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# THE CENTRAL MEDITERRANEAN NATURALIST

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*Centaurea spathulata* Zerafa, 1827.

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# THE CENTRAL MEDITERRANEAN NATURALIST

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# THE INDO-PACIFIC AFFINITY OF SOME MALTESE TERTIARY FOSSILS

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## ABSTRACT:

A review of the Maltese fossil record reveals an unsuspected marked Indo-Pacific affinity, suggesting a biostratigraphic link between the central Mediterranean and the Indo-Pacific in mid-Tertiary times. The family and sometimes even the genus of some Maltese Oligo-Miocene fossils still survive in the Indo-Pacific province after having become completely extinct from the Mediterranean region.

The fossils reviewed in this paper are the Cidaridae (which are also revised to reveal the presence of *Prionocidaris* and *Phyllacanthus*), *Coelopleurus*, *Echinoneus*, *Laganum*, *Apatopygus*, *Clypeaster*, *Tomistoma*, *Trionyx*, *Trilasmis*, *Kuphus*, and *Nautilus* — all of which have an Indo-Pacific affinity.

The survival of such a fauna in the Indo-Pacific region is attributed to two main factors: the former connection of Tethys to the Indo-Pacific, thereby allowing eastward migration of the central Mediterranean fauna into this Ocean, and climatic and other ecological conditions prevailing in the central Mediterranean region during mid-Tertiary times having been analogous to those now prevailing in the Indo-Pacific.

## GEOGRAPHICAL CONSIDERATIONS

Most of the fossils collected from the Oligo-Miocene deposits of the Maltese Islands show a striking similarity to the shallow-water marine fauna of the Indo-Pacific region. The Maltese Islands are situated in the central Mediterranean at latitude 36°N. and longitude 14-15°E., while the Indo-Pacific region lies thousands of miles away and covers a very extensive area. It includes the Red Sea, Gulf of Aden, Persian Gulf, Gulf of Oman, Arabian Sea, Bay of Bengal, Andaman Sea, Indonesia, China Sea, Australian region, the lowest part of the Gulf of California, the Bay of Panama, the Tropical Pacific and the Indian Ocean north of 26°S. (Wells, 1956).

The Mediterranean is but the western end of ancient Tethys whose former extension over present-day Turkey, Syria, Iran (Persia) and Afghanistan established direct communication with the Indo-Pacific province. Such connection allowed eastward migration of central Mediterranean faunas into the Indo-Pacific region. The warmer climate and waters of mid-Tertiary times explain the presence of recent Indo-Pacific genera and families among the Oligo-Miocene rocks of the Maltese Islands.

The sea began to withdraw from the Near and Middle East towards the end of the Oligocene (Savage, 1967) and the Mediterranean became effectively sealed off from the Indo-Pacific and the Atlantic by the end of the Middle Miocene (Berggren, 1972, Brassier, 1975, pp. 893, 897). This in turn initiated a sequence of events which ultimately ended up in the desiccation of the Mediterranean and in the "Messinian crisis" of late Miocene times. By correlating and calibrating continental and marine chrono-stratigraphic units, Berggren presented in 1973 a revised time scale for the late Miocene. This provided a chronological framework within which to interpret the later stages of the evolution of the Mediterranean region. The late Miocene desiccation phase (Messinian) of the Mediterranean was apparently relatively of brief duration, less than 2m.y., at about 7-5 m.y. ago (p. 17.)

## A REVIEW OF THE FOSSIL RECORD:

The present paper reviews the fossil record of the Maltese Islands and deals with some of the fossils having Indo-Pacific affinity. Such affinity was first recorded in the case of a crocodile skull belonging to the genus *Tomistoma*.

### i. REPTILES: *Tomistoma* and *Trionyx*.

In a paper read to the Geological Society of London in 1885, Lydekker reviewed the gavial-like skulls from "Division C" of the Globigerina Limestone of Malta and Gozo respectively (Cooke, 1896, p. 504). Both specimens were once in the collection of the British Museum (Nat. Hist.) bearing registration no. BM/? and BM/41151 respectively. Owen, who had originally examined the above-mentioned specimens, thought they both belonged to the same species and labelled both skulls "*Melitosaurus champsoides*". As the fossils were never described or figured, the name which Owen had given them must necessarily remain a "label" or "manuscript" name, (*Nomen in Collectione*), without any firm right of survival in scientific literature. This however, was not to be, as several years later, Hulke carried out a detailed study of the two skulls and realised that they represented two different species. These he described in 1871, calling the Gozo fossil, (now not traceable in BMNH), *Crocodylius gaudensis* sp. nov. and the 13 inch rostrum from Malta (BMNH/41151, presented to the BMNH by Captain Strickland R.N. in 1868), "*Melitosaurus champsoides* Owen". By his courtesy in thus preserving Owen's original label-name, Hulke recognised that name and made it scientifically valid. Strictly speaking, therefore, the binomial name "*Melitosaurus champsoides*" should be ascribed to Hulke and not to Owen, since label/manuscript names without the backing of a description are not scientifically valid. Owen's name however became still more deeply entrenched in scientific literature when, in 1886, Lydekker (p. 22) referred to Hulke's specimen as "*Tomistoma champsoides* (Owen)".

By 1885, the two Maltese crocodile skulls had attracted the attention of Lydekker who noted that they both possessed 4-5 premaxillary teeth, a very

slender rostrum, and an elongated premaxilla that articulated with the long slender nostrils. As these features characterised the genus *Tomistoma* Mueller, 1846, and as the above-mentioned Maltese Tertiary reptilian remains were both closely related to the existing Indo-Pacific crocodile *Tomistoma schlageli* (Strauch) of Borneo, Lydekker referred both fossil forms to the genus *Tomistoma*. He called the Gozo specimen *Tomistoma gaudensis* Hulke) and the Maltese specimen (BMNH/41151) *Tomistoma champsoides* (Owen), adding that the two fossils represented "one more instance of the survival of Middle and Upper Tertiary genera in the oriental region" (Lydekker, 1886, p. 22).

Cooke's "Division C" of the Globigerina Limestone, the "fine-grained bluish freestone" which yielded the gavial-like skulls referred to above, is said to have yielded also "a portion of a skull of *Tomistoma champsoides* with teeth in situ and with two vertebrae imbedded by the side of it". The latter specimen, said to have been presented to the University Museum by the Dock Engineer (Cooke, 1886, p. 506), cannot now be traced in the National Museum of Natural History Collections at Mdina, where the unlabelled and unregistered collection of the University Museum ended up.

It should be noted that the genus *Tomistoma* has been recorded in beds ranging from Eocene to Pliocene in North Africa and from Eocene to Miocene in Europe (Romer, 1968, p. 605).

Another reptile recovered from the Maltese Tertiary and known to have Indo-Pacific affinities is the large chelonian *Trionyx*. The anterior part of the carapace of this turtle was discovered in the Globigerina Limestone quarry at Luqa (Cooke, 1886, p. 504). As all building-stone quarries at Luqa involve only the lower division of the Globigerina Limestone formation, it is presumed that the carapace was recovered from this division.

When Dr. John Murray of the "Challenger" expedition visited Malta in 1890, he managed to acquire the specimen and in July of that same year presented it to the British Museum (Natural History) of London, where it is registered as "R.1795". In 1891 Lydekker described and figured the specimen as a new species which he called *Trionyx melitensis*. It is the only species of turtle known from the Maltese archipelago and is undoubtedly the same specimen recorded and figured anonymously (?Gulia) in 1843 (pp. 77-78, fig.). The species is allied to the existing Indian species *Trionyx gangeticus*, *T. leithi* and *T. hurium* with which it is said to agree in having the characteristic two neural bones (division of the first neural) between the first pair of costals, other members of the family having only one first neural bone (Boulenger 1889, p. 244; Lydekker 1891, p. 37). The genus *Trionyx*, which, during the Globigerina Limestone times, found the warm shallow seas of the Maltese area adequate for its survival, has now completely disappeared from the Mediterranean region and is confined to Indian waters.

## ii. SHARKS

Fossil sharks' teeth are extremely abundant in Maltese Tertiary deposits and though formerly thought to be limited to only three of the five local geological formations (Globigerina Limestone, Clays, Greensand), they have lately been collected also from the other two formations. Menesini (1974) has recorded *Odontaspis acutissima* Ag. from the Upper Coralline Limestone of Gozo, and the present author has collected *Isurus hastalis* (Ag.) from the same formation at Lippia, Malta, and *Carcharodon megalodon* Ag. from the base of the *Scutella* bed at Dwejra, Gozo, and *Odontaspis* sp. from the *Kuphus* bed in the Lower Coralline Limestone at Attard, Malta.

