

Morton, F. (1959). *Viertausendfunfhundert Jahr Hallstatt im Bilde*. [Abb. S. 59./figure on p. 59]

Ryder, M. L. (1970). Remains derived from skin, pp. 539-54 in Brothwell, D. R. and Higgs, E. S. (eds.) *Science in Archaeology* (2nd ed.). London: Thames and Hudson.

Ryder, M. L. (1981). Wools from Vindolanda. *Journal of Archaeological Science* 8, 99-103.

Ryder, M. L. (1982). European wool types from the Iron Age to the Middle Ages. *Archäologische Textilfunde. Textilsymposium. Neumünster. May 1981*.

Ryder, M. L. (1983). *Sheep and man*. London: Duckworth.

Ryder, M. L. (1987). The evolution of the fleece. *Scientific American* 255(1), 112-9.

Ryder, M. L. (1988). Danish Bronze Age wools. *Journal of Danish Archaeology* 7, 136-43.

Ryder, M. L. (1990a). Skin and wool textile remains from Hallstatt. *Oxford Journal of Archaeology* 9, 37-41.

Ryder, M. L. (1990b). The natural pigmentation of animal textile fibres. *Textile History* 21, 135-48.

Ryder, M. L. (1992). Haired animal skin remains from Hallstatt, Austria. *Oxford Journal of Archaeology* 11, 55-67.

Walton, P. (1988). Dyes and wools in Iron Age textiles from Norway and Denmark. *Journal of Danish Archaeology* 7, 144-58.

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Eagles in Anglo-Saxon and Norse poems

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The research on which this note is based was undertaken while writing a paper on a skull of a white-tailed eagle *Haliaeetus albicilla* (L.), from Roman Leicester (Baxter 1993) and has been subsequently expanded with the aid of further references from Dr Susan Limbrey of the University of Birmingham and Dr D. W. Yalden of the University of Manchester.

Reid-Henry and Harrison (1988, 78) state that it is the white-tailed eagle (rather than the golden eagle, *Aquila chrysaetos* (L.)) that is the companion of the raven in Anglo-Saxon and Norse poems as a carrion-feeder at battlefields. There are two kinds of evidence to support this assertion, based on the differences of habit between white-tailed and golden eagles on the one hand, and upon literary evidence on the other. The white-tailed eagle is more sociable than the golden eagle and much more likely to avail itself of carrion, irrespective of season or abundance of live prey (Bannerman and Lodge 1956, 288; Brown 1978, 86; Pycraft in Kirkman 1913, 92). In this, the white-tailed eagle is similar to the bald eagle of North America, to which it is more closely related. Bald eagles are attracted in great numbers to the present-day salmon spawning grounds of Alaska to feed on dead and dying fish. Prior to 1871, as many as forty white-tailed eagles could be seen together, attracted by carrion on the Scottish coast (Bannerman and Lodge 1965, 286). Such flocking by white-tailed eagles is facilitated by their greater sociability than golden eagles and much smaller home range: 600-800 ha per pair for white-tailed eagle, and 4500-5300 ha per pair for golden. The extensive home range required by golden eagles is apparently not determined by the abundance or scarcity of suitable prey (Brown 1978, 86).

White-tailed eagles are much more catholic in their tastes in food than golden eagles and will even eat gulls and the eggs of other birds. In one standard reference work (Cramp 1980, 52), the white-tailed eagle is described as 'predator, scavenger and kleptoparasite'. The

marked preference for carrion displayed by this bird compared with the golden eagle is probably related to morphological differences such as greater body weight, more massive bill construction, and inferior aerial performance (Brown 1978, *passim*).

Golden eagles seem always to have preferred upland and mountainous areas and to have had a relatively low population density, even under optimum conditions. Brown (1978, 179) considers that the Scottish population of golden eagles was probably never much larger than it is now and that England and Wales, together, could not have supported more than fifty pairs at any time since the last glaciation. As a lowland and waterside eagle with a small home range and more sociable habits, the white-tailed eagle was probably the more common of the two in the past.

