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Prehistoric Bird Watching in Southern Iberia? The Rock Art of Tajo de las Figuras Reconsidered

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ABSTRACT

This paper studies the relationship between humans and birds in the recent prehistory of the Southern Iberian Peninsula. With its high number of bird, mammal, and anthropomorphic paintings, a small rock shelter –Tajo de las Figuras– provides an excellent case study to address this topic. The cave is situated in an ecosystem that, as we will argue, favoured human-bird interactions and enabled prehistoric groups to engage with a diverse and rich bird community at particular times of the year. Even though the recorded depictions can generally be integrated into the wider ‘Schematic’ style regime characterising the recent prehistory of the region, they exhibit some outstanding features including a highly distinct naturalism. This naturalism enables us to identify the represented birds, not only at the family but also at the species level. Our contribution describes these pictorial data and contextualises them with the ecology, archaeology, and archaeozoology of the area. We intend to show that the singularity of the image-corpus registered at Tajo de las Figuras mirrors the unique conditions of human-bird interactions at the time. We suggest that the significance of the images derives from the special location of the cave in the wider landscape encouraging early practices of bird watching.

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Introduction

Human-bird interactions arguably played an important role for many prehistoric societies and different kinds of archaeological remains provide empirical data to study these relationships in greater detail, as well as in their specific context. Pictorial representations of birds, especially in the form of rock art constitute a valuable source of evidence, as both content and production techniques of such images offer clues as to the significance of these animals for human groups.

Although birds were not the most frequently represented animals in the recent prehistory of the Iberian Peninsula, the southern province of Cádiz (Spain) presents us with an unusual case of bird paintings, harbouring a group of rock shelters yielding around 99% of the total of bird images hitherto documented for the post-Palaeolithic of the area. It is probably no coincidence that this rich corpus of bird imagery occurs at close geographic proximity to the Straits of Gibraltar, which remains a key passageway for migratory birds to this day. The image-yielding shelters are furthermore located next to the former Laguna de la Janda, one of Europe’s most important wetland ecosystems of the time, which probably served as a first and last stop for many bird species before crossing the Straits.

In this contribution, we seek to link the pictorial evidence derived from a detailed study based upon digital photography and high-level image processing techniques with the ecological context of human-bird encounters. The nature of the images allows for the identification of distinct scenes and details of behaviour, outlining the elaborate knowledge of the authors about the physiology and ethology of the birds inhabiting the wider environment of the lagoon. We suggest that this link between the rock art and bird ecology indicates that the significance of the paintings derives from the specific location of the shelters in the landscape, which provided the opportunity to observe and witness particular bird behaviours.

This paper mainly focuses on one rock shelter, which is called ‘Tajo de las Figuras’ (in the following also ‘El Tajo’) and stands out with a total of 208 bird depictions; our analysis proceeds in three steps: we will first outline the geographic location of El Tajo within its lagoon environment; secondly, we will present and discuss the corpus of bird imagery identified there before shortly turning to the issue of chronology, providing some preliminary arguments for the dating of the rock art into the recent prehistory of the region; finally, we will juxtapose the pictorial data with presumably contemporaneous archaeological and osteological evidence in the hope to better understand the

position and role of the painted shelters within the settlement system of the area.

The cave of Tajo de las Figuras

Geographic location and history of research

Bird representations are known from five different rock shelters located close to the former wetland known as 'Laguna de la Janda' (Figure 1; hereinafter 'La Janda') in the southern part of today's province of Cádiz (Spain): these are Tajo de las Figuras (208 figures), Arco (7 figures), Las Palomas (3 figures), Mediano (1 figure), and Navafría (1 figure). Tajo de las Figuras clearly stands out among these locations, not only because of its high quantity and variety of bird images, but also because the shelter houses the impressive amount of 936 pictograms comprising animals as well as zoomorphic and anthropomorphic depictions.

The location around La Janda thus sharply contrasts with the rest of the Iberian Peninsula, where hardly any paintings of birds have been recovered from post-Palaeolithic rock art contexts yet. As we have stressed

in earlier works (Lazarich et al. 2012a, 2012b), it is therefore imperative to understand why birds are so numerous depicted in the region studied, while painting these animals was apparently not a primary focus in other regions at the same time. How can we explain this singularity with regards to both the quantity and diversity of bird representations?

Although Tajo de las Figuras was discovered and documented as early as the beginning of the twentieth century (e.g. Molina 1913; Cabré and Hernández Pacheco 1914; Verner 1914a, 1914b, 1914c; Breuil and Burkitt 1929), this question has not been asked before. Recent studies (e.g. Mas 2000, 2005; Carreras et al. 2009, 2011; Lazarich et al. 2012a, 2012b), however, have moved beyond the mere description and analysis of the caves, also taking its immediate surroundings into account. Surveys carried out by our own research group (Lazarich et al. 2013) have, for instance, managed to locate some settlements and a burial site near the caves. Although full archaeological excavations have not yet been carried out, we can already state that the settlements comprised techno-complexes possibly dating from the ancient Neolithic