Some of the genera represented in Maltese rocks, particularly *Hemipristis* and *Carcharodon*, have a marked Indo-Pacific affinity. Teeth of *Hemipristis* sharks are abundant in the Globigerina Limestone "Nodule beds" and in the Greensand, but have now completely disappeared from the Mediterranean and survive only in tropical waters thousands of miles away.

The artificial connection established in 1869 between the warm Indian Ocean and the Mediterranean by way of the Red Sea and the Suez Canal, is gradually restoring the former physical conditions of the Mediterranean area with consequent gradual changes in the central Mediterranean fauna. Warm-water members of the Indian Ocean, finding the Mediterranean basin congenial to them, are migrating westward and becoming gradually established in the Mediterranean. Records show that the White Shark of the Indian Ocean, whose ancestor, the Giant White Shark *Carcharodon megalodon* Ag., is very richly represented in Maltese Tertiary rocks, is making a come back to the Mediterranean. Dr. Giovanni Gulia editor of *Il Naturalista Maltese* narrates in that journal (1890, p. 11-12) how two men were swallowed by a large fish off Marsaxlokk, Malta, and records that a *Carcharodon* shark, known locally as *Silfjun* or *Huta tax-Xmara*, was thought to have been responsible. One year later, Cooke (1891, p. 76) reported the capture of a White shark, by British sailors during the Royal Navy manoeuvres of 1891. The fish measured 33 feet in length and weighed four tons. In recent years, a man-eating Great White Shark has been held responsible for the sudden disappearance of an English swimmer in Maltese waters. The unlucky man was snatched away from the surface while swimming with a Maltese companion across St. Thomas Bay (S.E. Malta) in the summer of 1956 (*Times of Malta*, July 20, 1956).

## iii. CIRRIPEDES: *Trilasmis*.

In 1953, Withers founded a new species of cirripede on a right tergum (lacking base) from the Upper Globigerina Limestone (Division A of Cooke) of Marsaxlokk. Cooke's Division A refers to 4.5 — 9 meters of fawn coloured clayey limestone with small concretions of hematite and clay ironstone. The

specimen which Withers called *Trilasmis (Temnaspis) melitense* was collected and presented to the British Museum (Nat. Hist.) by the late Dr. J. G. Baldacchino in June 1957, and is now registered in that Museum as INV. 35920. The species has marked Indo-Pacific affinities for it resembles in many ways the Recent *Trilasmis (Temnaspis) excavatum* (Hoek) occurring in the Malay Archipelago at a depth of 289-304 meters. (See Withers 1953, pp 95, 342-343, fig. 104).

iv. MOLLUSCS: *Kuphus* and *Nautilus*.

At about 30 meters beneath the *Scutella* bed, the Lower Coralline Limestone (formerly considered Lower Miocene, Aquitanian, and now thought to be Upper Oligocene, Chattian), may reveal a 1-3m thick bed of more-or-less vertically aligned tube fragments embedded in a rubbly or marly matrix (Zammit-Maempel, 1977, p. 15). The tubes belong to the mud-boring teredinid mollusc *Kuphus* Guettard, whose modern representative *Kuphus polythalamia* (L.) is restricted to the mangrove swamp areas of the Indo-Pacific (Turner, 1966, p. 73), with records from such places as Sumatra, Java, Celebes, Philippines, Moluccas and the Solomon Islands.

During Oligocene and Lower Miocene times the animals became very widely distributed and have been recorded from the East and West Indies, Madagascar and southern France. Comparable fossil tubes have been found also in the Eocene of the Khirthar beds of N.W. India and in the Pliocene of Italy and Java (Cox, 1927, p. 63). In the Catania Museum of Palaeontology the author examined (1964) several tube fragments from the Miocene of Sicily and they were very closely similar to the Maltese specimens.

In Malta and also elsewhere, the tubes were formerly mistaken for worm tubes, but the concentric laminations of their wall and the division of the narrow end of each tube into two separate siphonal canals, reveal their real nature. Specific identification of this teredinid is based chiefly on its internal structures, which have never been recorded in the fossil state (Cox et al., 1969, p. N740). The stalks of pallets and the moulds of valves of the Maltese *Kuphus* discovered by the present writer reveal that it is very similar to the Indo-Pacific *Kuphus polythalamia* (L) but is actually a new species (Zammit-Maempel, in preparation).

Remains of the cephalopod mollusc *Nautilus* are abundant in the Maltese Tertiary, being most common in the Globigerina Limestone and in its phosphatic "Nodule beds." Over sixteen specimens were collected by the authors from this formation during excavation of Ta' Ġorni tunnels, St. Julians. *Nautilus* internal moulds are known also from the Upper Coralline Limestone (Zammit-Maempel, 1977, pl. 26), and through the genus has never been recorded from the Lower Coralline Limestone, one large specimen is known to have been collected from this formation in the region of Qalet Marku.



The Maltese nautiloids are very closely similar to those now thriving in the warm Indo-Pacific waters. Their sutures, however, are straighter than those of the modern *Nautilus* but not so straight as those of *Eutrephoceras*.

- v. ECHINOIDS: *Coelopleurus*, Cidaridae (*Prionocidaris*, *Phyllacanthus*), *Apatopygus*, *Laganum*, *Clypeaster*, *Echinoneus*.

Because of the warmer climate during mid-Tertiary times, Recent Indo-Pacific genera and families of echinoids are very abundant and geographically widely distributed in Miocene rocks (Glaessner, 1969).

The echinoid fauna of the Mediterranean neogene is essentially a sub-tropical one (Cottreau, 1914) and that of the central Mediterranean island of Malta is made up of a large number of genera, with many of the genera being represented solely by one species. Such for example, is the case with the genera *Coelopleurus*, *Apatopygus*, *Laganum* and *Echinoneus*.

*Coelopleurus*:

The genus *Coelopleurus* was first recorded from the whole Mediterranean region by the present writer, from the uppermost limit of the Lower Coralline Limestone of Malta (Zammit-Maempel, 1969). It disappeared from the Mediterranean in Oligocene times (Mortensen, 1935) and now survives only at great depths (102-2419m) in the Indo-Pacific (Cottreau, 1914, p. 46). *Coelopleurus melitensis* Zammit-Maempel, however, must have lived at much lesser depths in the central Mediterranean as the Lower Coralline Limestone is a very shallow water deposit. Its Indo-Pacific affinity induced Dr. Stephenson of Keele University to search for similar affinities in other Maltese Tertiary echinoids. After examining the British Museum Nat. Hist. collections he concluded that a revision of the Cidaridae would also reveal a close Indo-Pacific affinity (Pers. comm. 8 May 1969). On learning that the present author was already working on this subject, Dr. Stephenson most courteously passed on to him (8 July, 1969) all the information he had obtained from the survey of Maltese echinoids in the Brit.Mus. (N.H.) collection.

Cidaridae: *Phyllacanthus*, *Prionocidaris*.

Six species of Cidaridae, pertaining to three genera, have been recorded from the Maltese Tertiary to date:

*Cidaris adamsi* Wright, *Cidaris melitensis* Wr., *Cidaris scillae* Wr., *Cidaris oligocenus* Gregory, *Cidaris sismondai* Mayer and *Cidaris avenionensis* Desmoulins, all of which with the possible exception of *Cidaris melitensis* Wr. have an Indo-Pacific affinity.

*Cidaris melitensis* Wr. which is abundant in the middle division of the Upper Coralline Limestone of some localities, seems to be the only Atlantic element in

the Maltese group. It is a *Stylocidaris* closely resembling *Stylocidaris affinis* (Philippi), the present-day Mediterranean species which lives on rocky and coral bottoms around the Island at depths of 80-to 120m. The species occurs also in the Atlantic Ocean. Referring to the North Atlantic cidaroid fauna, Fell (1966, p. U312) records that it too "seems to be a late derivative of a small Caribbean nucleus of genera derived from the Indo-Pacific".

Stefanini (1908, p. 440) considered the Mediterranean *Stylocidaris* a *Dorocidaris* (a synonym of *Cidaris* s.s.) on account of the "pronounced depression of its medium suture", whilst Tortonese (1965, p. 307) regarded the fossil as a *Stylocidaris* and a possible ancestor of *Stylocidaris affinis* (Philippi).

Reviewing Report No. 125 of the Royal Society of London written by the scientists on board the "Porcupine" during its 1870 expedition to the Mediterranean, Dr. Giovanni Gulia (1870, p. 40) recorded that "*Cidaris hystrix* seemed to them (the scientists) very abundant and that from a series of specimens of this species it resulted that *Cidaris hystrix*, *C. pabillata* and *C. affinis* are specifically identical". It is now known however, that there are two species of *Cidaris* in the Mediterranean: *Stylocidaris affinis* (Philippi) and *Cidaris cidaris* and that these can be distinguished from each other on the basis of their pedicellariae. As such structures are not preserved, it is consequently very difficult to distinguish the two species in the fossil state. Even the large-sized species of *Cidaris* encountered at surface on the southern part of the Island marking the Lower Coralline Limestone — Globigerina Limestone transition zone is attributed to the genus *Stylocidaris*.

