Wetland birds in the recent fossil record of Britain and northwest Europe

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18. Dalmatian Pelican *Pelecanus crispus*, Deep Bay, Mai Po, Hong Kong, February 1995. Geological evidence suggests that Dalmatian Pelicans bred in Britain, and in other western European countries (including The Netherlands and Denmark), prior to and during the Iron Age. *Ray Tipper.*

ABSTRACT Wetland habitats in Britain and other parts of western Europe have been severely depleted during the latter part of the Holocene owing principally to drainage and land reclamation. Changes in the distribution of a number of wetland bird species can be gauged from archaeological and geological site records of larger birds, whose remains are generally better preserved. Key species are discussed here, including a heron *Nycticorax fenensis* and a crane *Grus primigenia*, two extinct species named on possibly uncertain fossil evidence.

We can let our minds wander back to the misty realms of fifteen hundred years ago, to a wonderful Britain which was alive with bird song from coast to coast, which sheltered wolves, bears and boars in its dark woodlands, cranes in its marshes, bustards on its heaths and beavers by its streams, and we can visualize the great pink pelican sweeping on its huge pinions over the reedy waterways which then penetrated by secret paths into the very heart of what is now Somerset. (Whitlock, 1953)

Of all the major habitats in northwest Europe, wetlands may have been the most severely depleted during the latter part of the Holocene (approximately the last 10,000 years). This is certainly true of Britain (Whitlock 1953), where the effects of drainage and land reclamation have resulted in a massive loss of wetlands, and those which now remain are but a fraction of the area formerly covered by marshes, lakes, and even rivers. The consequences to breeding populations of wetland birds can be gauged by looking at those species which have vanished (although in the case of some only temporarily) from Britain, and elsewhere in northwest Europe, during the last 2,000-3,000 years. Examples include Dalmatian Pelican *Pelecanus crispus*, Night Heron *Nycticorax nycticorax*, Great White Egret *Ardea alba*, Eurasian Spoonbill *Platalea leucorodia*, Common Crane *Grus grus*, White-tailed Eagle *Haliaeetus albicilla*, Osprey *Pandion haliaetus*, Black Tern *Chlidonias niger*, and possibly also Pygmy Cormorant *Phalacrocorax pygmeus* and Greater Flamingo *Phoenicopterus roseus*. Another possible consequence of wetland loss may be that certain species, including Mute Swan *Cygnus olor* and Common Crane, may have become physically smaller owing to habitat impoverishment.

Rising sea levels during the later Pleistocene and earlier Holocene also resulted in the loss of wetlands, especially intertidal wetlands. These losses will have affected both breeding and wintering populations of many species, waders and waterfowl in particular, and, in tandem with the ameliorating climate, must have dramatically altered the distribution of many migratory species in northwest Europe (Stewart 2001).

Details from a variety of sites in northwest Europe which have yielded remains of wetland birds have been published (e.g. Bulleid & Gray 1911-17; Soergel 1955; Bramwell 1975; Clason & Prummel 1979; Northcote 1979, 1980; Harrison 1980, 1987; Bochenski 1983; Reichstein & Pieper 1986; Prummel 1987, 1993; Zeiler 1991; Zeiler & Clason 1993; Stewart 1999; Lawerier 2001). These include both geological sites and those which are purely archaeological, where bird bones presumably represent the remains of food refuse (e.g. Bramwell 1975). Geological sites, including the various fen deposits of East Anglia and Danish peat deposits, provide the best-preserved remains of wetland birds, often yielding complete, or near-complete, skeletons (Northcote 1979; Stewart 1999).

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19. Great Cormorant *Phalacrocorax carbo*, Quinta da Lago, Algarve, Portugal, February 1998. In Britain, we tend to think of the occurrence of Great Cormorants in freshwater habitats as being a modern phenomenon, but there is evidence to suggest that this species bred inland (at Glastonbury, Somerset) during the Bronze Age.

