

Capítulo 6

The Magdalenian avifauna at Erralla cave

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In its situation at the head of the Gorge of the Alzolaras stream, the immediate environs of the Cave of Erralla (Cestona) command a varied habitat for bird life. In the Gorge itself vegetation is dense, mixed forest of deciduous species, presently dominated by hazel and with some evergreens. The stream bed is fast flowing and stony with little weed in the upper reaches near the cave. Above the valley the land rises sharply into steep pastures of lush grass, with a wide variety of limestone flora. Higher still, on the west bank to the immediate south of the cave is an area of forest plantation, mainly Pine with some beech and an undergrowth of heathers, blackberry and bracken. The highest land lies to the south of the cave, where the Monte Gazume massif rises to 1000 metres, with a light afforestation, heathers and myrtle.

From the bird fauna found in the excavation of the cave it would appear that, despite intervening climate changes, the general pattern of the bird ecology has remained very much the same. Out of 38 different species present in the Magdalenian levels, most could just as easily live in the locality today; although it seems likely that some shoreline and waterbirds may have been imported from the lower reaches of the river Urola or the coast between 15 and twenty kilometers-6 hours walk away in Magdalenian times.

The list of species includes:

Anas platyrhynchos	Mallard
Aquila	Eagle
Accipiter gentilis	Goshawk
Falco subbuteo	Hobby
Falco naumanni	Lesser Kestrel
Falco tinnunculus	Kestrel
Lagopus mutus	Ptarmigan
Alectoris rufa	Redlegged partridge
Perdix perdix	Partridge
Coturnix coturnix	Quail

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Pluvialis apricaria	Golden plover
Tringa totanus	Redshank
Chlidonias niger	Blacktern
Columba livia	Rock dove
Nyctea scandiaca	Snowy owl
Asio otus	Long eared owl
Strix aluco	Tawny owl
Jynx torquilla	Wryneck
Lullula arborea	Woodlark
Alauda arvensis	Skylark
Hirundo rustica	Swallow
Monticola alba	Pied wagtail
Lanius minor/ex cubitor	Great/lesser grey shrike
Acrocephalus scirpaceus	Reed warbler
Oenanthe oenanthe	Wheatear
Turdus merula	Blackbird
Turdus iliacus	Redwing
Turdus philomelos	Song thrush
Turdus viscivorus	Mistle thrush
Emberiza calandra	Corn bunting
Emberiza citrinella	Yellow hammer
Emberiza cirius	Cirl bunting
Chloris chloris	Greenfinch
Carduelis carduelis	Goldfinch
Passer domesticus	House sparrow
Sturnus vulgaris	Starling
Garrulus glandarius	Jay
Pyrhocorax graculus	Alpine chough

Table 1, 2 and 3

The distribution of species of birds through the occupation levels is interesting. The remains from the later Magdalenian are very few in comparison with the early phase and the majority of the bones are those of greenfinch, and though with one kestrel, a thrush, corn bunting, yellow hammer and starling.

In the sterile layer between the middle and late Magdalenian, layers 11 and 12, the few bird species recovered are more closely comparable with those of the lower Magdalenian than the upper and, may possibly have become redistributed as a trampling effect. There are no Avian predators in these sterile layers, yet although rock doves could have been nesting in the cave, neither larks ptarmigan, shrike nor yellow hammer would have entered independently. These species are all found in the

TABLE 1

Great Level	I-III								IV		V												VI		
	Magdalenien Final Alleröd								Sterile Pre-Bölling		Lower Magdalenien Dryas I												Sterile		
Level (Spit)	1	2	3	4	5	6	7	8	11	12	13	14	15	16	17	18	19	20	21	22	23	24	26	28	29
Anas platyrrhynchos															1					1					
Aquila/buteo															1								1		
Accipter gentilis											2														
Faico subbuteo												1													1
Falco naumannii																			1						
Falco tinnunculus					1									2	1										1
Lagopusmutus									1	1	2	1		1	6	4		1	2					1	
Alectoris rufa											4			4								2			
Perdix perdix															1										
Coturnix coturnix															2										
Fluvialis apricaria																									1 2
Tringa totanus														2											
Chlidonias niger													1						1						
Columba livia										5	2	1	2		6			2	1	3	1	1	3		1
Nyctea scandiaca													1		1										
Asio otus														1											
Strix aluco														1	1										
Jynx torquilla															1										
Lullula arborea										1								1				5			
Alauda arvensis										1	1	3	2	3	2		2			4	2	1			
Hirundo rustica											2			1	2		2	2							
Motacilla alba																									1
Lanis minor/excubitor										1											2				
Acrocephalus scirpaceus																		2							
Oenanthe oenanthe														1	3										
Turdus merula											1					2		2	1	5					
Turdus iliacus														1						1			1		
Turdus philomelos	1																						1		
Turdus viviscivorus											1		3	3									1		
Emberiza calandra					2										1	1					2		1		
Emberiza citrinella		1							1		1	1	1	3	2							1			
Emberiza cirrus													2												1
Chloris chloris					1	1	1	2						1	1							1			
Carduelis carduelis																								1	
Passer domesticus											1			1	2							1			
Sturnus vulgaris					2														1						
Garrulus glandarius													2												
Pyrrhonorax graculus		2	4	5	5	3	4	4	5	15	30	27	40	57	46	48	2	45	36	39	36	22	4		2
TOTAL		3	7	5	6	6	6	2	4	8	23	47	32	51	79	77	66	2	58	44	55	48	27	11	1 5 3

earlier occupation levels and, apart from yellow hammer, are absent from the later period.