In the Anglo-Saxon poems, the white-tailed eagle is called the *earn*, a word closely related to the Gaelic *erne*, by which the species was commonly known in old ornithological works (e.g. Newton and Gadow 1899; Dresser 1871-81), and the Icelandic *ørn*. Although Gelling (1987, 175) has pointed out that the Anglo-Saxons used the word *earn* indiscriminately—'eagle' being derived from Middle English *eagle*, from the Old French *egle* or *aigle* (Martin 1992, 28)—it would seem that it is the white-tailed eagle that is meant in poems such as *The Seafarer*, lines 24-5, where it is described as 'with dripping feathers' (Kershaw 1992, 21), or *Elene*, line 11 and *Judith*, line 205, where it is 'the dewy-feathered' (Gordon 1962, 211 and 323, respectively), or *The Battle of Brunanburh*, line 63, where it is 'the dun-coated white-tailed eagle' (Kershaw 1922, 181, note 63). The trio of the wolf, raven and [white-tailed] eagle is a standard grouping in Anglo-Saxon literature (*ibid.*).

In the Norse (Icelandic) poems, the white-tailed eagle is the *ørn*. Under this name it is mentioned in lines 138 and 182 of *Helgi and Sigrun* (Vigfusson and Powell 1965, I, 136-7), line 58 of *Hjalmar's Death Song* (*ibid.*, 163) and lines 66 and 70 of *Atlamál* (*ibid.*, 334), among others. *Arnar* has also been translated as *erne* (i.e. white-tailed eagle) in some poems, e.g. in line 15 from *Grani-skald* (verses 2, 3 from *Edda*; Vigfusson and Powell 1965, II, 218). The expressions 'to give the eagle food' and 'feed the eagles' were well known kennings for 'kill enemies'. Examples of this are the inscription on the rune-stone commemorating Harald,

Ingvar's brother, at Gripsholm, Kärnbo parish, Södermanland in Sweden:

*They fared like men
far after gold
and in the east
gave the eagle food.
They died southward
in Skerland.*

(translated by Jansson (1962, 41) and illustrated by Sawyer (1982, pl. IV)), and lines 4-6 of *Olaf of Sweden's Praise*: 'Olaf feeds the eagles; the lord of the Swedes is foremost. The *erne* drinks his supper; the she-wolf laps the blood; the wolf stains his jaws; the eagle gets his meal there.' (Vigfusson and Powell 1965, II, 157).

It is probable that the giant eagle of the wind (*arnar*) in verse 36 of *Vafthrundismál*, named 'carrion-gulper' (*ibid.*, 66) was a white-tailed eagle and the bird also appears at the end of *The Prophecy of the three Sibyls* (lines 183-4): 'The waters are falling, the *erne* hovering over them, the bird that hunts the fish in [the streams of] the mountain.' (*ibid.*, 628).

The golden eagle is much more difficult to identify in the Norse poems, although there are words that signify 'eagle' in general, such as *ari*, which occurs in the children's jingle 'An eagle sat upon a rock' (Vigfusson and Powell 1965, I, 400). The recent literature is not always clear, with authorities giving different names. Hence Newton and Gadow (1899, 175) give *Ørn* as Icelandic for *Erne* or white-tailed eagle and Swainson (1885, 136) gives the Danish *Oern*, while Dresser (1871-81) has for the white-tailed eagle the Danish *Havørn* or *Fiskeørn*; Icelandic *Ørn*; Norwegian *Havørn*; Swedish *Hafsørn*; and Gaelic *Erne*, *Joliar-Bhuidhe* and *Joliah-Riamhach*. For golden eagle, Dresser (1871-81) gives Gaelic *Iolair dhub*; Danish *Steen-arend*; Norwegian *Kongeørn*, *Stenørn*, and *Fjeldørn*; and Swedish *Kungsørn*.