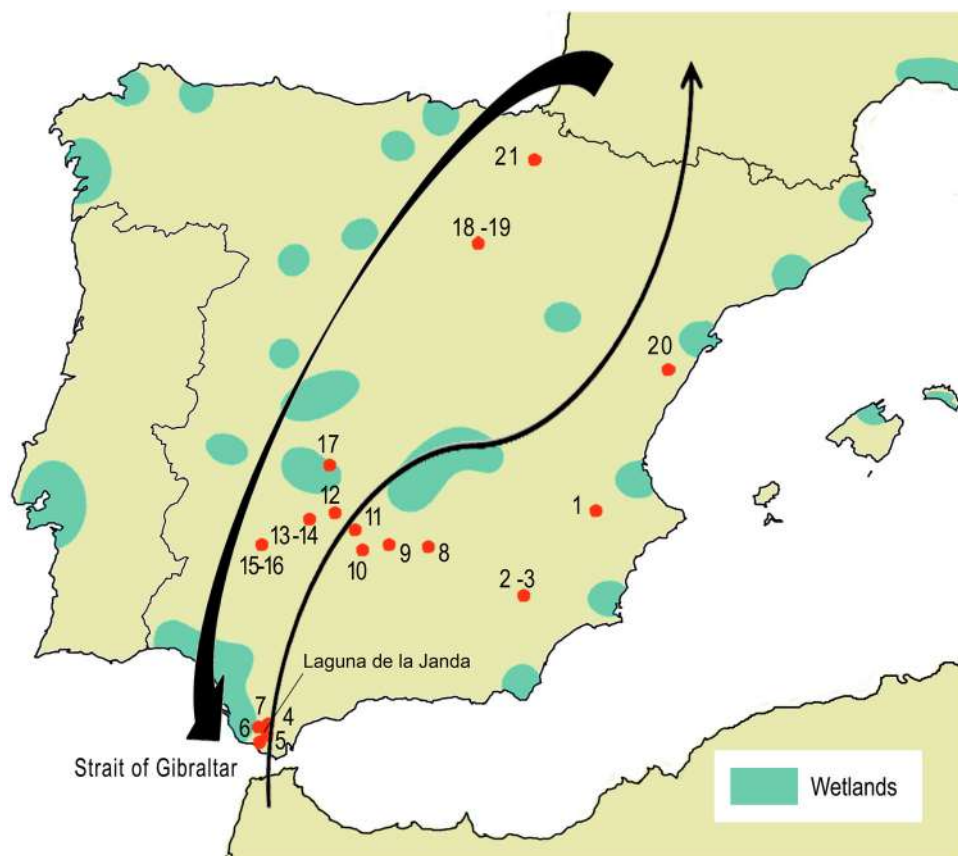


Figure 1. Location of rock art sites with bird representations on the Iberian Peninsula (based on Acosta 1968): 1 Cantos de la Visera ($N = 2$); 2 Los Letreros ($N = 1$); 3 Fuente de los Molinos ($N = 1$); 4 Mediano ($N = 1$); 5 Palomas I ($N = 3$); 6 Arco ($N = 7$); 7 Tajo de las Figuras ($N = 208$); 8 Canjorro de Peñarubia ($N = 1$); 9 Covatilla del Rabanedo ($N = 1$); 10 Peña Escrita de Fuenaliente ($N = 1$); 11 Venta de la Inés ($N = 1$); 12 Sierra de la Virgen del Castillo ($N = 1$); 13 Buitres de Peñasordo ($N = 3$); 14 Majadilla de Puerto Alonso ($N = 1$); 15 Peñón Grande de Hornachos ($N = 1$); 16 La Silla (?); 17 El Ratón ($N = 1$); 18 Los Peñascales ($N = 3$); 19 Peñón del Camino de Pedrajas ($N = 1$); 20 Cova Remigia ($N = 1$); 21: Cerro de Leguín ($N = 1$). Note the large concentration of birds painted in the south of the Iberian Peninsula. The Strait of Gibraltar is a transit area for bird migrations from Europe to Africa, and the former lagoon of La Janda was the place to stop for rest.

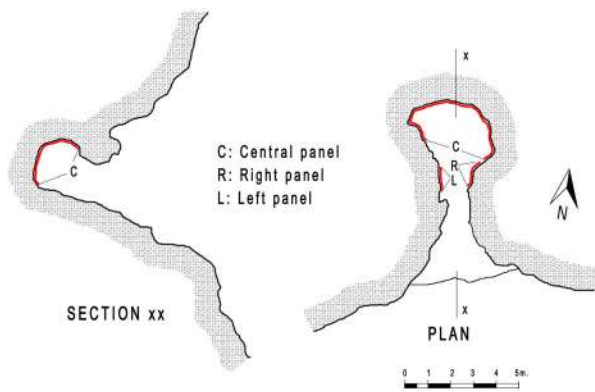


Figure 2. Section and plane view of Tajo de las Figuras, indicating the exact location of the three main image panels.

(end of the 6–5th millennium BCE) as well as remains of huts and objects from the Copper Age (ca. 4th–3rd millennium BCE).

Although varying taphonomic processes, especially wind erosion, have produced a large number of natural cavities in the area, only a few caves were actually painted (cf. Lazarich et al. 2012b). Most of these offer visitors a good overview of the surrounding ecotones and mark prominent vantage points from which to oversee and control the vicinity. The strongly slanted floor of the south-facing Tajo de las Figuras, however, suggests that this cave was unlikely to have served as a domestic space (Figure 2). We thus suggest that the bird paintings are a product of activities not directly tied to ordinary settlement behaviour. The paintings are likely an outcome of the visual opportunities provided by the caves. Since the immediate surrounding offers nesting possibilities for many bird species, it is additionally conceivable that these places functioned as ‘hubs’ for bird watching and bird hunting, including egg collecting.

Prehistoric ecology of the ‘Laguna de la Janda’

During prehistoric times and until its desiccation in the late 1960s, the ‘Laguna de la Janda’ (cf. Figure 1) was one of the most important wetlands in the south of the Iberian Peninsula. Fed by the rivers Barbate, Celemín and Almodóvar, the area was comprised by a number of smaller lagoons. These small lagoons were united in winter by the contribution of water, and reduced their level in the summer, leaving only the biggest of them –La Janda– with water all year round (Dueñas 2001). Such wetlands are very dynamic ecosystems – a fact that is also reflected through developments at La Janda in a deep-time perspective- from the Holocene after the Flandrian transgression (max. cal. 6500 BP) it was flooded by the sea, leading to the creation of an indoor bay of estuarine nature (Luque et al. 1999). Approximately 3800 years BP, La Janda lost its connection with the open sea. Thereafter, the river basin was increasingly sedimented (*ibid.*). During the

rainy season, La Janda was a real lagoon and in the summer more like a marshy area.

Wetlands are not only dynamic but also diversified ecosystems. Around the time when the caves were painted, we probably have to take into account a minimum of four different ecological contexts within the larger environment of La Janda: an estuary with a mix of freshwater and saltwater, a freshwater lagoon from the Barbate and Celemín rivers, vast low-lying areas with either herbaceous vegetation or low scrubland and prone to flooding in the rainy seasons and freshwater ecosystems near the rivers Barbate and Celemín.