Taxonomic review

Many of Europe's largest birds either inhabit wetlands or are closely associated with them. These include members of the Anseriformes, Ciconiiformes and Gruiformes, representing swans, geese, ducks, herons and egrets, storks and cranes. Any loss of wetland habitats will, therefore, have a disproportionate effect on the large-bird populations of an area, and this loss will be reflected within the fossil record, where

remains of the larger species tend to be those which are best preserved. The consequences of wetland loss will have also been significant for smaller birds. As their remains are small, however, the difficulties involved in the recovery of their skeletal remains are considerable, and require the sieving of suitable sediments. Inevitably, therefore, many smaller species are less well represented and their history in wetlands cannot be addressed adequately. Furthermore, the identification of many passerine bones to the species level is problematic, so their physical record, even if it were complete, would be ambiguous and difficult to interpret. Specific identification is the most crucial part of any study of bird bones and considerable difficulties exist; these were discussed by Stewart (1999, 2002a), who concluded that any uncritical review of the literature may lead to questionable conclusions. Many taxonomic groups are problematic in this respect, with ducks and the smaller passerines being possibly the most difficult to identify. The osteology of ducks is conservative, and while a profusion of identifications exist in the literature, it is questionable whether these are entirely accurate and reliable. Consequently, ducks have been omitted from this review.

Changes to wetland bird distributions have not been synchronous, suggesting that a range of factors may be responsible. For example, some species have subsequently re-established breeding populations in northwest Europe, despite there being no significant recovery of wetland environments. Little Egret *Egretta garzetta* has recently become firmly re-established as a regular breeding species in Britain (Bourne 2003), while Common Crane and Eurasian Spoonbill appear to be attempting to do so. Some have attributed these new breeding records to global warming (e.g. Unwin 2000).

There are few taxa which are relatively common in the archaeological record and which have subsequently shown little change in their distribution, one obvious example being Grey Heron *Ardea cinerea*. In contrast, there are many species which are inexplicably absent, or nearly so, from the archaeological record, even though their remains might be expected to occur frequently. These include all of the grebes Podicipedidae, Little Bittern *Ixobrychus minutus*, Osprey, Moorhen *Gallinula chloropus*, Common Coot *Fulica atra* and Water Rail *Rallus aquaticus*. Other species, including Eurasian Bittern *Botaurus stellaris*, White Stork

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Fig. 1. Dalmatian Pelican *Pelicanus crispus*, at London Zoo.

Ciconia ciconia, Eurasian Spoonbill, White-tailed Eagle, Marsh Harrier *Circus aeruginosus*, Common Crane and Black Tern, are well represented in the archaeological record, but their present European distributions suggest that numbers have diminished dramatically, with many having become locally extinct across large areas of Europe. Interestingly, Great Cormorants *Phalacrocorax carbo* disappeared from freshwater habitats in Britain but remained in coastal regions. Other species which are rare in the archaeological and fossil records and have disappeared from most or all of northwest Europe include Dalmatian Pelican, Pygmy Cormorant, Great White Egret and Greater Flamingo. There are also those species, including Black Stork *Ciconia nigra* and Squacco Heron *Ardeola ralloides*, whose current breeding distribution extends close to northwest Europe and which may have once bred there, but have not, as yet, been found on archaeological or palaeontological sites. Finally, we have a heron *Nycticorax fenensis* and a crane *Grus primigenia*, both extinct species named on questionable fossil grounds.

This paper discusses some pertinent examples of species whose distribution has changed.

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20. Greater Flamingos *Phoenicopterus roseus*, Tavira, Algarve, Portugal, November 1996. The sole archaeological record of Greater Flamingo in northwest Europe, in The Netherlands, dates from a period when the climate was warmer than it is today, and from a site which had a nearby saline lagoon.

Dalmatian Pelican

The identity of the pelicans which bred in Britain was uncertain for some time, although some commentators, including Whitlock (1953), erroneously believed them to have been White Pelicans *Pelecanus onocrotalus*. Not surprisingly, historical sources were inadequate in naming the species involved; the 'pelican' recorded in Norfolk by Sir Thomas Browne in 1663 may have been either an escapee from London or a vagrant from southeastern Europe (Whitlock 1953). It has subsequently been established that the pelicans were, in fact, Dalmatian Pelicans, which then bred in northwest Europe, including Britain (Joysey 1963; Northcote 1979). Dalmatian Pelicans are better suited to the cooler climate of northwest Europe and the shallow water bodies of areas such as the East Anglian Fens than are White Pelicans (Northcote 1979). Physical evidence for the presence of pelicans in Britain was perhaps most famously noted from an archaeological perspective by Joysey (1963) in a paper entitled 'A scrap of bone', which described a small bone fragment of Dalmatian Pelican from the Fens. Sites where the species has been recorded include the fen peat deposits; Glastonbury Lake village, Somerset; and the King George Dock in Hull, East Yorkshire (Bulleid & Gray 1911-17; Northcote 1979). The finds from East Anglia and Hull date from Godwin's pollen Zone VII, while those from Glastonbury are from Zone VIII, and more precisely from the Iron Age (700 BC to AD 43) (Northcote 1979).