*Cidaris adamsi* Wr. and *Cidaris scillae* Wr. originally described by Wright in 1864 from the Lower Coralline Limestone and Globigerina Limestone respectively, must be assigned to *Phyllacanthus* on the basis of the oval shape of their scrobicular tubercles. This genus is now limited to "Australia (5 or 6 species), Indo-Pacific" (Fell, 1966, p. U330). Cottreau (1914, p. 45) was aware of their systematic position as early as 1913, for he grouped both these echinoids (*C. adamsi* and *C. scillae*) under the subgenus *Leiocidaris* Desor, 1855, which is actually a junior synonym of *Phyllacanthus* Brandt 1835.

Under the subgenus "*Leiocidaris* Desor 1855", Cottreau (1914, p. 45) included also *Cidaris sismondai* Mayer. This was a new record for the Maltese Tertiary but Cottreau did not describe or figure the Maltese specimen referred to in his text. The original *Cidaris sismondai* Mayer is now known to be definitely a *Prionocidaris* another genus presently limited to the Indo-Pacific, excluding New Zealand (Fell, 1966, p. U330). Its presence in the Maltese Miocene however, has not been confirmed.

On account of the poor preservation of all specimens ascribed to "*Cidaris oligocenus* Gregory 1891" and *Cidaris avenionensis* Desmoulins collected so far from the Maltese Tertiary sediments, there is much debate as to their correct subgeneric position. It is interesting to remember that the species *Cidaris oligocenus* was founded by Gregory on an interambulacrum with attached ambulacrum

(BMNH/E.3401) and on broken spines (BMNH/3409) (Gregory, 1891, pl. 1 fig. 2-4; p. 589). Its scrobicular tubercles reveal that the specimen is a *Phyllacanthus*. This identification has been confirmed by Dr. Stephenson of Keele University who has examined the BMNH type material and has most kindly passed his comments to the author (Pers. comm. 8/5/69 and 8/7/69).

*Cidaris avenionensis* Desmoulins seems to be a *Prionocidaris*. It was first recorded from the Maltese Miocene in 1891 by Gregory (pp. 587-588, pl. 1 fig. 1a-c). His identification was based on only "half one sector with a few spines" from the Globigerina Limestone (BMNH/ E. 1957), but stated that "there can be little doubt" as to the correct identification of the species. Cottreau (1914, p. 79) recorded the species as a *Cyathocidaris*, and included under the same designation of *Cyathocidaris avenionensis* Desm., the large, sometimes cyathiform, spines from the Lower Coralline Limestone which Gregory (1891, p. 539) had attributed to *Cidaris oligocenus*.

The worn test of *Cidaris avenionensis* Desm. which Cottreau figured with long tapering spines attached (1914, p. 80 fig. 90) has been located in the "University Collection" (which now forms part of the National Museum of Natural History, Mdina, Malta). The specimen is however, so badly weathered and fragmented that it is not possible to identify the characteristic features.

### *Clypeaster*

The genus *Clypeaster* achieved worldwide distribution from Upper Eocene times onwards but is now limited to the Indo-Pacific and to the tropical Atlantic. It is found locally in great abundance where it displays two main stocks (*C. altus* and *C. marginatus*) with varieties related chiefly to variations in external morphology of the test and in the shape of the petals. It occurs at the upper limit of the Lower Coralline Limestone (Oligocene), in Nodule Layer 2 (NL.2) of the Globigerina Limestone, in the Greensand and in the Upper Coralline Limestone (Tortonian).

### *Echinoneus*

In 1864 Wright described a new species of echinoid from the Upper Coralline Limestone of Malta and called it *Amblypygus melitensis*. In 1929 Brighton, who figured and redescribed the species, attributed it to the genus *Echinoneus*, a "lineal descendant of the Cretaceous genus *Pyrina*". He considered the Maltese Miocene species very close to the modern *Echinoneus cyclostomus*. The *Pyrina* — *Echinoneus* line was described by Brighton (1929, p. 94) as being "almost static in evolution", so that it is not surprising that a species which is practically identical with the modern form existed already in the Miocene. Its modern representative, *Echinoneus cyclostomus*, is an exceedingly variable shallow water form with an unusually wide distribution in the Indo-Pacific and in the western Atlantic Ocean, but is now completely absent from the Mediterranean. In their

survey of the Key Largo Coral Reef Preserve, Florida, Kier & Grant (1965, p. 5) saw only a few specimens of the species *Echinoneus cyclostomus* and *Brissus unicolor* although all other species of echinoids were abundantly represented by living individuals. Its habitat was found to be broken rock bottoms associated always with *Brissus unicolor* at depths varying from 3 to 12m. Dead tests were also found on sandy rock bottoms (p. 7) and among debris eroded from the reef offshore at depths of 7-13m. Mortensen (1948, p. 78) reported the species as clinging to the undersurfaces of rocks at depths of 116m, but these observations could not be confirmed by Kier & Grant (1965, p. 26).

In Malta the author has collected only one crushed specimen (GZM/E.71) from the rubbly nodular middle division of the Upper Coralline Limestone on the north-west coast of Malta, and here too (as in Florida) the species was associated with a *Brissus* — (*Brissus oblongus*).

#### *Apatopygus* and *Laganum*

Early in 1965 two specimens belonging to the genus *Apatopygus* (GZM/E. 105 and E.683) were collected by the present author from the fragmented zone of the *Scutella* bed at Ix-Xghajra, limits of Zabbar, Malta. Another broken specimen (GZM/E.725) was recovered from the Lower Coralline Limestone of the same region about 3m below the giant *Lepidocyclina* zone. The exposure has since been covered up by the construction of a new coast road.

In a paper presented to the Echinoid Conference, Smithsonian Institution 6-8 September, 1972 (Abstract of Paper), Dr. Rose recorded the find of rare specimens of *Apatopygus* from Gozo (Malta) and Derna (Libya) stating that the genus ranged stratigraphically from Middle Eocene to Recent and geographically from the Mediterranean to Australia — New Zealand regions, far more widely than formerly accepted (Kier, 1966, U522). The paper was apparently never published. In another study on the stratigraphical and facies distribution of irregular echinoids in Miocene Limestones of Gozo (Malta) and Cyrenaica (Libya) presented at the V Congress of the Mediterranean Neogene at Lyon, Sept. 1971 and published in 1974, Rose again listed the rare presence of "*Apatopygus* sp.nov." in the *Scutella* bed of the Maltese Islands (p. 353) and in 1975 (p. 79) from "Il Mara or Xlendi member" of the Lower Coralline Limestone.

The presence of a *Laganum* specimen in the Maltese Tertiary is being recorded by the present writer in a paper awaiting publication (Zammit-Maempel, in press). This genus, which is known from the Miocene to Recent of the Indo-Pacific region (Wyatt-Durham, 1966, p. U472) is presently restricted to the shallow waters of the Indo-Pacific. It is new to the Maltese Islands, but Klein in 1734 (p. 31) and Leske in 1778 (p. 24-25, 87) had wrongly attributed to this genus the *Scutella* of Malta which Scilla (1670, Tav. VIII, fig. I, III) had figured in his *La vana speculazione*. The Maltese *Scutella*, which is now known to be *Scutella subrotunda* (Leske), was by Klein called *Laganum scillae*.

The echinoids and other fossils reviewed in this paper have a marked Indo-Pacific affinity and suggest a biostratigraphic link between European Tethys and the Indo-Pacific during Upper Oligocene and Miocene times. The survival of such a fauna in the Indo-Pacific regions is attributed to two main factors: the former open connection by way of Tethys with the Indo-Pacific, which allowed eastward migration of the central Mediterranean fauna, and climatic and other ecological conditions which prevailed in the central Mediterranean region during mid-Tertiary times being analogous to those which now prevail in the Indo-Pacific.

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# ADDITIONS TO THE MALTESE FLORA

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## ABSTRACT:

*Ipomoea cairica* (L.) Sweet; *Conyza floribunda* Kunth and *Secale cereale* L. are recorded as new to the Maltese flora. The first definite record of *Potamogeton pectinatus* L. is also given here, previous records being ascribed to errors in identification.

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A number of plants not previously known to exist in the Maltese Islands are dealt with here. Specimens of all species are deposited in the author's herbarium. IPOMOEA CAIRICA (L.) Sweet, *Hort Brit.* ed. 1: 287 (1827).

Syn. *I. palmata* Forsk.

