



KEYWORDS: *Bird – Ethno-ornithology – Dream flying – Sound symbolism – Iconicity*

BIRDS, DREAM-FLYING, AVIAN METAPHORS AND ROCK ART

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Abstract. The beginning of art is unknown, but according to archaeological evidence, birds played a significant part in hominin aesthetic and cultural behaviour. Artistically, birds' eggshells, bones and talons furnished some early artefacts. Linguistically, ethno-ornithology shows a universal prevalence of onomatopoeia in bird names, suggesting a possible link to language development. Birds also acquired a unique iconicity as metaphors and mythological symbols. Finally, flying, a particularly avian behaviour, is experienced by humans as dream-flying. Based on these facts, a cognitive hypothesis can be advanced that ornithographic art, avian metaphors and flying dreams constitute a 'mode of thought'. As a form of ideation, they represent images of reality involving affective, mnemonic and sensory stimuli. Using a multidisciplinary approach, this essay explores the perceptual processes underlying metaphors, flying dreams and rock art for understanding iconicity and artistic creativity.

1. Introduction

Unlike most animals whose geographic distribution is limited to their adaptive niches, birds exist everywhere in the world. They played an essential role in hominin life as a source of food, feathers, eggshell, bones, claws and hides. In the Mediterranean Basin, for example, small animals, birds and ostrich eggs were important components of the hominin diet from at least since the early Middle Palaeolithic (Stiner 2001; Finlayson et al. 2012; Best 2013; Fiore et al. 2016; Rufà et al. 2018; Dirrigl et al. 2020). Depending on availability, hominin diet included land birds and sea birds, such as penguins and seagulls (Kyriacou 2014; Best 2013). In Historic times, birds have been domesticated mostly for food and feathers, but birds were also used as hunting companions (hawks), fishing helpers (cormorants) or messengers (pigeons) (Robbins and Campbell 2017). Recent domestication of birds includes ostrich farming, which is significant in South Africa and elsewhere, where profitability is sustained mainly by the demand for ostrich hides, as in the United States (Nixon 2001).

The use of birds for medicinal purposes is known in different cultures. For example, Khoesan people sometimes burn ostrich eggshells and grind them into powder to be rubbed on the body or swallowed for healing purposes. Children also wear ostrich tendons around the ankle or neck to acquire strength (Low 2017). Until the recent arrival of the RNA polymerase technique, the medical utility of birds was demonstrated in the use of eggs to produce vaccines

(see <https://www.historyofvaccines.org/>).

2. Birds and rock art

2.1 Birds and ornamental objects

Birds also supplied some early archaeologically documented artistic objects. The earliest and later most abundant artefacts are of ostrich eggshells. These include eggshell beads discovered at El Greifa, Libya, dating to the Pleistocene (Bednarik 2016a: 78). In South Africa, ostrich eggshell containers were found at Diepkloof Rock Shelter dating to 60 ka (Texier et al. 2010; Kyriacou 2014). An engraved ostrich eggshell fragment from Patne, India, is dated 25 ka (Kumar et al. 1988; Bednarik 2003). In north-central Tanzania, Kiseso II rockshelter provided an enormous quantity of ostrich eggshells and evidence for ochre processing spanning more than 47 ka of stratigraphic sequences (Tryon et al. 2018). White-tailed eagle talons from Krapina (Croatia), dating to approximately 130 ka, show signs that the Neanderthals acquired and curated eagle talons for aesthetic and symbolic purposes (Radovic et al. 2015; Bednarik 2016a). In Rio Sico in northwest Italy and Mandarin Cave in the Middle Rhone valley, two golden eagle pedal phalanges were found, the one from Italy dating to no less than 49.1–48 ka, the other from France aged about 40.0 ka (Bednarik 2016a: 44). In Grotta di Fumane, in northern Italy, remains of various species of birds were present, with evidence of removal of feathers (ibid.; Peresani et al. 2011; Bejenaru and Serjeantson 2014).

2.2 Birds and music

Ice Age musical instruments have been recovered in Europe and Asia. These include flutes from hollowed bones of birds in the Transbaikal area (Lbova et al. 2010; Bahn 1998) and in Germany (Conard et al. 2009). Other flutes were recovered in France at Isturitz, Le Moustier and Haute Garonne (Buisson 1990). In Asia, flutes made from crane bones came from the Henan Province, China. Dating to the Early Holocene, they have a musical scale similar to Historic ones (Zhang et al. 1999).

2.3 Aviform and ornithographic images in rock art

In rock art, aviform objects are some of the earliest patterns of representation (Conard 2003; Svoboda 2012; Bednarik 2012). Present in rock art since the Upper Palaeolithic, bird representations take many forms, including sculpture, engraving and painting. The oldest avian representations known today are the Upper Palaeolithic ivory figurines of waterbirds from Europe and Siberia. One of these birds, a beautifully carved 'cormorant' or 'duck', was discovered in 2001 at Hohle Fels in the Swabian Jura of southern Germany, dating to 31–33 ka (Conard 2003: 830). Thirteen carvings of flying water birds were discovered at Mal'ta in 1956 and 1957 and dated between 23–19 ka. These bird figurines were made into pendants, ranging in size from 50 mm to 150 mm and carved out of mammoth ivory. One of the birds is a realistically represented 'swan' with full body, neck and legs. Other birds are stylised, their necks being longer than half the total length of their whole bodies (Svoboda 2012; Bednarik 2012). An owl-shaped ivory pendant came from Pavlov I, Russia (Svoboda 2012: Fig. 5), and three clay figurines of 'owls' from Dolní Vestonice (ibid.). A recently discovered miniature carving of a standing bird from Lingjing, Henan, China, was estimated to be about 13500 years old (Li et al. 2020).

Painted and engraved aviforms are found in rock art in many parts of the world (Schmidt 2001). Some of the earliest known ornithographic paintings are the extinct Mediterranean auks at Cosquer (Clottes and Courtin 1994). Ostriches are found engraved in Arabia, in the Sahara and the Namibian deserts (van Albada and van Albada 1994, 2000; Hachid 2000; Achрати 2007). 'Waterfowl' and 'owl' are found in Tomskaya Pisanitsa, Siberia (Miklashevich 2016). 'Pelicans', the evidence for which is found in the Saharan archaeological record (Wim et al. 2020), are depicted among the engravings of the Tassili (Hachid 2000: Fig. 400). Recently unearthed limestone plaquettes at Ein Qashish South in the Jezreel Valley, Israel, include an engraved image of a bird dating to the pre-Natufian Epipalaeolithic (Yaroshevich et al. 2016). There is even at least one instance of a bird stencil, discovered in Arnhem Land, in Northern Territory, Australia (Taçon et al. 2010: Fig. 4).

Bird tracks constitute a significant part of the iconic repertoire of rock art, and they sometimes occur

alongside forms interpreted as non-figurative or abstract signs. In Australia, for example, bird tracks are found engraved, painted and depicted using beeswax (Ouzman 107: Fig. 3). These patterns are referred to as 'track-and-circle' art. As Bednarik has indicated, some of these patterns in the Pilbara and the southwest date to the Pleistocene (Bednarik 2001; Franklin 2016).

3. Birds, onomatopoeia and ethno-ornithology

One of the fundamental properties of spoken language is arbitrariness, meaning there is no physical relationship between word and meaning; utterances are purely conventional (Hinton and Ohala 2006: 1–2). For example, 'there is no similarity between the sound of the word *dog* or the sound, sight or smell of a dog. Nor is the difference between the sounds of the words *dog* and *cat* in any way similar to the difference between dogs and cats' (Hockett 1959: 34). It is precisely because of the randomness, or independence of sound and meaning, that different languages have different forms for the same concepts (e.g., Arabic '*kalb*,' French '*chien*' and Spanish '*perro*' all mean 'dog') (see Waugh 1992). Arbitrariness also gives language the ability to communicate a limitless range of concepts and relations using the combination of only a few symbols. This principle of arbitrariness of language was recognised by Greek philosophers (Plato, *Cratylus* 431e), Arabo-Islamic philologists (Weiss 1974, 37; Shah 1999: 45) and modern linguists (Saussure's arbitrariness principle, 1916: 102; in Saussure et al. 1986).