Table 2

Level	Turdus philomelos		Level	Emberiza caesia		Level	Sturnus vulgaris	Level	Sturnus vulgaris		Level	Chloris chloris		Level	Emberiza caesia		Chloris chloris		Level	Sturnus vulgaris			
	LR	LR		LR	LR				LR	LR		LR	LR		LR	LR	LR	LR		LR	LR	LR	
Skull			Skull			Skull		Skull			Skull												
Mandible-upper - lower			Mandible-upper - lower			Mandible-upper - lower		Mandible-upper - lower			Mandible-upper - lower												
Coracoid			Coracoid			Coracoid		Coracoid			Coracoid												
Sternum			Sternum			Sternum		Sternum			Sternum												
Furcula			Furcula			Furcula		Furcula			Furcula												
Scapula			Scapula			Scapula		Scapula			Scapula												
Vertebrae			Vertebrae			Vertebrae		Vertebrae			Vertebrae												
Ribs			Ribs			Ribs		Ribs			Ribs												
Pelvis			Pelvis			Pelvis		Pelvis			Pelvis												
Humerus	P D		Humerus	P D		Humerus	P D	Humerus	P D		Humerus	P D		Humerus	P D		Humerus	P D		Humerus	P D		
Radius	P D		Radius	P D		Radius	P D	Radius	P D		Radius	P D		Radius	P D		Radius	P D		Radius	P D		
Ulna	P D		Ulna	P D		Ulna	P D	Ulna	P D		Ulna	P D		Ulna	P D		Ulna	P D		Ulna	P D		
Carpus-Metacarpus	P D		Carpus-Metacarpus	P D		Carpus-Metacarpus	P D	Carpus-Metacarpus	P D		Carpus-Metacarpus	P D		Carpus-Metacarpus	P D		Carpus-Metacarpus	P D		Carpus-Metacarpus	P D		
Digits			Digits			Digits		Digits			Digits			Digits			Digits			Digits			
Femur	P D		Femur	P D		Femur	P D	Femur	P D		Femur	P D		Femur	P D		Femur	P D		Femur	P D		
Tibio-Tarsus	P D		Tibio-Tarsus	P D		Tibio-Tarsus	P D	Tibio-Tarsus	P D		Tibio-Tarsus	P D		Tibio-Tarsus	P D		Tibio-Tarsus	P D		Tibio-Tarsus	P D		
Fibula			Fibula			Fibula		Fibula			Fibula			Fibula			Fibula			Fibula			
Tarsus-Metatarsus	P D		Tarsus-Metatarsus	P D		Tarsus-Metatarsus	P D	Tarsus-Metatarsus	P D		Tarsus-Metatarsus	P D		Tarsus-Metatarsus	P D		Tarsus-Metatarsus	P D		Tarsus-Metatarsus	P D		
Phalanges			Phalanges			Phalanges		Phalanges			Phalanges			Phalanges			Phalanges			Phalanges			
MNI	1	2	Total	1	2	4	Total	5	Total	1	5	Total	2	1	3	Total	1	1	2	Total	1	1	2

Table 3

Level	Falco tinnunculus		Level	Chloris chloris		Level	Sturnus vulgaris		Level	Lynx t. minor/ eximius		Level	Emberiza caesia		Level	Lagopus montanus		Colinus lincolni		Level	Sturnus vulgaris		
	LR	LR		LR	LR		LR	LR		LR	LR		LR	LR		LR	LR	LR	LR		LR		
Skull			Skull			Skull		Skull			Skull												
Mandible-upper - lower			Mandible-upper - lower			Mandible-upper - lower		Mandible-upper - lower			Mandible-upper - lower												
Coracoid			Coracoid			Coracoid		Coracoid			Coracoid												
Sternum			Sternum			Sternum		Sternum			Sternum												
Furcula			Furcula			Furcula		Furcula			Furcula												
Scapula			Scapula			Scapula		Scapula			Scapula												
Vertebrae			Vertebrae			Vertebrae		Vertebrae			Vertebrae												
Ribs			Ribs			Ribs		Ribs			Ribs												
Pelvis			Pelvis			Pelvis		Pelvis			Pelvis												
Humerus	P D		Humerus	P D		Humerus	P D	Humerus	P D		Humerus	P D		Humerus	P D		Humerus	P D		Humerus	P D		
Radius	P D		Radius	P D		Radius	P D	Radius	P D		Radius	P D		Radius	P D		Radius	P D		Radius	P D		
Ulna	P D		Ulna	P D		Ulna	P D	Ulna	P D		Ulna	P D		Ulna	P D		Ulna	P D		Ulna	P D		
Carpus-Metacarpus	P D		Carpus-Metacarpus	P D		Carpus-Metacarpus	P D	Carpus-Metacarpus	P D		Carpus-Metacarpus	P D		Carpus-Metacarpus	P D		Carpus-Metacarpus	P D		Carpus-Metacarpus	P D		
Digits			Digits			Digits		Digits			Digits			Digits			Digits			Digits			
Femur	P D		Femur	P D		Femur	P D	Femur	P D		Femur	P D		Femur	P D		Femur	P D		Femur	P D		
Tibio-Tarsus	P D		Tibio-Tarsus	P D		Tibio-Tarsus	P D	Tibio-Tarsus	P D		Tibio-Tarsus	P D		Tibio-Tarsus	P D		Tibio-Tarsus	P D		Tibio-Tarsus	P D		
Fibula			Fibula			Fibula		Fibula			Fibula			Fibula			Fibula			Fibula			
Tarsus-Metatarsus	P D		Tarsus-Metatarsus	P D		Tarsus-Metatarsus	P D	Tarsus-Metatarsus	P D		Tarsus-Metatarsus	P D		Tarsus-Metatarsus	P D		Tarsus-Metatarsus	P D		Tarsus-Metatarsus	P D		
Phalanges			Phalanges			Phalanges		Phalanges			Phalanges			Phalanges			Phalanges			Phalanges			
Total	1	1	4	Total	2	Total	4	Total	1	1	5	Total	1	1	2	Total	1	1	2	Total	1	1	2
MNI	1	1	2	MNI	2	MNI	4	MNI	1	1	2	MNI	1	1	2	MNI	1	1	2	MNI	1	1	2

