A CHECKLIST TO THE QUATERNARY AVIFAUNA OF THE MALTESE ISLANDS
PRELIMINARY NOTE

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Introduction

The Maltese Quaternary fauna is more or less well documented, with most works concentrating mainly on the pachyderms, ungulates and micro-mammals. Less known is the variable amount of avian remains unearthed from various sites. The only avian species which has to some extent been studied in detail are *Cygnus falconeri* and *Grus melitensis*. The other 44 species or genera which have been discovered and identified are less documented. Of these, no less than six species were endemic to Malta and/or the Mediterranean region. The Maltese Quaternary avifauna has been previously documented by Parker (1865, 1869), Adams (1866, 1867, 1870), Spratt (1867), Lydekker (1890, 1891), Bate (1916), Caton Thompson (1923), Despott (1924-25, 1926-27, 1928-29), Fischer & Stephan (1974), Northcote (1982a, 1982b, 1981-83, 1984, 1984-85, 1988) and Weesie (1987).

The present work records for the first time all the known Maltese Quaternary avian species in an annotated checklist. This is supplemented with additional notes by the author, remarks on fossiliferous localities, previous authors, present status, distribution and ecology of documented species. Future projected works will focus on the diet and predator-prey relationship, island speciation and the possible causes of extinction of some of these species.

Skeletal remains pertaining to the genus Procellariiformes, a pelagic seabird group not previously recorded from Maltese caves, are here reported for the first time. The association of these bird remains with human artefacts, discovered also from an "inland" locality might be suggestive to a hunter-gatherer way of life by early man.

Six species not mentioned in previous works have been identified from the "Bate Collection" reposited at the Natural History Museum, South Kensington, London. They are here added to the list of Maltese Quaternary Avifauna.

Bird Bone-Caves

The majority of Maltese Quaternary deposits were discovered in caves, but a number of fissures and crevices also yielded very interesting finds. Avian remains were almost always present in these quaternary deposits, in variable amounts and diversity of species.

The Maghlaq Cave produced bird bones from its upper layers, alongside bones and teeth of the rodent *Myoxus melitensis.* (Adams 1866). Avian bones from the Zebbug Cave, belonging mainly to *Cygnus falconeri* and *Cygnus equitum* were found associated with those of at least two *Elephas* sp, tortoise (turtle) bones, and two *Myoxus* sp, including *M. melitensis* (Spratt 1867). The Benghisa Gap yielded fragments of bird bones of large dimensions, bones of *Elephas* sp., *Testudo* sp, a small sized lizard the size of a common Chameleon, and frogs (Adams 1867). Adams (1866) recounts that *"Remains of birds were very common in nearly all localities and embraced various species. Raptors of large dimensions were represented by foot and wing bones in the Mnaidra Gap, where, likewise, as before stated, water birds, including gigantic Grallae and Anseriformes, were plentiful. In the Mnaidra Cave bird bones of large dimensions were found alongside many fragments and a few entire teeth of Elephas, and teeth and bones of Myoxus melitensis"* (Adams 1866). The abundance of material unearthed, and the diversity of species recorded, make Ghar Dalam the richest and most important of Maltese Quaternary sites. Material collected by Dorothea Bate from the Tal-Herba fissure has also contributed to a good number of diverse species **[Table 1].**

Locality	No. of Species
Ghar Dalam	31
Tal-Herba Fissure	8
Zebbug Cave	6
Ta' Kandia Fissure	4
Benghisa Gap	4
Mosta Ravine	4
Mnajdra Cave	3
Kalafrana	3
Tal-Gnien Fissure	3

Table 1. Number of avian species from Maltese Caves

Material

The "Bate Collection" comprising material from Ghar Dalam, Tal-Gnien Fissure and Tal-Herba fissures now reposited at the Natural History Museum, London; and material excavated by G. Despott from Ghar Dalam Cave between 1916-1917 (National Museum Natural History, Mdina and Ghar Dalam Cave and Museum), have been analysed. A systematic review of the bone material from the Bate collection of Tal-Gnien and Tal-Herba Fissure, revealed six new species of birds namely; *Accipiter nisus, Circus aeruginosus, Columba cf. livia, C. palumbus, Strix aluco* and *Corvus monedula.*

New material has also been discovered by Michael Gatt and the present author, in the course of a series of excavations carried out between 1996-1997, within a number of caves on the south coast of Malta. Skeletal remains of *Calonectris diomedea* and *Puffinus yelkouan* were found in a soft clayey-earth type deposit. Surface material was dry-sieved while individual bones were picked up from the sediment. Bones were collected in separate bags at depth intervals of 15cm. The material was later washed, prepared and analysed. The associated fauna included *Rattus* sp. *Crocidura cf. sicula* and *Chiroptera* sp. In one of these caves, dried straw, formerly used as bedding for cattle was also unearthed along with the bird bones from the sub-surface layer.

Unless otherwise stated, the local status follows that of Sultana & Gauci (1982), *The Birds of the Western Palearctic* by Cramp (1985, 1988) and Cramp *et al.* (1977, 1980, 1983, 1994) were consulted for status and distribution.

