

CRANE *GRUS* FOSSILS FROM THE MALTESE PLEISTOCENE

by E. MARJORIE NORTHCOTE

ABSTRACT. A coracoid (a syntype specimen) and a humerus, both of which are comparatively small, were formerly assigned to the large, extinct Pleistocene Maltese Crane *Grus melitensis*. They are reassigned to the much smaller extant Common Crane *G. grus*. This reidentification, supported by the discovery of additional Common Crane specimens from the Maltese Pleistocene, removes the evidence for maintaining, as previous authors have done, that the Maltese Crane had reduced flying power. This is the first record of Common Crane from the Maltese Pleistocene; it suggests that habitats with standing water existed on Malta c.125,000 years ago. The reassignment of the coracoid leaves the syntypal series for *G. melitensis* with two bones; from these a tarsometatarsus is chosen as lectotype and an emended diagnosis is given. This bone has splayed trochleae and a broad eminentia that is not clearly demarcated from the area intercondylaris.

LYDEKKER (1890, 1891), Harrison and Cowles (1977), Harrison (1979), and Northcote (1982a) have reported remains of the large extinct Maltese Crane *G. melitensis* Lydekker, 1890 from various Maltese Pleistocene sites. This crane was about the size of the Sarus Crane *G. antigone*, the largest living crane species (c. 8kg). Two bones appertaining to the forelimb, a coracoid and a humerus, have formerly been attributed to the Maltese Crane. Both of these bones are much smaller than those of the Sarus Crane. On account of this previous workers concluded that the Maltese Crane had reduced flying power. A purpose of this paper is to show that the coracoid and humerus do not belong to the Maltese Crane but to the much smaller extant Common Crane *G. grus* (c.6kg) that, as I will show here, was also present on Malta at that time. This necessitates a reconsideration of the Maltese Crane's flight ability. Lydekker did not designate a holotype for *G. melitensis* and his diagnosis for this crane cannot be substantiated. The coracoid is a syntype specimen; its reidentification leaves the syntypal series with two bones. From these it is important to select a lectotype upon which to base an entirely emended diagnosis for this species. Zoological nomenclature procedure follows the International Code (1961) (ICZN). Osteological nomenclature follows Baumel (1979).

DATE OF THE CRANE SPECIMENS

Maltese Pleistocene deposits are highly calcareous and no countable pollen that could be used for dating them has been found (Zammit-Maempel 1981, Northcote 1982b). Deposits that contain Maltese Crane remains such as those at Mnaidra, Tal Gnien, and Zebbug, also contain remains of the pygmy elephants *Elephas melitensis* Falconer, 1862 and/or *E. falconeri* Busk, 1867 (Adams 1870). These elephants were widespread on Sicily and Malta (Sondaar and Boekschoten 1967, p. 567) (the islands were connected by an isthmus at times during the Pleistocene, Zammit-Maempel 1977) and they flourished in the Upper Pleistocene during a period equivalent to the Ipswichian (Eemian) Interglacial Stage of more northern countries (Sondaar 1971). Gascoyne, Schwarcz, and Ford (1983) define this period by the interval 115-135 ka. This, then, is the date of the Maltese Crane and the associated crane remains that are the subject of this work.

IDENTIFICATION OF THE CRANE SPECIMENS FROM MNAIDRA

Material excavated by Adams (1870) from a Pleistocene fissure deposit at Mnaidra, Malta (Universal Transverse Mercator Grid VV 491651) is stored in the University Museum of Zoology, Cambridge

UMZC, Registered Number 252a. Fossilized bones were isolated from conglomerate using an electric mallet and drill and a clamped pin, then treated with 10–15% acetic acid, washed, dried, and laquered. As well as the Maltese Crane bones that I have described elsewhere (Northcote 1982a), the deposit yielded other crane specimens comprising a synsacrum fragment, the proximal extremities of both humeri, of the distal phalanx from a left digit majoris, of a right femur and of a left tarsometatarsus, and the distal extremity of a left tibiotarsus.