These various ecosystems as well as La Janda’s unique location in the proximity of the Straits of Gibraltar –the narrowest point for birds migrating to and from Europe and Africa– make it an ornithologically important area. The artificial drying of the lagoon in the twentieth century, however, lead to a decrease of the marshy vegetation, thereby also affecting the bird population (Recio, Dueñas, and Castro 1997; Dueñas and Recio 2000). The current bird population is smaller and less diverse, especially when compared to the times prior to its desiccation – the period in which the birds represented in the Tajo de las Figuras were painted (Verner 1912; Alonso López 1980). In spite of this modern ecological transformation, Common Cranes (*Grus grus*), White Storks (*Ciconia ciconia*), Black Storks (*Ciconia nigra*), Western Swampphen (*Porphyrio porphyrio*) and a large variety of aquatic birds can still be found today in those areas susceptible to flooding (Mosquera and Finlayson 1995).

The rock art

The style of the rock art encountered at El Tajo has been attributed to the ‘Schematic’ art of the Iberian Peninsula (Breuil and Burkitt 1929; Acosta 1968; Baldellou 1989). As stated before, however, the recorded paintings exhibit a remarkable naturalism and consequently represent at least an anomaly within this larger style-group (cf. Acosta 1968; Baldellou 1989). It is for this reason that we regard them as a reflection of a regional style which we have termed ‘Laguna de la Janda style’ (cf. Lazarich et al. 2012a, 2012b; see *infra*). The high-level of detail and pictorial ‘realism’ of this imagery suggest that representational differentiations denote actual family and species differences, often with the intention to highlight particular animal behaviours. Understanding the significance of this art thus requires not only relating the images to their ecological context, but also to analyse their interrelationships and structural composition. A peculiar feature of the Tajo de las Figuras rock art is its spatially confined nature: the various motifs are painted in extreme proximity to one another, with clear cases of pictorial overlap and juxtaposition (Mas 2000) (Figure 3).

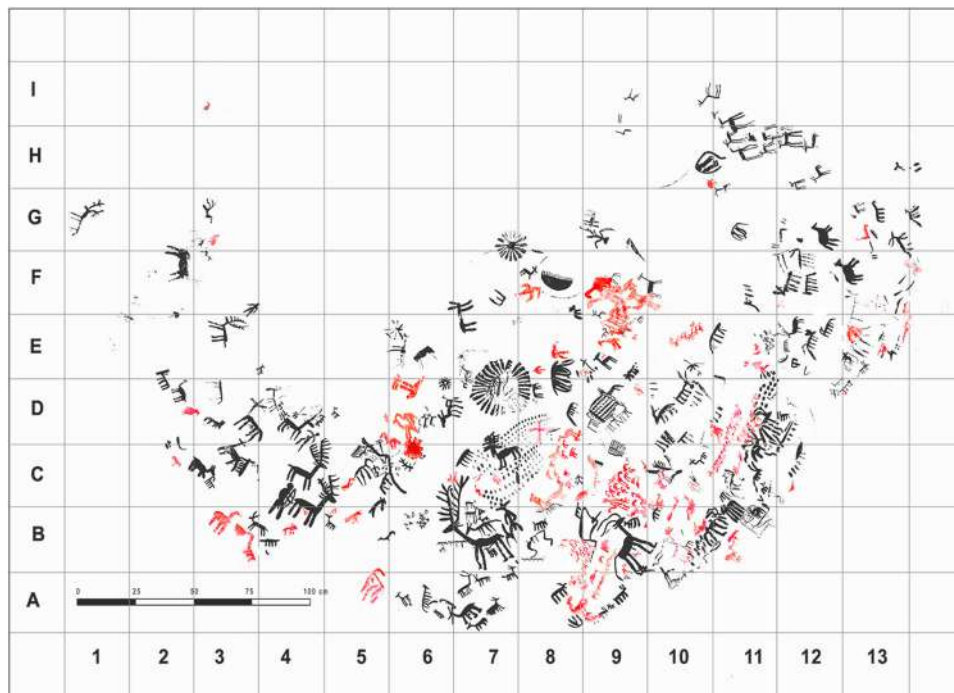


Figure 3. Spatial distribution of the paintings on the central Panel C of Tajo de las Figuras (based on Breuil and Burkitt 1929); birds are emphasised by red digital tracing.

In the following, we will briefly outline the methodology used to document and analyse the rock art of El Tajo, before presenting a selection of the corpus of bird imagery in some more detail. We will then discuss the zooarchaeological context of the imagery. Together with the content and style of the depictions, this, in turn, furnishes some initial arguments as to the likely date of this bird-rich imagery.

Methodology

The subsequent study of the paintings is based on digital images taken under natural lighting conditions, before manipulating them using the DStretch plugin for *ImageJ*¹; the plugin, which was specifically designed to enhance faint pictographs, intensifies and distorts colours (Harman 2005, 2008). At El Tajo, the yellowish colour of the sandstone rock presents additional difficulties as it ‘masks’ the reddish dyes used for the paintings, which results in them not appearing as clearly. To avoid this, a second chromatic correction was carried out using Photoshop with the aim to highlight red and eliminate the remaining colours, i.e. cyan, yellow, green, blue and magenta. This has made it possible to obtain more precise and objective reproductions than those previous documentation efforts have yielded.

The pictorial corpus of birds

Inventory of the images

The main objective of our approach was to determine the species of represented birds and the relative

frequencies with which they occur, as well as to describe some of the specific behaviour depicted. The criteria for identification as well as the nomenclature follow Barros and Ríos (2002) and *Avibase* (Lepage 2017). Generally, the determination of bird species and families takes into account three aspects of the imagery and its context: (1) the morphological characteristics of the represented figures themselves; (2) the nature and composition of the present and past bird communities living in the wider lagoon environment; (3) available taphonomic information on bird remains associated with the painted caves in the vicinity. Combining these lines of evidence should allow for a reliable reconstruction of the pictorial corpus of birds encountered at Tajo de las Figuras.

The 208 bird paintings are mostly distributed in the back of the cave, which ends in a semi-circular shape with a dome-shaped roof. To be able to better represent and explain the paintings, the rather large space is usually divided into three parts (cf. Cabré and Hernández Pacheco 1914; Breuil and Burkitt 1929; Mas 2000, 2005) (Figure 2). First, the central Panel C, which comprises the ceiling and a large part of the semi-circular rear wall. This section is where most figures and birds are found (cf. Figure 3). Looking into the cave from the entrance, secondly, a set of figures is located on the right Panel R. On the left side of the entrance, finally, one encounters another small panel –left Panel L– in which no birds were represented, but a remarkable number of anthropomorphs ‘schematically’ drawn have also been identified (Figure 4).