Remains of Dalmatian Pelicans have been found in late Eneolithic (approximately 5,000-4,000 BC) deposits at Vlaardingen, Netherlands (Clason & Prummel 1979), including nine bones of at least three individuals. There is also an undated record of an unidentified pelican from the Maasvlakte, Netherlands, which was discovered during dredging operations to create new waterways (Kompanje & Kerkhoff 1991). Skeletal remains of Dalmatian Pelicans have also been reported from Denmark (Northcote 1979), where there are six verified specimens and one of a pelican unidentified to species. Six of the specimens were dated to Jenssen's Danish pollen zones VII and VIII, which correspond to Godwin's zone VII, a period spanning 5,000-2,000 years BC (Northcote 1979).

Clason & Prummel (1979) quoted Pliny, who stated that Dalmatian Pelicans formerly bred in the estuaries of several major European rivers, including the Rhine, Scheldt and Elbe. Furthermore, they speculated that the disappearance of the pelicans was at least partly due to the loss of the biotope which supported this species.

Great Cormorant

Two subspecies of Great Cormorant presently occur in northwest Europe: the nominate *carbo* and the 'continental' form *sinensis*, the former being significantly larger than the latter (Ericson & Hernández Carrasquilla 1997). The nominate form is currently restricted to the coastal regions bounding the northern and western perimeters of the region, although this was apparently not always the case. Ericson & Hernández Carrasquilla have shown that during the prehistoric and early historic (AD 500-1,000) periods, *carbo* was present in southern Sweden throughout the year. Today, only *sinensis* breeds there, but is joined by birds of the nominate form in winter. The same appears to have been true in Denmark, and possibly elsewhere in Europe in earlier times, and it may be that *sinensis* is a relative newcomer to western Europe (Stewart 2002b).

The modern trend is for *sinensis* to be more of an inland bird, while *carbo* has come to favour a marine environment, being replaced by *sinensis* as the latter extended its range into northwest Europe. The preference of *carbo* for coastal environments in Britain may have led to misconceptions regarding this species' preferred habitat. There has been recent topical controversy resulting from Great Cormorants becoming re-established in freshwater habitats in Britain. The Wildlife and Countryside Act of 1981 introduced full legal protection to the species, leading to increased numbers in freshwater habitats (such as flooded quarries and gravel-extraction workings, many of which may resemble former habitats), where gamekeepers had formerly controlled them. This led to claims by sports fishermen and fish farmers that the birds were colonising freshwater habitats as a result of overfishing at sea. There is, however, clear evidence that Great Cormorants formerly bred in freshwater habitats at Glastonbury, where skeletal remains of young birds have been found, confirming that inland breeding occurred here during the Bronze Age (2,400-700 BC) (Bulleid & Gray 1911-17). Furthermore, examination of the remains suggests that these birds appear to belong to the larger, nominate subspecies.

Pygmy Cormorant

The Pygmy Cormorant has been found just once in the British archaeological record, the remains coming from a timber-lined well on an archaeological site in Stert Street, Abingdon, Oxfordshire (Cowles 1981). This appears, however, to be the sole record from northwest Europe. Although there is no evidence to suggest that this specimen, dated to the fifteenth or sixteenth century, originated from a breeding colony in Britain, the climate during the time when the Abingdon timber-lined well-shaft became filled might have been warmer than that at present, as vines are known to have been grown in Abingdon in about 1380. It was not long after this, however, that the climate deteriorated dramatically, with several severe winters recorded during the 1430s (Cowles 1981). Today, Pygmy Cormorant breeds no farther west than Albania and Macedonia, but remains fairly common and widespread in wetlands bordering the Black, Caspian and Aral Seas, and through Asia Minor east to Iran.

Another example of an exotic bird found in the archaeological record, dated to a similar period, came in the form of a parrot (Psittacidae), not identified to species, which was found in a pit-fill dated to the mid to late seventeenth century at Castle Mall, Norwich (Albarella *et al.* 1997). This parrot clearly did not represent a breeding species in Britain but was found on an archaeological site. It would, therefore, be wise to treat the remains of the Pygmy Cormorant with equal caution, unless the species is found again and in a natural context thus eliminating doubt over its origins.

