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Potential exploitation of avian resources by fossil hominins: An overview from ethnographic and historical data

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ABSTRACT

Human consumption of bird meat in modern societies comes in two ways: as embryos –i.e., eggs– and as hatched individuals, either young or adults. Poultry provide nowadays about one-third of the animal proteins and fat in human diets, but the bird–human interface is possibly an ancient one. Hundreds of species are kept as pets and non-edible products, such as feathers or eggshells are used by traditional cultures in all continents as body ornaments, headdresses or jewelry. Regarding fossil hominins, it has been reported that Neanderthals decorated themselves with raptors and corvid feathers. It is also known that they consumed birds, including pigeons, according to cut marks in bone remains. Even if birds may be perceived as elusive prey due to their flight capabilities, they are forced to incubate their eggs in a fixed position, the nest, where the nestlings grow until they reach full size. This makes eggs, nestlings and brooding adults easy prey. Roosting birds are practically defenseless against stealth predators. And humans may become such when they learn to interpret cues left behind by the birds themselves. Birds share a common sensitive world with humans. Most birds are diurnal as we are, and they rely on visual and auditive cues for communication, that we may learn to interpret, or that we can even imitate.

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1. Introduction

Fossil hominins, and specially Neanderthals, have typically been depicted as hunter-gatherers relying on the capture of large mammalian prey for animal protein and fat acquisition, prey that they would hunt with stone implements or sharpened wooden sticks (e.g., Thieme, 1997; Villa and Lenoir, 2009). Alternatively, these fossil hominins, even if possessing tool-carving abilities, are sometimes described as fearful carrion eaters taking advantage of the partially-eaten remains left behind by large carnivores (e.g., Binford, 1984, 1988; Blumenschine, 1986). Fossil hominins have also been envisioned as followers, or perhaps competitors, of vulture flocks, which in turn would point to the location of carcasses in open environments (Schaller and Lowther, 1969). Yet there is little

reference in the literature to other potential food items of animal origin pre-dating anatomically modern humans (*Homo sapiens*) (Klein, 1999), excepting perhaps recent interpretations of bird-product use by Neanderthals in their Eurasian distribution. This may include meat consumption, but also the ornamental use of feathers (Peresani et al. 2011; Finlayson et al., 2012) or of other anatomical parts, such as the talons of large raptors (Morin and Laroulandie, 2012; Romandini et al., 2014; Radovic et al., 2015; Laroulandie et al., this volume). Cut marks on pigeon (*Columba livia/oenas*) bone remains found, e.g., in Gibraltar testify that these relatively small birds were a stable potential prey along millennia for cave-dwelling Neanderthals (Blasco et al., 2014). However, the prevailing paradigm among Palaeolithic archaeologists today is still one which regards flying birds to have been difficult prey to capture and beyond the capabilities of all hominins prior to 50 ka and non-modern hominins, including the Neanderthals, even after the 50 ka threshold (Finlayson et al., 2012).

A majority of bird species are of very small size (the mean body mass for the bird Class is 37 g, and few species are more than 1 kg, Blackburn and Gaston, 1994), so that, if consumed, many birds may

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have been eaten on the spot, leaving no trace in archaeological sites. In addition, there is the confounding factor that avian bone accumulations may be due to birds of prey leaving behind pellets and other remains at perching or roost sites (see, e.g., Núñez-Lahuerta et al., 2015). However, birds are ubiquitous in any environment, from deserts to frozen lands at high latitudes or high mountains, and therefore they are expected to become a potential food reserve for any carnivore including humans.

Here we explore the possible ways in which fossil hominins may have had access to bird products as food or for other applications. We emphasize “access” because birds are considered elusive prey for terrestrial carnivores due to their flight capabilities (Klein, 2001; Klein et al., 2004), but we will also discuss potential uses other than food. To carry out this exercise, we will analyse bird traits that make them susceptible to become the prey of humans, and concurrently we will expose human abilities to detect and hunt birds when they are grounded, by hand or with simple technologies such as clubs.

1.1. Bird use by modern humans

Bird meat consumption in modern societies comes in two ways: as embryos –i.e., eggs– and as hatched individuals, either young or adults. Compared to the available species, about 10,000 in the world (Clements et al., 2014), the number of avian species domesticated for their eggs or meat is however very reduced at a global scale (two galliforms –the chicken and the turkey–, a few waterfowl –geese and ducks–, the pigeon (*Columba livia*) and the Japanese quail (*Coturnix japonica*). Many other species are, however, hunted and eaten regularly. Birds (poultry, mainly farmed chicken) provide today about one-third of the animal proteins and fats contained in human diets (Food and Agriculture Organization, 2015), but the interaction among humans and birds is possibly an ancient one, and as such it has remain important until today. Hundreds of species are kept as pets (Tella and Hiraldo, 2014), a few others are used themselves as hunting or fishing weapons (the falconry birds and the cormorants, respectively Glasier, 1986; Beike, 2012-), and non-edible products, such as feathers or eggshells are used by traditional cultures in all continents as body ornaments, headdresses, jewelry or as water containers. Many ancient civilizations had a fascination for birds and their feathers. The Aztecs, for instance, collected live birds in Central and even South American regions for their elaborate zoos and aviaries during thousands of years prior to the Spanish conquest (Tella, 2011). Etched ostrich eggshell fragments dated 60,000 years BP found in Africa have been interpreted as fragments of water canteens, in the same way as surviving traditional bushmen from the Kalahari use today emptied ostrich (*Struthio camelus*) eggs to store water underground in the desert (Texier et al., 2013).