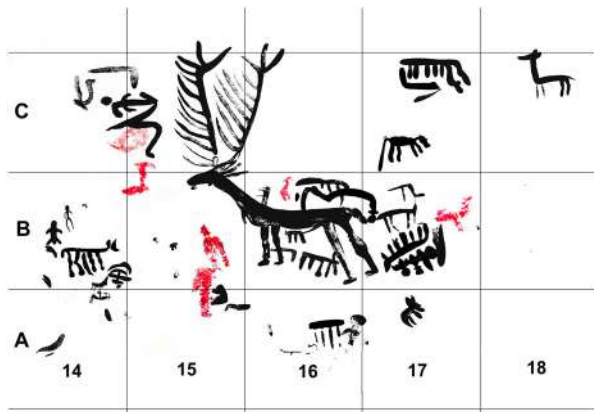


Figure 4. Panel R of Tajo de las Figuras (based on Breuil and Burkitt 1929); birds are emphasised by red digital tracing.

Table 1 summarises all of this information showing that 150 images can be unambiguously related to particular bird species; there are, moreover, 14 figures that appear to display ‘generic’ birds, for which no secure attribution to a family or species was possible. We consider the remaining 44 images to also depict birds, even though they do not possess the distinct characteristics present in the other paintings. To facilitate orientation within the dense composition of Panel C, we have installed an artificial grid, comprising squares A-1 to I-13 and reference the locations of the images accordingly (cf. Figure 3).

Otididae make up the group of birds most frequently represented ($n = 42$). For the Great Bustard (*Otis tarda*, $n = 35$) – clearly identifiable by the large body and the erect neck – both male and female birds as well as adults and offspring are shown. The birds cluster in D-11, C-11 and C-10, and are depicted in a remarkably ‘scenic’ way: a larger male is followed by two females and numerous chicks (Figures 3 and 5). La Janda seems to have been an important breeding ground for the Great Bustard (Verner 1909) before its artificial desiccation in the 1960s, and the birds lived there in great numbers.

The second group of birds belonging to the *Otididae* family is made up by the Little Bustard (*Tetrax tetrax*, $n = 7$). The respective bird drawings (C-11 and D-11) are characterised by oval-shaped bodies and a strongly arched neck and head. Today, these birds can still be encountered in the immediate surroundings of El Tajo.

The *Laridae* family ($n = 24$) is more difficult to identify, but is probably represented in a more ‘schematic’ manner as a group of flying birds, possibly showing different species of seagulls (B-8 and B-9). These bird paintings are distinguished by downward-facing curved wings suggesting a flight motion.

The representations of the family *Radillae* ($n = 19$) are characterised by a plump body, short wings, short wings and legs with long fingers. Three members of this family can be identified as Purple Gallinule (*P. porphyrio*), which are represented three times in Panel C

(A-8, B-9, and D-10). Another 16 birds can be identified as Crested Coot (*Fulica cristata*) or simply as Coot (*Fulica atra*), merely distinguished by their red horns – a feature only visible during the breeding season (A-9, B-9, C-8, C-9, C-10, and D-11, Figure 3).











Specimens of the *Ardeidae* family are also recorded ($n = 18$). These are medium to large wading birds, with a slender and ovoid body, short tail, and large neck folded to an ‘s-shape’ during flight. The figures encountered in the middle part of the central Panel C (E-10; cf. Figure 3) probably show individuals of the Grey Heron (*Ardea cinerea*) or Purple Heron (*Ardea Purpurea*); another six herons are depicted in the lower part of the same panel (B-11 and C-11). The second group of birds from the *Ardeidae* family is made up by Cattle Egrets (*Bubulcus ibis*, $n = 3$), a bird of a slightly smaller size than the heron. This species upholds a commensal relationship with cattle and other grazing mammals, removing ticks and insects from them, to feed itself. This symbiotic behaviour is explicitly displayed in the central Panel C, where a single Cattle Egret is associated with a large deer (B-9); a different individual of the same species is placed directly under the belly of another large deer (B-4), itself stalked by a human hunter to its left.

Birds of the *Gruidae* family are among the more commonly depicted birds, even though they are only represented by a single species – the Common Crane (*G. grus*, $n = 17$); these are grouped in two areas on the roof of the cave (D-6, E-9 and F-9). Their defining trait is their long neck paired with a large drooping tail. The west-facing group of nine cranes (E-9 and F-9) may be interpreted as a scene of two birds copulating amongst their conspecifics; the other group entails a scene (D-6) where a crane couple is depicted in front of a nest made of branches and mud and containing three eggs arranged for incubation. The ethological details are remarkable here. One can clearly identify the beak of the male who appears to ‘peck’ the female, a behaviour commonly displayed during the reproductive period. Mas and Finlayson (2001) regard both of these scenes as ‘snapshots’ of the same event.

The Greater Flamingo (*Phoenicopterus roseus*) with its characteristic slender neck, long legs, and curved beak appears eleven times (cf. Table 1). All images are concentrated in one area (C-9, cf. Figure 3), seemingly related to the depictions of two anthropomorphic figures we consider hunters. One of them seems to be wearing a headdress imitating a bird, the other holds an axe in one hand and a dead bird in the other.

In the lagoon area of La Janda there existed and there is a great diversity of *Anatidae* family (Alonso López 1980; Finlayson 1992). However, the presence of this family in paints Tajo de las Figuras is insignificant. Only six specimens could be identified so far, probably referring to the Barnacle Goose (*Branta*

Table 1. Different bird species and their quantities recorded at Tajo de las Figuras. For each bird category, habitat preferences in the wider lagoon environment of La Janda for are provided in the last column: A coastal estuary marsh; B freshwater lagoon; C flooded lowland; D riverine ecosystem; E coastal zone.