Nevertheless, arbitrariness is not absolute. Different 'symbolisms tend to work themselves out in vocalic and consonantal contrasts and scales despite the arbitrary allocations of these same vowels and consonants in the strictly socialized field of reference' (Sapir 1929: 226). Sound symbolism is a common feature in all worlds' spoken languages — in some more than in others (Hockett 1959; Waugh 1992; Hinton et al. 1994: 4; Nuckolls 1999; Dingemanse 2012: 655; Imai and Kita 2014; Lockwood and Dingemanse 2015; Blasi et al. 2016; Thompson and Do 2019). Sound symbolism has been subject to extensive linguistic, cognitive, and anthropological studies (Peirce 1902; Sapir 1929; Dingemanse 2012; Haynie et al. 2014; Blasi et al. 2016; Perlman et al. 2018; Sidhu and Paxman 2018).

Sound symbolism occurs when 'a sound unit such as a phoneme, syllable, feature, or tone is said to go beyond its linguistic function as a contrastive, non-meaning-bearing unit, to directly express some kind of meaning' (Nuckolls 1999: 228). Indeed, there are words whose acoustic and articulatory structures consistently convey information about specific perceptual properties of their referents. There is a mapping, or correspondences, between the form of a symbolic word and the sensory features it depicts, which gives it certain iconicity (a perceived analogy between the form of a sign and its meaning) (ibid.; Waugh 1992; Taub 2001; Dingemanse 2012; Dingen-

manse et al. 2015; Dingemanse 2018; Taitz et al. 2018; Perlman et al. 2018; Thompson and Do 2019).

Sound symbolic words fall into two main categories: onomatopoeias and ideophones ('expressives', 'mimetics' and 'phonaesthemes').

3.1 Onomatopoeia: direct sound symbolism

Human speech consists of vocal sounds to communicate information about sensory perceptions emanating from the environment and the body. Interestingly, though, this vocal ability is limited in one particular but significant respect: sounds are difficult to describe or communicate vocally in speech accurately. This is why it is easier to imitate a sound vocally (e.g. a car passing by) than to describe it. However, approximate imitation of such a sound is not too difficult, and 'listeners [do] identify sounds better with vocal imitations than with verbal descriptions' (Lemaitre et al. 2016).

When it comes to acoustic objects and events, the most imitative words in a language are onomatopoeias (Hockett 1959; Berlin and O'Neill 1981; Waugh 1992; Dingemanse 2012; Haynie et al. 2014; Akita and Dingemanse 2019; Thompson and Do 2019). These are words in which speech sounds mimic environmental noises, be they animal sounds, natural sounds or mechanical and manmade sounds. These memetic sounds can also be given lexicalised form (Waugh 1992; Hinton and Ohala 2006). A typical example of onomatopoeia is the vocalisation of a dog's barking: *woof woof* (English), *wou wou* (Cantonese), *wan wan* (Japanese), *hau hau* (Polish) (Thompson and Do 2019: 1). As can be seen in these examples, onomatopoeia is realised through the arrangement of acoustic or articulatory gestures of each specific language, creating an 'analogue' of the referent's object: barking. These examples also show the iconic use of reduplication in onomatopoeia — a morphological process whereby the root of a word or the whole word is repeated exactly or with a slight change to represent repetition and duration (Waugh 1992; Dingemanse 2012, 2018; Perlman et al. 2018; Taitz et al. 2018; Akita and Dingemanse 2019).

In addition to reproducing sounds, onomatopoeic words can also convey tonal aspects of the referent event. For example, in the onomatopoeic English word *ding-dong*, which refers to the sound of a bell, there is an analogy between the phonemes and the sound: the stop /d/ provides a sharp onset; the vowel /i/ is a loud, clear tone; and the nasal /ŋ/ furnishes a muffled die-off. While the enigma /ŋ/ echoes a bell tolling, the alternating /i/ and /o/ suggest movement or fluctuation in pitch as the bell tolls (Taub 2001: 24; Hinton and Ohala 2006; Thompson and Do 2019).

Though onomatopoeic words constitute only a small part of the inventory in languages worldwide, they are still significant. Onomatopoeic words are used to memorise and communicate ideas and concepts involving sensory imageries (Cole and Pick-

ering 2010; Imai and Kita 2014; Lemaitre et al. 2016; Auracher 2017; Preziosi and Coane 2017; Sidhu and Paxman 2018). In nomadic herding settings, such as the Tuvan of southern Siberia, onomatopoeic words play an important role in interacting with animals through hunting calls and animal domestication songs (Nuckolls 2010).

Many researchers have hypothesised that onomatopoeia and other sound symbolic words are universal linguistic patterns (Nuckolls 1999; Hinton and Ohala 2006: 8; Mompeán-Guillamón and Cifuentes-Férez 2012; Imai and Kita 2014; Dingemanse 2018; Thompson and Do 2019), and that they have an innate basis in the psychological constitution of the speaker (Ohala 1994; Ramachandran and Hubbard 2001; Auracher 2017). An fMRI study indicated that onomatopoeic sounds are processed by far more extensive brain regions involved in processing auditory stimuli than verbal and nonverbal sounds. Onomatopoeia, it was suggested, may be associated with some structural properties of the brain and how it processes information and learning (Hashimoto et al. 2006; Sidhu and Paxman 2018).

Some linguists think that onomatopoeia may have played a role in the emergence, development and evolution of language as a human communication system (Nuckolls 1999; Arbib 2006; Blasi et al. 2016; Lemaitre et al. 2016; Perlman et al. 2018; Taitz et al. 2018).

3.2 Onomatopoeia and ethno-ornithology

In human communication, onomatopoeia is particularly prevalent in ornithological domains. This, for example, is shown in the names for crow (*Corvus*), which are, by and large, onomatopoeically similar around the world (Keyes 1998: 41). In many languages, the name of this bird tends to mimic its harsh cawing, which is marked by the frequent occurrence of the back sound /k/ and its relatives /q/, /g/, and /gh/, and front /a/. Such is the case, for example, in the following: *khoka* (Cherokee), *kakay* (Tamil), *qhara* (Tibetan), *korkot* (New Guinea Tolai), *qura* (Amharic), *!kara* (!Kung), *kannákanná* (Yaruba), *kurrok* (Massi), *kolagh* (Indo-European Persian), *ka'ak* (Mon-Khmer Sinman), *kararat* (Ainu), *karasu* (Japanese), *kutq* (Siberian Kamchadal), *kraka* (Old Icelandic) and *ghurab* (Arabic) (Galaty 1998; Keyes 1998). Interestingly, in addition to the onomatopoeic character of the word signifying 'crow,' there is a high degree of similarity in various cultural interpretations of the crow's call and the symbolism of this bird (Galaty 1998; Keyes 1998; Hunn and Thornton 2010; Tidemann and Wideside 2010; Pizarro and Larson 2017; and Ng'wemo 2010).