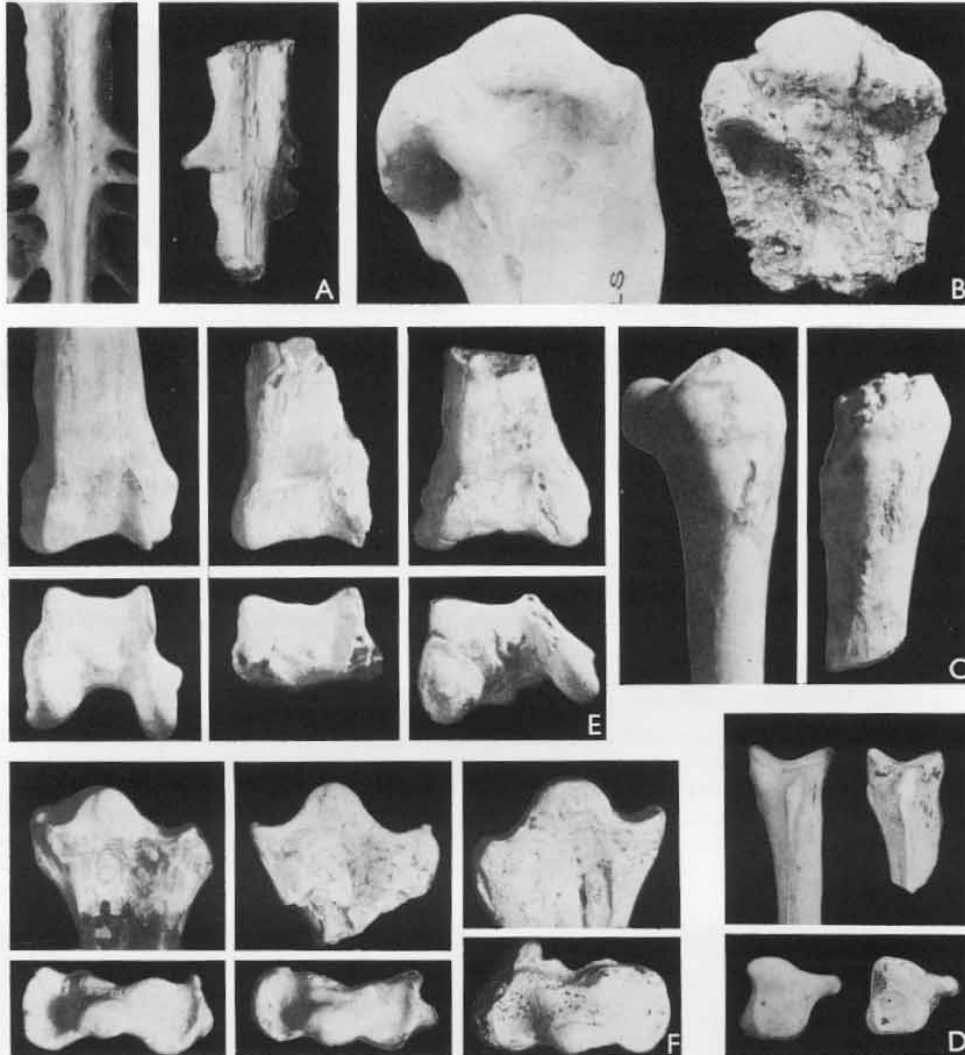
In size and proportions the fossil bones closely resemble the Common Crane (Reference Specimens: British Museum (Natural History) BM (NH) S/1972.152.4.3 and UMZC 344S); they are smaller than the Sarus Crane (Reference Specimens BM (NH) S/1952.2.149 and UMZC 344M). The only specimens among the new crane fossils for which comparable Maltese Crane specimens are available are the tibia and tarsus. The caudal width of the new fossil tibiotarsus extremity measures 21.0 mm; the Common Crane measures 20.0–22.2 mm, $n = 6$ (Harrison and Cowles 1977), Sarus and Maltese Cranes 23.9–28.6 mm, $n = 8$ (Northcote 1982a). The maximum width of the new fossil tarsometatarsus extremity measures 26.5 mm; the Common Crane measures 20.8–27.0 mm, $n = 11$ (Northcote 1979), Sarus and Maltese Cranes 27.1–33.3 mm, $n = 8$ (Northcote 1982a). Thus the new fossil tibia and tarsus are too narrow to belong to the Maltese Crane.