1.2. Why birds may be an integral part of the diet of fossil hominins

Apart from their presence in all kind of habitats, and therefore co-occurring in all areas inhabited by fossil hominins, birds possess a number of characteristics making them potential dietary items: (a) first of all, they are edible, with only four species out of 10,000 known to be venomous –and this only externally because of poisonous feathers (Dumbacher et al., 2004)–. (b) they are generally non-dangerous behaviourally, excepting the large birds of prey and owls in the adult state, that may attack intruders approaching their nests. (c) a majority of avian species are diurnal, as humans are, so that a temporal coincidence in activity patterns occurs. (d) Except the owls and a handful of nocturnal birds, the vast majority spend the night at roost sites, where they become defenceless. (e) for breeding, and contrary to mammals, most birds attach themselves to nest sites where they lay their eggs and raise their

nestlings –the latter applies to altricial or semialtricial species. (f) last, humans share with birds the same sensory world. They are visually oriented animals, with auditive calls following close and, however, showing in general reduced olfactory capabilities, at least compared to mammals (Roper, 1999). This may explain why birds cannot easily detect approaching predators by smell and rely almost exclusively on vision for protection.

2. Avian products as food

The easiest edible bird items for a human are the eggs. They are nutritious providing fat, protein, albumin and the essential carotenoids so abundant in the coloured yolk (Surai and Noble, 2013). Although fragile, eggs may be transported in a bag or basket and they may be stored for days before they get rotten. Ethnographic examples of wild eggs collection abound both in developed countries and among tribal people. Bird eggs were even collected for the beauty of their shells, and as recently as the late XIXth century and early XXth century –the heyday of oology–, eggers and oologists abounded in western countries (Henderson, 2007). Massive gathering of eggs at seabirds colonies is still practised today by local communities in many places, including Madagascar in the southern hemisphere (Le Corre and Bemanaja, 2009) or the Faroe islands (Denmark) in the northern hemisphere (Moller, 2006). In coastal areas, egg harvesting also include the digging of sea turtle nests, which is still practised at sandy beaches in places like Central America (Campbell et al., 2007). Accounts of seabird eggs for human consumption in California in the XIXth century or in Hawaii until the early XXth century have also been reported (Henderson, 2007). More recently, 300,000 eggs of the black-footed penguin were sold annually only on Dassen Island, off the west coast of South Africa (Spark and Soper, 1967). On the Falkland islands (UK) off the Argentinian coast, Gentoo penguins provided large amounts of eggs during the traditional “egging week”. Falklanders were said to consume 61 penguin eggs per head annually (Strange, 1981) until recently. Less known examples include the harvesting of waterfowl eggs in wetlands, such as in current Doñana National Park (southern Spain), where the practice, locally known as “hueveo” (that may be translated as “egging”), was discontinued in the 1960’s once legal protection for the marshes was achieved in the area (Tijeras and Cobo, 2013).

Fossil hominins surely found bird eggs at hand whenever they were available (i.e., spring and summer in mid and high latitudes, at the peak of the bird breeding seasons, or anytime of the year in intertropical or equatorial areas). This resource is easy to harvest, as bird colonies are predictable in time and space, the only risk incurred being to descend or climb up to the nest-site if located in rocky outcrops, coastal cliffs or trees. In shallow water marshlands, the harvest would have been straightforward as nest-sites are built over the water among vegetation, barring perhaps the risk of drowning or getting trapped in quick sands. For birds breeding on the ground, such as ostriches or the other ratites –tinamous, rheas, or emus–, galliforms (including partridges, quails and pheasants), or species in the Otididae family (bustards and allies), the only challenge would have been to find the otherwise well camouflaged nest-site.

Once bird eggs hatch, nestlings occupy the nest-site (in altricial or semi-precocial species). The fledgling state, when the juveniles fly from the nest, comes after weeks or even months after hatching, depending on the species-specific pattern of development. Sea petrels, even laying a single egg, stay longer than any other species of similar sizes: several months in the case of the larger albatrosses (Warham, 1996). Precisely petrel nestlings, which accumulate thick fat reserves, are coveted by humans for food. In the Canary islands, there is evidence that Cory’s Shearwaters (*Calonectris borealis*) were

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