The prevalence of ornithological onomatopoeia is recorded in languages spoken by peoples of different continents, especially among forest dwellers. For example, in the Kaluli language of Highland Papua New Guinea, where birds are referred to as those that 'say their names,' about forty per cent of bird names

are onomatopoeic (Feld 1979). A similar pattern is reported in Selepet, another Papua New Guinea language, where thirty per cent of the bird names are onomatopoeic (ibid., citing McElhanon 1977). Among the Mayan Tzeltal, almost fifty per cent of the bird names are onomatopoeic (Berlin and O'Neill 1981: 259). About a quarter of the bird names recorded in Canadian Delaware were derived from the perceived sounds of the birds' calls (ibid.). A high number of the recorded bird names in Aguaruna and Huambisa (two Jivaroan languages spoken in north-central Peru) are also thought to be onomatopoeic (38% and (34%) respectively (ibid. 1981: 240). About 47% of the bird names in Chile were onomatopoeic of Mapuche origin. The Mbuti people of Congo have the highest percentage of onomatopoeic bird names (67%) (Ibarra et al. 2020). Finally, onomatopoeias are present in many Australian languages, covering several semantic domains, including bird names, such as *wirrihwirrihyak* (Black-faced Cuckoo-shrike) and *wak wak* (Torresian Crow) in Kunwinjku, *durrk* (emu) and *jikiridjikiriditj* (Willie Wagtail) in Jawoyn, and *panpal-lala* (Crested Bellbird) in Anangu (Tidemann 2010: 158–160; Haynie 2014).

The frequency of onomatopoeic birds' names may be because birds have distinctive calls. As Greg Keyes pointed out, it is likely 'that the more distinctive, memorable, and identifiable the call, the more likely it is to have its call lexicised [*sic*] as its name' (Keyes 1998: 41). Equally important, many of the onomatopoeic bird's names are associated with forest birds, which do not generally allow themselves to be seen and are mainly identified by the sounds they make, instead of their colours, size, behaviour or habitat (Hunn 1992; Ng'weno 2010; Feld 2012).

3.3 Ideophones: indirect iconicity

In speech, onomatopoeia represents a direct iconicity manifested in the acoustic resemblance between a word and a related meaning. On the other hand, ideophones display indirect iconicity; they convey few but important perceptual features of the referent objects or events. Their iconicity resides in the correspondences between specific phonemes and sound segments and particular non-acoustic perceptual characteristics and/or semantic categories, including touch, smell, taste, size, movement, emotional state and so on (Evans and Treisman 2010; Blasi et al. 2016; Auracher 2017; Sidhu and Paxman 2018).

The earliest behavioural sound-symbolism experiments, known as the *mil/mal* effect (Sapir 1929), focused on the properties of vowels and their associations with shape and size. When asked to pair nonwords such as *mil* and *mal* with small and large shapes, participants generally paired *mil* with the small shape and *mal* with the large shape (Sapir 1929; for a review, see Sidhu and Paxman 2018). Later studies confirmed the association between high and front vowels (e.g., /i/) and small objects; and low and back

vowels (e.g., /u/) and large objects across speakers of different languages.

Subsequent studies focused on symbolic associations of consonants and vowels. Known as the *maluma/takete* effect, these tests were later called the *bouba/kiki* effect in reference to the experiment used by Ramachandran and Hubbard (2001). In these studies, participants were asked to match nonsense words with unfamiliar round and angular shapes. Participants generally paired *maluma/bouba* with the round shape and *takete/kiki* with the spiky, angular shape. The general inference was that voiceless stop consonants, such as /p/, /t/, and /k/) and front vowels (e.g., /i/ as in *heel*) tend to be associated with sharp, or spiky, shapes; while sonorant consonants, such as /l/, /m/, and /n/, the voiced bilabial stop consonant /b/, and back vowels (e.g. /u/), are associated with round shapes, or curvy forms (Sidhu and Paxman 2018).

Iconicity is now widely documented across the world's diverse languages, signed and spoken (Perlman et al. 2018). The techniques of investigating associations between nonwords and sensory features have been applied to a wide range of cross-modality experiences. For example, looking into the cross-modal correspondences between odours and visual stimuli (shapes) showed that the odours of lemon and pepper were significantly associated with an angular shape. In contrast, raspberry and vanilla were associated with a rounded shape (Hanson-Vaux, Crisinel, Spence 2012). Odour–vision correspondences were studied by Kaeppler (2018), showing that language plays a significant part in mediating the mapping of odour–vision correspondences. Research on sound symbolism also found evidence that haptic properties of product packaging influence people's perceptions of taste (Ludwig and Simmer 2013; Kampfer et al. 2017; Falcoón et al. 2019). The investigation also indicated that cross-modal correspondences between shape and taste could influence the expected and actual experience of eating chocolate (Qian 2017; Turoman et al. 2018).

3.4 Ideophones and synesthesia

In addition to their iconicity, sound symbolisms also involve synesthetic processes relevant to cognitive behaviour (*infra*). Sound symbolism and synesthesia involve cross-modalities or associations between seemingly unrelated sensory cues from different sensory modalities (Parise 2016: 7). Linguistic cross-modal correspondences are called 'synesthetic associations' and 'weak synesthesia' (ibid.). In the lived world, objects and events are perceived at once in a bundled input of multiple sensory modalities (Evans and Treisman 2010). Because of the implicitly perceived correspondence of their basic features, these sensory modalities also modulate each other, giving rise to cross-modal associations or synesthesia (Parise 2016; Auracher 2017).

This cross-modality phenomenon is a non-patho-

logical condition in which stimulation in one sensory modality automatically triggers a conscious perception, often in a second modality (Ramachandran and Hubbard 2001; Grady 2005; Hanson-Vaux et al. 2012; Harvey 2013; Neckar and Bob 2014). A common form of synesthesia is triggered when a tactile, auditory, olfactory or even gustatory stimulus results in visual imagery. This is the reason synesthetes perceive words or numbers as distinctly coloured. Other synesthetes taste sounds or see colours when they hear music. In such cases, synesthesia is experienced by people as 'a form of thinking, an imagistic alternative to inner speech, not merely curious sensory anomalies' (Hunt 1989: 190; Stutts and Torres 2012).

Some researchers have hypothesised the existence of *neonatal synaesthesia*, suggesting that all humans are born with a strong cross-modal perception that declines and weakens over most people's lifetimes (Ludwig and Simner 2013).

As a phenomenon of intersensory and intrasensory linkages, synesthesia seems to provide insights into the neural basis of the mind (Ramachandran and Hubbard 2001; Grady 2005; Harvey 2013; Neckar and Bob 2014). Synesthesia is observable under various conditions, including artistic creativity and in conditions of some brain dysfunctions and injuries. In mild forms, synesthesia is conducive to the creation of 'synesthetic' metaphors (Neckar and Bop 834). Synesthesia can also be induced under conditions relating to drug use (Sinke et al. 2012), and perhaps meditation, sensory deprivation, artistic creativity and shamanistic trances.

In its linguistic form, synesthesia is known as the 'synesthetic metaphor' and is frequent in language across different cultures (Gibbs 2011: 540). The following phrases are examples of synesthetic metaphors in the English language: 'sweet smell,' 'noisy colour', 'cold words', 'sweet face' and 'soft green' (Yu 2015). In the phrase 'sweet face', a gustatory concept (sweet) is used to describe the word (smell) that belongs to the olfactory domain. Though they involve a transfer of the attribute of one sensory domain to another sensory domain, synesthetic metaphors are different from the phenomenon of real co-sensation.

4. Metaphors

Discourse and communication presume the ability to understand the meaning of signs, words and metaphors. Consisting of the Greek *phero* (to carry) and *meta* (over, across), the term 'metaphor' is defined as a figure of speech that directly refers to one thing by mentioning another, usually for rhetorical effect (Lakoff and Johnson 1980; Ricoeur 1978). In so doing, metaphors create a semantic kinship between terms that are distant from one another to produce a new meaning congruent with the intended idea. As they point to hidden similarities between two ideas, metaphors also alter the boundaries between the imaginative (manipulation of faint mental images and im-

pressions) and the psychological (emotional intensity and exaggeration) and introduce a poetical element into the discourse. As Paul Ricoeur has indicated, 'there is a structural analogy between the cognitive, the imaginative, and the emotional components of the complete metaphorical act' (Ricoeur 1978: 159).