Text-fig. 1. shows features on the new fossils that are sufficiently intact for morphological comparison with the Common Crane: the sulcus ventralis of the synsacrum (text-fig. 1A), the impressiones obturatoriae of the femur (text-fig. 1C), the tuberculum ventrale, incisura capitis and caput of the humerus (text-fig. 1B), the dorsal and articular surfaces of the wing phalanx (text-fig. 1D), the sulcus cartilaginis and the condyles of the tibiotarsus (text-fig. 1E) and the eminentia intercondylaris and the cotyla of the tarsometatarsus (text-fig. 1F). In morphological structure the fossil bones closely resemble the Common Crane. Certain features of the newly prepared tibia and tarsus can also be compared with the Maltese Crane. On the tibiotarsus in both the new fossil and the Common Crane the condylus medialis is flattened medially and there is a high ridge where it meets the sulcus cartilaginis on the caudal surface. In contrast, the Maltese Crane has a more rounded condyle, the ridge is lower, and the sulcus is consequently more smoothly curved (text-fig. 1E, top). Another tibial characteristic concerns the disposition of the condyles. In the Common Crane the condylus medialis and the ridged medial edge of the sulcus lie parallel to the condylus lateralis and the lateral edge of the sulcus; there is an indication of this condition in the new fossil tibia—although the cranial parts of the condyles are missing, the edges of the sulcus lie parallel to one another. In contrast, the Maltese Crane tibia has the condylus medialis and the medial edge of the sulcus directed medially and away from the condylus lateralis (text-fig. 1E, bottom). On the tarsometatarsus in both the new fossil and the Common Crane the eminentia intercondylaris is attenuated and clearly demarcated from the area intercondylaris. In contrast, the Maltese Crane tarsus has a broad eminentia that is not clearly demarcated from the area behind it (text-fig. 1F). Thus, in morphological structure the new fossil tibia and tarsus differ from the Maltese Crane.

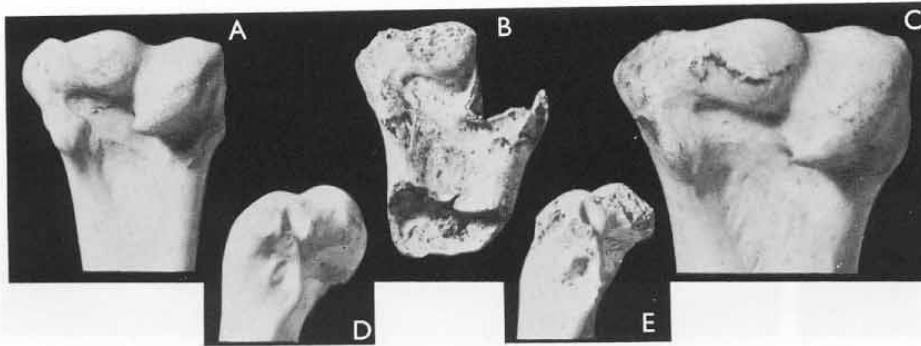
In summary, their size, proportions and morphological structure provide reasonable justification for assigning the newly prepared sacrum, fore- and hind-limb fossils to the Common Crane.

REASSIGNMENT OF THE HUMERUS BM (NH) A5162

Part of the distal extremity of a right humerus excavated by Bate c.1934 from a Pleistocene cave deposit at Tal Gnien, Malta (VV 421751) is stored in the British Museum (Natural History), Registered Number A5162. This humerus fragment is much smaller than the corresponding part of the Sarus Crane; in size and proportions it closely resembles the Common Crane (text-fig. 2). The size and proportions of this distal humeral extremity match those of the proximal humeral extremity shown in text-fig. 1B. The caudal and dorsal surfaces of fossil A5162 are damaged but where it is sufficiently intact for morphological comparison it closely resembles the Common Crane. In particular, both have the epicondylus ventralis rounded ventrally and confluent with the condylus ventralis. In both, also, the condylus lies at right angles to the shaft of the bone and its bulbous dorsal part is symmetrically shaped. Also, the angle between the condylus and the tuberculum supracondylare



TEXT-FIG. 1. A-D, Common Crane, recent UMZC 344S (left) and Maltese Pleistocene UMZC 252a (right). A, ventral view of synsacrum, B, caudal view of proximal part of right humerus, C, caudal view of proximal part of right femur, D, dorsal view (above), articular surface (below) of distal phalanx of left digit majoris. E, F, Common Crane, recent UMZC 344S (left) and Maltese Pleistocene UMZC 252a (centre), Maltese Crane UMZC 252a (right). E, caudal view (above), articular surface (below) of distal part of left tibiotarsus. F, dorsal view (above), articular surface (below) of proximal part of left tarsometatarsus (left and centre) and right tarsometatarsus (right). D is figured $\times 2$; all the rest $\times 1$.