	Family	Species	Common name	Quantity	Habitats
	Otidae	<i>Otis tarda</i>	Great Bustard	35	C
		<i>Tetrax tetrax</i>	Little Bustard	7	C
	Laridae	<i>Larus argentatus/Larus canus/larus marinus</i>	European Herring Gull/ Common Gull/ Great Black-backed Gull	24	E
	Rallidae	<i>Porphyrio porphyrio</i>	Purple Gallinule	3	A
		<i>Fulica cristata/Fulica atra</i>	Crested Coot / Coot	16	A
	Ardeidae	<i>Ardea purpurea</i>	Purple Heron	15	B-D
		<i>Bubulcus ibis</i>	Cattle Egret	3	B
	Gruidae	<i>Grus grus</i>	Common Crane	17	C
	Phoenicopteridae	<i>Phoenicopterus roseus</i>	Greater Flamingo	11	A
	Anatidae	<i>Branta leucopsis/ Anas platyrhynchos/ Tadorna ferruginea</i>	Barnacle Goose/ Mallard/ Ruddy Shelduck	6	B
	Therkiornithidae	<i>Platalea leucorodia</i>	Eurasian Spoonbill	2	B
		<i>Plegadis falcinellus</i>	Glossy Ibis	5	B
	Recurvirostridae	<i>Recurvirostra avosetta</i>	Avocet	2	A
		<i>Himantopus himantopus</i>	Black-Winged Stilt	2	A
	Accipitridae	<i>Circus aeruginosus</i>	Marsh Harrier	1	C
		<i>Gyps rueppellii</i>	Rüppell's Vulture	1	C
		Total number of securely identified birds		150	
		Unidentified		14	
		Possible birds		44	
		Total number of birds		208	

leucopsis), the Mallard (*Anas platyrhynchos*), or the Ruddy Shelduck (*Tadorna ferruginea*).

The *Threskiornithidae*, wading birds with a characteristic beak, are represented by the Eurasian Spoonbill (*Platalea leucorodia*; $n = 2$) and the Glossy Ibis (*Plegadis falcinellus*; $n = 5$). One of the Spoonbills (D-8) is depicted with a flattened beak and long legs with large, robust, non-webbed toes. Another depiction of a spoonbill further serves to illustrate the accuracy with which birds and bird behaviour were depicted at El Tajo (D-11). What at first glance might look like a 'third leg' is actually a depiction of the bird during defecation, when the excrement is released (cf. Rodríguez 1996; Mas and Finlayson 2001; Hancock et al. 2010). Among the five specimens of the Glossy Ibis (C-8 and C-10), the most characteristic one is located directly below the Eurasian Spoonbill just described (D-8). The Glossy Ibis is depicted with its sickle-shaped

beak and a small mollusc. What we thus see here is a fairly precise depiction of the bird's foraging behaviour – the Glossy Ibis wades in shallow water, using its sickle-shaped beak to probe into the soft mud for food such as crustaceans, molluscs, etc. (Barros and Ríos 2002). From the *Recurvirostridae* family we have a Pied Avocet (*Recurvirostra avosetta*; $n = 2$) represented in the right Panel R, right over the large deer that seems to 'preside' over this scene. These waders are characterised by their long, upturned bill, and their unique feeding technique; they scythe their bills from side to side in shallow brackish water or on mud flats. The same family is further depicted by two Black-winged Stilts (*Himantopus himantopus*; $n = 2$) whose morphology resembles the avocet, although they are distinguished by a straight beak. Today, stilts are frequently found in La Janda during the spring months (cf. Barros and Ríos 2002).

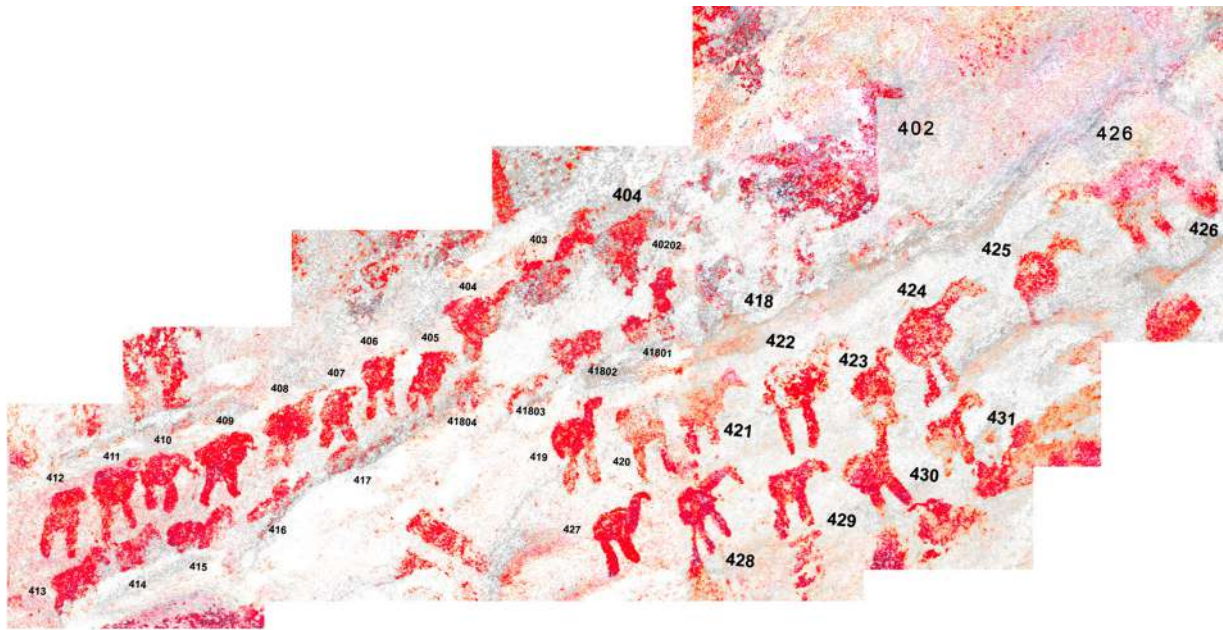


Figure 5. Sample of the compositional richness of bird paintings at Tajo de las Figuras: flock of Great Bustards (*O. tarda*) led by a large male (no 402) and accompanied by two or three females (nos 403 and 404) as well as a large number of chicks (nos 405–412). This scene is embedded in the naturally-sloped morphology of the cave wall. Below this scenic grouping, other east-facing birds such as *F. cristata* (no 421), *T. tetraz* (nos: 422, 423, 424, and 425), and bustards (nos 428, 429, 430, 431) can be found.