Little Egret and Great White Egret

In recent years, Little Egret has become established as a regular breeding species in Britain (Lock & Cook 1998). The species' recent expansion into northwest Europe is attributed to an increased northwesterly post-breeding dispersal which led to birds overwintering in these areas and subsequently remaining to breed. Greater protection from persecution as a result of the EC Birds Directive may also have been influential (Lock & Cook 1998). There are no archaeological or palaeontological records of Little Egret in northwest Europe (though see Bourne 2003), but remains of Great White Egret have been discovered on two occasions: from a medieval urban site in Amsterdam and a late medieval castle in Breda, both in The Netherlands (www.archis.nl). Until recently, Great White Egret bred no closer to Britain than eastern Austria, although in recent years small but expanding breeding populations have become established in The Netherlands and northwestern France.

Night Heron and the extinct heron *Nycticorax fenensis*

The archaeological and fossil record of the Night Heron is not extensive. Remains have been found in the London area, discovered in a food refuse deposit (Harrison 1980), and two further records exist in The Netherlands: one from Haarlem dated from the late medieval to early post medieval period, and one from Zutphen with an early medieval date (www.archis.nl). Today, Night Heron breeds as far north as the English Channel but its occurrence in Britain remains sporadic.

The extinct heron *Nycticorax fenensis* was described by Friant (1950), based on two specimens currently housed in the Sedgwick Museum, Cambridge. Although these were originally identified as Great Bittern, Friant believed them to belong to an extinct species of night heron. Given this uncertainty, a detailed re-examination of these specimens is required.

Greater Flamingo

There is a single archaeological record of Greater Flamingo in northwest Europe, coming from the Neolithic 'northern site' at Kolhorn, Netherlands (Zeiler & Clason 1993). This was attributed to a warmer climate than exists today, as well as the presence of a saltwater lagoon in the vicinity of the site. The author has seen the specimen, which is poorly preserved, and would like to examine it further before accepting it without question.

Eurasian Spoonbill

Although Eurasian Spoonbills formerly bred in southern and eastern England (Gurney 1921; Whitlock 1953; Harrison 1982), breeding ceased during the seventeenth century, probably because of a combination of hunting and the draining of the species' favoured breeding and feeding sites. Today, it still breeds in several colonies in The Netherlands, where numbers appear to be increasing and expanding into northern Germany. Recent breeding attempts in Britain have met with mixed success, but its re-establishment as a regular breeding species seems a distinct possibility. Within the published literature, there remains the possibility of confusion between Eurasian Spoonbill and Shoveler *Anas clypeata*, as these species were often given the same local and regional names.

In The Netherlands, there is a record of Eurasian Spoonbill from the Roman castellum Velsen I

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21. Night Heron *Nycticorax nycticorax*, Utah, USA, June 1999. Archaeological remains of Night Herons have been found in the London area, while bones found in Cambridgeshire may have belonged to an extinct species of *Nycticorax* heron (see text).

Reston Kilgour

22. Eurasian Spoonbills *Platalea leucorodia*, Cley, Norfolk, June 1999. Spoonbills bred in southern and eastern England until the seventeenth century, when the combined effects of hunting and wetland drainage were probably responsible for the extinction of these breeding populations. Will we see them become re-established at sites like Cley in the foreseeable future?

dated to AD 15-30 (Prummel 1987, 1993). Prummel (1987) assumed that the remains of the spoonbill were of one which had died naturally, owing to the past belief that birds which eat fish, along with shellfish-eating birds, are unpalatable. There is also a single archaeological record from Poland, dated to the early medieval site at Santok (Bochenski 1993).

Common Crane

The Common Crane has a relatively good palaeontological and archaeological record, having been found at numerous Holocene sites of various ages in Britain (Newton 1901; Boisseau & Yalden 1998) and northwest Europe (e.g. Bochenski 1983, Zeiler 1991, Prummel 1993, Zeiler & Clason 1993, Stewart 1999). Crane bones are common in the record, being found among domestic waste in towns as well as in peat deposits. Reference to cranes being eaten can be found in many texts. For example, in a list of presents sent to William Moore of Losely to mark his daughter's wedding on 3rd November 1567, there is included nine cranes 'out of the marshland in Norfolk' (Simon 1944). Other texts mention that 'Crane is hard of digestion and maketh yll juice, but beyng hanged up longe in the ayre, he is the less unholsome' (Simon 1944). The latter probably accounts for the fact that Common Crane subsequently became 'no longer sought after; such is changing fancies of English fare' (Smith 1949).