Systematics

Order PROCELLARIIFORMES
Family PROCELLARIDAE

Genus *Calonectris*

Calonectris diomedea **Cory's Shearwater**

Localities: Ghar in-Naghag, Mista Cavern ?

Listed by: Present work

Present Status & Distribution: Two distinct races; *Calonectris d. borealis* of the North Atlantic and *C. d. diomedea* of the Mediterranean. Breeding visitor to the Maltese Islands, from the end of February to mid-October (Cachia-Zammit & Borg 1986-87). An estimated 7,000 pairs breed on Malta, Gozo, Comino and Filfla.

Habitat: Strictly pelagic. Breeds on offshore rocky islands and coastal cliffs.

Note: The Cory's Shearwater spends the day feeding out at sea, visiting the colonies only at night. About 5-8 pairs still breed at Ghar in Naghag. The Cory's Shearwater breeds in caves, crags and crevices as well as amongst boulders overlooking the open sea (Cachia Zammit & Borg 1986-87). Accessibility to the nesting colonies is not always difficult and breeding birds may have been taken out of their nests for food. The relatively small amount of bones found in association with human remains, however, suggests that this species was only taken randomly.

Genus *Puffinus*

Puffinus yelkouan **Levantine Shearwater**

Localities: Ghar in-Naghag (Benghisa), Ghar Dalam, (Mista Caves), Ghar Hasan.

Listed by : Present work

Present Status & Distribution: The Levantine shearwater is a bird of the central and eastern Mediterranean islands. It breeds on offshore islands and headlands. Common breeding visitor from mid-November to mid-July, breeding on Malta, Gozo, Comino and Cominotto and probably also on Filfla (Sultana & Gauci 1982, Borg & Cachia-Zammit 1986-87; Borg *in press*). The Levantine Shearwater is an endemic species to the Central and

eastern basin of the Mediterranean.
Habitat: Same as that of *Calonectris diomedea*.
Note: The small amount of remains of Levantine Shearwater found associated with human remains at Ghar Dalam suggests that due to its more crepuscular habits it was very irregularly taken by man.

its habits (Northcote 1988).

Cygnus olor **Mute Swan**
Synonyms: *Anas olor*
Locality: Zebbug
Listed by: Despott (1926-27)
Present Status & Distribution: Widespread breeding bird over temperate Europe, being basically absent from

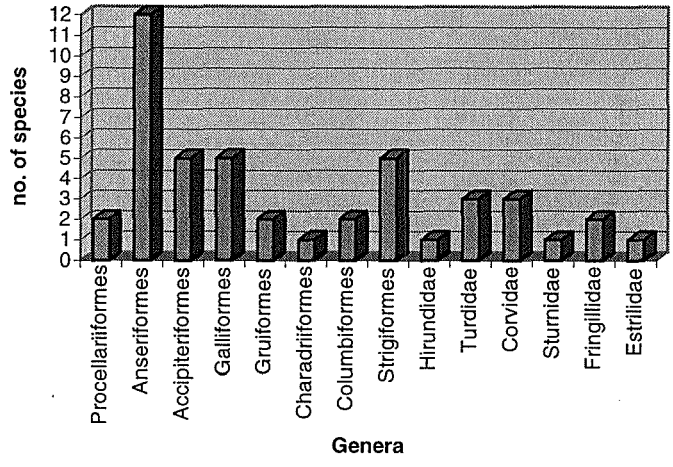

Table 2 : Genera and number of species discovered in Maltese Quaternary deposits.

Order ANSERIFORMES
Family ANATIDAE

Genus *Cygnus*

Cygnus equitum
Locality: Ta' Kandia Fissure, Tal-Herba Fissure, Benghisa Gap, Zebbug Cave, Ghar Dalam, Kalafrana Fissure.
Listed by: Bate (1923), Despott (1928-29), Northcote (1988)
Present Status: globally extinct

Cygnus falconeri
Locality: Ta' Kandia Fissure, Tal-Herba Fissure, Benghisa Gap, Ghar Dalam, Mnajdra Cave, Zebbug Cave, Zebbug Fissure, Tal-Gnien Fissure,
Listed by: Parker (1865 & 1869), Adams, (1866), Bate (1916), Despott (1926-27, 1928-29), Lydekker (1890), Tagliaferro (1915), Northcote (1982, 1981-83).
Present Status: globally extinct
Note: The diminutive size of this species' foot bones, compared with those of the present day *C. olor*, may suggest that this species was probably more terrestrial in

northern and southern Europe; all European populations now more or less of domesticated origin. Partial migrant, mainly in extreme cold spells. Vagrant, Up to 1982, it was recorded six times (Sultana & Gauci 1982). An increase in sightings has been noted in the mid to late 1980's and early 1990's (Birdlife Malta records).
Habitat: The wild form of this bird breeds in the steppe lakes of central Asia, but it is more familiar as a tame bird of urban and suburban lakes.

Cygnus cygnus **Whooper Swan**
Synonyms: *Cygnus musicus*
Locality: Zebbug
Listed by: Parker (1865), Northcote (1988)
Present Status & Distribution: Breeds across the entire breadth of the northern Palearctic from Iceland to northeastern Siberia, south in Europe to Southern Sweden and Poland and in Asia to Aral Sea and Mongolia. Migratory. The Whooper swan has been omitted from the list of Maltese birds.