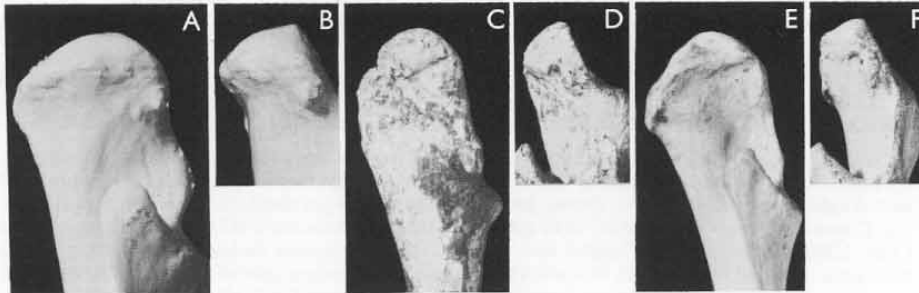
TEXT-FIG. 2. Distal extremity of right humerus. A–C, cranial view. A, Common Crane recent UMZC 344S, B, Maltese Pleistocene BM (NH) A5162, C, Sarus Crane UMZC 344M. D, E, ventral view. D, Common Crane recent UMZC 344S, E, Maltese Pleistocene BM (NH) A5162. All $\times 1$.

is of similar form on the fossil and on the Common Crane (text-fig. 2, A and B. The proximal part of the tuberculum of the fossil is missing (text-fig. 2B); its ventral surface compares well with that of the Common Crane text-fig. 2, D and E).

Harrison (1979, p. 14), too, observed the fossil humerus BM (NH) A5162 to be 'of similar size and character to that of the Common Crane', but, without illustration or further description, he assigned the bone to the much larger Maltese Crane. However, its size, proportions, and morphological structure provide reasonable justification for reassigning this humerus to the Common Crane.

REASSIGNMENT OF THE SYNTYPE CORACOID BM (NH) 49365

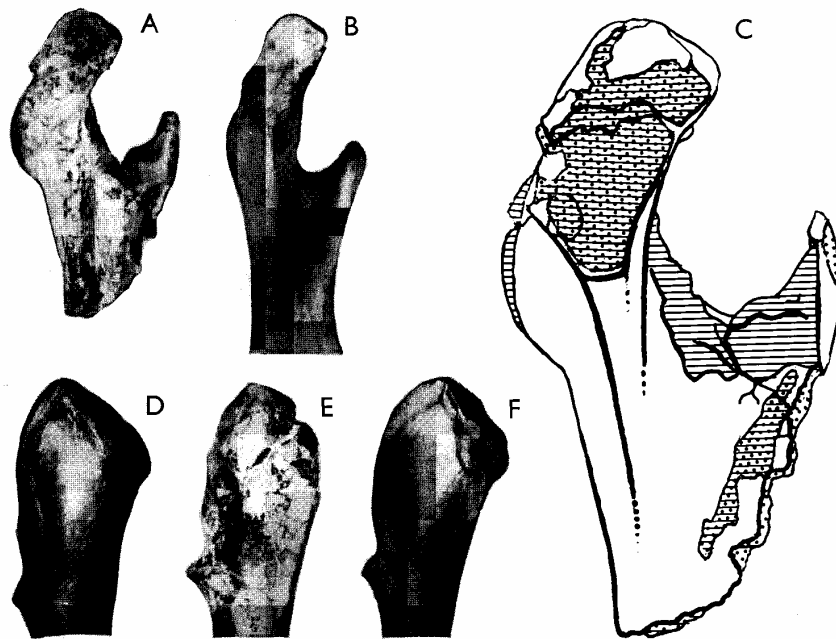
The dorsal half of a right coracoid excavated by Spratt *c.*1860 from a Pleistocene cave deposit at Zebbug, Malta (VV 497700) is stored in the British Museum (Natural History), Registered Number 49365. Lydekker (1890, 1891) described the 'head' (i.e. the dorsal tip) of this fossil as 'smaller and relatively narrower' compared to the Sarus Crane 'which affords a well-marked distinction from that species' (1890, p. 408). Harrison and Cowles (1977) considered the 'head' too eroded for such comment and it is, indeed, too damaged for accurate measurement (text-fig. 3). In general, bone



