraction from the oesophagus and proventriculus by means of a self-opening crook. The second method, employed for extraction from seed and animal feeders, involves a simple water pump, with which food is washed from the gullet.

The main advantages of these methods, which together should permit analysis of most species of wildfowl, are that it is unnecessary to dissect or disfigure the carcass in any way, and that a large number of birds may be treated in a short period.

During the winters 1965-66 and 1966-67, various methods were investigated for the extraction of ingested food from the oesophagus and proventriculus of dead wildfowl. Two techniques are described which permit a rapid examination of the material, and which are applicable to most species of wildfowl.

The first method employs the principle of a toggle-bolt: a self-opening "barb" is fitted to a rod long enough to reach the proventriculus, and sufficiently narrow to permit insertion without pushing food material beyond the reach of the barb itself. The equipment is operated without the use of water.

The second method is basically similar to stomach pumping: water is simply pumped into the gullet and allowed to drain out, usually under pressure, with food items in suspension.

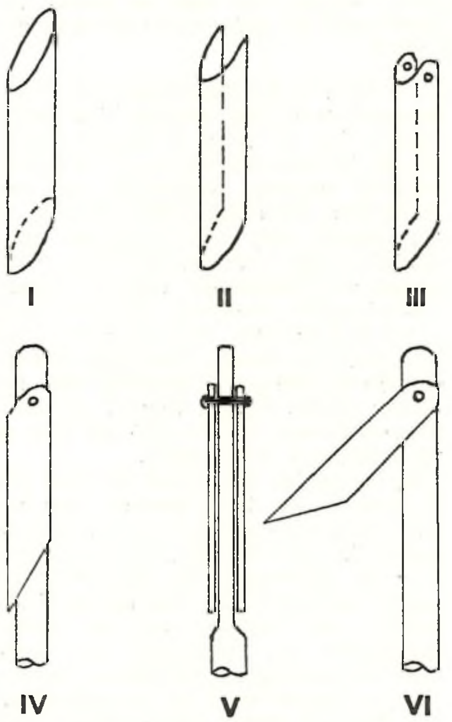
These techniques have been found to be especially useful when a large number of specimens must be rapidly examined, and when it is desirable to leave carcasses intact for table or other purposes.

1. *Dry extraction*

Construction of apparatus. Prepare a 3 ft. (1 m.) length of $\frac{1}{8}$ in. (0.3 cm.) diam. brass or galvanised wire, by fitting a short wooden handle at one end and filing two flats along the last inch (2.5 cm.) of the opposite end (Fig. V). Drill a 3/64 in. (c. 0.1 cm.) hole through these flats, $\frac{1}{4}$ in. (0.6 cm.) from the end.

A "barb" is prepared from $\frac{1}{4}$ in. (0.6 cm.) outside diameter soft P.V.C. tubing, by cutting a $\frac{5}{8}$ in. (1.5 cm.) length at an angle of 60° each end (Fig. I). A $\frac{1}{8}$ in. (0.3 cm.) strip is cut away to produce a "U"-shape cross section (Fig. II). Drill or hot-pierce a 3/64 in. (c. 0.1 cm.) hole close to one end through both sides, and round off upper corners (Fig. III).

Place the completed barb over the wire, aligning drillings on each (Fig. IV). A small pin is inserted and burred to form a hinge (Fig. V). It may be found necessary to slightly modify the dimensions given, to ensure free movement of the barb to the open position (Fig. VI), since materials vary somewhat according to source.



Figures I—VI. Construction of apparatus.

Procedure for use. The barbed end of the rod is pushed over the tongue of a dead bird, which is suspended by its legs, until a solid resistance from the gizzard is felt. On withdrawal, the barb will open, pulling out food material within the gullet. This procedure should be repeated several times.

It has been found advantageous to fit a " piston " about 2 in. (5 cm.) below the barb. This may take the form of a tight coil of twine, about $\frac{3}{4}$ in. (1.9 cm.) in diameter and 2 in. (5 cm.) long, having the effect of consolidating food material below the barb and facilitating extraction.

Food items should be washed off into water, and separated later by sieving.

2. *Wet extraction*

Construction of apparatus. A metal or plastic tube, about 2 ft. (62 cm.) long and $\frac{3}{8}$ in (0.9 cm.) outside diameter is connected to a water container of up to 2 gallons (9 l.) capacity, with rubber tubing. Connected separately to the container is a rubber bulb, fitted with a non-return valve at each end to permit continuous pumping of air into the filled container.

Procedure for use. Suspend the bird by its legs. To collect food items, a polythene bag may be held over the head; this is facilitated by cutting a small hole in the side of the bag, and passing the tube through from the outside before inserting it into the gullet. About 1 pint (0.6 l.) of water vigorously pumped from the container is usually sufficient to wash out food. This should be drained by pouring the contents of the polythene bag through a sieve of not less than 120 mesh/in. (47 mesh/cm.).

After both wet and dry extraction, material may be preserved and labelled in the usual manner.

In practice, it has been found that dry extraction is most suitable for investigations involving grazing species, whilst seed and animal feeders should be sampled by washing. It may be necessary to employ both methods, dry first, when specimens are tightly packed with food.