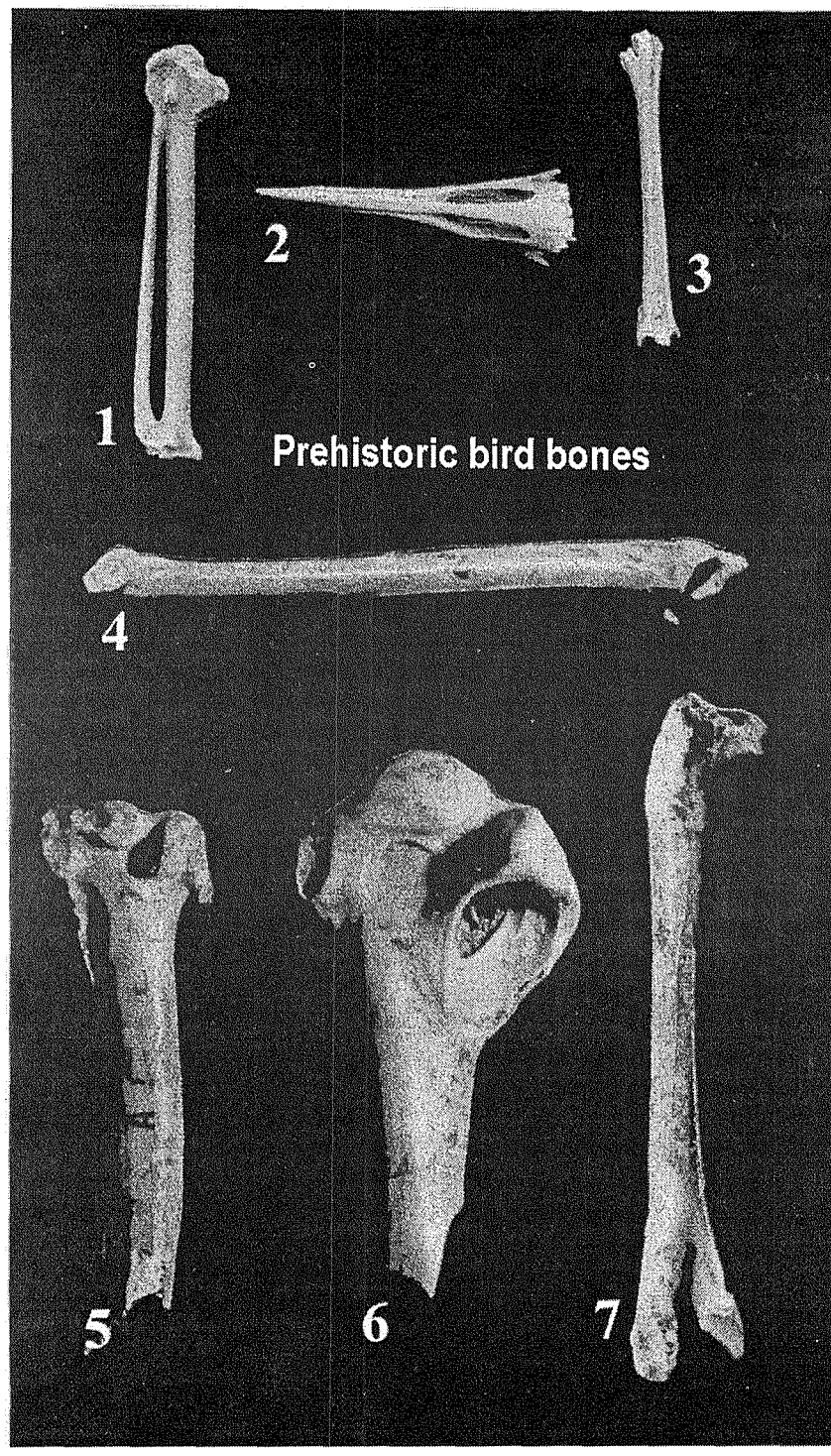

Figure 1 (Specimens are not to scale)

1. Carpos-metacarpos of *Calonectris diomedea*
2. Upper mandible of *Puffinus yelkouan*
3. Tarsus of *Puffinus yelkouan*
4. Left ulna of *Corvus frugilegus* (courtesy of Ghar Dalam Cave and Museum.)
5. Distal extremity of right humerus of *Corvus corone*
6. Proximal end of left humerus of *Tadorna tadorna*
7. Left femur of *Asio flammeus* (courtesy of Ghar Dalam Cave and Museum)

Habitat: Breeds in open shallow waters, from steppe lakes to pools in the northern taiga, also by coastal inlets, estuaries and rivers. Winters in lowland open farmland, usually in coastal regions and inland in floodplains.

Genus *Anser*

Anser fabalis **Bean Goose**
Locality: Ghar Dalam,
Listed by: Despott (1926-27)
Present Status & Distribution: Breeds across northern Europe and Asia. There are two major wintering areas: the temperate lowlands of Europe and the corresponding region of eastern Asia. Migratory. Vagrant to the Maltese Islands, recorded only in winter.
Habitat: Breeding in open damp tundra, coastal regions and on Arctic islands. The taiga forms breed mostly in sub-Arctic regions, favouring scrubby birch forest and even relatively dense coniferous forest zones with boggy clearings. Winters in open areas, favouring damp steppe and open agricultural land, but almost always in very open country.