The golden eagle does not occur in Iceland, while the white-tailed eagle does, and was once common (Cramp 1980). To an Icelander, *Ørn* would be the white-tailed eagle and the Norse poems as they have come down to us are Icelandic creations. The prefixes to the bird names in the modern Scandinavian languages where the particular eagle is identified as 'fish' eagle, 'king' eagle, or 'stone' eagle, etc., do not figure in the sagas and cannot be used as an aid to identification. It seems reasonable to conclude, therefore, that the linguistically

related names *Earn* and *Ørn* in Anglo-Saxon and Norse poems generally refer to the white-tailed eagle, *Haliaeetus albicilla*.

A most interesting paper by Gelling (1987) draws attention to the topographical nature of Anglo-Saxon place names in which *earn* is the first element. Many of these have as their second element words indicating woodland, particularly *lēah*. Most of the names referring to woodland eagles are inland locations situated near major rivers, including the Thames, Severn, Mersey, Ribble and Don. Others relate to lesser rivers, and include Arley (*Earn-lēah* = 'eagle clearing') in Warwickshire, between the Rivers Anker and Tame, close to the Roman site of Mancetter and not far from Leicester. Such locations would have been ideal nesting sites for white-tailed eagles, which seem to have had a widespread distribution in wooded riverine and lacustrine habitats in England during Anglo-Saxon and earlier times.

Gelling (1987, 176) notes that these woodland names and others referring to more open and upland areas have a complementary distribution and speculates that the two groups may indicate the former presence of different kinds of eagles. Certainly, there are records of golden eagles resident in the Peak of Derbyshire, the Lake District and the Cheviots in the past and of vagrants occurring in Sussex, Berkshire, Norfolk, Lincolnshire and Northamptonshire (Newton and Gadow 1899, 179; Witherby 1939, 40). However, the white-tailed eagle is also on record as having formerly bred in the Lake District and on Dartmoor (Newton and Gadow 1899, 175); Bannerman and Lodge 1956, 286) and a certain amount of overlap in distribution is to be expected. For example, the present author finds it difficult to accept uncritically that the eleven Devonshire names listed by Gelling which have suffixes indicative of valleys or high places necessarily relate to the golden rather than the white-tailed eagle in view of the proximity of the coast, of major rivers such as the Taw and Dart, and of the presence of the latter species in the area in relatively recent times. These could also be the former haunts of white-tailed eagles.

There seems little doubt, in view of the additional information given above, that the Leicester specimen was a resident in Roman times and that the species had a much more widespread inland distribution in Britain in the past, being pushed out towards the coast

and extinction with the expansion of human population and habitat destruction. The popular name 'sea eagle' reflects the final status of the species as a British resident and the more scientifically correct name white-tailed eagle should be applied throughout its temporal span.

References

Bannerman, D. A. and Lodge, G. E. (1956). *The birds of the British Isles*. V. Edinburgh and London: Oliver and Boyd.

Baxter, I. L. (1993). An eagle, *Haliaeetus albicilla* (L.), skull from Roman Leicester, England, with some speculations concerning the palaeoecology of the Soar valley. *Circaea, The Journal of the Association for Environmental Archaeology* 10 (1), 31-7.

Brown, L. (1978). *British birds of prey*. London: Collins.

Cramp, S. (ed.) (1980). *Handbook of the birds of Europe, the Middle East and North Africa. The birds of the Western Palearctic*. II. Oxford: University Press.

Dresser, H. E. (1871-81). *A history of the birds of Europe. Including all the species inhabiting the western Palearctic region*. V. London: H. E. Dresser.

Gelling, M. (1987). *Anglo-Saxon eagles*, pp. 173-81 in Turville-Petre, T. and Gelling, M. (eds.) *Studies in honour of Kenneth Cameron. Leeds Studies in English. New Series* 18. University of Leeds.