Table 7

Level	17 species																	
	Ardea	Platyrhynchos	Aquila/buteo	Falco	Bonasa	Agelaius	Recurvirostra	Cathartes	Columba	Nyctala	Alcedo	Hirundo	Turdus	Euphonia	Euphonia	Chondestes	Bonasa	
Skull																		
Mandible-upper																		
- lower																		
Coracoid																		
Sternum																		
Furcula																		
Scapula																		
Vertebrae																		
Ribs																		
Pelvis																		
Humerus	P																	
D																		
Radius	P																	
D																		
Ulna	P																	
D																		
Carpus-Metacarpus	P																	
D																		
Digits																		
Femur	P																	
D																		
Tibia-Tarsus	P																	
D																		
Fibula																		
Tarsus-Metatarsus	P																	
D																		
Phalanges																		
Total																		
MNI																		

Table 8

Level	18 species																	
	Agelaius	Alcedo	Hirundo	Chondestes	Turdus	Euphonia	Euphonia	Recurvirostra	Bonasa	Bonasa	Level	19 species						
Skull																		
Mandible-upper																		
- lower																		
Coracoid																		
Sternum																		
Furcula																		
Scapula																		
Vertebrae																		
Ribs																		
Pelvis																		
Humerus	P																	
D																		
Radius	P																	
D																		
Ulna	P																	
D																		
Carpus-Metacarpus	P																	
D																		
Digits																		
Femur	P																	
D																		
Tibia-Tarsus	P																	
D																		
Fibula																		
Tarsus-Metatarsus	P																	
D																		
Phalanges																		
Total																		
MNI																		

- BONE INDUSTRY
- LITHIC INDUSTRY
- HEARTH
- UNEXCAVATED AREA
- BIRD BONES
 - a. Zonotrichia
 - b. Lullula arborea
 - c. Anas americana
 - d. Larus michauxii
 - e. Zenaidura macroura
 - f. Sturnus vulgaris
 - g. Gallus gallus



Fig. 3. Insect eaters and birds of woodland and open country

Table 9
Level 20

	Level 20										Level 21	Level 21										
	L	R	L	R	L	R	L	R	L	R		L	R	L	R	L	R	L	R	L	R	
Skull																						
Mandible-upper											1										1	
Mandible-lower											1										1	
Coracoid											1										2	
Sternum																					2	
Furcula																					2	
Scapula											1										2	
Vertebrae																					1	
Ribs																						
Pelvis											1										1	
Humerus	P										2	P									3	
	D										4	D									1	
Radius	P										4	P									3	
	D											D										
Ulna	P										3	P									2	
	D											D									1	
Carpus-Metacarpus	P										4	P									1	
	D											D									1	
Digits											1										2	
Femur	P										4	P									1	
	D										1	D									2	
Tibio-Tarsus	P										6	P									2	
	D										2	D										
Fibula																						
Tarsus-Metatarsus	P										3	P									3	
	D										1	D									3	
Phalanges											1										2	
Total			1	2		2	2	2	2	2	1			1	2				2		3	
MNI			1	1	1	1	1	1	1	1	4-5			1	1	1	1	1	1	1	1	5-6

Table 10
Level 22

	Level 22										Level 23	Level 23										
	L	R	L	R	L	R	L	R	L	R		L	R	L	R	L	R	L	R	L	R	
Skull																						
Mandible-upper																						
Mandible-lower																						
Coracoid											3										4	
Sternum																						
Furcula											2											
Scapula											3										2	
Vertebrae																						
Ribs																						
Pelvis											1										1	
Humerus	P										4	P									3-2	
	D											D									1	
Radius	P										2	P									2	
	D											D										
Ulna	P										5	P									3	
	D										4	D									2	
Carpus-Metacarpus	P										2	P									1	
	D										1	D									3	
Digits											1										3	
Femur	P										1	P									1	
	D											D										
Tibio-Tarsus	P										4	P									2	
	D										1	D									1	
Fibula																						
Tarsus-Metatarsus	P										2	P									2	
	D										1	D									3	
Phalanges											1											
Total			1	3	4	2	5	1	2	1	3			2	1	2	5	5	1	1	3	
MNI			1	1-2	1-2	1	2	1	1-2	1	5-6			1	1	2	2	1	1	1	1	3-4