Genus *Branta*

Branta bernicla **Barnacle Goose**
Locality: Zebbug, Ghar Dalam, Ta' Kandia Fissure, (Ghar Bodecabu ?), Benghisa Gap, Mosta.
Listed by: Parker (1865, 1869), Caton Thompson (1923), Despott (1928-29),
Present Status & Distribution: Three well-defined races were the nominate race breeds across high Arctic tundra of Siberia to Taymyr Peninsula. Winters in Northwest Europe in Netherlands, England and western France, with smaller numbers remaining in Denmark and Coastal Germany. Vagrants have occurred south to central and south eastern Europe and North Africa east to Egypt. Dispersive. The Barnacle Goose has never been recorded (in the living form) from the Maltese Islands.
Habitat: Breeds by low coastal tundra, with pools and small inlets and islands. Winters on tidal mud and sandflats, estuarine and coastal grassland. Rarely occurs on fresh water, except sometime on passage.
Note: Although originally suggesting that bones retrieved from the Zebbug Fissure belonged to this species, Parker (1865), later (1869) concluded that it was more probable that these belonged to a large sized Mallard *Anas platyrhnchos*. The right coracoid found by Caton Thompson from Ghar Dalam and reported by Bate (1923) has not been confirmed as belonging to *Branta bernicla*. A lower end of a femur and 2 fragmented bones collected by Bate from Tal-Gnien Fissure (NHML not catalogued) were identified as belonging to a small *Anser* sp. (Borg *in prep*.)

Genus *Casarca*

Tadorna ferruginea **Ruddy Shelduck**
Synonyms: *Tadorna casarca*.
Locality: Ghar Dalam
Listed by: Despott (1926-27)
Present Status & Distribution: A small population in North West Africa wintering in southern Spain. The main population breeds from extreme southeastern Europe and Turkey, eastwards across southern and central Asia to Western China. Migratory. A vagrant to the Maltese Islands, it has been recorded 7 times up to 1982.
Habitat: Breeds in open country, particularly by rivers and saline lakes in open steppe and upland plateaux, locally by rivers in mountainous districts, but generally avoids well forested country. Winters by slow-flowing rivers and lakes in lowland districts, normally avoiding coastal waters.

Tadorna tadorna **Shelduck**
Locality: Ghar Dalam
Listed by: Despott (1924-25)
Present Status & Distribution: Coastal populations in regions of north-western Europe, from Scandinavia and British isles south to Atlantic coast of France, with isolated pockets along French Mediterranean shores and Sardinia; very small numbers also breed in Tunisia. Migratory. Scarce visitor to the Maltese Islands from late September to late March.
Habitat: Estuaries, both muddy and sandy, and shores of inland saline and brackish lakes in open steppe-like country. In western Europe primarily coastal in distribution, but in Asia a bird of inland salt lakes. Less commonly on freshwater lakes and sheltered coastal bays.

Genus *Anas*

Anas acuta **Pintail**
Locality: Ghar Dalam,
Listed by: Fischer & Stephan (1974)
Present Status & Distribution: Widespread across almost the whole of northern North America, Europe and Asia. Highly migratory. In Malta this species is fairly common from late August to February, with most from mid-September to mid November, though small influxes have also been recorded in February. A few occur irregularly in March and occasionally in April.
Habitat: In general a bird of open wetlands, avoiding wooded areas. Breeds among wet meadows, on marshy lakesides or by slow rivers. In winter, also on estuarine flats, brackish marshes and coastal lagoons.

Anas platyrhnchos **Mallard**
Synonyms: *Anas boscas*
Locality: Mosta,
Listed by: Despott (1928-29)
Status & Distribution: Widespread across most of the northern hemisphere, avoiding tundra zone of high Arctic, high mountains and deserts. Chiefly migratory. Fairly common from October to January, smaller numbers are infrequently and irregularly recorded in February and March and from July to September.
Habitat: Almost any form of lowland still water, from freshwater lakes to sheltered coastal bays and estuaries. Occasionally at higher altitudes.

Genus *Aythya*

Aythya ferina **Pochard**
Synonym: *Fuligula ferina* .
Locality: Ghar Dalam
Listed by: Despott (1926-27)
Status & Distribution: Widespread over most of Europe and Asia. Migratory. Scarce visitor to the Maltese Islands from mid-August to late February.
Habitat: Shallow to relatively deep freshwater lakes with extensive open water, but with fair cover of fringe or emergent vegetation around edges. Outside breeding season, also on more open lakes and reservoirs, slow flowing rivers and occasionally estuaries and sheltered coastal bays.

Genus *Marmaronetta*

Marmaronetta sp.
Locality: Ta' Kandia Fissure,
Listed by: Despott (1928-29)
Status & Distribution: This is generally a scarce and very local bird, with patchy and relict distribution around the western Mediterranean and from Turkey east to Central Asia. The western population in small pockets in southern Spain, Morocco, Algeria and Tunisia. Mainly sedentary. A vagrant to the Maltese Islands where it has been recorded only four times.
Habitat: the present habitat of the Marbled Teal is; relatively small, shallow freshwater and brackish lakes with emergent and fringe vegetation in lowland areas. Also along slow rivers and saline coastal lagoons.