Family: Convolvulaceae

A large colony of this creeper/climber occurs on the clay slopes at Daħlet Fekruna (Xemxija) in NW Malta. It has probably escaped from cultivation from the nearby Xemxija estate. My attention was first drawn to its existence in 1973 by G.L. Bate, then residing in Malta. I have visited the place several times since then and the colony is flourishing.

Accompanying species include *Tropaeolum majus* L. (another widespread adventive), *Hedysarum coronarium* L., *Cynara cardunculus* L., *Oxalis pes-caprae* L., *Hordeum marinum* Huds. and *Phalaris paradoxa* L. Another adventive Ipomoea, *I. purpurea* Roth, also used to occur in the same place when *I. cairica* was first found, but it does not seem to have persisted.

*Ipomoea cairica* is frequently cultivated as an ornamental under the name of "I. digitata" which refers to *I. paniculata* (L.) R. Br., a different species with less deeply lobed leaves and larger flowers. *I. cairica* is a native of the Old World tropics, becoming naturalized in regions with a suitable climate. (5593) FIGS. 1,5.





Fig. 1: *Ipomoea cairica* from Dahlet Fekruna (photo: E. Lanfranco)

CONYZA FLORIBUNDA Kunth in Humb., Bonpl. & Kunth, *Nov. Gen. Sp.*  
4:73 (1820).  
Syn. *C. naudinii* Bonnet  
Family: Compositae

First found by the author in August 1976 where it was growing as a weed in the University grounds at Tal-Qroqq (Msida). Accompanied by *Conyza bonariensis* (L.) Cronq., *Convolvulus arvensis* L., *Parietaria diffusa* Mert. & Koch, *Dittrichia viscosa* (L.) W. Greuter and other weeds. In Aug. 1977 Michael Briffa came across another colony growing on waste ground at Floriana. In 1978 it has been recorded from Pieta and Marsa.

*Conyza floribunda* is very closely related to *C. bonariensis* from which it differs by being larger and more robust — often exceeding 200cm in height; by having a larger, usually denser inflorescence; by being greener (*C. bonariensis* being markedly greyish) and by having much wider lower leaves. According to Cronquist (1976), *Conyza floribunda* should be regarded as a variant of *C. bonariensis* since study of native populations of the two taxa does not lend support to their separation. *C. floribunda* is a native of South America. (5491) FIG. 2.

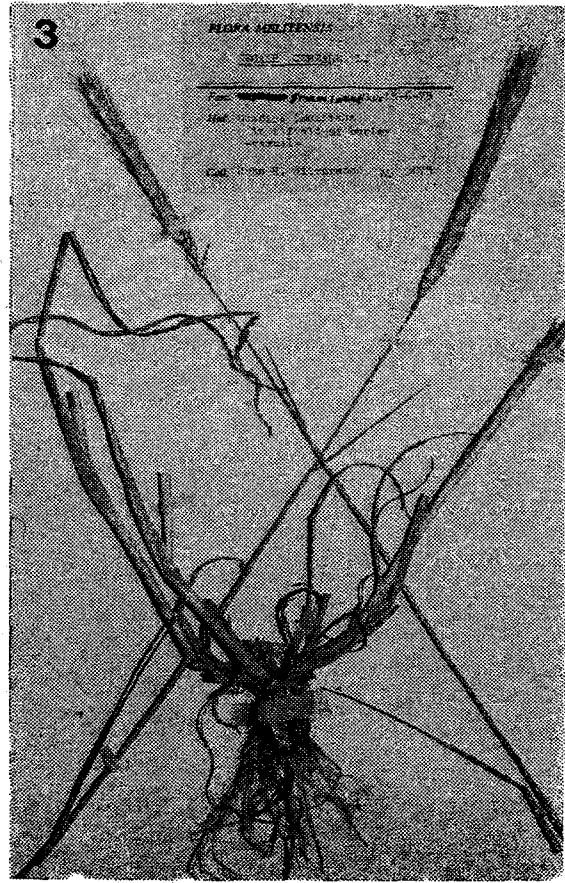


Fig. 2, *Conyza floribunda* (5491); Fig. 3, *Secale cereale* (5075);

POTAMOGETON PECTINATUS L., *Sp. Pl.* ed.1: 127 (1753)

Family: Potamogetonaceae

This species (together with two other Potamogetons) was recorded by Gavino Gulia (1873) as occurring in ditches at San Pawl tat-Targa. Sommier and Caruana Gatto (1915) and J. Borg (1927) cite Gulia's record, commenting that no *Potamogeton* has ever been found by others. The latter ascribes the *Potamogeton* records to error. Haslam *et al* (1977) ascribe the records to Gulia and Borg without further comment. It is probable that as far as *P. pectinatus* is concerned, the records are ascribable to *Zannichellia palustris* L. which is common at San Pawl tat-Targa whereas there is no suitable habitat for any *Potamogeton* in that locality.

This year (May 1977) a large population of *Potamogeton pectinatus* in flower was found at Ghajn il-Kbira (Girgenti) in a large reservoir by Michael Briffa and myself. Accompanying submerged aquatics were *Myriophyllum verticillatum* L. and an unidentified *Cladophora*. The reservoir is formed by damming

part of the valley to retain the spring water. Unlike most other bodies of water in the Maltese Islands, it does not dry up in summer. According to farmers in the area, there used to be a small permanent pond before the dam was built.

Although here *P. pectinatus* was growing in a purely freshwater habitat; this species is known to grow also in brackish and fully saline waters with species of *Ruppia* and *Zostera*. Sterile plants are very similar to species of *Ruppia* but these have finely denticulate leaf-tips while *P. pectinatus* has smooth leaf-tips. (5635) FIG. 4.

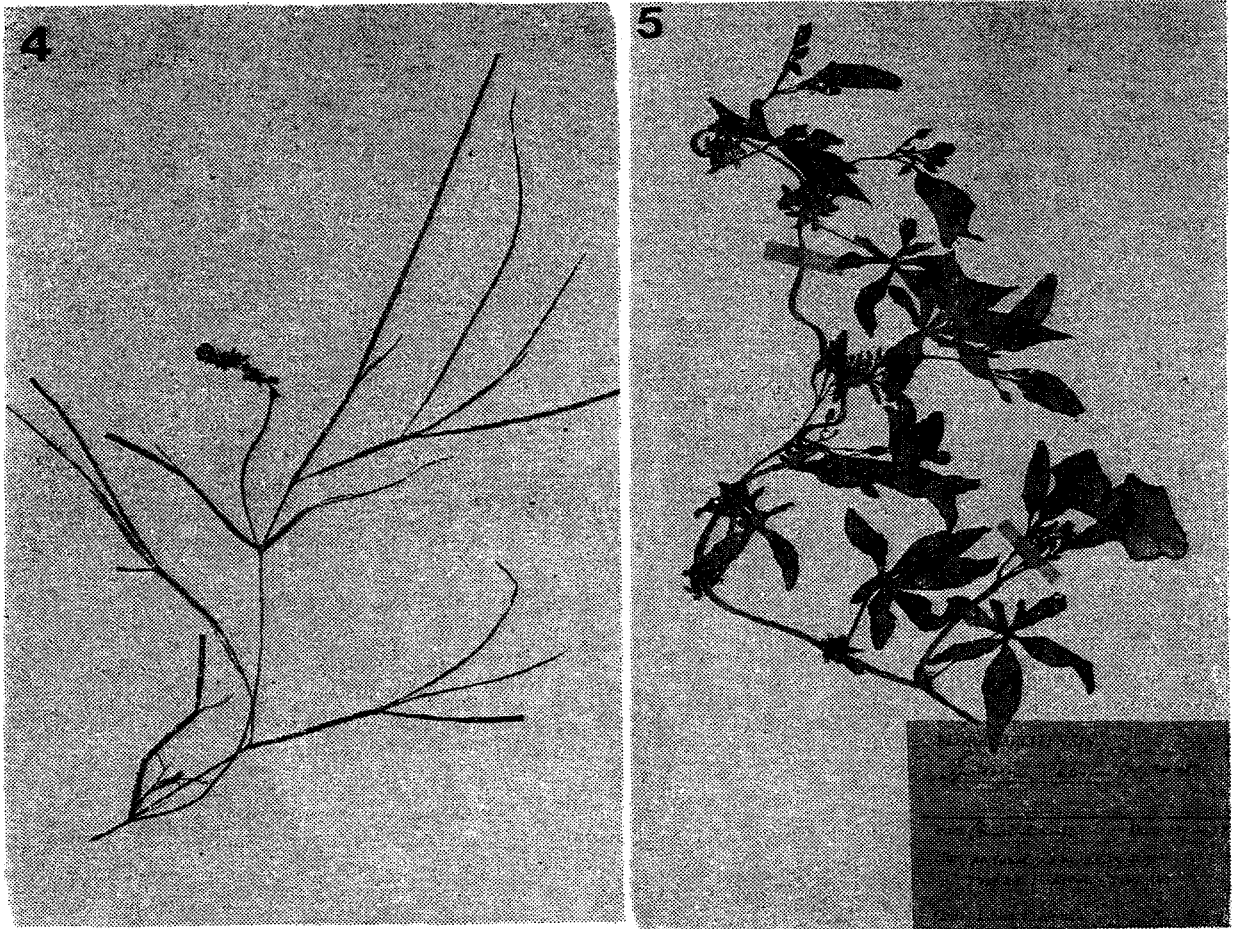


Fig. 4. *Potamogeton pectinatus* (5635); Fig. 5, *Ipomoea cairica* (5593).  
(Paotos E. Lanfranco).