The formerly widespread distribution of Common Crane in Britain is further illustrated by the large number of place-names which include local and traditional names given to the bird (including prefixes such as 'cran', 'trani', 'cron', 'corn' or 'cranuc'; Boisseau & Yalden 1998), and documentary evidence (Southwell 1901). Common Cranes probably became extinct as breeding birds in Britain in the sixteenth century (Whitlock 1953) and in countries such as Denmark in the early nineteenth century, but in the remote marshlands of Scandinavia and Poland, substantial breeding populations still exist (Cramp & Simmons 1980). Recolonisation of Denmark began in 1925 (Cramp & Simmons 1980) and recently it has become re-established as a breeding species in East Anglia (Boisseau & Yalden 1998).

The existence of unusually large crane bones in the fossil record has led some authorities to attribute these to an extinct late Pleistocene species *Grus primigenia* (e.g. Harrison & Cowles 1977). A number of authors have used a variety of methodologies to address the question of the validity of *Grus primigenia*. Their arguments have been based primarily on analyses of non-biometric osteological traits, as well as on the zoogeographic distributions of the fossils in relation to modern taxa, balanced

against perceptions about the significance of these types of information.

In order to investigate the identity of these large cranes, Stewart (1999) conducted a detailed survey, measuring crane bones, both from the fossil record and from modern specimens, regardless of whether they were previously assigned to Common Crane or *G. primigenia* (or indeed other species of crane which do not now occur in the region). This demonstrated, for the first time, that the bones of male Common Crane are larger than those of the female. In the initial stages of the work on the British material, it seemed possible that the lack of female-sized specimens in the fossil record could be part of the problem. If the Common Crane has diminished in size during the Holocene, since about the Roman era, it is possible that ancient females were approximately the size of modern males, while larger specimens, hitherto named *Grus primigenia* may, in fact, be male Common Cranes. If this hypothesis is correct, Common Crane and *Grus primigenia* are synonymous.

An alternative explanation, that another species, extinct or extant, is involved, cannot be wholly eliminated, but to suggest that the large cranes were conspecific with the extant Common Crane is a more parsimonious explanation of the lack of fossils the size of modern females, since it is unlikely that there were consistently no small females preserved in the fossil record.

The mechanism responsible for the change may be similar to that which has apparently led to a size reduction in Mute Swans (Northcote 1981, 1983) namely the effects of habitat destruction and impoverishment by wetland drainage. The fact that both species appear to have shown significant size reduction during approximately the same time period is strong evidence for a similar cause, and suggests that domestication is not responsible for the change in Mute Swan size.

Black Tern

There appear to be just two records of Black Tern in northwest Europe from the archaeological or palaeontological record for the Holocene. These include one from the late Holocene site of Duzej Sopwy Cave, Poland (Bochenski 1993), and two bones from Haithabu, Germany (Reichstein & Pieper 1986). Although Black Tern formerly bred in large numbers in Norfolk and Lincolnshire until the first half of the nineteenth century (Whitlock 1953), it subsequently declined and was lost as a breeding species to Britain, and there have been only sporadic breeding attempts in recent years (Taylor *et al.* 1999). It may be reasonable to question whether, in light of this fact, the species has been adequately

Wendy Dickson

23. Common Cranes *Grus grus*, Burrafirth, Unst, Shetland, April 1999. This species has a comparatively good palaeontological and archaeological record, and its remains have been found at numerous Holocene sites of various ages in Britain, commonly among domestic waste in towns.

David Tipling/Windrush

24. Immature White-tailed Eagle *Haliaeetus albicilla*, Finland. Archaeological and palaeontological evidence suggests that White-tailed Eagles formerly bred in the lowlands of south and southwest Europe, whereas today they breed only in the north and northwest. The species was perhaps not uncommon as an urban scavenger before it became widely persecuted.

considered when tern bones have been identified in the archaeological record, for example at Baynard's Castle in London (Bramwell 1975). In this instance, both Sandwich Tern *Sterna sandvicensis* and Common/Arctic Tern *S. hirundo*/*S. paradisaea* bones were identified. Black Tern bones are unlikely to be mistakenly identified as those of Sandwich Tern, which is significantly larger, but the latter two species, being much smaller, may cause problems.