Table 11										Table 12										Table 13											
Level		Agelaius sp.		Columba livia		Ammodramus		Turdus phoeniceus		Turdus viscivorus		Syrnium griseolus		Level		Sageus montanus		Columba livia		Turdus viscivorus		Turdus viscivorus		Fem. torquilla		Syrnium griseolus		Site			
24		L	R	L	R	L	R	L	R	L	R	L	R	25		L	R	L	R	L	R	L	R	L	R	L	R	26		L	R
Skull																															
Mandible-upper																															
- lower																															
Coracoid																															
Sternum																															
Furcula																															
Scapula																															
Vertebrae																															
Ribs																															
Pelvis																															
Humerus	P																														
	D																														
Radius	P																														
	D																														
Ulna	P																														
	D																														
Carpus-Metacarpus	P																														
	D																														
Digits																															
Femur	P																														
	D																														
Tibia-Tarsus	P																														
	D																														
Fibula																															
Tarsus-Metatarsus	P																														
	D																														
Phalanges																															
Total																															
MNI																															

Table 13.

Table 12															
Level		Falco subellipticus?		Pipilo aberti		Motacilla alba		Syrnium griseolus		Level		Pipilo aberti		Columba livia	
28		L	R	L	R	L	R	L	R	29		L	R	L	R
Skull															
Mandible-upper															
- lower															
Coracoid															
Sternum															
Furcula															
Scapula															
Vertebrae															
Ribs															
Pelvis															
Humerus	P														
	D														
Radius	P														
	D														
Ulna	P														
	D														
Carpus-Metacarpus	P														
	D														
Digits															
Femur	P														
	D														
Tibia-Tarsus	P														
	D														
Fibula															
Tarsus-Metatarsus	P														
	D														
Phalanges															
Total															
MNI															

- 11 Lanius minor/excubitor
- 13 Hirundo rustica
- 16 Oenanthe oenanthe, Jynx torquilla
- 17 Hirundo rustica
- 18 Hirundo rustica oenanthe
- 20 Hirundo rustica, Acrocephalus scirpaceus
- 21 Hirundo rustica
- 22 Lanius minor/excubitor
- 28 Motacilla alba

It seems possible, therefore, that, whatever agency was responsible for bringing these birds into the cave, the occupation of these levels must be associated with the spring and summer months, from late March to September or October.

(Fig. 4, Fig. 5, Fig. 6) The seed and vegetable eating group include the larks, finches, sparrows, doves, jay and thrushes. The variety of flowering plant and trees in the area would provide an ample diet for both the small seed eaters, fruit for thrushes and larger seeds for the doves and the jay with its predilection for acorns, beech mast and other nuts. The thrushes would also have found ample supplies of animal food in the form of earthworms and molluscs, food which is also taken by the doves, wheatears and jays.