SECALE CEREALE L., *Sp. Pl.* ed.1: 87 (1753).

Family: Gramineae

Found in a field of barley at Ghadira (Mellieħa) by J. H. Silverwood in June 1975. Its seed was evidently imported by accident with that of barley. This is the rye of cultivation. There is no record of this cereal ever being cultivated in Malta. In 1976 some variants were cultivated at the Argotti Botanic Gardens. (5075) FIG. 3.

ACKNOWLEDGEMENTS: I am grateful to G.L. Bate, Michael Briffa and J.H. Silverwood for providing specimens and information and to A. Hansen (Copenhagen) for help with taxonomical problems.

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On the occurrence of *Crocidura suaveolens* Pallas (Mammalia, Insectivora) in the Maltese Islands with notes on other Maltese shrews.

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ABSTRACT

*Crocidura suaveolens* Pallas, 1811 is recorded definitely for the first time from the Maltese Islands. Previous records of this species are reviewed and are shown to refer to other species or else to be unconfirmed. Besides *C. suaveolens*, two other shrews inhabit the Maltese Islands. *Suncus etruscus* (Savi) is distributed in both Malta and Gozo while both *C. suaveolens* Pallas and *C. russula* (Hermann) appear to be restricted to the island of Gozo. The latter species has not, however, been recorded in this study.

INTRODUCTION

The first mention of the occurrence of *Crocidura suaveolens* in the Maltese islands was that of Gulia (1913) who reported that a male of this species was captured by G. Despott at Tal-Brolli, Ghaxaq (Malta). As pointed out by Lanfranco (1969), Gulia did not state whether he was referring to *C. suaveolens* Pallas or to *C. suaveolens* Blasius [= *Suncus etruscus* (Savi)]. Lanfranco (1969) is of the opinion that Gulia was referring to *C. suaveolens* Blasius since all the specimens of shrews examined by Lanfranco turned out to be *S. etruscus* (Savi). Lanfranco (1969) further states that in his opinion "It appears that there are no other shrews on our islands". Bate (1935) refers to Gulia's record as "*Crocidura suaveolens* (= *Pachyura etrusca* Savi)" indicating that she too believed that Gulia was referring to *Suncus etruscus* (Savi). Sultana (1971) reported that he had extracted the remains of two specimens of *C. suaveolens* from pellets of the Barn Owl *Tyto alba* collected at Xaghra, Gozo. However, this author does not give the authority's name, so, as in the case of Gulia's record, it cannot be decided whether the specimens were actually *C. suaveolens* Pallas or *S. etruscus* (Savi). Sultana's records are discussed further below. The present record of *C. suaveolens* Pallas is thus the first unequivocal record of the occurrence of this species in the Maltese islands.

*Crocidura suaveolens* Pallas, 1811

1 male; Mgarr, Gozo 22/V/1973 leg. J.L. Schembri; det. P.D. Jenkins.

The specimen was found dead, but not decomposed, in a roadside ditch. The hairs on the superior part of the body are coloured in various shades of brown while those on the inferior part of the body are coloured grey, though occasional

yellowish-brown hairs also occur. There is a more or less distinct transition in the coloration of the superior and inferior parts of the body. The legs are of a yellowish-white colour while the tail is brownish-white.

The dentition of the upper jaw is shown in Fig. 1.

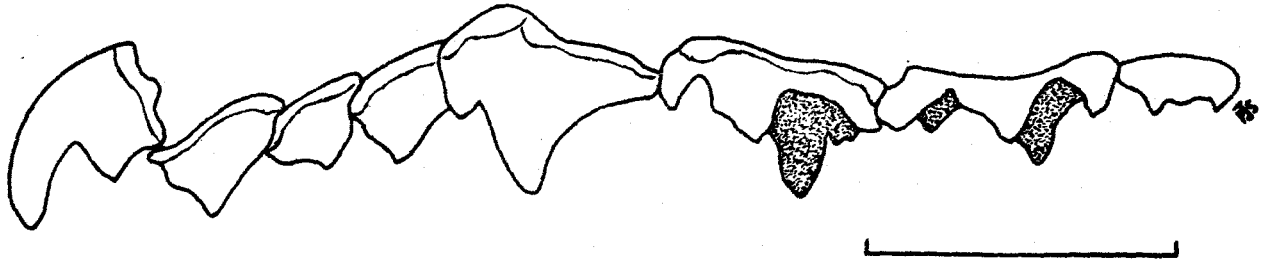


Fig. 1 Dentition of the upper jaw of *C. suaveolens* Pallas; Specimen from Mgarr, Gozo. Scale represents 2 mm.

The specimen has the dimensions given below.

Body

Length of head and body	50.3 mm
Length of tail	27.5 mm
Length of posterior leg	11.6 mm

Skull

Condylbasal length	18.1 mm
Maximum breadth	8.2 mm
Maximum height of braincase	5.0 mm
Superior dental file length	7.9 mm

This specimen of *C. suaveolens* cannot be referred to any of the forms or races attributed to this species without further studies on a larger number of individuals, and in any case, these races are of uncertain status (Toschi & Lanza, 1959).

## DISCUSSION

Besides *S. etruscus* (Savi) and the present record of *C. suaveolens* Pallas, other species of shrew have been recorded from the Maltese islands. Roberts (1954) mentions *Sorex araneus* (L.) from Malta, however, as correctly stated by Lanfranco (1969), the range of this species does not even include Sicily. Despott (in Vaufrey, 1929) records *S. etruscus* and *Crocidura* sp. from the Maltese islands. Two skulls, one from Malta and one from Gozo, examined by Bate (1935) turned out to belong to *S. etruscus* (Savi) and *C. russula* (Hermann) respectively. Particularly interesting is Sultana's record of *C. suaveolens* and *C. russula* from pellets of *Tyto alba* from Gozo (Sultana, 1971). As already mentioned, this author does not give the authority's name and, in an effort to confirm these records, we have

examined the correspondence between J. Sultana and T.B. Silcocks, to whom the mammalian remains had been sent for identification. It transpired that Mr. Silcocks had in turn sent the remains of the shrews to Dr. G.B. Corbet of the British Museum (Natural History) for identification. There is, however, no trace of any correspondence between T.B. Silcocks and Dr. G.B. Corbet relating to Maltese material at the British Museum (P.D. Jenkins, personal communication). On the other hand, T.B. Silcocks in personal communication to one of us (S.P.S.) asserts that the Maltese material sent to him by J. Sultana was definitely identified as *C. russula* (Hermann) and *C. suaveolens* Pallas by Dr. G.B. Corbet.

In view of our own record of *C. suaveolens* and Bate's record of *C. russula* (Bate, 1935) we are of the opinion that Sultana's records are valid. Unfortunately, however, the skulls on which these records are based are lost.

Two species of shrew have definitely been confirmed to inhabit the Maltese islands, while a third species, *C. russula* (Hermann) almost certainly also occurs. Of these species, two (*C. suaveolens* Pallas and *C. russula* (Hermann)) have only been recorded from Gozo, while the other (*S. etruscus* (Savi)) occurs in both Malta and Gozo.

Finally, it is interesting to note that fossils of *Crocidura cf. leucodon* (Bate, 1925) and *C. russula* (Storch, 1970) have been found in Ghar Dalam cave, Malta, while fossil *C. cf. russula* (Bate, 1935) have been found in pleistocene deposits of Tal-Gnien, Malta.

#### ACKNOWLEDGEMENTS

We are very grateful to Dr. P.D. Jenkins of the British Museum (Natural History) for identifying the shrew, for examining correspondence in the files of the British Museum on our behalf and for her helpful comments. We also wish to thank Mr. A. Valletta for arranging to have the shrew identified, Mr. J. Sultana for allowing us to examine the correspondence between himself and Mr. Silcocks, and to Dr. G. Zammit-Maempel for making available to us several important papers on Maltese mammals.

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## Additional Notes on the Holotype **COELOPLEURUS** **MELITENSIS** Zammit-Maempel 1969.