Order ACCIPITRIFORMES
Family ACCIPITRIDAE
Genus *Gyps*

Gyps melitensis
Locality: Zebbug, Ghar Dalam,
Listed by: Lydekker (1890)
Status: globally extinct
Note: This species has been also recorded from the Pleistocene deposits of Crete, Hungary, France, Austria and Germany (*in* Weesie 1987)

Genus *Accipiter*

Accipiter nisus **Sparrowhawk**
Locality: Tal-Herba Fissure
Listed by: Present work ("Bate collection" Natural History Museum London, not catalogued)
Status & Distribution: Present over most of Europe, migratory. In Malta it is a scarce autumn migrant from mid-September to early November. Very scarce in spring from mid-March to mid-May.
Habitat: In wooded areas at all altitudes, mainly in cooler climates from Mediterranean through temperate and boreal to subarctic. For breeding prefers extensive stands of coniferous, mixed or less often purely deciduous trees.

Genus *Aquila*

Aquila chrysaetos **Golden Eagle**
Locality : Tal-Gnien Fissure, Tal-Herba Fissure.
Listed by: Despott (1926-27), Weesie (1987)

Status & Distribution: Over most of the Western Palearctic from Britain to the middle east, Mediterranean and Maghreb. Mainly sedentary, some first year birds disperse over a wide area. A vagrant to Malta, one reported taken at Qrendi in 1873 (Wright 1874).
Habitat: Mountainous, upland, and in eastern part of western palearctic also in lowland forest or wetland terrain. Mainly in temperate middle latitudes, but ranging into boreal, steppe and Mediterranean zones.

Genus *Circus*

Circus aeruginosus **Marsh Harrier**
Locality : Tal-Herba Fissure
Listed by: Present work ("Bate collection" Natural History Museum London, not catalogued but listed as probably *C. cf. cyaneus or C. cf. cinereus*).
Present Status & Distribution: Increase in numbers in the last twenty years over most of its range; Central and southern Europe and in former USSR. Migratory. In Malta the Marsh Harrier is a fairly common spring and autumn migrant, with a noticeable increase in numbers in the last ten years.
Habitat: Temperate and Mediterranean climates but penetrating into boreal, steppe, and subtropical. Avoids mountainous, forests, and wooded areas and in desert confined to oases. Strongly prefers shallow, standing, fresh or brackish waters fringed and extensively invaded by tall standing reeds.

Order GALLIFORMES
Family TETRAONIDAE
Genus *Lagopus*

Lagopus lagopus **Willow Grouse**
Synonyms: *Lagopus albus*
Locality: Mosta,
Listed by: Despott (1928-29)
Status & Distribution: Stretching across higher latitudes of west palearctic within arctic, subarctic, boreal and marginally into temperate zones, oceanic as well as continental, and even extending to Atlantic insular outliers. Sedentary. No species of Grouse has ever been reported from the Maltese Islands in historical times.
Habitat: Different subspecies have different preferences to types of habitat. The nominate *lagopus* in northern Russia prefers shrubbery of willow *Salix* and dwarf birch *Betula* mixed with berry-grown tundra. *Lagopus l. scoticus* (Red Grouse) is now largely confined to heather moors normally above or well clear of trees.

Family PHASIANIDAE
Genus *Coturnix*

Coturnix coturnix **Quail**
Locality: Ghar Dalam,
Listed by: Fischer & Stephan (1974)
Status & Distribution; Europe, Mediterranean and Maghreb. Highly migratory. Common passage migrant from late February to May and from late August to mid-November. Influxes occur mostly in April and September with up to 300 birds recorded in a day. In recent years numbers have decreased. A few attempt to summer or to winter, but successful breeding is usually prevented by human interference.
Habitat: The Quail prefers wide open spaces with level or undulating landforms and normally clear of trees and bushes, from margin of boreal to through cool and warm temperate to steppe and Mediterranean zones. Generally avoiding extremes of heat or cold, aridity or humidity, and exposure to strong winds. Chooses seasonally dense, moist but not wet herbage, tall enough for complete concealment.

Genus *Alectoris*

Alectoris graeca **Rock Partridge**
Locality: Ghar Dalam
Listed by: Fischer & Stephan (1977)
Status & Distribution; Present in Europe, mainly in Subalpine regions. Declining in numbers due to hunting pressures. Mainly sedentary. This species has never been recorded in Malta in historical times.
Habitat: In continental mid-latitudes of warm temperature and Mediterranean zones. Mainly in dry, rocky mountains between treeline and snowline, tolerating cold but preferring sunny situations of low humidity. Avoids closed forest, but occurs freely among sparse stunted open woods of pines and juniper. Prefers dwarf heath, also on stony ground, scree, and rocky escarpments on crags. Accordingly

occupies sub-alpine niche, only rarely below 900 m, mostly between 1200 m and 1500 m.