TEXT-FIG. 3. Dorsal part of right coracoid. A, C, E, medial view; B, D, F, dorsal view of 'head'. Sarus Crane UMZC 344M (left), Common Crane recent UMZC 344S (right) and Maltese Pleistocene BM (NH) 49365 (centre). All $\times 1$.

width is proportional to weight^{0.375} (Northcote 1982*b*). Text-fig. 3 shows that, not only the dorsal tip, but also the rest of the coracoid fragment is much smaller than the Sarus Crane; in size and proportions the bone closely resembles the Common Crane (text-fig. 3) that is *c.*2 kg lighter. A 'smaller and relatively narrower head' is, therefore, to be expected, Lydekker (1890) made no comment concerning the rest of the bone. He provided only an inaccurate sketch and assigned the coracoid to a new, very large extinct species he named the Maltese Crane *G. melitensis*.

Harrison (1979) noted the correspondence in size between the fossil coracoid and the Common Crane but considered they differed in their morphological structure; he provided no illustration. First (p. 14), he maintained that the processus procoracoideus is 'proportionately longer and more curved' on the fossil than on the Common Crane. However, the processus on the fossil has a length (10.3 mm) within the range (8.8-10.9 mm, *n* = 6) for Neolithic (UMZC and Sedgwick Museum, Cambridge SMC) and recent Common Cranes. It appears 'more curved' because the lateral edge is eroded and the tip is cracked and buckled; in addition, the whole processus seems to have become detached at some time, then replaced in an unnatural position with adherent matrix at its base and this has altered its appearance (text-fig. 4A-C). Secondly, Harrison (1979 p. 15) stated that the area between the facies articularis humeralis and the lateral edge of the processus acrocoracoideus is narrower and deeper on the fossil coracoid than on the Common Crane. However, matrix adheres to the eroded lateral edges of both the facies and the processus on the fossil and this results in an apparent narrowing and deepening of this area (text-fig. 4D-F). Thirdly, Harrison (1979, p. 14) considered the surface of the sulcus *m. supracoracoidei*, particularly at the level of the medial part of the facies articularis clavicularis, to be dorso-ventrally narrower on the fossil coracoid than on the Common Crane.



TEXT-FIG. 4. Dorsal part of right coracoid. A-C, ventral view. A, Maltese Pleistocene BM (NH) 49365, c, the same specimen to show matrix (hatched) and erosion (stippled), B, Common Crane recent UMZC 344S. D-F, lateral view. D, Common Crane Neolithic SMC 1912, E, Maltese Pleistocene BM (NH) 49365, F, recent UMZC 344S. C is figured $\times 2$; all the rest $\times 1$.

However, this area appears narrower on the fossil as a result of erosion of the ventral and medial corner of the sulcus and the adjoining part of the *facies articularies clavicularis* (text-fig. 4). Harrison and Cowles (1977, p. 27) considered the fossil coracoid too 'slender' to belong to the Common Crane. However, only in ventral view does it appear to be more 'slender' and this results from erosion and chipping of the medial edge of the shaft at the base of the *processus procoracoideus* (text-fig. 4 A-C).

In summary, there is no evidence for assigning coracoid BM (NH) 49365 to the Maltese Crane. Features that have been used for doing so are the result of erosion, fossilization, and excavation. The size, proportions, and morphological structures of this bone provide reasonable justification for reassigning it to the Common Crane.

