Proc. Univ. Bristol Spelaeo. Soc., 1988, 18 (2), 258–264

BIRD BONES FROM SOLDIER'S HOLE CHEDDAR, SOMERSET

by

C. J. O. HARRISON

N.G.R. ST 46875400

ABSTRACT

Fresh study of the fossil birds from Soldier's Hole, Cheddar, confirms the importance of this collection with a British Late Pleistocene context. The birds allow valuable insights as to the local environment both in Middle or early Late Devensian time, and more especially during the Lateglacial.

INTRODUCTION

Soldier's Hole is on the south side of Cheddar Gorge above the prominent cave opening known as Cooper's Hole (Barrington, 1964, p. 70; Barrington & Stanton, 1970, p. 100). Exploration of the site was begun by H. E. Balch in 1927 (Balch, 1928a, p. 28; 1928b, pp. 204–9), and completed in January 1930 by R. F. Parry, who also produced the final report (Parry 1931). Wilfrid Jackson undertook identification of the vertebrate and invertebrate fossils recovered at this time.

Parry recognized four stratigraphic units which he numbered 1 to 4 from top to base. These were divided into 21 arbitrary spits which were again numbered top to base. Below the third spit these were each six inches (15 cm) in thickness. Artefacts and fossils of Devensian age were reported from units 4 and 3 (spits 21 to 4), fossils of uncertain age from unit 2 (spits 3 to 2) and artefacts of later prehistoric ages from unit 1 (spit 1). Parry took the boundary between units 4 and 3 to lie between spits 10 and 9. The bird remains, however, suggest that this division might be better placed between 11 and 10 and that demarcation has been adopted in this paper.

Mammal remains, some of which have been dated, and human artefacts, provide some evidence for these divisions (R. Jacobi, pers. comm.). Large mammals recorded from unit 4 include Mammoth, Lion and Spotted Hyaena, while surviving artefacts include two substantially complete and one broken fully bifacial 'leaf-points'. Radiocarbon dating for fossils of Reindeer and Bison from this unit would seem to indicate the presence of both Middle and Late Devensian material.

Reindeer and Brown Bear are the only large mammals to be certainly identified from unit 3. A metacarpal of Reindeer from spit 8 is dated close to 10,000 years before present. Chipped flints from unit 3 have precise typological analogues within the substantial collection from Gough's Cave dated at about 12,000 years bp. Bird remains suggest that unit 3 might have included spits 10 to 3 and this has been adopted here. It would have covered the period from the Lateglacial Windermere Interstadial to the Lateglacial-Holocene boundary; that is to say between c. 12,500 and 10,000 years before present.

The bird bones from Soldier's Hole were only partially identified by Jackson (in Parry, 1931, p. 58). A more complete listing was made by Bramwell (1960) who was able to draw some more general environmental inferences from habitat requirements of individual species. The whole collection has now been re-examined with reference to a larger range of comparative

material. As a result there have been some changes in identification and the total number of species identified has been increased to twenty-eight.

Species lost from the earlier lists through changes in identification include Whooper Swan *Cygnus cygnus,* Lesser White-fronted Goose *Anser* cf *erythropus,* Kestrel *Falco tinnunculus,* Moorhen *Gallinula chloropus,* Common Gull *Larus canus,* Stock Dove *Columba oenas,* Mistle Thrush *Turdus viscivorus,* Jay *Garrulus glandarius,* and Finches Fringillidae species.

SPECIES PRESENT, AND DISCUSSION

In TABLE I the presence of the species has been set down using the spits as divisions. The actual specimens involved are listed at the end of the paper.

Unit 4

The first of these divisions, unit 4 (spits 21–11) is thought to be of Middle to early Late Devensian age. Of the six bird species present the White-fronted Goose *Anser albifrons,* Ptarmigan *Lagopus mutus,* Long-tailed Skua *Stercorarius longicaudus* and Kittiwake *Rissa tridactyla* are all species that breed on arctic tundra or rocky arctic shore, moving south in winter. The last species has extended its nesting range south in recent times. The remaining two species, the Greylag Goose *Anser anser* and the White-tailed Sea Eagle *Haliaeetus albicilla* usually occur in slightly warmer areas but at the present day breed in Iceland and north to the arctic shores of Scandinavia. The species would therefore generally fit climatic assumptions for this period.