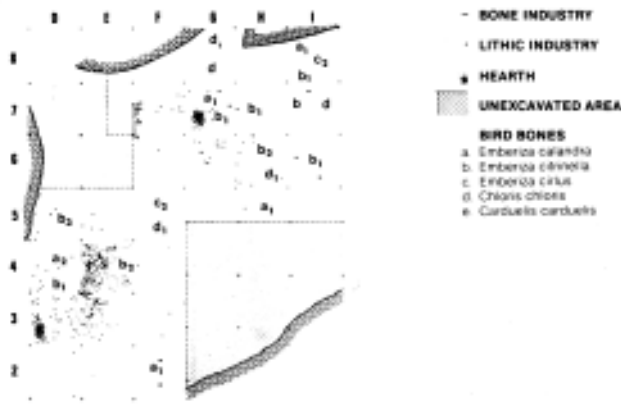


Fig. 4. Seed eating birds, Buntings and Finches



Fig. 7. Predators

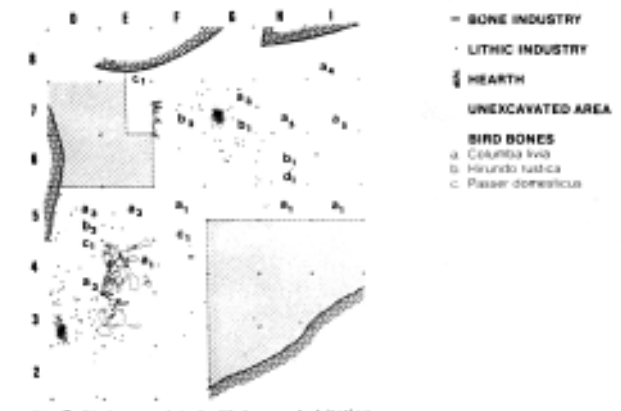


Fig. 5. Birds associated with human habitation

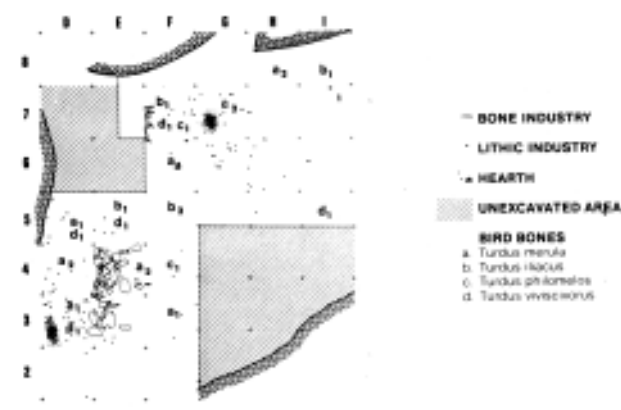


Fig. 6. Thrushes

predator bones around the cave is slightly curious; they, to an even greater extent than bones of other species, tend to be scattered around the periphery of the occupied area, except in the case of one eagle claw bone recovered from the first «depot rituel» with a phalange, probably of a falcon, which additionally shows signs of having been pierced. The owl bones were similarly scattered even though the concentration of small mammal bones in areas 3E, 3D, 4E and 4D suggests that if a tawny owl had roosted in the cave, it was in the rocks overhanging these areas, if the concentration of small mammals were in fact disgorged owl pellets. The microfauna is unlikely to have been brought into the cave by either of the other two species of owl, neither of whom would have been likely to have roosted in its rocky niches. The snowy owl of which there are only two bones from levels 15 and 17, was more common throughout Western Europe at this period, with remains recovered from a large number of cave sites in France and the Pyrenees. It prefers to roost in stumps and rocks in open ground, with a clear view of its surroundings; whilst the longeared owl is essentially treehaunting, hunting its prey in the grass and scrub above the cave and roosting in trees in the open or in the valley.

As with the other predators, the bones of owls seem to have been deliberately thrown outside the main habitation areas; indeed, the majority of all bird bones were recovered from outside the areas of maximum density of artifacts, and usually away from the two hearths, towards the edges of the excavated area on the north and eastern sides of the cave.

(Fig. 7) Besides this, the jay, along with the other predators in the cave, will take many small birds, as well as eggs. The lower Magdalenian levels contained bones of hawks, accipiters and owls. Most bones of predators were recovered from levels 15, 16 and 17 with a hobby from level 13 and a lesser kestrel from levels 14 and 28. Two clawbones, both of eagle came from levels 17 and 24 but the specific determination is not certain. The distribution of the

(Fig. 8) The only species found all over the excavated area is the chough, which may be because it is present in so much larger numbers or, it could be argued, that the general scatter of its bones occurred because the deaths were natural; they were not brought into the cave and disposed of by man.

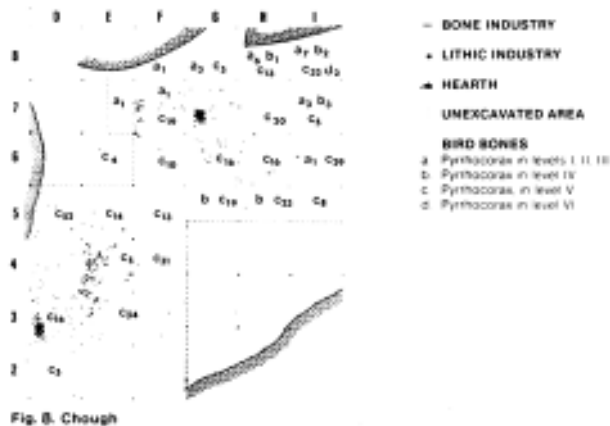


Fig. 8. Chough

Close study of the distribution of chough bones shows that the bones in levels of the final Magdalenian were found outside the areas of human debris, whereas in the lower Magdalenian they occur also within the areas of flint and worked bone deposits. Since it is in the lower Magdalenian that the bones of summer migrants appear there may be a relevant connection here with the seasonal occupation of the cave.

Appendix I. The overall numbers of bones recovered are so small that measurements of individual species on their own are meaningless and only through linking the Erralla data to other sites carrying approximately similar radio carbon dates can useful comparisons be made (see Altuna + Merino 1984).

It seems clear that even though their nutritional value was negligible the birds at Erralla were food items. The minimum number of individuals of any species in any level is small; at most there are two to three birds of any species other than chough and of them a maximum of only six to eight. The scatter of birdbones away from the concentrations of flint could be suggestive of snack eating behaviour and rubbish disposal; the way in which sweet wrappers and chip packets are thrown aside. There is no sign of any butchery or cutting marks on any birdbones and evidence of other means of utilisation is small.

Plate I. There is one phalange, as mentioned above, belonging probably to a falcon or accipiter, from level 16, with holes in the proximal end, which appear to have been bored deliberately. Microscopic examination of the holes shows no marks of cutting but the edges are extremely smooth, even polished. Since the epiphysis on the proximal end of phalanges is thick relative to the rest of the bone, a fissure at this point would not have occurred through natural wear without destroying the bone altogether. The location of the holes is interesting, with one bored vertically through the end, just below the epiphysis and two others horizontally and at right angles into the centre, below the epiphysis. Interesting too is the location of the find, in 4E amongst the material of «depot rituel» I. Supposing that these holes were bored artificially, this claw could have been a pendant or formed part of a necklace and for this reason gained a place in the «ritual» arrangement, inferring some particularity about either the individual or species of bird from which it originated.

Other uses are less readily identifiable, feathers for decoration and missiles, tamed birds for hunting or decoys or even as pets. All these are possible and becoming more likely as we begin to understand more clearly the living and subsistence practices in the late Palaeolithic.