White-tailed Eagle

It was owing to persecution by gamekeepers and farmers that White-tailed Eagle became extinct throughout much of Britain during the eighteenth and nineteenth centuries, although it had already suffered losses as a result of wetland drainage in earlier times (Whitlock 1953). White-tailed Eagles remained in the coastal regions of western Scotland until 1916, when the last-recorded nesting attempt prior to the recent reintroduction took place on Skye. The Marsh Harrier disappeared as a breeding species in Britain at about the same time but has subsequently recovered without the help of reintroductions.

The present distribution of White-tailed Eagle is concentrated in northern and northwestern Europe, it being most abundant in the coastal regions and upland areas of Scandinavia. Written records, together with both archaeological and palaeontological finds, show a quite different picture (Reichstein 1974; O'Connor 1993), and it seems that White-tailed Eagles probably bred in the lowlands to the south and southwest of the region. Skeletal remains are relatively common on archaeological sites, and this species may have held a religious significance at certain times (Parker 1988). Furthermore, a predominance of wing bones suggests that its feathers may have been used at other times for fletching arrows (Reichstein 1974). Finds at Haithabu, Germany, indicate it to be the most common wild species for which remains were found, since 184 bones, representing a minimum of 32 individuals, were discovered (Reichstein & Pieper 1986). It is possible that in the past, before it became widely persecuted, White-tailed Eagle may have behaved as an urban scavenger.

Discussion

Lister (1996) recently described the primary ways in which terrestrial vertebrates respond to environmental change. These consist of behavioural accommodation, distributional shift, phenotypic modification, evolution and extinction. Of these, the destruction of wetlands has certainly brought about local extinctions as well

as distributional changes, and may also have led to evolution or phenotypic modifications (e.g. size reduction) in some species, including Mute Swan and Common Crane. Rapid and significant environmental changes leading to evolutionary change in species might cause us to mistakenly believe that an extinction has taken place when, in fact, the skeletal size of modern species may be significantly different from that of their ancestors. This may have been the case with Common Crane, which appears to have become smaller during the later Holocene in Britain; alternatively, the larger birds discovered in the fossil record may represent a species, or subspecies, which became extinct during the seventeenth century.

The long-term effect of global warming on birds has received much attention lately. For example, Moss (1998) considered the possible consequences of this phenomenon, including the higher survival of wintering species, expansion and contraction of breeding ranges, changes in feeding grounds of passage migrants, and the effects on the food supply of intertidal feeders owing to rising sea level. It may be the case that the recent establishment of breeding populations of certain species in Britain, including Little Egret, Eurasian Spoonbill and Common Crane, together with increases in the Cetti's Warbler *Cettia cetti* population and the gradual northward expansion in Europe of species such as Black-winged Stilt *Himantopus himantopus*, is a result of global warming. 'New' breeding species are initially encountered as vagrants, some of which may eventually remain or return, and establish viable breeding populations. Of course, not all vagrants will become breeders, but this pattern gives added importance to vagrants, and single records of species in the fossil record should not necessarily be dismissed (Schelvis 1993). Alternatively, the appearance of new species in an area may result from human interference.

Although there have been many changes in bird distribution in recent years, a large number cannot be attributed to a particular cause, and historical change, apparent only in the fossil record, will inevitably prove more difficult to explain. Perhaps the best example of a species that has undergone unexplained distributional change is the Collared Dove *Streptopelia decaocto*, which first reached northwest Europe from the east during the 1950s. No satisfactory explanation has yet been proposed that adequately describes why it increased so far and so fast, spreading at least 1,900 km in 20 years (Fisher 1966).

Drainage has had a dramatic effect on wetland birds in northwest Europe, but it is also important to recognise that some of the changes in distribution which took place when large parts of our wetlands were being drained may have been 'natural' and would have happened regardless of human intervention. It is perhaps another facet of human arrogance to assume that any and all changes in distribution are down to us. Any information regarding ancient records of rare, unexpected or lost bird species are of value and may help to reconstruct the so-called 'natural' condition of the northwest European avifauna of the past. The archaeological record is an invaluable tool in this regard and future finds may lead to a better understanding of our lost Holocene avifauna, and therefore should perhaps be reported to organisations which determine conservation policy.

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