Two specimens of the family *Accipitridae* – diurnal birds of prey with long wings and hooked peaks – have also been identified at El Tajo (cf. Table 1). The first individual exhibits a V-shaped tail and a hooked beak (C-9), possibly representing a Marsh Harrier (*Circus aeruginosus*). The habitat of these birds is confined to wetlands, where they build their nests on the ground and close to the water (Barros and Ríos 2002). In the same grid and directly below this individual, one encounters another representative of the *Accipitridae* family whose morphology (thick neck devoid of feathers combined with a curved beak) resembles the Rüppell's Vulture (*Gyps rueppellii*).

Comparison with other depicted animals and humans

There are some notable similarities and differences between the birds and other depicted creatures, including humans, warranting attention. The first aspect is that the mammals drawn look much more 'schematised' than the birds. The technique used to paint the heads, necks, legs and tails of the birds (cf. Figure 3: E-7/F-7, E-12, and F-12) was that of a simple blow with a crushed branch, a brush or, probably, most commonly, by using the fingers. The bodies of these same birds are painted 'Plain ink' by means of coloured spots. The main difference between the representation of animals and humans is that the former are almost always shown in 'profile', whereas the anthropomorphic figures tend to be shown in 'frontal view' (*en face*) (esp. B-7 and C-9; cf. Mas 2000). On the other hand, most of the birds identified are represented in groups, some of which we can interpret as flocks

(B-8/B-9 and C-8/C-9). This gregarious behaviour is applicable to other animals such as mammals, especially goats and other ungulates, which are organised in a similar way in smaller groups (e.g. A-7). An exception are male deer (B-7 and B-16) which are displayed alone, contrasting with younger individuals that are shown in groups (e.g. H-11). Other mammals, such as horses, donkeys, dogs, and foxes are sometimes also painted in isolation or represented in pairs, although in most cases they can be found in close proximity to other animals (e.g. A-7). The images therefore seem to mimic the outstanding characteristics of the observable behaviours of the respective animals and their aggregating habits.

A unifying feature of the nonhuman representations is the emphasis on aspects of fertility as well as on rutting and breeding behaviours. The respective pictorial details and scenes are not only documented by the corpus of bird imagery discussed before, but also occur within the depictions of mammals. There are, for instance, representation of deer and goats 'in heat' (e.g. B-7 and B-9), deer suckling their cubs, or deer herds next to their offspring (A-7). This ties in with an apparent concern of the prehistoric authors of the rock art to highlight sexual dimorphisms, a precondition of our ability to discriminate between different sexes.

Human figures or anthropomorphs are generally rare and dispersed over the entire panel, mostly occurring alone instead of in groups (except for, perhaps, B-10). The dominance of nonhuman agents in the rock art is therefore striking and reproduces, we argue, the immense richness and diversity of nonhuman animal

life at the Laguna de la Janda at the time the paintings were created; a time when the lagoon was regularly swamped with animals –some endemic, some migratory– and human presence seemed to be of marginal significance. Although humans are portrayed as a part of the local web of life, they occupy no special place in the art; to the contrary, they appear to be no more than a footnote in the ‘theatre of nature’. There are only two scenes in which humans are shown interacting with other animals. In the first one, a hunter is depicted with a weapon, perhaps an axe, in his/her right hand, carrying a caught bird in his/her left one (C-9 and B-9). Right next to this figure, there is another anthropomorph, probably wearing a bird-shaped hat (right bottom corner of C-9). If this interpretation is adequate, the figure may showcase a specific hunting approach, well-documented in ethnographic literature (cf. Edwards and Olson 2000).

Ecological and seasonal implications

The various bird species depicted at El Tajo prefer to live in different habitats, such as freshwater lagoons, riverine ecosystems etc. (cf. Table 1). This diversity directly reflects the ecological structure of the ancient ‘Laguna de la Janda’ environment outlined above. However, in the paintings there is a conspicuous absence of *Anserinae*, which are known to have frequented the area in large flocks at least since the Holocene period (Mosquera and Finlayson 1995; Mas 2000). Since anserines only come to La Janda in winter, it has been suggested (ibid.) that their absence in the depictions could be due to the fact that the rock art captures seasonal information. This idea is supported by some of the behavioural details recorded for both birds and mammals, especially deer and goat discussed in the previous section. Aspects of rutting behaviour as well as rearing the offspring are clearly associated with particular seasons of the year (Mas 2000, 358). The respective depicted animals and behaviours can then be argued to belong to spring to late autumn (cf. Mas 2000; Mas and Finlayson 2001).

Archaeozoology

The archaeozoological record of the study region stands in sharp contrast to the prominence of bird depictions in the rock art of Tajo de las Figuras. To this date, no bird remains have been recovered from domestic or funerary contexts of the area around the cave (cf. Lazarich 2007). Moreover, known Neolithic (5th to 4th millennium BCE) sites of the Atlantic coastal region of Cádiz similarly lack osteological bird remains (Ramos et al. 2006). This situation also applies to the faunal record of Holocene cave occupations in Gibraltar (cf.; Rhodes et al. 2000), where only partridges and pigeons have hitherto been found (Finlayson 1992; Finlayson et al. 1999). These birds, however,

are not depicted at El Tajo. The already mentioned cave of Nerja at the Costa del Sol in the Mediterranean area, about 200 km away from La Janda, with its deep stratigraphy spanning from the Early Upper Palaeolithic into the Early Holocene provides the only significant reference to the inventory of birds encountered at El Tajo. The walls of Nerja have preserved hundreds of vertebrate images, including fish, reptiles, mammals as well as birds (Hernández-Carrasquilla 1994, 1995).