Metaphors are not important simply because of their poetic or rhetorical function. New developments in cognitive linguistics, particularly since the introduction of conceptual metaphor theory (CNT) three decades ago, has shown that the human conceptual system is metaphorically structured. That is, most concepts are constructed and understood in terms of other concepts (Lakoff and Johnson 1980). Some even think that metaphors are 'primarily a matter of thought and action and only derivatively a matter of language' (ibid.: 153). Moreover, metaphorical understanding of many abstract concepts is believed to be grounded in bodily experiences involving neural substrates dedicated to sensorimotor perception and emotional response that are activated in the course of the body's interaction with its surrounding (Bolognesi and Bicicchi 2014: 7).

Interestingly, both metaphors and ideophones derive their meanings from their grounding in the body and the motor and somatosensory mapping mechanisms that underlie their conceptual structures (Lakoff 1993; Hubbard 1996; Dingemans 2012). While the cross-modal mapping in ideophones involves correspondences between the form of a word and the sensory features it depicts, the mapping in metaphors, as we will see later, is both conceptual and emotional and involves intentionality and consciousness.

5. Avian metaphors

There are various types of metaphor, including hyperbole, metonymy, simile, trope, synecdoche, irony, antithesis, allusion and illusion. All these conceptual forms are fundamental to human cognitive behaviour, manifesting themselves in linguistic, artistic, religious and philosophical discourses.

Bird imageries, or avian metaphors, are a big part of these discursive endeavours. Linguistically, this is indicated by countless avian metaphors in modern English, such as, for example, 'albatross' (bad luck), 'swan song' (final act), 'hawk' (belligerence), 'dove' (peace), 'ostrich's head in the sand' (denial), 'as the crow flies' (distance) and 'aviation' (air navigation). Other avian metaphors are built around terms such as 'nest' (communal), 'feather' (lightness, softness), 'soaring', 'eggshell', 'bird's eye view' (visual scope) and so on.

Sometimes the relationship between avian metaphor and a given signifier is almost imperceptible. For example, 'ellipsis' and 'elliptic' are used to describe ambiguous images and utterances, but the original meaning of 'ellipticity' refers to the asymmetry of birds' eggs. Although avian eggs come in various forms, egg shape generally shows two main

characteristics: asymmetry and ellipticity. The shape of bird eggs is generally explained as an adaptation: to help stabilise the egg in the nest, preventing it from rolling away. Recent studies also indicate that egg shape correlates with flight ability, suggesting that adaptations for flight may have been a factor in the variation of avian eggs (Stoddard et al. 2017).

5.1 Swans and signs

Remarkably, the power of birds to signify is inscribed in the word 'swan'. Indeed, the Greek name of the swan is *κύκνος*, which is transliterated as 'cygnet', a meaning which is preserved in the word 'sign' and other related Indo-European cognates (Cygnet: sygnett, signett, signet, cignet, cygnette, cygnet. Signet: sygnett, signett, signet, sygnet, syngnet. Sign: singne, signe, sygne, sygnne) (Ewgen 2015).

This power of birds to signify is shown in Plato's *Phaedo*, where Socrates evokes the swan and its divine power as he tries to console his followers who were stressed over his imminent death following his trial and condemnation. To convey to them his equanimity in the face of death, as well as the truth of his philosophy, Socrates likened himself to a swan: swans, he told them, sing most and best when they feel that they are to die. They do so joyously because they know they will meet the gods. Likewise, Socrates has no fear of death. His followers, however, do not understand that his philosophy is a preparation for his death and his meeting with the gods, just as they do not understand the swans, believing that they sing out of sorrow and in mourning for their own death (*Phaedo* 84e; also, Ewgen 2015; Krell 2015).

The allegorical power of birds is also illustrated in a short treatise called *Risalat al-Tayr* ('The epistle of the birds'), written by Avicenna (980–1037 CE) and later rendered in a beautiful poem by Farid ud-Din 'Attar, a 12th-century Persian poet. This allegory describes the human urge to seek true knowledge and how it can be attained. It features birds that managed to free themselves from captivity and go on a journey seeking meaning to their existence. After going through numerous obstacles and challenges, the surviving few birds realise that they already have what they were searching for: themselves (Avicenna and Mehren 1889; 'Attar 1972).

In the central Mexican codices, for example, birds



Figure 1. 'Human' with 'avian wings'; courtesy Pieter Jolly.

were used as personal names, location signs and symbols for abstract concepts (Sharpe 2014). As shown in the following, the power of avian imageries to signify is also evident in their use as religious, mythological, funerary and heraldic symbols.

5.2 Birds as mythological symbols

Reference to birds is common in mythological narratives. In many cultures, birds and avian creatures stand for gods, goddesses, and beings invested with supernatural power. For example, the Egyptian Toth, the god of balance and writing, assumed the form of an ibis, while Nekhbet, the patron goddess of Upper Egypt, was a vulture (Wilkinson 1992). Athena, the virgin goddess of wisdom, was associated with the owl. In Mesopotamia, Anzu, the fire-breathing bird, represented power, and in China and East Asia, the mythological bird Fenghuang symbolised harmony. In Mesoamerica, the Aztecs had Quetzalcoatl, the 'feathered serpent' or 'Quetzal-feathered serpent'. Aboriginal people across Australia believed that Dreaming Ancestors had animal or human-animal form, including birds (Ouzman et al. 2002). Cassowaries appear in numerous legends and tribal tales on the island of New Guinea and are of 'great ritual and mystical significance'. Many strange beliefs are held about them (Feld 1979; Tidemann 2010: 5).

In Western art, the portraiture of Leda and the Swan is a reference to the myth of Zeus, in the form of a swan, seducing Leda, who bore him Helen and Polydeuces, while she bore Castor and Clytemnestra for her husband Tyndareus (see, e.g., Bartolomeo Ammanati, *Leda and the Swan*, c. 1535).

Association of birds and shamanistic practices have also been suggested in connection with South African rock art. Some of the therianthrope figures in this art display avian characteristics; they have

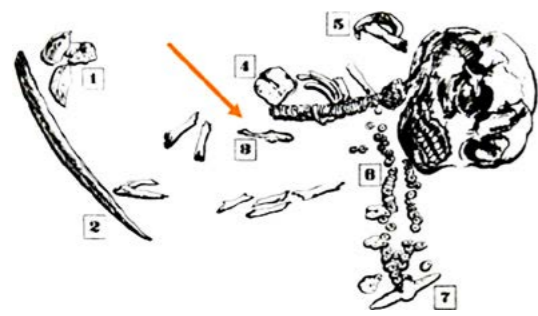


Figure 2. Bird 'offering' in a boy's burial, Mal'ta. Photo Vladimir Gorodnjanski, The Hermitage Museum.

'feathers' on the body, wing-like appendages, or extended arms in a wing-like manner (Fig. 1). Some of these figures combine antelope features with those of humans and birds (Fig. 1a). For their association with flight, they have been referred to as flying bucks and alites (see Jolly 2002; also, Schmidt 2001; cf. Hromník 1991 and 1992).

Among some Siberian and central Asian people, animals and trees represent celestial powers, and birds are often associated with shamanism. In their ritualistic performances, shamans imitate cranes, geese and swans, which are believed to be 'messengers' ensuring the circulation of souls between different worlds, and between life and death. Shamans also emulate the cries of these birds when calling them (Zarcone 2013a). Swans are sometimes part of shaman headdresses and shamanistic dances (ibid.). The integration of birds in religious rituals has also been observed in Australia, where Aborigines mimicked the sound of a cawing crow in their dance (Tidemann 2010: 154; also, Basedow 1925: 378, cited in Dobrez 2017: 163, who does not explicitly mention the 'caw of the crow').