Family GRUIDAE
Genus *Grus*

Grus melitensis
Locality: Zebbug, Tal-Gnien Fissure, Mnajdra.
Listed by: Lydekker (1890), Harrison (1979), Northcote (1984-85).
Status: globally extinct

Grus grus **Common Crane**
Locality: Tal-Gnien Fissure, Zebbug, Mnajdra.
Listed by: Harrison (1979), Northcote (1984-85)
Present Status & Distribution: Becoming rare over much of its European range. Migratory. In Malta it is a scarce autumn migrant from early September to November, Usually very scarce and irregular in winter, occasional in Spring.
Habitat: In west Palearctic, now concentrated in upper middle latitudes between arctic tundra and steppe zones. At high altitudes and latitudes breeds on treeless moorlands, bogs or areas of dwarf heath, usually in moist or wet situations where pools or small lake occur. Occasionally in reedbeds. Outside breeding season it flocks in traditional roosts and assembly areas in floodlands, shallow sheltered bays or swampy meadows.

Family OTITIDAE
Genus *Otis*

Otis tarda **Great Bustard**
Locality: Ghar Dalam
Listed by: Despott (1926-27, 1928-29,)
Present Status & Distribution: Declining throughout most of its range in Iberia and in northeastern and east Europe. Mainly sedentary, partial migrant. A vagrant to Malta, four records between 1835 and 1899.
Habitat: Across continental middle latitudes, especially in steppe zone, but penetrating into temperate. Mediterranean and marginally into boreal zones, and into oceanic climates. Strongly attached to lowlands, river-valleys and undulating open country, avoiding steep or rocky terrain, deserts, wetlands, forests, and savannahs or parkland with more than isolated or small clumps of trees. Also avoids areas liable to annual rainfall much above 600 mm. Tolerates cold, but heavy or prolonged snow cover may be cause of regular or irregular migrant status in some areas.

Otis tetrax **Little Bustard**
Locality: Benghisa Gap, Ghar Dalam,
Listed by: Despott (1928-29)
Present Status & Distribution: A declining species throughout much of its breeding range. Very localised, probably due to choice of habitat. Breeding in France, Iberia, Italy and Morocco. Migratory in northern part of its breeding range, partial migrant to sedentary further south. A vagrant to the Maltese Islands; between 1862 and 1978 recorded 9 times.
Habitat: Middle continental latitudes reaching oceanic lowlands; in open, level or undulating terrain with extensive views, but not on bare tracts or wetlands. Primitive habitat is rough steppe grassland with tall grasses.

Order CHARADRIIFORMES
Family SCOLOPACIDAE
Genus *Scolopax*

Scolopax ghardalamensis
Locality: Ghar Dalam
Listed by: Fischer & Stephan (1974)
Present status: globally extinct
Note: The present day Woodcock *Scolopax rusticola* is predominantly a lowland species, but occupies suitable habitat at higher altitudes. Favours more or less extensive woodland for cool shade, humidity and soft humus apt to retain moisture. Frequenting forest belts, avoiding frosty and warm-dry conditions, and favouring moist but not wet terrain.

Order COLUMBIFORMES
Genus *Columbidae*

Columba cf. livia **Rock Dove**
Locality: Tal-Herba Fissure
Listed by: Present work ("Bate collection", not catalogued at Natural History Museum, London).
Present Status & Distribution: Original distribution obscure because of long history of domestication by man, e.g. for food (dovecotes and special platforms in breeding caves) and for breeding (e.g. racing pigeons).In the Maltese Islands it

is a rare breeding resident, declining in numbers and interbreeding with feral pigeons.
Habitat: In middle and lower latitudes of west Palearctic, mainly in continental temperate, Mediterranean, steppe, desert and subtropical zones, but also on oceanic coasts and boreal sub-tropical islands.

Columba palumbus **Wood Pigeon**
Locality: Tal-Herba Fissure
Listed by: Present work ("Bate collection" Natural History Museum London, not catalogued)
Present Status & Distribution: Breeds all over Europe from Fenno-Scandia to large Mediterranean islands. Migratory. The Wood Pigeon is a scarce autumn migrant from early September to late November, scarce but annual in Spring.
Habitat: In upper and lower middle latitudes, continental and oceanic, especially temperate but recently extending through boreal to low arctic; breeds also marginally in steppe and Mediterranean zones where large scale wintering occurs. Able to withstand chilly, cloudy, rainy or misty conditions, but thinning out markedly in face of torrid, arid, frosty or snowy climates.

Order STRIGIFORMES
Family TYTONIDAE
Genus *Tyto*

Tyto alba **Barn Owl**
Locality: Ghar Dalam
Listed by: Fischer & Stephan (1974)
Present Status & Distribution: Cosmopolitan. Very scarce breeding resident, last known pair shot in 1988. Possibly a small number of migrants arrive irregularly.
Habitat: Mainly in open but not treeless lowlands, especially farmland with hedges, ditches, ponds and banks. In the Maltese Islands, the Barn Owl has been recorded breeding along cliffs, valleys, fortifications and in quarries, predominantly in Gozo, but its numbers have been further reduced by human persecution.

Tyto (Asio-strix) melitensis
Locality: Ghar Dalam, "Zebbug"?
Listed by: Despott (1928-29), Type specimen at NHM, London No. 49322, presented by T.A.B Spratt.
Present status: globally extinct.
Note: It is still uncertain to which genus this owl pertain.