Gordon, R. K. (1962). *Anglo-Saxon poetry*. London: Dent.

Jansson, S. B. F. (1962). *The runes of Sweden*. London.

Kershaw, N. (1922). *Anglo-Saxon and Norse poems*. Cambridge: University Press.

Kirkman, F. B. (ed.) (1913). *The British bird book*. London and Edinburgh: P.C. and E.C. Jack.

Martin, B. P. (1992). *Birds of prey of the British Isles*. Newton Abbot: David and Charles.

Newton, A. and Gadow, H. (1899). *A dictionary of birds*. London: Adam and Charles Black.

Reid-Henry, D. and Harrison, C. (1988). *The history of the birds of Britain*. London: Collins with Witherby.

Sawyer, P. H. (1982). *Kings and Vikings*. London: Methuen.

Swainson, C. (1885). *Provincial names and folk lore of British birds*. London: Trubner and Co.

Vigfusson, G. and Powell, F. Y. (1965). *Corpus Poeticum Boreale, the poetry of the Old Northern Tongue from the earliest times to the thirteenth century*. I, II. New York: Russell and Russell.

Witherby, H. F. (ed.) (1939). *The handbook of British Birds*. London: Witherby.

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A method for the preparation of very small animal skeletons

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David and Payne (1992) describe a variety of methods by which the skeletons of animals can be prepared. These include maceration, simmering in water and, in one instance, immersion in the waters of a Greek harbour, where small carnivorous organisms will deflesh the specimen. This is reminiscent of Bolin's method (quoted by Casteel 1976) in which marine isopods of the American Pacific coast would clean a fish in only 24-42 hours.

At the risk of spoiling the opportunities that zooarchaeologists have to claim travel grants to Greek harbours and the Pacific USA for specimen preparation, I have found that other, more local organisms can be used to achieve an excellent result in cleaning the skeletons of very small animals. While simmering or burial work well for larger specimens, small fish of <15 cm length, or small birds or mammals, present a tedious job in extracting the small bones from fish or vole soup. To avoid this, it is worth enlisting the help of tadpoles.

Tests were made in a small garden pond which contained an abundant spring population of both common frog (*Rana temporaria* L.) and common toad (*Bufo bufo* L.).

The tadpoles of each species emerge from the spawn in spring, and soon become enthusiastic carnivores. A small specimen of the gudgeon, *Gobio gobio* L., measuring 10 cm from the nose to the tail fork, was perfectly prepared in about 10 days. Similarly, small birds robin or sparrow size are quickly cleaned. In the case of birds and mammals, an additional incentive can be given to the tadpoles by skinning the specimen; in the case of small fish, the abdominal cavity can be opened. The specimens are placed in a small metal container such as a food tin, with its sides perforated with 6-8 mm holes above the level of the specimen. A small piece of 10 mm mesh prevents the specimen from floating. The container is suspended a few centimetres below the water surface. Tadpoles locate this food source within a few minutes. The skeletons are thoroughly cleaned by these industrious amphibians, and by observing the process frequently, perfectly clean but articulated skeletons can be obtained. These are easily disarticulated if separated bones are needed.

Tadpoles feed with horny jaws, though the microscopic examination of very small fish bones does not show any abrasion to the bone surface. The rate of growth and subsequent metamorphosis in tadpoles are both food- and temperature-dependent. At high populations densities, metamorphosis takes several months, though it is probable that an abundant food supply in the form of your comparative specimens would shorten this time. The desired small animals could be stored in a freezer until the processing season.

By this method, the zooarchaeologist may save much frustrating work in cleaning small specimens, and assist, too, in the propagation of our increasingly urbanised amphibians.

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What are we measuring?

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When I began studying animal remains from archaeological sites it was common for archaeologists to keep only a few examples of any bones found for identification and subsequent listing in the excavation report.