Siberian shamanistic practices are thought to have been represented in rock art. Pointing to people depicted wearing fringed clothes in the Siberian rock art of the Altai, Tuva, and Mongolian regions, E. Devlet suggested that

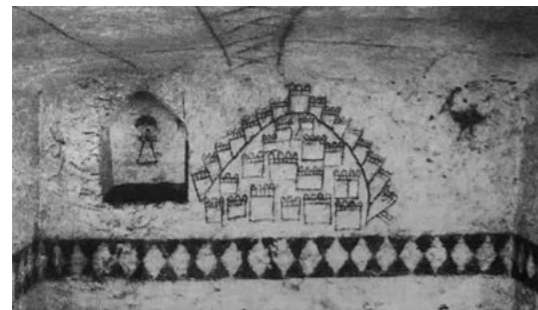


Figure 3. Rooster in a Punic burial, Hanout, Tunisia; photograph by M. Fantar.

the fringes are of an ornithomorphic nature. They stand for the ability of the fringed people to transform themselves into birds and the power to fly (Devlet and Devlet 2002: 129; Vieira 2010: 255).

Some of the shamans of central Asia were Islamicised under the influence of Sufism, but they retained some of their shamanistic practices. Known today as *bakhshi*, *emchi*, *parikhan* etc., they have become healers and seers (Zarcone 2013b). In the religious performances of the Alevi-Bektashi, Sufi initiates imitate the crane in their dance.

Finally, a mention should be made of the association of birds with ornithomancy — a magical practice of foretelling the future based on examining the entrails of sacrificed birds. Ancient and widespread, ornithomancy is well documented in ancient texts (Flower 2007; Rozenn 2019).

5.3 Birds as funerary symbols

In some cultures, birds have funerary functions, a practice that may go back to the Upper Palaeolithic times. One of the earliest usages of bird imagery for funerary purposes is the figurine of a bird found among the grave offerings of a young boy's skeletal remains from Mal'ta believed to be 24 000 years old (Fig. 2). Remains of birds used as grave offerings have been documented in the Tripolye-Cucuteni culture (Ukraine, Romania and Moldova), dating to 5100–2900 cal BCE (Ledogar et al. 2017); and at burials in Ajvide (Gotland, Sweden) and Zvejnieki (Latvia) dating between 8000–3900 bp (Mannermaa 2008). At Çatalhöyük, archaeological finds suggest that eggs were exploited for food and funerary purposes (Demarchi et al. 2020). Birds have been found in tombs of the Chimú people at Paracas and other sites in the Peruvian coastal deserts and date back to 350 BCE to 200 CE (Stierlin 1979). Bird remains have also been recovered from late pre-Historic sites in Newfoundland, in north-eastern Canada, where an extinct Beothuk society lived. Among the artefacts recovered were caribou bones fashioned into pendants in the form of stylised bird feathers, engraved and coated with red ochre. Also present were carved pendants in the form of bird feet (Kristensen and Holly 2013: 44; Figs. 2 and 5).

The use of bird imageries has also been documented in Punic funerary iconography. The ancient cemetery of Kerkouane, a north-eastern city in Tunisia that was destroyed in the middle of the third century BCE, contains burial chambers with mural paintings. On the walls of one of these tombs, there is an image of a mausoleum with a pyramidal top set next to the image of a 'sacrificial altar' with burning fire. On the opposite wall is another mausoleum with a 'sacrificial altar' fire lit and a 'rooster'. On the back wall, another 'rooster' is seen above a representation of a walled city. The 'rooster' is also depicted perched on the pyramidal summit of two mausoleums in a burial tomb (aka *hanout*) in Sejenane in the north-west of Tunisia (Fig. 3). M. Fantar (1970: 36–37) and S. Lancel (1995: 222–223) interpret the 'rooster' as the deceased's soul. In another Punic burial site at Kef el-Blida is a drawing of a ship with a high stern and sails hoisted at half-mast. It carries 'armed sailors'. Standing on its prow is a 'man' holding a shield in his left hand and brandishing a double-headed axe in the right hand. His menacing attitude seems to be aimed at a person seen in a floating position ahead of the ship. The

image has been interpreted as the departing soul of a dead man or an apotropaic attitude toward a malevolent spirit (Lancel 1995, 226). In a different context, the association of birds and boats has been noted in rock art at Valcamonica (Fossati 2015) and in East Timor (O'Connor 2003).

Interestingly, this Libyco-Punic association of the rooster and the afterlife seems to have been adopted by the Romans, who replaced the Phoenicians as rulers in North Africa in the 2nd century BCE (Lancel 1995: 224). For example, in Tunisia, the mausoleum *Flavii* at *Cillium* (Kasserine) is inscribed with a long Latin poem dedicated to the owner of the mausoleum and his family. One of the lines in the poem mentions the 'quivering wings of the cock on the summit of the edifice' (*CIL*, VIII: 211b), indicating that there may have been a rooster on the top of the mausoleum (Sawyer 2010).

In the Hindu tradition, the Srauta funerary practices include a ritual known as Agnicayana ('the building up of the fire altar'). It involves the construction of a great bird-shaped altar, the *uttaravedi* ('northern altar'), built of five layers of 200 bricks each. The Agnicayana is believed to give the deceased individual immortal existence, as he is taken to heaven at the end of his life by the bird represented in the form of the altar (Bellah 2011: 505–506).

Zoroastrian funerary practices involve the placement of the body of the dead atop a tower and its exposure to the sun and to scavenging birds (Modi 1928). This form of sky-burial is also known in Tibet (Logan 2019) and was practised by Native Americans (Jensen 2004: 109).

6. Birds, flying, and flying dreams

It is unknown when human beings began fantasising about flying, but the desire to fly and overcome gravity occupies a significant part of human imagination. This desire to fly is expressed in the Greek myth of Icarus, who, ignoring his father's instructions, flew too close to the sun, and fell when the wax in his wings melted.

In modern times, flying as a conveyance became a reality, but many attempts preceded this. The first in recorded history to try to realise the dream of flying is Abu al-Qasim 'Abbas ibn Firnas (Nilson and Hartman 1996: 271). A polymath and expert in glassmaking from Qurtoba, Spain, ibn Firnas attempted to fly in 880 CE, using a contraption of wings. His fatal adventure earned him the honour of naming one of the craters of the Moon Ibn Firnas. His attempt inspired others, including the 11th-century English Benedictine monk, Eilmer of Malmesbury. Da Vinci did not try flying, but he studied flying intensely and designed various mechanisms for that purpose (ibid.).

Nowadays, flying techniques have been mastered to the point where parachuting, hang-gliding and the use of flying suits have become hobbies for those seeking the thrill of taking to the air. However, fly-

ing can also induce fear and anxiety. According to his biographer, Freud was afraid of flying and travelled only by terrestrial and maritime means (Scherr 2001: 115).

6.1 Flying dreams

The fantasy of flying is manifested in the human experience of flying dreams, a phenomenon that has been documented since historical antiquity. For example, a flying dream is described in a manual of dream interpretation by Artemidorus in the second century CE: 'A man who was living in Rome dreamt that he flew around the city near the rooftops and that he was elated by his adept flying' (Bulkeley 2016: 197).

Dreams are internally generated experiences akin to altered reflective consciousness and a reduction of voluntary control of action and thought (Nir and Tononi 2010). As a result of the discovery of rapid eye movement (REM) sleep, dreaming is now understood in terms of the neurophysiological activity of the brain. REM is a reference to brain activation during sleep similar to that of waking, but with inhibition of muscle tone (as measured by electromyography) and involuntary saccadic (rapid) eye movements (Hobson 2009: 805). Dreaming also appears in lighter levels of non-REM (NREM) sleep and the hypnagogic (transitional state from wakefulness to sleep) period of sleep onset, as well as under hypnosis (Hunt 1989: 3; Nir and Tononi 2010; Windt 2018).