The picture of bird life and exploitation which emerges from a study of the cave of Erralla is that, apart from certain species like ptarmigan, snowy owl and alpine chough, whose range was then at lower altitudes or more widespread, the birds to be found in levels dated to between 16,270 and 12,310 bp are not markedly dissimilar to the species resident in Guipuzcoa at the present day and that, even though Erralla would not appear to be a major occupation site in terms of human population and quantity of worked flint, yet they showed a significant interest in capturing and using a wide variety of small birds, in particular, as an additional relish to their diet.

APPENDIX I

MEASUREMENTS IN MILLIMETRES

Species	Level	Bone	Number	Side	Length	Proximal	Shaft	Distal
<i>Anas platyrhynchos</i>	22	Tarsometatarsus	6F320	L	44.00	10.60		10.50
<i>Lagopus mutus</i>	13	Tarsometatarsus	5D328	L	36.0	7.40	3.35	7.80
	16		5F310	R	44.45	8.65		10.45
			4E343	R	39.40	7.8		7.55
		Carpometacarpus	3D374	R	33.95	4.45		6.4
	18			L	34.85	5.95		7.65
		Tarsometatarsus	4E355	L	31.75			
		Carpometacarpus		L	31.75	9.00		7.50
<i>Alectoris rufa</i>	16	Carpometacarpus	4E350	L	25.45	7.05		5.75
<i>Perdix perdix</i>	18	Carpometacarpus	1	R	27.1	5.55		6.0
<i>Coturnix coturnix</i>	17	Tarsometatarsus	8H	L	26.45	4.58		5.05
			6F	L		5.0		5.0
<i>Lullula arborea</i>	20	Humerus	4D369	R	20.60	6.0	1.45	4.50
	23	Humerus	4F		21.45	6.95	2.0	5.2
<i>Alauda arvensis</i>	20	Coracoid		L	19.6	5.5		3.75
				R	20.90		4.00	
	12	Tarsometatarsus	BI194	R	23.45	3.5	1.25	2.65
	16	Femur	5E327	L	19.9	3.3	1.55	3.6
		Tibiotarsus		R	34.65	4.5	1.45	3.1
	17	Carpometacarpus	4F432	L	17.15	4.45		5.6
			H678	L		4.3		
	17	Tibiotarsus	5I261	L	34.85	4.6		3.05
18	Carpometacarpus		R	16.25			3.85	

MEASUREMENTS IN MILLIMETRES

Species	Level	Bone	Number	Side	Length	Proximal	Shaft	Distal	
<i>Alauda arvensis</i>	22	Tibiotarsus	6F302	R		5.05	1.45		
		Carpometacarpus	4F153	R	17.25	4.25		3.80	
		Tarsometatarsus	7F	R	24.1	3.5		2.9	
	23				L	25.45	3.6		2.7
		Humerus	3D400			22.5		2.45	6.0
	24	Carpometacarpus	6G	R	17.4	4.25		3.8	
<i>Lanius Minor/excubitor</i>	11	Humerus	8I184	L		7.75	2.35		
	16	Humerus	4D351	R	22.55	7.05	2.35	5.6	
	22		7H282	L	24.75	7.70	2.65	6.0	
		Ulna	7H282	R	31.5	3.85	2.0	3.65	
<i>Acrocephalus scirpaceus</i>	20	Humerus	6I244	R	23.1	7.15	2.1	5.6	
<i>Turdus merula</i>	13	Femur	7G282	R	30.10	4.80	2.10	5.05	
	22	Tibiotarsus	7G6285	R				4.75	
		"	4D	L				4.5	
		"	6F320	L	7.65				
		"		R	8.05				
	23	Femur	6F320	L				5.7	
		Humerus	4E383	R				8.35	
		Tarsometatarsus	"	L				4.10	
		Ulna	6F320	L		5.35			
carpometacarpus		"	R	22.80	5.25		4.65		
<i>Turdus iliacus</i>	16	Coracoid	5F310	L	23.6	7.10		5.35	
	22	Humerus	7F297	R	22.65	7.65	2.35	6.45	
	25	Ulna	81	R				3.75	

MEASUREMENTS IN MILLIMETRES

Species	Level	Bone	Number	Side	Length	Proximal	Shaft	Distal
Turdus philomelos	1	Humerus	7F152	R		9.00	2.80	
	24	Femur	4F	L		5.45	2.35	
Turdus viscivorus	16	Ulna	5I261	R		4.8	2.25	
		"	5D347	L			3.0	4.50
	24	Carpometacarpus	3D	R	23.6	5.60		4.95
Oenanthe oenanthe	16	Ulna	5D347	L	22.65	2.90	1.40	2.75
	18	Coracoid	3D347	R	20.00	3.85	1.20	
		Carpometacarpus		L	15.65	3.6		3.00
		Tibiotarsus		L		4.50	1.75	
Hirundo rustica	13	Ulna	7G	L		3.50	1.90	
	17	Carpometacarpus	4D	L	14.65	4.10	3.35	4.60
	18	Humerus	6H361	R	16.35	6.45	2.10	5.80
		Carpometacarpus	3E	L	15.90	3.95		3.35
	21	Humerus	5D	R	16.50	6.10	2.28	4.85
Moracilla alba	28	Carpometacarpus	5D	L		3.80		3.55
		Carpometacarpus	7I309	R	15.80	3.50		3.35
Embiriza calandra	5	Ulna	5H161	R	27.00	4.50	2.00	4.25
		Femur	2F170	R	20.50	4.60	1.70	3.65
	18	Ulna	8I215		27.30	3.90	2.40	3.50
	22	Humerus	79285	L			2.20	5.45
		"	4D	R	23.00	7.25	2.40	5.45
Embiriza citrinell	2	Humerus	6H140	L	21.55	7.30		5.80
	11	Humerus	8I184	R	21.0	6.70	2.25	5.50
	15	"	6I225	R	20.85	6.45	2.10	4.90
	16	Coracoid	4E350	R	21.0	3.70		4.85