Finally, it should be noted that these methods are qualitatively less sensitive than conventional methods of viscera analysis, as described by Harrison (1960), since the gizzard is not emptied. However, there is reason to believe that quantitative precision may be enhanced, since the effects of differential digestion are considerably reduced (see Pollard 1967).

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Comparison of techniques for the analysis of wildfowl viscera

D. F. W. POLLARD

Summary

Gullet and gizzard contents were analysed after water extraction and conventional extraction techniques had been applied. The results suggested that the four species of seed eaten had been digested differentially within the gizzard, due mainly to differences in their resistance to mechanical digestion. A similar order of relative resistance was observed following artificial grinding of an undigested sample from the gullet. Since the more resistant seed species accumulate within the gizzard, conventional analysis may show an undue bias towards these forms; extraction methods which sample only the gullet should overcome this problem, at the expense of some qualitative precision.

Differential digestion rates have been observed by Koersveld (1950) to exert a considerable effect on the results of viscera analysis of dead jackdaws. Olney (1961) has suggested that the results of analysis of wildfowl might be similarly modified. Since analyses of wildfowl viscera are usually confined to the oesophagus, proventriculus and gizzard, the main source of error would appear to lie in differences in the rates of mechanical digestion within the latter organ, whilst the bird was alive.

While investigating various methods of viscera analysis, an opportunity arose for comparative analyses of a single bird by conventional and water extraction (see Pollard 1967) techniques. A duck Mallard was shot in January, 1966, shortly after feeding among flood debris from the River Severn. The intact bird was first treated by washing out the oesophagus and proventriculus, after which the viscera were removed. It was found that the oesophagus and proventriculus had been completely emptied by washing; the gizzard contents were set aside for analysis. Five sub-samples were taken from each sample of ingested food, and separated into food types. These comprised seeds of four species of flowering plants. The mean frequency of each species in each sample is given in Table I, as a percentage of the total number of seeds in each sample.

Statistical analysis of the sub-sample counts showed that significant differences ($P = 0.05$) in the percentage frequencies occurred in all four species. The results suggest that the order of digestion rates was as follows: *Rumex* sp. (very rapid), *Glyceria maxima*, *Ranunculus* sp. and *Polygonum persicaria* (slow). Clearly, if the gizzard only had contained food, analysis would have indicated that *Polygonum* and *Ranunculus* together formed a considerable proportion (32.6 per cent) of the food ingested, whilst *Rumex* would be regarded as almost a trace item. In fact, analysis of the gullet revealed that the former species totalled only 8.2 per cent, whereas *Rumex* formed 15.6 per cent of the number of items taken.

In comparing the results of these two analyses, it has been assumed that the food items were distributed at random in the feeding area, and that the bird did not alter its preference for any particular species whilst feeding. The nature of the feeding area suggests that the former assumption was reasonable, but there could be no check on preference changes.

As a further check on the hypothesis that the seed species under consideration varied in their resistance to mechanical digestion, an attempt was made to simulate gizzard action on an undigested sample. The classified contents of the oesophagus and proventriculus were mixed with grit from the gizzard for the same bird, moistened, and lightly ground with a pestle and mortar for about a minute. After resorting, the numbers of remaining intact seeds were calculated as

Table I. Results of viscera analyses.

Food species	*Mean frequency (%) in oesophagus and proventriculus*	*Mean frequency (%) in gizzard*
Glyceria maxima	75.2	65.8
Polygonum persicaria	3.8	16.4
Ranunculus sp.	4.4	16.2
Rumex sp.	15.6	1.6

percentages of their original frequency. The losses incurred by each species during this treatment were as follows: *Rumex* 87%, *Glyceria* 86%, *Polygonum* 26% and *Ranunculus* 4%. Whilst there is obviously considerable difference between grinding by the gizzard in a live bird and the simulated treatment applied, the orders of resistance observed are rather similar. The comparatively high percentage loss shown for *Glyceria*, after artificial grinding, was due to the fact that most seeds were simply broken into two pieces; as such they were still identifiable. This also applied to some fragments of other species. However, under natural conditions, there would be a certain amount of chemical digestion, rendering identification more difficult, whilst fragments would be quickly passed into the intestine.

Whilst the results presented above cannot be regarded as entirely conclusive, they do indicate that conventional analysis of viscera may bias the apparent food preferences or availabilities towards items more resistant to mechanical digestion. This resistance would be controlled by a variety of factors, including, in the case of seeds, size, shape and wall thickness; the nature of other items ingested is probably important also. In an analysis of contents of crop, gizzard and droppings of force-fed quail, Jensen and Korschgen (1947) observed similar effects of differential digestion on the apparent diet composition. For example, the original diet included 11.8 per cent, by weight, *Pinus* seeds and 24.3 per cent *Robinia* seeds. Slight reductions were observed in the crop composition (10.5 and 19.2 per cent respectively); the gizzard was found to contain 71.2 per cent *Pinus* and 6.5 per cent *Robinia* seeds. Analytical methods involving the gullet only, such as the rapid extraction techniques described by Pollard (1967), would appear to overcome this problem, although they are less sensitive, qualitatively, than full analysis of all three viscera components.

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