Chronology

Assigning a clear-cut chronological position to the corpus of paintings from Tajo de las Figuras is difficult for a number of reasons: the natural pigments, i.e. iron oxides and calcite, which were employed for drawing for pictures, cannot be dated directly. The fact that the natural coating that developed on top of the rock art was removed about ten years ago further complicates the matter. As a consequence, we are largely restricted to contextual arguments in order to estimate the age of this rock art. The main thrust of the argument is stylistic and situates the paintings within the broader image-context of the macro-region. In general, the rock art of El Tajo showcases overarching similarities with the ‘Schematic’ style of the Iberian Peninsula (Acosta 1968; Hernández Pérez 2009), but also exhibits some regional, and perhaps even unique, characteristics – features that led us to coin the term ‘Laguna de la Janda style’ (cf. Carreras et al. 2009, 2011; Lazarich et al. 2012b). The latter is currently found in fifteen caves in the southern Cádiz region – Cueva del Arco, Cueva Cimera, Cueva de Santamaría, Navafría, Cueva del Viento, Padrón, Castaño I, Castaño IV, Navafría, Cueva de las Palomas, Bacinete, Piruétano, Taconeros, Arrieros, and Pajarraco (cf. Carreras et al. 2009) – whereas the former appears to be confined to the La Janda area (Lazarich et al. 2012a, 2012b). Since the particularities of the El Tajo paintings are mainly based on the naturalism of the depicted birds, there is the possibility that the ‘Laguna de la Janda style’ is the product of particular conditions of human-bird encounter and does not, strictly speaking, denote a distinct chronocultural phenomenon. Having said this, we can now turn to the chronological implications of this overall configuration of style.

In contrast to the so-called ‘Levantine’ art of the Iberian Peninsula which is usually considered to reflect the presence of the first agro-pastoral groups in the region, perhaps even stretching back to the Mesolithic (Hernández Pérez 2009), ‘Schematic’ art is typically regarded to indicate the timeframe from the Neolithic to the Copper Age (Grimal and Alonso 1994; Ripoll 2001; Viñas et al. 2012). Traditionally, the El Tajo paintings have been attributed to the early agro-pastoral phase because of the apparent stylistic differences to the known corpus of Palaeolithic

imagery with its more developed naturalism and the lack of the representational dynamism and painting technique characteristic for the 'Levantine' style (Breuil and Burkitt 1929; Acosta 1968, 1983; Hernández Pérez 2009). In fact, the unusual mixture of more 'naturalistic' and more 'schematic' features in the rock art of El Tajo is somewhat analogous to the portable art of the Copper to Bronze Age of the region exhibiting a similar profile (cf. Acosta 1968, 1983; Hernández Pérez 2009). It is therefore possible that the El Tajo corpus of images falls within a more 'developed' phase of agro-pastoralism in the southern part of the Iberian Peninsula.

The content of the El Tajo rock art also supports its agro-pastoral origin. The art not only features wild animal's observable in the prehistoric lagoon environment, but equally encompasses probably domesticated animals such as donkeys (B-8), goats (B-6) and even dogs (B-6 and E-11) (cf. Breuil 1920; Breuil and Burkitt 1929, figure 31; Acosta 1968, 1983; Mas 2000, 121). There are two scenes where several goats appear in close proximity to a dog, possibly indicating the latter's role as a watchdog (E-11; cf. Acosta 1968, 1983, 21). Similar depictions centred on bovids and donkeys can be found in the rock shelters and caves nearby, such as Castaño IV, Mediano, and Taconeros. Some of them host rock art belonging to the same style regime as the paintings of Tajo de las Figuras (cf. Carreras et al. 2009). Although the introduction of the donkey to the Iberian Peninsula is traditionally dated to the Iron Age (Beja-Pereira et al. 2004), recent findings at the Portuguese site of Leceia have shown that these animals may have been present already around the Chalcolithic (cf. Cardoso, Eisenmann, and Orlando 2013). All of this is consistent with a placement of the El Tajo rock art somewhere between the earlier part of the Neolithic and the Chalcolithic. Recent archaeological discoveries in the La Janda area are consistent with this assessment. Prospections have brought to light numerous traces of human settlement probably dating to the Late Neolithic and Copper Age and extended the known burial complex at the foot of Tajo de las Figuras on the left bank of the river Celemin (Lazarich et al. 2013). The nearby dolmen galleries of Los Charcones are regarded to date to the same period (Ramos et al. 1995). The earliest radiocarbon dates for the Neolithic of the region falling into the interval between the 6th and 5th millennium BCE (Jordá Pardo and Aura 2009) would then provide a maximum age estimate for the images.

This broad timeframe (Neolithic to Bronze Age) is not unrealistic given the well-attested overlap between individual images, their juxtaposition, as well as their occasional re-painting (cf. Lazarich et al. 2012a, 2012b). Previous work has already emphasised the palimpsest character of the El Tajo image panels (Mas 2000, 2005), indicating that they encapsulate some time-depth. One may therefore argue that the imagery has a 'transitional' status and in reality

embodies various painting stages starting from the early Neolithic extending to the Copper Age and perhaps even to the Bronze Age. An input by the latter might be signalled by some of the 'fully schematic' figures, anthropomorphs, and the reduced simple markings/signs. This interpretation would place the majority of the bird paintings into the earlier stages of the rock art sequence of Tajo de las Figuras to a period when anthropogenic impacts on the environment were still limited and nonhuman agents were both visually and behaviourally dominant. The nearby settlement of El Retamar (Puerto Real, Cádiz) dating to the early to mid-6th millennium BCE attests to the presence of people at this early date in the region (Ramos and Lazarich 2002). In our view, all of these contextual arguments justify a provisional placement of the imagery from Tajo de las Figuras into the recent prehistory of the Southern Iberian Peninsula.

Discussion and conclusion

What is the significance of the rich bird imagery from Tajo de las Figuras? Why are birds displayed in such great detail and prominence? The answer to this question can perhaps be found if we relate the images to their wider ecological and archaeological context, synthesising the data presented thus far and putting them into perspective. At any rate, it seems clear that the answer must do justice to the apparent singularity of the bird pictures encountered at La Janda, both in terms of their quality and quantity. This singularity ultimately suggests that the paintings were motivated by the particular conditions of human-bird interaction within the wider lagoon environment and the specific position of the painted caves therein. We may then propose that the bird paintings of El Tajo provide an authentic, albeit somewhat selective window into the potency and vibrant nature of bird life in the La Janda wetland during recent prehistory.

This is not to say that the images should be understood as a 'mirror of nature'. The creation of rock art is always socially mediated and enriched with latent symbolism that informs us about the culturally filtered engagement of human communities with their surroundings (cf. Lazarich et al. 2012a, 2012b; Díaz-Andreu, García Benito, and Lazarich 2014). Animal life is an important part of these surroundings, especially in a dynamic and attractive ecosystem as encountered during prehistoric times at La Janda. The point is that the content of the El Tajo art appears to highlight the special place of the cave in this pregnant landscape and to showcase its particularity. The depictions clearly capture the exceptional variety and great number of birds visiting the lagoon on their seasonal migrations from Europe to Africa and vice versa, a 'spectacle' that could be well-observed from the position of the cave.