MEASUREMENTS IN MILLIMETRES

Species	Level	Bone	Number	Side	Length	Proximal	Shaft	Distal
Emberiza citrinella	18	Humerus	7G271	L	20.60	6.40	2.05	5.00
		"	4D395	L	20.75	7.05	2.30	5.25
	23	Coracoid	5D373	R	19.80	3.25		4.75
		Ulna		L	20.95	3.60	2.15	3.25
	23	Tibiotarsus		L	30.25	4.25	1.35	2.65
		Femur	8I	R	17.9	2.85		3.1
Emberiza cirrus	15	Humerus	5F312	L			1.75	4.3
Cjloris chloris	4	Ulna	8G146	L	20.75	4.00' 3.88'	1.90	2.90
	5	Humberus	8G160	R	22.0	6.15	2.50	5.50
	6	Humberus	9G170	L	6.4	6.45		
	7	"	96173	L	21.70	7.25	2.25	4.65
		"	8G125	L	20.0	6.50	2.15	5.35
	17	"	7I225	R		6.35	1.85	
	22	Ulna	6H23	L	22.4	3.8	1.70	2.75
Carduelis carduelis	23	Humerus	5H306	L	15.65	5.40	1.60	4.15
Passer domesticus	18	Ulna	9F357	L		3.1		
		Femur	5F333	R		3.4	1.55	
Sturnus vulgaris	2	Humerus	8G149	L		8.80		
Garrulus glandarius	14	Humerus 1mm	8I199	L	43.45	12.0	4.0	
		Femur epiphysis diseased	5I	R	38.35	7.00	4.00	7.15
Pyrrhocorax graculus	4	Humerus	8H149	R	44.25	14.05	5.30	15.80
	11	"	7I184	L			4.80	
	1 - IV		8I194	L			5.40	13.65

MEASUREMENTS IN MILLIMETRES

Species	Level	Bone	Number	Side	Length	Proximal	Shaft	Distal
Pyrrhocorax graculus	V	Humerus	6I220	R				11.05
			5G290	R				11.75
			14	8I215	L			
			5H260	L		14.50		
			5D345	L				11.25
			7F261	R				11.75
	15		5F303	R	45.00		5.00	11.45
			6I225					12.15
			8H251	R				11.00
	16		6I234			12.85	4.2	11.00
			7I215	R				11.50
			2D390	L	44.24	14.2	4.9	11.20
		7I219	L			5.30	13.95	
	17	immature	7F270	L		4.90	11.25	
		6H263	L				11.25	
		6G269	R		14.30			
	18	6I227	L		13.60	4.50		
		4E358	L			4.95	11.30	
		8G271	R				13.15	
	21	5H	R		12.60	3.75	7.00	
		4F346	L	45.65	14.10	5.3	12.55	
		8H277	R		14.25		13.35	
		6F314	L					
	22	5D369	L	49.90	13.75	4.80	12.00	
		4E378	L		15.75			
	23	4H343	L		12.70			
		5H	R	48.85	14.60	4.65	10.50	
	24	6G296	R	41.40	12.25	4.15	19.95	

MEASUREMENTS IN MILLIMETRES

Species	Level	Bone	Number	Side	Length	Proximal	Shaft	Distal
Pyrrhocorax graculus		immature " "	6I263	L		14.50		
			6G296	R		13.25		
			4E387	R		13.50		
			6G296	R		13.75	4.25	
			4F357	L			4.45	
			7G280	L	45.85	13.79	4.64	11.50
t - IV	2	Ulna	8H138	L		8.25		
	6		9G	R		8.35		
			8G	R	61.0	8.45	3.75	7.75
	8		8I168	R	56.4	7.75	3.95	7.05
	11		8I184	L		8.90	5.00	
V	13		7G278	R				7.40
			7F	R		8.60	4.75	
			5F296	R	53.80	7.20	3.85	6.80
			"	R		7.80		7.85
			5D328	R	57.60	7.90	4.25	7.50
			"	L				7.85
	14		8I215	L		7.15		
			5E321	L		8.25	4.55	
	15		7G256	L	57.95	8.00	4.50	6.90
	16		7I215	R		7.50		
			4D351	L				7.25
			"	R				7.45
			5F310	R				7.35
			5D347	L		8.60		
			3D371	L				7.35
8I		L		8.15				
	7I219	L				8.10		