DISCUSSION

This is the first Common Crane record from the Maltese Pleistocene. (The proximal humeral extremity from Mnaidra and the dorsal coracoid extremity from Zebbug articulate satisfactorily with each other and with a recent Common Crane scapula; this confirms that all three belong to one species.) Evidently, two crane species, one very large, the other smaller, were sympatric on Malta. Today, Common Cranes are strongly associated with aquatic habitats (Cramp and Simmons 1980, pp. 616, 618). Their presence at various localities on Malta c. 125,000 years ago suggests that, unlike today, habitats with standing water existed on the island at that time.

There are many hind-limb bones of the Maltese Crane in existence but Harrison and Cowles (1977) and Harrison (1979) knew of no fore-limb bones large enough to support such a large crane in the air, nor hind-limb bones of a smaller crane that came from the Maltese Pleistocene. They, therefore, reasoned that the relatively smaller size of the two fore-limb bones that they regarded as belonging to the Maltese Crane, indicates that it had reduced wings and Harrison and Cowles (1977, p. 27) suggested that the bird was 'an insular form with reduced powers of flight'. Doubt is cast upon this reasoning as a result of the re-examination of the fore-limb bones. This doubt is reinforced by the presence in the Maltese Pleistocene deposit of Common Crane remains, especially as these include hind-limb bones. It is more reasonable to assign the comparatively small fore-limb bones to the comparatively small and contemporaneous crane they resemble than to assign them to a much larger crane and postulate reduced flight ability to explain the resultant size disparity.

Lydekker (1890) based the new species *G. melitensis* on three specimens—the coracoid BM (NH) 49365, a tibiotarsus BM (NH) 49361 and a tarsometatarsus BM (NH) 49358. (All occurred in one deposit; presumably that is why Lydekker (1890) assigned them all to one species.) All the specimens in this syntypical series are of equal value in nomenclature (ICZN, Article 73c). A year later, Lydekker (1891) designated as the 'types' (that is, the syntypical series) the coracoid from the original syntypical series plus a pelvic girdle fragment. Brodkorb (1967) followed Lydekker (1891). However, the syntypical series consists of the specimens on which the author based the species (ICZN, Article 72b) so that Lydekker's designation dated 1891 is invalid. Reassignment of the coracoid to the Common Crane, as recommended here, requires its removal from Lydekker's (1890) syntypical series of *G. melitensis*. Two specimens now remain—the tibiotarsus and the tarsometatarsus; both have been described and figured (Lydekker 1890, 1891; Northcote 1982a). With regard to the tibiotarsus, Lydekker (1890, 1891) and Harrison and Cowles (1977) stated that the smaller disto-proximal width of the supratendinal bridge distinguishes *G. melitensis* from *G. antigone* but Mourer-Chauviré, Adrover, and Pons (1975), Harrison (1979), and Northcote (1982a) showed this feature to be not diagnostic for *G. melitensis*. With regard to the tarsometatarsus, Lydekker (1891, p. 163) stated that 'the proportions and relationships of the three trochleae are precisely the same' on Maltese and Sarus Cranes and similar to those on the Australian Crane *G. ribicunda*. However, on both of the last-named species (as on other living cranes) the trochleae are close together and roughly parallel to one another, whereas on *G. melitensis* the intertrochlear notches are relatively wide and the trochleae for digits II and IV are curved away from that for digit III; compared to *G. antigone*, the *incisura intertrochlearis medialis* is greater in *G. melitensis* (c. 5 mm cf. c. 4 mm) and the trochlea for digit IV is more curved laterally (Northcote 1982a). Though undoubtedly gruiform, the tarsometatarsus of

G. melitensis, unlike the tibiotarsus, clearly differs from *G. antigone* in morphological structure. Lydekker (1890) considered the tarsometatarsus of *G. melitensis* to be larger than *G. antigone*, chiefly on account of its larger maximum medio-lateral width (32 mm *cf.* 26 mm) but this larger width results from the splaying of the trochleae. Lydekker did not designate a holotype for *G. melitensis*; therefore, in accordance with the rules of the ICZN, Article 74, I suggest that the syntype tarsometatarsus BM(NH) 49358 should be designated its lectotype and that the individual characteristics of that bone as described here should form the basis of an emended diagnosis of this species. The tibiotarsus becomes the paralectotype. This procedure prevents *G. melitensis* from being placed in the synonymy of *G. grus* and preserves a long-standing name.

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