Unit 3

Most of the bird remains from Soldier's Hole were recovered from unit 3 (spits 10–3) and are attributable to the Lateglacial period. Artefactual evidence suggests that part of the span represented by these fossils is contemporaneous with the human use of Gough's Cave. Ptarmigan, Willow/Red Grouse *Lagopus lagopus,* Blackbird/Ring Ousel *Turdus merula/torquatus* and Fieldfare *T. pilaris* are common to both sites at this time, while Whooper Swan *Cygnus cygnus,* Peregrine Falcon *Falco peregrinus* and Stock Dove *Columba oenas* are present at Gough's Cave but absent from Soldier's Hole. Pollen spectra from Gough's Cave (Leroi-Gourhan 1986) provide data on local vegetation at this time.

The spits of unit 3 may range over some two thousand years, covering the climatic fluctuations created by the Windermere Interstadial. This produced a climatic amelioration at the beginning of this period which resulted in a spread of woodland and recolonization by birds of woodland and warmer climate. Subsequently conditions became drier, and steppe-like vegetation was more widespread. At the end of the Laterglacial period there was a short reversion to cold conditions during the Loch Lomond glacial readvance.

In spite of this, there is now little evidence of a chronological sequence of change in the bird specimens. Although the absence of two tundra-type species, Ptarmigan and Snow Bunting *Plectrophenax nivalis,* after spit 5 and the late incidence of the Rock Dove *Columba livia* might be adduced as evidence, such variation could be due to accident of occurrence or absence in a small random sample. More significantly, as stated earlier, the evidence from dating of the reindeer bone and from flints, suggests a lack of good chronological stratification. In the circumstances the birds from unit 3 have to be considered as a single, albeit potentially time-transgressing, sample.

TABLE I—*Birds species present as fossils in Soldier's Hole*

units†	1	2	3								4										
spits	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Greylag Goose *Anser anser*		*											*								
White-fronted Goose *Anser albifrons*											*										
Mallard *Anas platyrhynchos*			*	*	*	*		*	*												
Wigeon *Anas penelope*				*																	
Teal *Anas crecca*								*		*											
White-tailed Sea Eagle *Haliaeetus albicilla*			*													*					
Sparrowhawk *Accipiter nisus*		*																			
Merlin *Falco columbarius*			*	*																	
Ptarmigan *Lagopus mutus*					*	*	*	*				*									
Willow/Red Grouse *Lagopus lagopus*			*	*	*	*	*	*	*												
Black Grouse *Lyrurus tetrix*		*		*	*	*		*	*	*											
Hazelhen *Tetrastes bonasia*							*	*													
Common Partridge *Perdix perdix*			*			*	*	*	*	*											
Black-tailed Godwit *Limosa limosa*								*													
Long-tailed Skua *Sterocorarius longicaudus*											*										
Kittiwake *Rissa tridactyla*											*										
Rock Dove *Columba livia*				*																	
Long-eared Owl *Asio otus*								*													
Short-eared Owl *Asio flammeus*							*	*													
Dunnock *Prunella modularis*						*															
Blackbird/Ring Ousel *Turdus merula/torquatus*						*		*													
Fieldfare *Turdus pilaris*				*		*	*		*												
Song Thrush *Turdus philomelos*						*															
Snow Bunting *Plectrophenax nivalis*									*												
Raven *Corvus corax*				*	*	*		*	*												
Jackdaw *Corvus monedula*				*	*	*	*	*													
Magpie *Pica pica*				*		*			*												

†For correlation with the units of Parry (1931), see text.

Although the presence of species with varied habitat requirements in a single spit might be the result of later admixture, by analogy with present-day local avifaunas it can be shown that species with differing needs could have been accommodated within the range of habitats provided by small differences in altitude in a single area.

The situation is well illustrated by the gamebirds, which tend to be sedentary and are therefore useful indicators of local climatic conditions. Of those present at this period, Ptarmigan occur on cold tundra or its montane equivalent, Willow Grouse are found in willow and birch scrub, and the British form, the Red Grouse *Lagopus lagopus scoticus* (sometimes treated as a separate species) has become adapted to heather *Calluna vulgaris* moorland. The Black Grouse *Lyrurus tetrix* is usually a bird of forest and scrub edge, feeding and displaying in open places; and the small Hazelhen *Tetrastes bonasia,* no longer found in Britain but still present on the continental mainland, prefers woodland. Finally the Common Partridge *Perdix perdix* of more temperate grasslands is also present.