'Dreaming is almost always delusional', but not without emotional content (Nir and Tononi 2010: 6). Self-monitoring and reflective thinking in dreams are reduced due to the deactivation of relevant brain regions such as the posterior cingulate cortex, inferior parietal cortex, orbitofrontal cortex and dorsolateral prefrontal cortex (ibid.). This leaves room for emotional responses, which in REM sleep are associated with marked activation of limbic and paralimbic structures such as the amygdala, the anterior cingulate cortex and the insula (ibid.).

A prominent theory concerning dreams is the activation-synthesis advanced by Allan Hobson and Robert McCarley; it combines the discovery of rapid eye movement (REM) sleep and a theory of consciousness to understand the neural mechanisms of dreaming. The theory of activation-synthesis suggests that dreams that occur during REM sleep have features of primary consciousness, but they 'do not strongly evince the characteristics of secondary consciousness' (Hobson 2009: 804). Primary consciousness is defined 'as simple awareness that includes perception and emotion.' Ascribed to most mammals, it is different from secondary consciousness, which depends on language and includes such features as self-reflective awareness, abstract thinking, volition and metacognition' (ibid.) Indeed, as studies have shown, there are differences in regional patterns of cerebral blood flow and glucose metabolism between REM dreaming and waking cognition (Siclari et al. 2020: 850–851). While

REM sleep involves increased activity and blood flow in limbic and paralimbic areas believed to account for the emotional aspects of dreaming, the case is different for lucid dreaming, a variant of normal REM dreaming, in which the subject maintains dual awareness of the two states of dreaming and sleeping (ibid.; Levin and Young 2002: 202; Hobson 2009; Bolognesi and Bicisecchi 2014: 7). Dreaming, according to the activation-synthesis theory, results from the brain's attempt to make sense of neural activity that takes place during REM sleep. During sleep, some higher-order functions of the brain continue to process activity in some of the lower levels of the brain responsible for basic biological processes. Dreaming is a kind of virtual reality model of the world that is of functional use to develop and maintain waking consciousness (Hobson and McCarley 1977; Maggiolini et al. 2007; Hobson 2009).

As to flying dreams, the activation-synthesis theory suggests that the primary event is a perception of movement, which is endogenously generated in dreaming sleep and processed in higher-order functions of the brain at the level of primary consciousness. Flying dreams, therefore, are intimately related to the activity of the human vestibular mechanisms — the body's awareness of balance, movement and rotation signals that are registered in the inner ear and processed in the cerebellum (Hobson and McCarley 1977; Hunt 1989; Schönhammer 2004; Hobson 2009; Windt 2018). The involvement of vestibular arousal in these dreams underscores the kinaesthetic character of the experience of flying.

Experiences of flying dreams emerge early in life (Hunt 1989; Nielsen et al. 2003; Nielsen 2017), are highly prevalent (about 40%) but rare in frequency (0.5% – 3%) (Schredl and Piel 2007; Picard-Deland et al. 2020). Some flying dreams involve soaring journeys into the sky, while others portray the dreamer hovering (Bulkeley 2016: 200) or floating closer to the ground. Sometimes people have total control over their direction and speed, while at other times, their flight is more erratic and unpredictable.

Other sleep-related experiences linked to flight include dreams of falling, and lucid dreaming, where the subject maintains dual awareness of the two states of dreaming and sleeping (Levin and Young 2002: 202; Hobson 2009; Stumbrys et al. 2014). Because of their content, falling dreams and dreams of flying are sometimes referred to as 'gravity dreams' (Maggiolini et al. 2007).

While sleep experiences such as falling are stressful, flying dreams are generally pleasurable, even euphoric (ibid.: 95; Hunt 1989: 197; Schönhammer 2005). They may also be associated with low neuroticism — a personality trait referring to tendencies to respond with negative emotions to threat, frustration or loss (Lahey 2009; Soffer-Dudek et al. 2011).

Some studies demonstrate that gravity dreams can be responsive to sensory stimulation adminis-

tered during REM sleep — particularly the application of somatic or vestibular stimuli. In an experiment conducted by T. Nielsen (1986), a blood pressure cuff inflated around a subject's leg during REM sleep elicited dreams of falling, spinning, flying and physical disorientation (Nielsen 1993; cf. Hunt 1989: 197; Picard-Deland et al. 2020). Flying dreams have also been related to conditions of breathing and induction due to inflating the lobe of the lungs in a state of sleep (Barrett 1991: 132; Schredl and Piel 2007: 105, 657).

Recent experimentation has shown that exposures to simulated flying (e.g. custom-built virtual reality flying task) can increase the occurrence of unassisted flying dreams for some participants, which raises the possibility of technologically inducing and enhancing flying dreams (Picard-Deland et al. 2020). Experiences of flying dreams were also changed qualitatively, exhibiting higher lucid-control and emotional intensity levels after the virtual reality exposure. Prior working experience with flying or related activity can also influence flying dreams. For example, hang-gliding instructors frequently dream of flying without their hang-gliders (ibid.).

There are many etiological theories about the origin of flying dreams. From an evolutionary perspective, flying dreams are generally thought to have evolved to stimulate, rehearse and maintain sensory and motor reflexes necessary for survival in the face of external threats and play (Revonsuo 2000; Hobson 2009; Siclari et al. 2020: 850–851). None of these hypotheses has been empirically tested.

In the past, most theories on dreams were psychological, led by psychoanalysis, which connected dreams of flying to sexual fantasies. For example, Freud associated flying dreams with erections in men and with a desire to be a man in women (Sherr 2001; Schönhammer 2005). He also thought of the iconic image of a stork bringing children as a 'winged phallus' and a wish to fly (Schredl 2007). There was also interest in the underlying somatic and neurological processes in sleep-related phenomena. For example, Havelock Ellis suggested in 1913 that flying dreams are triggered by the absence of pressure in the soles of the feet and reduced sensory input through the skin while balance and movement centres are activated during sleep (Hunt 1989: 182; Barrett 1991: 132). As we have seen above, recent research focuses on the neurophysiological aspects of sleep.

6.2 Flying dreams and avian metaphors

As stated above, both metaphors and dreams are recognised as a mode of thought (Lakoff 1993; Johnson 2005; Gibbs 2009, 16; Purcell 2018). They both involve affective, mnemonic, perceptual and kinetic registrations and stimuli, and they make use of signs and symbols to depict deeper meanings (Hunt 1989: 69; Aragno 2009: 43; Windt 2018).

There is even a deeper relationship between these two phenomena, as metaphors are also thought to in-

habit and structure dreams (Lakoff 1993: 77; Dodge and Lakoff 2005). Some cognitive researchers think that metaphors are 'the very stuff of which dreams are made' (Aragno 2009: 30; cf. Maggiolini et al. 2007: 96). The unconscious metaphor system which structures ordinary thought, Lakoff said, also structures dreams, 'mediating between the meaning of the dream to the dreamer and what is seen, heard, and otherwise experienced dynamically in the act of dreaming' (Lakoff 1993: 86; Dodge and Lakoff 2005; Bulkeley 2016). Lakoff even further claimed that the 'metaphor system plays a role in generating dreams' (Lakoff 1993: 77).

Perhaps nowhere are dreams and metaphors as intertwined as in flying dreams. As cognitive structures, dreams and metaphors are deeply rooted in human perception and bodily movement through space. Whereas the perception of movement in flying dreams is directly connected to the action of the vestibular system, the kinaesthetic character of avian metaphors is the product of synesthetic associations.

In many ways, it can be said that, perceptually, the flying dream is no more than a realisation of an avian metaphor in the form of kinaesthetic experience. It is true, as Windt has pointed out, that the experience of unsupported flying has no straightforward waking model, and it may be loosely modelled on swimming or observed flight in insects, squirrels or fish (Windt 2018: 2586, No. 4). It may also be that the experience of the flying dream is a memory of the foetal suspension in the embryonic fluid. There is also the possibility that flight fantasies involve activating a dormant memory of a shared origin or a lost tail. However, the reason flying dream experience is likely to assume an avian association is historical, having to do, as we have seen, with the significance of birds in human culture (*supra*).