In 1969 I established a new species of *Ceolopleurus* on the basis of a single specimen which I had found overlying the Lower Coralline Limestone and underlying the base of the *Scutella* bed on the north west coast of Malta. The Lower Coralline Limestone formation has since been attributed to the Upper Chattian (Late Oligocene), whilst the lower part of the overlying Globigerina Limestone is probably Aquitanian (Lower Miocene) (FELIX, 1973).

The record of *Ceolopleurus* from the Maltese neogene increases still further the evidence of Maltese Oligo-Miocene genera surviving in the Indo-Pacific regions, but in spite of repeated search for further specimens, none has been recovered.

At the time of the original description of the type, it was not possible to locate the madreporite. With better cleaning facilities and a re-study of the apical region, it has now become possible to locate the madreporite and consequently to orientate the echinoid. The additional plate noted at the level of the third protuberant tubercle from the apex, has been found to lie in Ray 4 (Loven). The cause of the supernumerary interambulacral plate cannot be ascertained, but it is probably the result of splitting of the developing plate at its very site of origin in the angle between the genital and ocular plates as a consequence of trauma or parasitism.

### ACKNOWLEDGEMENTS

The helpful correspondence with Professor Devries is gratefully acknowledged.

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## Insect Pollinators on *CYNARA CARDUNCULUS* L.

During late May and early June the purple flowers of *Cynara cardunculus* L. are the most conspicuous feature of clay soils in the Maltese countryside. These attract a large number of pollinating insects, mainly Hymenoptera and Coleoptera. Below is a list of such pollinators observed in early June 1977 in the Wardija (Malta) area.

### HYMENOPTERA

*Scolia flavifrons* Fabr.  
*Sceliphron destillatorum* (Ill.)  
*Halictus scabiosae* Rossi  
*Apis mellifera* L.

### COLEOPTERA

*Cetonia lugubris* Herbst.

### COLEOPTERA (cont'd.)

*Aethiessa floralis* Fabr.  
*Oxythyrea funesta* Poda.  
*Omophlus melitensis* Baudi  
*Nacerda melanura* L.  
*Tillus unifasciatus* Fabr.  
*Larinus scolymi* Oliv.

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## Occurrence of *BRACHYTRIPES MEGACEPHALUS* Lefevre in the Maltese Islands (Orthoptera Grylloidea)

The occurrence of *Brachytripes megacephalus* in the Maltese Islands is known from just one record, having been found at Ramla (Gozo) by Guido Lanfranco (LANFRANCO 1957). As a result it has been difficult to assess its status and to study its habits in the Maltese Islands.

A second specimen (dead) has been found by writer in April 1977 at Ghadira (Malta) in coastal sands — this is much the same type of habitat as that of Ramla (Gozo). Its yellowish-brown colour may also be suggestive of its partiality to sandy habitats.

It may appear strange that this species has not been found before at Ghadira since this spot is very popular with naturalists. This may be accounted for by its burrowing and nocturnal habits or by its being an accidental.

On questioning some farmers in the Ghadira area, some informed me that *B. megacephalus* does occur irregularly from mid-spring to the end of June and again before the first rains in September till early October. One of the farmers insisted that it was very infrequent and certainly not annual in appearance. We must therefore await further observations before we can decide whether *B. megacephalus* is indigenous or not.

Both Ghadira and Ramla have farms in the vicinity in which plants of the families Solanaceae and Leguminosae are cultivated. It is possible that due to alteration of its natural habitat, this cricket might make use of cultivated plants for nourishment and its possible persecution as a pest organism may have led to depletion of its populations.

The writer is indebted to Mr. D. Cutajar for his valuable advice.

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Lanfranco, G. (1957) — Notes on the Orthoptera of the Maltese Islands. *Ent.* 90: 75-76.

**L.F. Cassar,**

Villino Fralimar, Nazju Ellul Street, Msida, Malta.

*Cotylorhiza tuberculata* (Macri) (Cnidaria, Scyphozoa) in large numbers.

Although numbers of this jellyfish are observed fairly regularly every year, large numbers were brought into the bays and harbours from mid-August to mid-September 1977, especially into those facing south and south-east, with winds blowing from these directions most of the time.

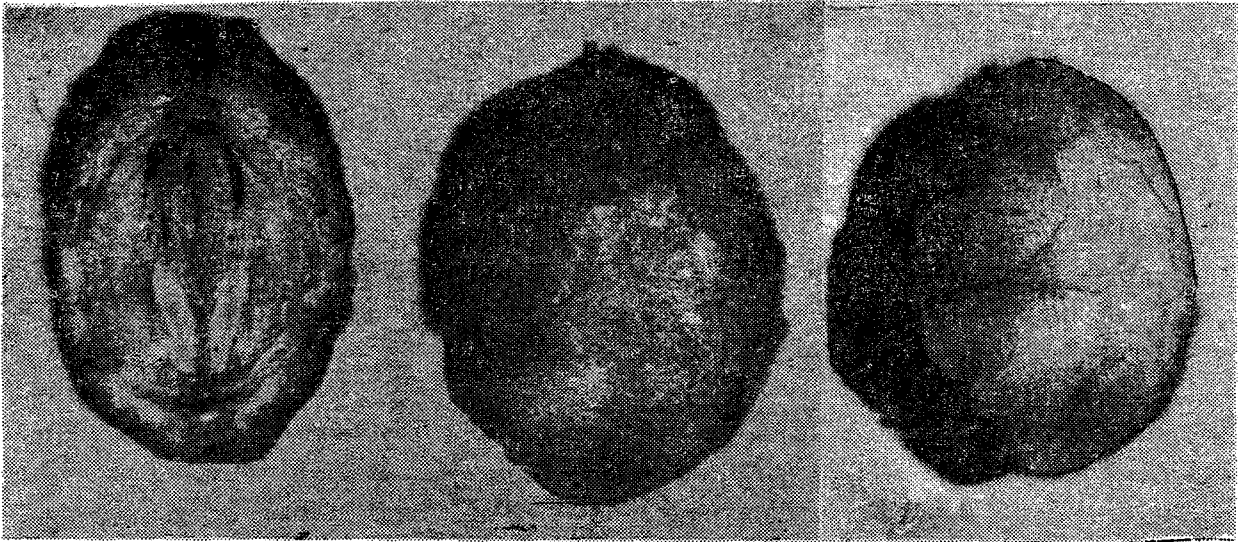
Guido Lanfranco

*Apis mellifica* Linn. (Hymenoptera, Apoidea) trapped in flowers of *Acanthus mollis*, Linn.

It may be of interest to note that in several flowers of *Acanthus mollis* Linn. eleven honey bees, *Apis mellifera* Linn. were found, one in each flower, dead, dry, and head inwards, on 21st, and 30th May 1977, from plants at Buskett. It is the hypothesis of the present writer that the strong stamens of *Acanthus* locked the bees in.

Guido Lanfranco

*Stomatolepas elegans* Costa (Crustacea, Cirripedia) on *Dermochelys coriacea* Linn., taken in Maltese Waters.



On a specimen of *Dermochelys coriacea* Linn. landed at Spinola Bay, St. Julians, Malta, there were about 40 specimens of the barnacle *Stomatolepas elegans* Costa, attached to the softer folds of skin at the base joints of the forelimbs, hindlimbs, neck and tail. The Leathery Turtle was brought up dead on 3rd June 1977. I am indebted to Dr. G.A. Boxshall, Crustacea Section of the British Museum (Natural History) London, for the identification.

Guido Lanfranco

*Amara eurynota* Panz. (Coleoptera, Carabidae) in large numbers.

Hundreds of specimens of this beetle were observed in the streets of Valletta, Malta, close to St. Elmo, on the 26th April 1976, and in declining numbers up to 1st May 1976. In November of the same year, a lesser replica was observed, on the 22nd and 23rd. It was first recorded by a single specimen from Wied il-Kbir, by M. Cameron and A. Caruana Gatto, in "A list of the Coleoptera of the Maltese Islands", *Trans. Ent. Soc. Lond.* 59(3):389, Nov. 1907. I am indebted to Dr. M.E. Bacchus, British Museum (Natural History) London, for confirming the identification.

Guido Lanfranco

## BOOK REVIEW

G. Zammit-Maempel, M.D., F.G.S. — An outline of Maltese Geology (44 pp., 29 plates. Price £1.50)

Rock forms so much a part of the landscape of the Maltese Islands, both to the resident and to the visitor, that it is perhaps surprising that an attractive guide to the geology of the islands, written for the layman, has not appeared

before. Now Dr. Zammit-Maempel has produced a work to serve two purposes: to act as a guide to the splendid exhibition of Maltese Geology which he has worked to create in the National Museum of Natural History; and to serve as a general introduction to the rocks and fossils of the islands for the visitor generally.