This role of La Janda as a migrational hub for birds crossing the Straits of Gibraltar in spring and autumn is still attested today (e.g. Finlayson 1992) and creates a seasonal ‘amplitude’ in bird presence in the area. This, in turn, certainly endows the region with a ‘pulsing’ and ‘breathing’ quality, while key transitions in seasonality and animal composition are signalled by incoming and departing birds. We have seen that the depicted birds cover a broad spectrum of habitats, all of which contribute to the complex mosaic ecosystem of the lagoon landscape. Even today, in its shrunken condition, this ecosystem is one of the largest retreat areas for birds in Europe (cf. Barros and Ríos 2002). Arguably, the corresponding ornithological richness is directly reflected in the rock art of Tajo de las Figuras.

That visibility and observability were conditioning factors of what was painted onto the cave walls is further, indicated by the missing small forest birds known to still inhabit the varied wetland ecosystem of La Janda. These are less visible in the open landscape and do not easily make an impression on potential observers located in the caves. By contrast, there is a preponderance of large aquatic birds such as wading birds, flamingos, cranes, swamphens, and also bustards in the present bird imagery; in addition, birds are often shown in groups or flocks, forming gregarious entities which are easy to spot in the landscape. This concern with visual salience is also reflected in some of the details of bird ethology, for example the depicted courting behaviour of the Great Bustard which occurs in early spring and is quite compelling with males erecting the shorter feathers of their tail. In general, many of the identified animal scenes, especially those showing species associations or even mutualistic behaviours, seem to reference the ecosystem of La Janda itself. This further supports the idea that the rock art of El Tajo, above anything else, seeks to convey the uniqueness of La Janda as an ecospace, thereby also mirroring the special role of birds in it. Again, the represented particularities of bird behaviour, including details of the life cycle, and the varied modalities in which these animals are pictured (i.e. flying, resting, swimming, feeding, copulating, hatching, and even defecating) substantiates this view.

Even though it is possible, and even likely, that prehistoric groups also took advantage of the richness of birds at La Janda for subsistence purposes, the archaeozoological record suggests that avifauna did not constitute a major food staple (cf. Cortés et al. 2010). As we have seen, bird bones are underrepresented in the known sites from the relevant time frame, although excavation techniques, preservation conditions and a lack of systematic sieving might have contributed to this picture. Nevertheless, hunting scenes are directly depicted or at least insinuated in the imagery of Tajo de las Figuras (C-4 and C-9). Moreover, the utilisation of bird-extracted materials, especially feathers, is for instance implicated by the portrayal of bird-shaped

headdresses encountered not only in El Tajo (C-8 and C-9), but also in the nearby cave site of Castaño 1 (Carreras et al. 2009, 33).

Having said this, it is clear that the painted caves themselves cannot be addressed as habitation sites or hunting stations there is at least no convincing archaeological evidence supporting this hypothesis. Furthermore, their position in the anthropogenic landscape seems to separate them from other foci of human activity in the timeframe of concern. Megalithic structures and settlement traces, including Los Charcones (Ramos et al. 1995), are located in different places in the ancient lagoon environment, especially close to the rivers Celemín and Barbate; the only exception is a megalithic necropolis at the foot of El Tajo (Breuil and Verner 1917; Lazarich et al. 2013). This burial complex, however, may be understood as a feature signalling the significance of the smaller area where the images were applied. All of this would promote the idea that the rock art of Tajo de las Figuras is a product of the ‘special place’ where it was made, having less to do with domesticity and specialised activities such as hunting or the commemoration of the dead. Yet, the network of inter-visibility that exists between all of these places, including the rock art sites, indicates that they were part of an integrated system of occupation, with different site categories serving complementary roles (cf. Lazarich et al. 2013).

The accentuation of the fertility and breeding theme, evoked by both the bird and mammal representations at Tajo de las Figuras, similarly suggests that the main focus of the rock art lies on environmental rhythms echoed by animal signature-behaviours which are easily observable in the landscape. Just like the bird imagery (see supra), these mammal depictions denote the seasons of spring and autumn. Springtime is implicated by the various paintings showing animal courtship display and rearing behaviours – it is for example the time of the year when doe produce offspring (Soriguer et al. 1994; Santiago-Moreno et al. 2007). The autumn period, for instance, is connoted through the depiction of the rutting behaviour of deer or by goats giving birth. This overall consistency of the seasonal signal across species and art-category boundaries (‘naturalistic’ versus more ‘schematic’ style) may be taken as an additional argument for the unity of the entire image corpus, suggesting that the rock art indeed addresses the wider animal ecology of La Janda when nonhuman life was ‘bustling’ there, at particular junctures of the year. Zvelebil and Jordan (1999), for example, have argued that salient events in the life cycle of animals often constitute important points of reference in the narratives and mythologies of prehistoric societies; they highlight in particular the importance of migratory water birds, which through their arrival signal the renewal of the ecocultural cycle of human communities (cf. Lahelma 2008).

In total, the evidence therefore points to the ecological significance of the rock art of Tajo de las Figuras, which appears to reference the two seasons of the year when animal life within the lagoon environment of La Janda was particularly vibrant and large numbers of birds gathered there on their migratory routes. The content and composition of the depictions clearly reference these 'hotspots' of animal activity and convey the importance of the corresponding ecological transitions for the people inhabiting the landscape during this time. We may suspect that birds were regarded as the harbingers of these transitions and humans consequently started to observe them from favourable positions in the landscape. The painted caves of the area, including Tajo de las Figuras, are such places of observation and they may thus record early practices of bird watching.

Note

1. See <http://www.dstretch.com/RA2005YDS/JonHarnaRA2005YDS.html>. DStretch is a tool for rock art researchers who want to improve the images of photographs. It is a plugin for ImageJ. ImageJ is an image processing and analysis programme written in Java. It must be installed first before you can use DStretch. <https://imagej.nih.gov/ij/index.html>.

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No potential conflict of interest was reported by the authors.

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