It might appear difficult to reconcile these occurrences in a single assemblage, but parallels can be found at the present day. Most of the species occur together through much of Norway, Sweden and further east. A more precise parallel in terms of habitats within a single region occurs in the Cairngorms of north-east Scotland. Here the high bare mountain tops have a tundra-like flora with Ptarmigan present. Red Grouse occur on the heather slopes, where some scrub is also found. Towards the foot of the hills trees begin to occur, forming a forested zone with Black Grouse occurring on its edges. On the low ground there are grassy and cultivated areas.

All these habitats can therefore be present as zones within a single area. Even when the climate might still have been cold, conditions at Cheddar could have created a microenvironment enabling trees to survive. In permafrost areas of northern Canada several hundred miles north of the general tree-line, small areas of forest have been found in places where sheltered valley conditions and escarpments away from colder coastal regions have created small, favourable microclimates (Maycock and Matthews, 1966). At Cheddar the lower levels of the mainly southward-facing edge of Mendip could thus have favoured the development of a narrow tree zone bordered by shrubs when conditions were generally less suitable.

One could therefore envisage the country round the caves as possibly having at times bare, high hill tops with open tundra-like conditions; grading down into moorland and low scrub vegetation on the sometimes rocky slopes; with thicker and in some areas continuous tree cover in a narrow zone along the lower edges of hills and in valleys; finally giving way to open grassland on the lower plain.

Pollen evidence from Gough's Cave (Leroi-Gourhan, 1986, fig. 1) gives some evidence of vegetation, although as already commented this may be relevant to only a part of the time-span represented by unit 3 at Soldier's Hole. The scrub and trees would appear to have been mainly birch, with juniper on higher dry slopes, hazel probably as an edge and understorey at lower and moister levels, and alder in marshy places or by streams. Small amounts of pine pollen are interpreted as the results of long-distance transport.

The birds can be fitted into this background. Ptarmigan and Snow Buntings would have nested on high tundra-type places; both may have moved to lower levels in winter, and the buntings to more southerly coastal areas. Upper slopes would probably have carried a moorland-type vegetation grading into scrub. Merlins *Falco columbarius* would nest in such areas, moving away to

coasts in winter. Bones of Blackbirds *Turdus merula* and Ring Ousel *T. torquatus* are for the most part indistinguishable. If the specimens are of the latter then they might also have nested in such areas by rocky outcrops, while Rock Doves would be limited to caves or cavities such outcrops.

Where birch scrub or juniper could grow, the Willow/Red Grouse could live. Where scrub became trees, the Black Grouse would be likely to occur. In this latter habitat Blackbird and Dunnock *Prunella modularis* might also be found. The Magpie *Pica pica* would also be likely to use this zone for nesting, preferring slightly isolated trees. Fieldfares might have been winter visitors, in which case they would be found on more open places on low ground or slopes; but in view of the likely climate they may have nested in loose colonies in the trees.

At times forest need have been no more than a zone of trees along the lowest slopes and possibly discontinuous in places. Hazelhens are forest birds but it is interesting to note that the present-day range extends into riverine alder forest (Harrison 1982). The Long-eared Owl *Asio otus* is another species requiring trees, although it may tolerate discontinuous tree cover; and the Song Thrush *Turdus philomelos* is mainly a forest species.

The repeated occurrence of Mallard *Anas platyrhynchos,* and of Wigeon *A. penelope* and Teal *A. crecca,* indicate the presence of some open water. Mallard and Teal will tolerate small and overgrown waters, but Wigeon prefer more open waters with grassy edges. The Black-tailed Godwit *Limosa limosa* winters on coasts but breeds on grassy areas by water. The Common Partridge is resident on drier grassland. The Jackdaw *Corvus monedula* usually feeds in open areas of short grass on lowlands or hill slopes, nesting in holes of larger trees or rock outcrops. As a group these species would require the presence of grassland with some open water.

The occurrence of this range of species raises the question of the predator or predators likely to have accumulated the remains in Soldier's Hole. The Raven *Corvus corax,* the remaining species on the list, is a large generalized predator and scavenger occurring in many habitats but preferring to nest on a more open ledge or tree giving a wide view all round. It does not fit the role of principal predator and some of the other species present would be too large as prey. Of the predatory birds present, the two owls listed, Long-eared Owl and Short-eared Owl *Asio flammeus* do not use cave sites and are likely to have been prey rather than predators. Mammalian predators would have had difficulty in capturing such a range of birds and would have done more damage to the bones.