The best introduction to the book, as to Maltese Geology, is the National Museum exhibit in the Vilhena Palace just within the old city at Mdina. In the exhibit are examples of most of the fossils which have made the islands celebrated for over two millenia. A number of these are illustrated in the book by excellent photographs on art paper. These illustrate something of the fascination of the islands to the palaeontologist. But what the general reader may not realise is that the illustrations in the book are better than those that have been produced before and present a scientific contribution in their own right. It is to be hoped they may stimulate more work on the fossils of the islands, but the author draws attention to the legal constraints on the collecting, and especially the exporting of geological and palaeontological material.

The general geological account is noteworthy, especially for the simplicity of the prose and the attractive diagrams, and especially the photographs which illustrate the theme. References are given for those that wish to read more, and mention should be made of Dr. Hyde's book published in 1953 which gave a very detailed history of early work. Here lies the novelty of the new guide, since it is not heavily filled with detail, but concentrates on things which the ordinary tourist or visitor can see for himself.

Internationally, there is an increasing awareness of Man's environment, and an increasing interest in Natural History generally. Dr. Zammit-Maempel's guide will help many to achieve greater interest and pleasure from Maltese scenery. Both the Guide and the Exhibit can be highly recommended to any who have the least interest in the islands and it may provide the key that opens the door to the fascination a geologist finds in the quarries, crags and coasts of the Maltese Islands.

Professor Michael R. House  
University of Hull, England  
July 1977

S.M. HASLAM, P.D. SELL & P.A. WOLSELY — "A Flora of the Maltese Islands" Malta University Press, 1977. pp lxxii, 560, paper, 8vo, 70 plates with about 450 line drawings. Price: £M3.50.

This is the first complete flora of the Maltese Islands since J. BORG's "Descriptive Flora of the Maltese Islands" (1927), recently reprinted by O. Koeltz.

The opening chapters include information on geography, topography, climate, soils vegetation and other physical aspects. A good proportion of the

information given here is original. There is also a useful section on the history of the study of the Maltese flora, but although the information here is essentially accurate, it leaves the reader with the impression that hardly any work was done in this field in the period between the two floras.

The flora includes descriptions of about 1130 species (of which some 160 are commonly cultivated plants). Apart from the authors' own observations, the records have been based mostly on the work of GRECH-DELICATA (1853); SOMMIER & CARUANA-GATTO (1915); BORG (1927); G. LANFRANCO (1955, 1969) and KRAMER & WESTRA (1972). The way in which they quote the records is inconsistent since they fail to acknowledge a number of records given by the above and other authors. Thus they fail to quote SOMMIER & CARUANA-GATTO for 200 records, G. LANFRANCO for about 70, KRAMER & WESTRA for 14. Only about a dozen of BORG's records have been overlooked but the authors seem to ignore completely the existence of his "Third Supplement ..." (1935) with the result that some half-dozen *newly recorded* species are left out of the flora.

The authors also ignore the existence of a number of important papers published in "*The Maltese Naturalist*". Considering that the most recent insertion in their Bibliography is dated 1975 it works out that 9 of the relevant papers appearing between 1970 and 1974 have been disregarded. It is evident that the authors had access to this periodical since they cite two papers from it. This resulted in the omission from the flora of more than 40 species and in the failure to correct old records in the light of new information (e.g. *Centaurea pullata* and *Gaudiniopsis macra* which should be replaced).

The status given to the plants included in the flora also shows a number of inconsistencies. Thus a number of cultivars and hybrids of *Narcissus* which very occasionally escape from cultivation are given a full treatment. Conversely such important taxa as *Enarthrocarpus pterocarpus*, *Polygonum equisetiforme* and *Nicotiana longiflora* are relegated to a brief mention. Various doubtful records appearing in the old flora have been included here without comment while many validly recorded and confirmed species in the recent papers of KRAMER & WESTRA, E. LANFRANCO and SILVERWOOD (all cited in the Bibliography) have been left out of the flora completely and arbitrarily. Among victims of such treatment are *Polygonum patulum*, *Chenopodium ficifolium*, *Ononis alopecuroides* (a frequent plant), *Cephalaria syriaca*, *Rumex obtusifolius* (common) and *Rumex sanguineus*.

Some of the genera receive a poor treatment. Thus only four out of at least eight species of *Rumex* and only five out of nine species of *Amaranthus* are recorded. *Andropogon distachyus* must have been omitted by oversight since this is common and well known. The authors also failed to take into consideration a number of recent revisions of genera such as those of RUNEMARK, PIGNATTI and STEINBERG for *Parapholis*, *Phagnalon* and *Adonis* respec-

tively, all of which bear on the Maltese plants. They misquote SOMMIER & CARUANA-GATTO claiming that according to S. & CG, *Cerastium brachypetalum* is more frequent than *C. glomeratum* whereas S. & CG actually claim the reverse.

On the credit side I should mention the inclusion of four new records: *Carex spicata*, *Origanum onites*, *Myriophyllum verticillatum* and *Paspalum dilatatum*. Some of the misidentifications appearing in the older floras have been put right. These include *Fraxinus angustifolia* *Carex otrubae*, *Onopordum argolicum* and *Aster squamatus*, replacing *F. excelsior*, *C. vulpina*, *O. sibthorpiatum* and *A. subulatus* respectively. Other positive features include the incorporation of a very useful glossary and the very low price which brings this relatively vast work within reach of everybody's pockets.

The illustrations are generally very well executed and accurately display the character of the plants they portray. It is a pity that as a result of the quality of printing and reduction, some of the diagrams have lost clarity. It is also unfortunate that some of the diagrams represent plants other than those which they are meant to portray. Thus "*Galium aparine*" is *Rubia peregrina* (which features twice in the same plate); "*Vicia tetrasperma*" is *V. leucantha*; "*Frankenia laevis*" is *F. pulverulenta*; "*Chenopodium album*" is *C. opulifolium*. The names of *Ferula communis* and *Foeniculum vulgare* have been switched (printer's error?).

The authors have given new Maltese and English names to some of the species. I do not personally agree with inventing new vernacular names where they do not exist but if it has to be done, this should be the responsibility of a board of botanists and linguists and not arbitrary. Some of the new names are impractical, e.g. *Widen il-Gurdien Idellek* (*Cerastium glomeratum*); *Kittiental-Imħarbat* (*Linum strictum*) and *Xnejn inħaxlet* (sic) (*Trifolium campestre* & *scabrum*). Calling the Autumnal *Scilla autumnalis*, *Għansal tax-Xitwa* (transl. Winter squill) is misleading. *Silla Qatranija* for *Psoralea bituminosa* is superfluous since this plant already enjoys at least two vernacular names. Some of the new English names are not much better, e.g. *Bloody Broomrape* (*Orobanche sanguinea*). It is strange then that some well-established Maltese names have been omitted e.g. *Tuffieħ is-Serp* (*Solanum luteum*) and *Għallis* (*Notobasis syriaca*).

In spite of the numerous technical faults outlined, this book is still valuable when considered simply as an identification guide. The incorporation of Keys and the diagrams, especially the details given of the legumes of the many *Medicago* species and the flowers of *Ophrys* would make this book much easier to use than BORG's Flora. I urge anybody interested in identifying Maltese plants to get the book. I cannot help mentioning that had the authors taken the trouble to consult people actively working on the Maltese flora, all the technical faults mentioned could very easily have been averted.

EDWIN LANFRANCO

## NEWS AND VIEWS

**MALTESE FLORAS:** A number of Maltese Floras have quite suddenly appeared on the market. The "*Descriptive Flora of the Maltese Islands*" of Prof. John Borg, first published by the Malta Government Press in 1927 and long out of print has recently appeared in facsimile reprint (pub. O. Koeltz). It is rather unfortunate that the supplement which Prof. Borg published in 1935 in the periodical "*Archivium Melitense*" has not also been incorporated.

Guido Lanfranco's "*Field Guide to the Wild Flowers of Malta*" (Progress Press) which has been out of print for a few years has appeared in a new edition. The field guide is essentially a pocket excursion flora which enables the user to identify some 600 of the local plants. In order to aid identification, the field guide has a number of plates of line-drawings arranged according to the colour of the flowers. A number of nomenclatural mistakes appearing in the previous edition have been corrected but no attempt has been made to change correctly applied names which have now gone into synonymy. A very common plant which was inadvertently left out of the previous edition, *Mercurialis annua*, has now been included.

The long-awaited complete flora of the Maltese Islands, compiled by S.M. Haslam, P.D. Sell and P.A. Wolsely which was originally due in 1970 has finally been published (Malta University Press). A review of this publication appears elsewhere in this issue.