Perceptually, the cognitive significance of the experiences of flying dreams and avian metaphor is determined by their intensely kinaesthetic character. Because of the salience of movement and spatiality in these experiences, both avian metaphor and flying dream tend to alter what has been termed the logic of image-schematic structure, or the 'spatial and bodily logic that makes it possible for us to make sense of, and to act intelligently within, our ordinary experience' (Johnson 2005: 22).

Indeed, human thinking and conceptual strategies, including metaphors, are generally dependent on the sensorimotor action and movement of the body in response to cues from the peripersonal (immediately surrounding) space. This space is defined by a vertical direction and many horizontal ones. High positions and low ones also differentiate it; forward and backward orientations; contiguous points and disjointed ones; bounded and unbounded spaces, contained and containing objects, and so on.

Coping with sensory inputs from peripersonal space involves organising one's motor functions and

movement consistently with the demands of kinematic and biomechanical congruence. Response to these demands gives rise to recurring action-paths, or image schemas, that inhabit 'the felt qualities of our perceptual, experience, understanding, and thought' (Johnson 2005: 31; Grady 2005: 44). Deriving from 'bodily experience, including perceptions via sight, hearing, touch, kinaesthetic perception, smell and possibly also internal sensations such as hunger, pain, etc.' (Grady 2005: 45), image schemas are pre-representational sensorimotor structures that organise information and give shape to how reality is conceived, categorised and mediated linguistically (Lakoff 1993; Doge and Lakoff 2005; Achraati 2007, 2013; Aragno 2009; Cardinali et al. 2009; Gibbs 2011; Fusaroli and Morgagni 2013; Bolognesi and Bicisecchi 2014).

Cognitively, therefore, concepts and metaphors are structured according to correspondences between a source domain (concrete and bodily based ideas) and a target domain (abstract concepts that are to be mapped onto source domains). As Lakoff put it, 'metaphor can be understood as a mapping (in the mathematical sense) from a source domain ... to a target domain'. In one of Lakoff's examples, LOVE IS A JOURNEY (capitalisation is conventional), there is a systematic correspondence between entities in the domain of love (e.g. the lovers, their common goals, their difficulties, the love relationship etc.) and entities in the target domain of a journey (the travellers, the vehicle, destinations etc.) (Lakoff 1993: 79).

One of the image schemas that structures human understanding is kinaesthetic. Deriving from the body's interaction with containers of all shapes and sizes, these kinaesthetic image schemas constitute a 'container' image, which is metaphorically projected onto abstract domains, making them understandable in terms of their concrete and bodily based perceptions (Lakoff 1993; Clausner 2005; Grady 2005; Johnson 2005: 21; Gibbs 2006).

Interestingly, the experience of flying dreams and avian metaphor is a benign, even a rewarding violation of the *logic* of image-schematic structure. That is, because of the salience of the kinaesthetic perception in 'flying', this experience is more commensurate with an OPEN-ENDEDNESS image schema instead of the familiar CONTAINER image schema. This openness schema can be used to map a host of concepts onto flying dream: 'freedom', 'open sky', 'afloat', 'over above', 'glide', 'kite', 'breezing', 'taking off', 'soft', 'light', 'soaring', 'smooth-landing' and 'homing' (see Bulkeley 2016: 206–207; also Montoro et al. 2015).

Emotionally, the most important effect of a flying dream is the experience of euphoria, a feeling which can be understood in terms of synesthetic links involving various cross-modal associations (visual, tactile, kinetic). It also suggests a sensory mapping of metaphors that have a positive valence, such as 'happy is up', 'good is up', 'light' and 'soft' (see Bulkeley 2016: 206–207; Montoro et al. 2015).



Figure 4. A fantastic fusion of a 'canine' and an 'aurochs'; Moghar at-Tahtani, Algeria; photograph by author.



Figure 5. Animal puzzle, Moghar at-Tahtani; photograph by author.

7. Flying dreams, metaphors and rock art

A link between dreams and creativity is widely recognised. As J. Taylor noted, 'since the dawn of written history, dreams have served as a primary vehicle for human creativity and increasing self-awareness' (cited in Schiavone and Villasalero 2013: 283; cf. Schredl 2008). Numerous studies point to an association between psychological tests of creativity and dreaming (Hunt 1989: 13). As Hunt commented, 'what has widely been taken as most "primitive" about dreaming, its "bizarreness", turns out to express capacities related to imagination and aesthetic ability' (ibid.).

As a form of ideation, both metaphor and dream present and re-present mood and thoughts, creating a novel reality in which conscious and unconscious perceptual information are blended (Aragno 2009: 36). In metaphors and dreams, there is a constant mapping

of concepts and sensory features, of forms and meanings, of source domains and target domains, resulting in the mental reality that combines novelty and oddity, and expresses a 'truth that is compatible with literal falsity' (ibid.: 36, citing Goodman, 1984). Dreams and metaphors are cognitive devices in which imperceptible ideas and feelings find expressions, the symbolisms of which derive from personal experience and collective memories and general sensibilities of native cultures (Bolognesi and Bicisecchi 2014).

Although research relating to the development of pre-Historic art is still evolving, it is not unreasonable to hypothesise that similar cognitive processes registered in dreams and metaphors are also present in rock art production. In rock art, just as in metaphors and flying dreams, there is an alignment between various concepts and sensory domains and a constant mapping of ideas and perceptual features from unrelated experiences (see above). The emerging pictorial depictions convey thoughts and emotions that are perceived even before they are processed and mediated linguistically; the meanings often exceed the iconic or depictive sense they denote. In ornithographic depictions, this excess of meaningfulness finds a heightened outlet in the 'unboundedness' and 'liberating effect' associated with flying and its underlying kinaesthetic perception. As in dreams and metaphors, this kinaesthetic effect is more likely to induce categories of reality that deviate from the logic of the image-schematic structure of thinking and understanding, giving rise to categories that include ambiguity, paradox, irony, humour, bizarreness and even absurdity. Through various graphic techniques, these expressive forms are realised in rock art, including avian depictions.

A major problem in understanding a pictorial creation in rock art is that it displays both an emic or inherent meaning, and an etic meaning deriving from an outside process of interpretation in which the role of pareidolia is not insignificant (Bednarik 2003a). Pareidolia is a psychological process involving a vague stimulus causing a perception of meaningful images (or sounds) in patterns representing familiar objects (ibid.; Bustamante et al. 2010; Bednarik 2016b).

Indeed, giving meaning to an ensemble of grooves and colour patches on a rock always carries the possi-

bility of mistaken identification. The human visual system is apt to be 'deceived' into perceiving an object where none exists (Bednarik 2003b). Aside from the fact that the 'production of iconographic forms is simply the cultural and intentional creation of features prompting visual responses to a signifier' (ibid.), there is another problem of visual disambiguation: this is when the pictorial ambiguity is blatantly intentional and in no way due to a lack of skill or to the conformity to some stylistic exigency. This deliberate ambiguity demands much of the creative power of the artist and the beholder: while increasing the sources of emotional and mnemonic perceptions, the graphic depiction *confounds* the logic of conceptual construction. Two petroglyphs from Moghar at-Tahtani in Ksour, Algeria, can be induced to clarify this effect. The image in Figure 4, which exhibits the highest degree of draughtsmanship, offers a hybrid image, a *junction* of more than one identifiable figure — a canine and an 'aurochs'. Just as in linguistics, this *junction* involves altering and fusing boundaries of different terms. Moreover, this pictorial *junction* seems to be an intentional *malapropism* for amusement, just as in linguistics. The confounding of boundaries can be taken to an extreme, as in Figure 5, which has been interpreted as a rhino, an elephant, a feline and even an act of coupling (Hachid 2000).