The predator is therefore likely to be avian, to utilize a fairly open cave site such as Soldier's Hole, and to be capable of killing and carrying prey such as Mallard and Black Grouse, and possibly the geese of the earlier cold period. There are two potential species—the Eagle Owl *Bubo bubo* and the White-tailed Sea Eagle *Haliaeetus albicilla.* In historic times the Eagle Owl has not occurred in Britain other than as a rare and accidental visitor, but there is evidence of its presence throughout the Pleistocene.

The presence of bones of the Sea Eagle in both spits 3 and 16 make it seem the most likely candidate, but evidence from other sites shows that the predator does not always leave its own remains with that of its prey. Accipitrine birds such as the eagles tend to strip food from a carcase, any bones ingested being partly or wholly digested, but limbs with little flesh tending to be discarded. Owls tend to swallow small prey whole and tear up and swallow larger prey, the bones being cast up, clean and often intact, in pellets of undigested material.

Both these large predators take a wide range of prey, down to quite small

creatures. The Soldier's Hole list of birds would mostly fit as prey for a White-tailed Sea Eagle, but the species inhabiting trees and shrubs are more likely to be taken by an owl. In addition the remains of small mammals also present at this period suggest a large owl as predator. It is possible, of course, that more than one predator may have been involved serially over a long period of time.

There appears to be no reason to suggest man as a predator at this site at either period. Mourer-Chauviré (1983) has studied more abundant remains from caves in France and has found that with large samples of bird bones there is a preponderance of humeri and femora at sites of human occupation; and of coracoids, carpometacarpi and tarsometatarsi where avian raptors were the predators. The samples from Soldier's Hole are rather small for comparison of this kind, those of spits 21–11 definitely so; but in the total specimens from spits 11–3 there are 17 humeri and 8 femora as against 16 coracoids, 12 carrometacarpi and 39 tarsometatarsi. This increases the likelyhood that avian predators were responsible.

It is further interesting to compare the results if a similar exercise is performed on the even smaller sample of bird bones from spits 19–11 of Gough's Cave. Here identification of 9 humeri and 3 femora as against 5 coracoids and 1 tarsomestatarsus would not disagree with Mourer-Chauviré's predictions for a location where humans were major accumulators of faunal material.

Apart from their specific habitat requirements most of the birds which occurred in spits 10–3 of Soldier's Hole are species which at the present time have a distribution extending northwards over most of Scandinavia and could be described as a boreal fauna, roughly coincident with the present distribution of conifer forest. A number of the species, such as geese, ducks and songbirds are migrants, only occurring in this northern part of the range as breeding birds in the summer. Four species have a more limited northerly range than most. The Common Partridge and Jackdaw, normally resident where they occur, reach only as far north as southern Sweden and Finland at present. The Black-tailed Godwit breeds north to northern Denmark and the Gulf of Keralia, while the wild Rock Dove is a bird of warm temperate regions, extending north along the milder Atlantic coasts to the Shetlands and Faroes. On the basis of present-day distribution, the presence of Partridge and Jackdaw would seem to indicate a climate no colder than c. 15°C in summer and c. −5°C in winter. The other species involved could also occur within these limits, allowing for the possibility of altitude affecting conditions in the way suggested earlier.

Units 2 and 1

Only three species have been identified from spits 2 and 1. The Greylag Goose might be expected by water or in grassy, marshy places. The Sparrowhawk *Accipiter nisus* is a forest, or forest-edge species. The Black Grouse is also a forest edge bird.

MATERIAL EXAMINED

The relative completeness of individual specimens has not been indicated. The prefix 'S' refers to spit numbers. The specimens are now in the Cheddar Caves Museum.

Greylag Goose *Anser anser;* S13 humerus; S2 tarsometatarsus. White-fronted Goose *A. albifrons:* S11 tarsometatarsus. Mallard *Anas platyrhynchos:* S6 coracoid, furcula; S5 humerus; S4 coracoid; S3 coracoid. Wigeon *A. penelope:* S4 tibiotarsus. Teal *A. crecca:* S10