**YOUNG MEMBERS SECTION:** In view of the increasing number of students in the ranks of the Natural History Society, it has been decided to launch a "young members" section. It is envisaged that this section will help to direct interest in natural history into scientifically useful channels, to promote awareness of the concept of conservation and to help add to our knowledge of Maltese Natural History by means of organized surveys.

**SA MAISON:** After many vicissitudes the plot at Sa Maison which the N.H.S. adopted in 1971 for the cultivation of Maltese wild plants seems to be recuperating. It has been agreed with officials of the Dept. of Agriculture to close the place off for some time to ward off vandalism; to surround the separate plots dedicated to the different plants by stone boundaries and to undertake to plant material which officials of the N.H.S. provide. All these, we are pleased to say are being done. It is hoped that with the continuing cooperation of the Department of Agriculture, we shall shortly be able to present the Island with a truly Maltese garden.

**AN OUTLINE OF MALTESE GEOLOGY:** This is the title of a recent publication by Dr. George Zammit-Maempel. This book serves a dual purpose: it is a concise yet clear account of Maltese Geology and at the same time a guide to the Geology Section of the National Museum of Natural History, Mdina.

A review of this publication appears elsewhere in this issue.

**PAINTINGS FOR FUND-RAISING:** Mr. Guido Lanfranco, President of the N.H.S. presented four paintings of Maltese Wild Plants to the Society. These were auctioned in order to help in funding this periodical during the activity of the 2th June 1977. The paintings depict *Fagonia cretica*, *Anchusa azurea*, *Muscari comosum* and *Palaeocyanus crassifolius*.

**MRS. HELEN WIRTH:** It is with deep sorrow that I have to record the untimely passing away of Helen Wirth which occurred on the 20th of June. All of us will recall the energy and dedication which Helen bestowed on the Society and the regular participation of Helen and her husband Lewis in all the activities of the Society. We all remember her exquisite paintings of Maltese wild plants, a welcome feature of all the Society's exhibitions and exhibition meetings. When the sorrowful event occurred Helen had been serving her term as Hon. Secretary of the Society — a task which she carried out with her usual love and good cheer. My sympathy and that of all the members and friends of the Natural History Society, lies with her husband Lewis (himself an enthusiastic painter of wildlife) and her daughter Mariza.

**APOLOGY:** The Editor would like to apologize for the very long delay in issuing this first issue of *The Central Mediterranean Naturalist* which was due to appear in late 1977. The delay was due to its being held up at the printers. It is only after the material was transferred to the present printers, Messrs. Gauci Maistre of Valletta, that the periodical has finally seen the light of day.

**OUR NAME:** Although originally advertised as *The Maltese Naturalist — New Series*, this periodical has changed its name to *The Central Mediterranean Naturalist* in order to comply with Act. 22 (1978) of Maltese Law which forbids the use of the words 'Malta', 'National' and derivatives in titles of books, newspapers, names of firms, etc. without permission from the Prime Minister.

**CLOSER TO NATURE EXHIBITION:** On the 21st July, 1978, The President of the Republic of Malta, Dr. Anton Buttigieg, inaugurated the exhibition "Closer to Nature", organized by the Natural History Society at the National Museum of Natural History, Mdina. The exhibition included paintings, drawings and photographs on natural history subjects by Messrs. V. Axiak, A. Bezzina, M. Briffa, J. Cilia, E. Lanfranco, G. Lanfranco, J. Schembri, M. Schembri, P. Schembri and S. Schembri. Part of the exhibition was dedicated to the eminent Maltese naturalist Giuseppe Despott (1878 - 1936) in commemoration of the first centenary from his birth. This section included numerous publications by Despott which were loaned by Mr. Guido Lanfranco.

**THANKS:** The Natural History Society is indebted to a number of organizations and individuals who through their contributions have made possible our activities and this publication. We are particularly grateful to the local branch



of the International Council for Bird Preservation for donating £M50.00 and to the Friends of Malta Association who have contributed £M30.00 towards our publications fund. To the Representative of the British Council for allowing the Society to make use of their premises; Mr. Joe Grech of the Victoria Scouts Group, Gozo, for facilities in connection with our Gozo Branch; Mrs. R. Williams for providing facilities for a fund-raising activity; Miss Carbonaro, Mr. D. Cutajar, Prof. Dr. K. U. Kramer (Zurich); Mr. E. Lanfranco; Mr. G. Lanfranco; Mr. A. Macelli; Mrs. M. Millar; Mr. J. Sultana; Mr. J. H. Silverwood; Mr. and Mrs. L. Wirth and Dr. and Mrs. G. Zammit-Maempel who have presented donations to the Natural History Society in general or the *Central Mediterranean Naturalist* in particular. The Society is also grateful to all those persons who have participated, given lectures or presented exhibits during our activities and to those persons who have contributed papers for this periodical.

#### PUBLICATIONS RECEIVED:

*Supplemento alle Ricerche di Biologia della Selvaggina* Vol. V no. 7 and 8, Jan. and May 1977. Laboratorio di Zoologia Applicata alla Caccia, Bologna.

*Gorteria*, Vol 8 no. 4 to 12 (Aug. 1976 to Dec. 1977), Leiden.

*Gorteria*, Vol 9 no. 1 to 5 (1978), Leiden.

*Il-Merill*, no. 18, Jan-Jun. 1977, Malta Ornithological Society.

*Bird's Eye View*, no. 1 Oct. 1977, Malta Ornithological Society.

*Birds of Prey*, 1978, Malta Ornithological Society Educational Leaflet.

*Why Conserve Nature*, I.C.B.P. (Malta) 1977.

*International Council for Bird Preservation President's Letter*, no. 40, March 1977, no. 41, July 1977.

*Bulletin of the British Museum (Natural History) Botany*. Vol. 5 no. 6 and 7 (1977); Vol. 6 no. 1.

*Council of Europe Newsletter, Nature*, 1976 no. 12, 1977 no. 1, 8 to 12, 1978 no. 1 to 5 (through the Dept. of Agriculture).

*Naturopa*, no. 26 (1976, no. 27 (1977), nos. 28, 29 (1978), (through the Dept. of Agriculture).

*Hobbies Society Magazine* vol. 1 no. 6 (1977).

Laycock, G. (1973) — *The Sign of the Flying Goose*, Anchor Nat. Hist. Books, (through the United States Information Service).

Eckholm, E. (1977) — *The Picture of Health, Environmental Sources of disease*. World Watch Institute, Massachusetts Ave. Washington D.C. (through

the United States Information Service).

*Friends of the Mediterranean Sea*, Newsletters no. 1. to 7. (1975 to 1977), International Ocean Institute, University of Malta, Msida.

*Kidma, Israel Journal of Development*, Vol. 12/1977 (Vol. 3, no. 4) (through the Embassy of Israel).

*Israel in the Mediterranean Ecosystem*, Environmental Protection Service Publication no. 78-01 (1978) Jerusalem, (through the Embassy of Israel).

Lichfield, N. and Marinon, U. (1977) — Land-use — Planning and Environmental Protection: Convergence or Divergence? *Environment and Planning A*. Vol. 9, pages 985-1002, (through the Embassy of Israel).

*Israel Environment Bulletin* Vol. 4 no. 4 (Feb. 1978) (through the Embassy of Israel).

*Atti, Ser. 6* Vol. XI (1976) — Istituto Botanico dell'Università', Laboratorio Crittogamico, Pavia.

# Instructions to Contributors

The Editorial Board invites papers and short notes dealing with any aspect of natural history having a bearing on the Mediterranean in general and on the Maltese Islands in particular.

Authors should submit *two copies* of each paper which should be typewritten in double-spacing and with a wide margin on the left side. Illustrations and photographs should be of good quality and should all be numbered consecutively (Fig. 1; Fig. 2; etc.) whether they are line-drawings, photographs or graphs. Numbers and captions should be on a separate sheet and not on the illustration itself.

The information submitted in the paper should be original, based on personal research and should represent a contribution to our knowledge of the field covered. The information should be given in clear, concise language. Except for short notes, each contribution should be preceded by an *abstract* of not more than a hundred words. The papers submitted may be reviewed by a referee whose comments will be passed on to the authors concerned.

Authors are to check carefully the accuracy of all scientific names and references cited. Citation of references should follow this format:— surname; initials; date of publication (in brackets); title of work; title of periodical (suitably abbreviated); volume number; part (in brackets); pages. When referring to a book, the publishers and the place of publication should also be cited.

**SUPPLEMENTS:** In the case of the occasional supplements which will be published, it is not necessary that the information submitted be a new contribution but care should be taken to achieve maximum accuracy. Only the more important bibliography needs to be cited.

In order to aid the funding of this periodical the authors are requested to contribute the sum of £M1.00 (c. £stg1.35) for every page in excess of four pages and will be billed for plates in excess of one page. Cheques should be made payable to *The Central Mediterranean Naturalist*.