Genus *Otus*

Otus scops **Scops Owl**
Locality: Ghar Dalam,
Listed by: Fischer & Stephan (1974)
Present Status & Distribution: Breeds in many south European countries and on large Mediterranean islands. Migratory. Generally a fairly common spring migrant from early March to early May. It occurs in larger numbers in autumn from September to November. A very few birds winter in most years, mainly in overgrown areas. Very occasionally recorded in the month of August. It has never been recorded breeding in historical times.
Habitat: Prefers warm dry lowlands in middle and lower middle latitudes, mainly continental temperate and Mediterranean, but also steppe and oceanic. Avoids both closed forests and extensive open tracts, preferring broad-leaved and mixed open woodland with underbrush and old hollow trees.

Genus *Asio*

Asio flammeus **Short-eared Owl**
Locality: Ghar Dalam, Tal-Herba Fissure.
Listed by: Despott (1924-25).
Present Status & Distribution: Mainly in northern and central-eastern Europe. Migratory. It is a scarce passage migrant in the Maltese Islands from early March to late April and from mid-September to late November. Formerly a scarce breeder with the most recent record in 1983.
Habitat: From high to middle lowlands, continental and oceanic, in arctic tundra, boreal, temperate, steppe and Mediterranean zones, overlapping into certain mountain ranges, but predominantly in lowlands.

Genus *Strix*

Strix aluco **Tawny Owl**
Locality: Ghar Dalam
Listed by: Present work; specimen no. A5029 in N.H.M. London collected by Bate (1934) from Layer V.
Present Status & Distribution: Over most of Europe and Mediterranean Europe, also present on large Mediterranean Islands. Sedentary. This

species has never been recorded from the Maltese Islands in the living form.
Habitat: From coastal to Alpine regions avoiding windswept, rainy, frosty, or arid climates and large unbroken forests, wetlands or naked rocky terrain, or in treeless plains.

Order PASSERIFORMES
Family HIRUNDINIDAE
Genus *Hirundo*

Hirundo sp. (*H. rustica* or *H. daurica*)
Swallow or Red-rumped Swallow
Locality: Ghar Dalam
Listed by: Fischer & Stephan 1974
Present Status & Distribution: The Swallow is present throughout the whole western Palearctic, it is a very common passage migrant from the end of February to mid-June and from late August to mid-November. It has been recorded breeding on two dates; in 1974 and in 1995. The Red-rumped Swallow is also present throughout the western Palearctic. Both species are migratory. In the Maltese Islands it is generally a scarce spring migrant from late March to late May. In autumn it is rare and irregular from late September to early November.
Habitat: The Swallow is found breeding from subarctic through boreal, temperate, steppe and Mediterranean zones in both continental and oceanic climates; missing only from arctic tundra and desert belts. Usually avoids densely wooded or arid land. Forages over open water, usually near margins. The Red-rumped Swallow frequents more or less the same habitat as the Swallow, frequenting warm temperate, steppe and especially Mediterranean zones. It nests in sea-cliffs and caves. It is much more dependent on reliable warm climate than the Swallow.

Family TURDIDAE
Genus *Turdus*

Turdus cf. merula **Blackbird**
Locality: Ghar Dalam
Listed by: Caton Thompson *in* Despott (1924-25)
Present Status & Distribution: Present throughout the western Palearctic, possibly the commonest Thrush species in the region. Mainly sedentary but also partially migratory. In the Maltese islands, the Blackbird is a fairly common passage migrant and winter visitor from early October to late March.
Habitat: Exceptionally diverse, including dense woodland, varied types of farmland, heaths, moors, some wetlands and urban gardens. Given shelter it will tolerate wet, windy and cool situations better than very warm and dry ones; prefers moisture and shade, with ample access to bare ground, layers of dead leaves or short grass and herbage.
Note: some bones from the Bate collection (NHML) may actually belong to other Thrush species, notably *T. iliacus*.

Turdus philomelos **Songthrush**
Locality: Ghar Dalam
Listed by: Despott (1924-25)
Present Status & Distribution: Present and common in most of the western Palearctic. Migratory. The Songthrush is generally a very common autumn migrant and winter visitor to the Maltese Islands; also in spring.
Habitat: Largely temperate but also boreal and marginally subarctic. Tolerates cool, humid and windy but not arid, very warm, nor persistently frosty and snowy climate. It can be found wherever trees and bushes accompany open grassland, patches of dead leaves under trees, or moist ground supporting ample invertebrate food organisms, and accordingly a neutral or higher pH value.

Family CORVIDAE
Genus *Corvus*

Corvus monedula **Jackdaw**
Synonym *Coloeus monedula*
Locality: Mista Cavern
Listed by: Present work, (Natural History Museum London, Cat. No. A494).
Present Status & Distribution. Present throughout Western Palearctic ranging into the middle east. A noted decline in numbers in recent years. Sedentary. Formerly a common breeding resident which has been exterminated from the Maltese islands in the 1950's.
Habitat: Frequents boreal, temperate, steppe and Mediterranean lowlands, continental as well as oceanic. Tolerates wide ranges of precipitation and settled and unsettled weather, but avoids extremes of heat, ice and snow. Needs sheltered nesting places, apparently

adapting from main reliance on hollow or shady trees to rock crevices (inland or coastal).