tarsometatarsus; S8 two humeri, furcula. White-tailed Sea-eagle *Haliaeetus albicilla:* S16 ulna; S3 humerus. Sparrowhawk *Accipiter nisus:* S2 femur. Merlin *Falco columbarius:* S4 femur; S3 tarsometatarsus. Ptarmigan *Lagopus mutus:* S12 tarsometatarsus; S8 two tibiotarsi, tarsometatarsus; S7 tibiotarsus; S6 two tarsometatarsi; S5 coracoid, four tarsometatarsi. Willow/Red Grouse *L. lagopus:* S9 ulna; S8 tarsometatarsus, ulna; S7 femur, furcula; S6 two tarsometatarsi; S5 tarsometatarsus; S4 tarsometatarsus, ulna; S3 tarsometatarsus. Black Grouse *Lyrurus tetrix:* S10 tarsometatarsus; S9 two coracoids, three tarsometatarsi, three tibiotarsi, femur, ulna, carpometacarpus; S8 five tarsometatarsi, femur, ulna, carpometacarpus; S6 tarsometatarsus, lower mandible; S5 coracoid; S4 two carpometacarpi; S2 coracoid, humerus. Hazelhen *Tetrastes bonasia:* S8 coracoid; S7 femur. Common Partridge *Perdix perdix:* S10 femur; S9 ulna, coracoid; S8 tibiotarsus, tarsometatarsus, carpometacarpus; S7 tibiotarsus; S6 tibiotarsus; S3 tibiotarsus. Black-tailed Godwit *Limosa limosa:* S8 tarsometatarsus. Long-tailed Skua *Stercorarius longicaudus:* S11 humerus. Kittiwake *Rissa tridactyla:* S11 humerus. Rock Dove *Columba livia:* S4 humerus, ? immature tibiotarsus. Long-eared Owl *Asio otus:* S8 tarsometatarsus. Short-eared Owl *Asio flammeus:* S9 humerus; S8 humerus. Dunnock *Prunella modularis:* S6 humerus. Blackbird/Ring Ousel *Turdus merula/torquatus:* S8 two tarsometartasi, two ulnae, humerus. Fieldfare *T. pilaris:* Many bones, tarsometatarsi and tibiotarsi used to establish presence in S9, S7, S6 and S4. Song Thrush *T. philomelos:* S6 humerus, two femora. Raven *Corvus corax:* S9 coracoid; S8 tibiotarsus, three coracoids, lower mandible; S6 tarsometatarsus, femur; S5 tarsometatarsus; S4 coracoid, humerus, carpometacarpus. Jackdaw *C. monedula:* S8 humerus, three carpometacarpi; S7 ulna; S6 femur, two coracoids, ulna, three carpometacarpi; S5 coracoid; S4 ulna. Magpie *Pica pica:* S9 ulna; S6 tarsometatarsus; S4 tibiotarsus. Snow bunting *Plectrophenax nivalis:* S9 humerus; S6 coracoid, four humeri.

REFERENCES

BALCH, H. E. 1928a. Mendip Nature Research Committee. Report for 1927. *Rep. Wells Nat. Hist. Archaeol. Soc.*, **39** for 1927, 26–29.

BALCH, H. E. 1928b. Excavations at Wookey Hole and other Mendip caves, 1926–7. *Antiq. J.*, **8**, 193–210.

BARRINGTON, N. 1964 *The caves of Mendip.* Clapham, Dalesman Publishing Company Ltd.

BARRINGTON, N. and STANTON, W. [I.] 1970. *The complete caves of Mendip.* Cheddar, Cheddar Valley Press.

BRAMWELL, D. 1960. Report on a collection of bird bones from the 1929 excavations at Soldier's Hole, Cheddar. *Proc. Somerset. Archaeol. Nat. Hist. Soc.*, **104** for 1959/60, 87–90.

HARRISON, C. J. O. 1982. *An atlas of the birds of the Western Palaearctic.* London, Collins.

LEROI-GOURHAN, ARL. 1986. Pollen analysis of sediment samples from Gough's Cave, Cheddar. *Proc. Univ. Bristol Spelaeol. Soc.*, **17** (2) for 1985, 141–144.

MAYCOCK, P. F. and MATTHEWS, B. 1966. An arctic forest in the tundra of northern Ungava, Quebec. *J. Arctic Inst. N. Am*, **19**, 114–144.

MOURER-CHAUVIRÉ, C. 1983 Les oiseaux dans les habitats paléolithiques: gibier des hommes ou proies des rapaces? pp. 111–124 in C. GRIGSON and J. CLUTTON-BROCK (eds.) *Animals and archaeology: pt. 2, Shell middens, fishes and birds.* [B. A. R. International Series, **183**]

PARRY, R. F. 1931. Excavations at Cheddar. *Proc. Somerset Archaeol. Nat. Hist. Soc.*, **76** (2) for 1930, 46–62.

Dr C. J. O. HARRISON, 48 Earl's Crescent, Harrow
Middlesex HA1 1XN, U.K.