Figure 6. Stylised human and avian forms: (a) Ishtar, © 2010 RMN-Grand Palais (musée du Louvre) / Franck Raux; (b) a bird pendant, Mal'ta, Siberia; (c) Lalinde figures, Dordogne; and (d) 'ostriches', Fouaijat at-Tamar, Algeria. Photographs: internet (a) and (b), Don's Maps, <https://www.donsmaps.com/>, D. Hitchcock (c) and the author (d).

Sometimes, the pareidolic effect is intensified by creating a sliding transition or morphing one icon into another. This effect is recognisable in Figure 6, where a stylised goose pendant of Mal'ta can easily be transposed onto the form of a female figurine such as that of Ishtar, now housed at the Louvre Museum. Avian figures sometimes take a ship's forms (Westerdahl 2015: 149). The



Figure 7. 'Waterfowl'; courtesy Alexander Pakhunov.

pareidolic effect is well illustrated by Figures 6c and 6d.

Sometimes, through proximity, features from two (or more) contiguous images are arranged to create the impression of a new image. For example, in Figure 7, a petroglyph from Sheremet'evo, in north-eastern Russia, shows what the authors say are waterfowl

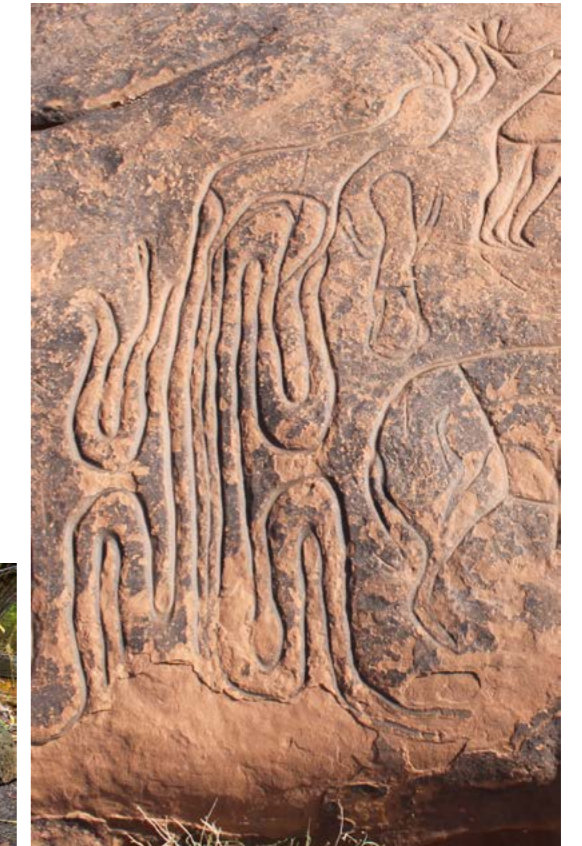


Figure 8. A 'squatting person' and an 'adorned ram'. Moghar at-Tahtani, Algeria; photograph by author.



Figure 9. 'The hunter at the mercy of the hunted', Lascaux; courtesy Don Hitchcock.

(Devlet and Pakhunov 2010: Fig. 9, 109). However, the figures are arranged to suggest either two birds and a third one in between, or two birds and a quadruped below them. At Moghar at-Tahatani, Algeria, the outline of the iconographic adorned ram is placed to suggest a cephalic form in a stylised person (Fig. 8). In a petroglyph from the vicinities of Lake Onega, northwest Russia, the leg of an elk doubles as a swan's neck. At a Karetski site, an elk's head was used as a base for the bodies of two swans (Vieira 2010: 255, Fig. 2).

P. Schaafsma has documented usage of avian-induced ambiguity in the New Mexico Jornada style petroglyphs and in later Pueblo rock art, where roadrunner tracks appear in conjunction with carnivore tracks. Having zygodactylous feet (two toes pointing forward and two back), roadrunners leave distinct tracks in the form of an incurved X-shape. These tracks are perceptually neutral in direction; they suggest the bird could be travelling in either direction. Exploring the symbolism of 'confusion with regard to trails' in Pueblo ceremony and myth, Schaafsma found that they have a funerary significance'. At Nambe, Jemez and Cochiti, she indicated, 'the track is used in funeral and other services for the dead, both to confuse evil spirits which might plague the soul of the deceased and to keep the dead from following the



Figure 11. Anthropomorph 'licking elephant's droppings'; courtesy A. and A.-M. Van Albada.



Figure 12. Qur'anic verse 27-30.

living' (Schaafsma 1989; this information was kindly supplied to the author by P. Dobrez).

Humour may also be present in rock art avian imagery. A possible example is the irony of the hopelessness of a 'hunter' lying with his 'broken bird-shaped spear-thrower' at the mercy of a bison he has injured (Fig. 9). Humour can take a scatological hint, as in Figure 10 of a spear-thrower consisting of an 'ibex with emerging turd on which two birds are perched' (Bahn 1988: 208). Scatological themes are also found in Saharan rock art (van Albada and van Albada 2000). In the Messak, Libya, a therianthrope *lécheur de crottes* is seen 'licking the droppings of an elephant' (Fig. 11).

Perhaps the ultimate ironic representation of birds (outside rock art), is the distinctly avian form in one of the zoomorphic genres of Islamic calligraphy (Fig. 12). Not only do bird forms inscribe sacred references, but they also violate what is wrongly believed to be a religious ban on producing the likeness of living things in Islamic art. Interestingly, these calligraphic traditions began in central Asia, where birds are part of shamanistic traditions that have been Islamicised (*supra*).

Postscript

The richness of avian metaphors and their power to signify are rooted in their strongly kinaesthetic character. There may be other reasons for the human tendency to find expressiveness in such metaphors. Humans and birds share many biological and behavioural traits. Birds, for example, have vocal capacities that are found in only a few other species and use complex visual and aural signalling. They also include the only animal that can reproduce human language. It is interesting that vocalisation and vocal imitation, which humans share with certain marine mammals, parrots, hummingbirds and songbirds, is absent in non-human primates.

Some orders of birds have evolved networks of brain regions for song learning and production that have anatomical analogies in human cortical regions and basal ganglia. Both human speech and birdsong

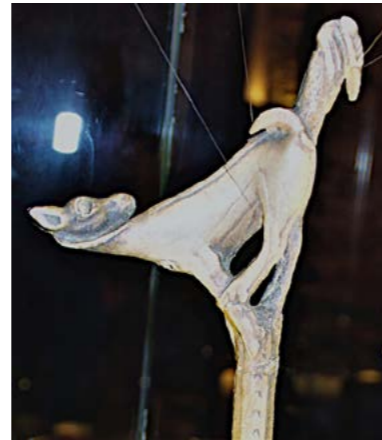


Figure 10. Spearthrower, Parc de la Préhistoire, Tarascon-sur-Ariège; photograph by author.

result from a complex interaction between genetic, neural and environmental influences. Birds and humans also share FOXP2 (which is interesting considering the antiquity of the avian lineage), a gene that is a factor in language acquisition and development (Bolhuis et al. 2010; Burkett et al. 2018).

Finally, there is the playfulness that characterises birds, which humans display in many forms, including in plays on words and metaphors (Achrati 2017). The genesis of metaphor — the metamorphoses of a linguistic unit from a literal to an allegorical sense — seems to mimic the ontogenetic development of birds from egg to hatchling to soaring creatures. What is interesting is that even in the scientific domain, '[t]he language of science is largely metaphorical' (Taylor and Dewsbury 2018).

Acknowledgments

My thanks to the four RAR peer reviewers and P. Dobrez for her review and helpful suggestions. Thanks also to Pieter Jolly, Axel and Anne-Michelle Van Albada, A. Pakhunov and Don Hitchcock for sharing their photographs.

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