MEASUREMENTS IN MILLIMETRES

Species	Level	Bone	Number	Side	Length	Proximal	Shaft	Distal			
V	17	Ulna	7I223	R		8.05					
			"	L					5.50		
			BI224	L					6.15		
			5D348	R					7.40		
	18			5H282	L	59.05	7.25	5.15	7.25		
				8H270	L					7.00	4.60
				7H261	R						7.65
	20	immature	"	4F341	L		8.25	4.50			
				4E365	L					7.25	4.20
				6I244	R					7.85	4.10
				7G278	R						7.40
	21			5D364	L	60.75	8.75	4.80	5.0		
				5H302	L						7.65
				5E350	R						7.80
	22			4E378	L				7.05		
				2D407	R						7.85
	23			4D	L				7.70		
				"	L					7.65	7.50
				3E296	R						4.2
	24	immature		5H306		61.20	7.45	3.90	7.75		
				7G290	L						7.60
	V	14	Carpometacarpus	5F307	L	36.0	8.90		8.35		
				8H240	L					8.75	
"				L	8.45						
16				5G300	L		8.25	8.10			
18				4D3395	L		8.70		8.10		
				6F302	L					36.0	8.65
				6H255	R						8.10

MEASUREMENTS IN MILLIMETRES

Species	Level	Bone	Number	Side	Length	Proximal	Shaft	Distal
		Carpometacarpus	6F302	L	36.0			8.65
			6H255	L				8.10
	20		5D357	L		9.25		
	22	immature	5D369	L	37.30	8.30		8.35
			4F351	R	36.0	8.85		8.10
			5D	L	36.05			8.90
	23		4F357	L	34.00	8.25		8.10
			4D385	R	37.20	9.15		8.85
I - IV	8	Carpel	7H158	R	18.55			
	11		7I184	L	18.6			
	12		8I194	L	17.35			
	14		43334	R	17.50			
			BI	L	18.30			
			6I	R	15.60			
V	16		5F310	R	17.10			
			53327	R	18.35			
			6F	L	17.50			
	17		7I225	L	17.90			
			"	L	16.60			
	19		4D360	L	18.25			
			7H271	R	17.60			
	20		7G82	L	17.40			
	22		7F	L	17.80			
	3	Femur	8H145	L	40.80	7.70	3.60	7.75
			8G155	R		8.25		
			8G150	R		8.65		
			7I148	R				8.00

MEASUREMENTS IN MILLIMETRES

Species	Level	Bone	Number	Side	Length	Proximal	Shaft	Distal
	4	Femur	9G145	R			3.75	8.80
	13	Abraided	6H			6.80	3.0	
			5G365	L				7.65
	14		6F317	L				7.75
			6I	R				7.80
	15		6F285	R	41.15	8.25		8.40
			5E324.	R				7.80
			SE321	R				9.00
	16		6H251	L	41.15	7.90	3.30	8.35
			6I215	L	38.60	7.65	3.05	7.75
			5D342	L		7.55		
			8G25	L		7.30		
			"	L				7.80
			"	R	35.50	7.75	3.20	7.70
			4D351	R	39.15	7.50	3.15	7.65
			5D347	R		7.50		
			7I219	L		7.80		
	17		5E	L		7.60		
			5D348	L		10.65	2 frags	8.0
			6G269	R		7.75		
	18		6H255	L	39.30	7.90	3.50	7.65
			6H261	L		8.00		
	20		7G278	L				8.25
			6G283	R		7.75		
	21		5D364	R				8.65
	23		5H306	R	88.10	8.10	3.30	8.85
	24		6G300	L			3.70	7.90
I - IV	5	Tibiotarsus imature	7F173	R		9.55	4.0	

MEASUREMENTS IN MILLIMETRES

Species.	Level	Bone	Number	Side	Length	Proximal	Shaft	Distal	
	8	Tibiotarsus	8I160			8.65	4.25	5.8	
			8I318				3.20	6.00	
	12		8I194	L	42.60	7.00	3.00	5.60	
	13	Single Specimen (6H	R				7.00	
	15		5E330	L			3.50	6.40	
	16		5D347	R				6.20	
	17		6I231	R		10.00.1			
			6F	L		9.90			
	18		5D348	L				6.75	
			5E335	R				6.85	
			5I255	L		9.95	3.60		
			3H263	R		10.20	3.30	5.25	
			4E358	L		10.60	4.00		
			7G271	L				6.85	
			3E	R				6.00	
			7I	L				7.25	
			20	4E365	R			3.25	6.15
				4E341	R		9.30	3.25.	
	21		4E377	L		9.85			
			"	L	66.35	9.85	3.30	6.25	
	22		5I251	L			3.50	6.75	
			7F277	R				7.3	
	23		7F	L		9.15			
		5H306	L	67.80	11.00	3.50	6.8		
			R	67.75	11.00	3.45	6.7		
		7G290	R		10.40				
		"	L	69.40		3.65	6.10		
		8I358	L		6.50				
		"	L		6.15				

MEASUREMENTS IN MILLIMETRES

Species	Level	Bone	Number	Side	Length	Proximal	Shaft	Distal
	12	Tarsometatarsus	8I194	L	42.60	7.00	3.00	5.60
	13		5G290	L		6.80		
				R	44.90	7.35	2.90	
	14		5E321	R				5.20
			7H	R				5.30
			8I199	L				5.70
			8I215	L	45.35	7.05		5.25
			"	R		7.00		5.25
	15		5E335	L		7.0		5.35
	16		5F310	R				4.90
				L				5.40
	17		3H263	L				5.25
	20		5E348	L				5.35
	21		4E377	L	42.75	7.25		5.20
			6I246	R		7.00		
			8H1277		6.70			
			"	R	45.90	7.25		5.50
	23		4F355	L	46.95	7.45		5.65
			4D385	R		7.75		
			"	R	46.70	8.25		5.75
	24		8I251	R		7.65		

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