Corvus cf. frugilegus **Rook**
Locality: Ghar Dalam
Listed by: Caton Thompson (1922), Despott (1924-25),
Present Status & Distribution: Declining over most of its range in central and northern Europe. Fluctuating over much of its eastern range. Sedentary. In the Maltese Islands it has been noted as not very common Schembri (1843), Wright (*in* Sultana & Gauci, 1982) reported as very common in winter 1861-62 and 1862-63. Presently a vagrant. Two recent records; one in 1973 and another in 1979.
Habitat: For breeding it requires fairly tall trees, either on edges of forests or woodlands or by preference in clumps and groves fronting open grassland. Avoids dense woodland, dry hard, and rocky surfaces, wetlands and other tall dense vegetation, including scrub and thickets.

Corvus corone **Carrion Crow**
Locality: Ghar Dalam
Listed by: Caton Thompson (1922), Despott (1924-25)
Present Status & Distribution: Present throughout western Palearctic. A sedentary species where In historical times it has been recorded four times in the Maltese Islands.
Habitat: From subarctic and boreal through temperate to Mediterranean, steppe and desert zones. It nests in rocks, cliff ledges and on ground among heather. Also in tall trees in mixed colonies with *C. monedula*. In lowlands it frequents parks and woodlands intersected by fields and clearings.

Corvus corax **Raven**
Locality: Ghar Dalam ?
Listed by: Despott (1926-27)
Present Status & Distribution: Increasing and re-colonising formerly abandoned countries due to protection afforded. It is mainly sedentary, in the Maltese islands the Raven has been recorded four times between 1906 and 1941.
Habitat: So wide-ranging that concept of habitat is hardly applicable (Cramp & Perrins 1994). Nests in inaccessible rock faces and tall trees, and wide largely undisturbed foraging area with tracts of open surface of any kind on which long range food is gathering. Thus it avoids interior of large or dense forests, scrub woodland, thickets, shrubby terrain, wetlands with tall aquatic vegetation. Sea cliffs, even in windy and chilly climates, often satisfy.

Family STURNIDAE
Genus *Sturnus*

Sturnus vulgaris **Starling**
Locality: Ghar Dalam
Listed by: Fischer & Stephan (1974)
Present status & Distribution: Widespread over most of Europe and near east. Very common autumn migrant and winter visitor from mid-September until mid-March. In recent years small numbers of Starlings have started to breed regularly, mainly on Comino.
Habitat: Mainly in lowlands and uplands but in Alpine regions breed regularly at over 800m and sparsely or locally even to 1500m. During breeding season must concentrate where suitable holes are available, either naturally in hollow trees, rock or clay crevices or artificially in apertures in buildings or other structures.

Family FRINGILLIDAE
Genus *Carduelis*

Carduelis chloris **Greenfinch**
Locality: Ghar Dalam
Listed by: Fischer & Stephan (1974)
Present Status & Distribution: Present over most of the western Palearctic being both sedentary as well as partial migrant. In the Maltese Islands it is a common autumn migrant and winter visitor in small numbers. Small passages occur also in spring. It is seen from early October to mid-April, but a few are seen throughout the whole year. It is also a very scarce breeder.
Habitat: It mainly frequents tall densely-leafed trees and feeds on a diet of seeds accessible under appropriate trees, on bushes, or on crop, weed, and other plants.

Genus *Coccothraustes*

Coccothraustes coccothraustes **Hawfinch**
Locality: Ghar Dalam
Listed by: Fischer & Stephan (1974)
Present status & Distribution:

Present over most of Europe and North Africa. Sedentary as well as migratory. Generally a frequent autumn migrant and a winter visitor in the Maltese Islands, in very small numbers from late September to late February. 1-2 birds are recorded in March and April in some years.
Habitat: Most characteristically a bird of natural open mixed oak *Quercus* and hornbeam *Carpinus* forest, but extends freely to most other tall deciduous trees which carry large fruits within handling capacity of massive bill, especially beech *Fagus*, ash *Fraxinus*, elm *Ulmus* and sycamore or maple *Acer*. Occupies mixed broad-leaved conifer woodlands and forests.

Family Estrildidae
Genus Amandava ?.
Amandava amandava **Avadavat**
Locality: Ghar Dalam
Listed by: Fischer & Stephan (1974).
Present Status & Distribution: Native to India; wild populations in the western Palearctic stem from escaped cagebirds. Rejected from the list of Maltese Birds by Sultana and Gauci (1982), Schembri (1843) reported 2 *Fringilla amandava* (= *Amandava amandava*) taken in 1842. These were undoubtedly escapees (Wright, 1864).
Habitat: Often in tall grass and reeds at wetlands and on cultivated land.

Conclusion

The occurrence of bird species, which can be broadly classified into two categories; those inhabiting woodlands and those preferring marshland habitat, is in itself indicative of the prevailing environmental conditions in Pleistocene Malta. The Maltese islands were more covered in woodland and lush vegetation during the Ice Age with, the climate progressively degrading into the semi-arid one of present day.

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