Bollettino della Società Paleontologica Italiana, 58 (2), 2019, 155-163. Modena

Mesosceptron Fucini, 1915 from the Sinemurian of Sicily: an aulacoceratid cephalopod and not an octocoral

Johannes Pignatti, Nino Mariotti, Carolina D'Arpa & Chiara Sorbini

J. Pignatti, Dipartimento di Scienze della Terra, Università "La Sapienza", P.le A. Moro 5, I-00185 Roma, Italy; johannes.pignatti@uniroma1.it
N. Mariotti, Dipartimento di Scienze della Terra, Università "La Sapienza", P.le A. Moro 5, I-00185 Roma, Italy; nino.mariotti@fondazione.uniroma1.it
C. D'Arpa, Museo di Geologia "G.G. Gemmellaro", Università degli Studi di Palermo, Corso Tukory 131, I-90100 Palermo, Italy; carolina.darpa@unipa.it
C. Sorbini, Museo di Storia Naturale dell'Università di Pisa, Via Roma 79, I-56011 Calci, Italy; chiara.sorbini@unipi.it

KEY WORDS - Xiphoteuthididae, Coleoidea, Pennatulacea, Octocorallia, Jurassic, Nomenclatural act.

ABSTRACT - The genus Mesosceptron *Fucini, 1915 from the Sinemurian of Montagna del Casale, Sicily, was originally described as a pennatulacean octocoral. The nominal genus is based on eight new species; no type species was fixed in the original publication. Re-examination of the type specimens of these species shows that they are incompletely preserved coleoid rostra that according to current systematic practice may belong to more than one genus within the xiphoteuthidid Aulacoceratida. In order to clarify the systematic attribution of the nominal genus* Mesosceptron*, we designate herein as its type species,* M. neumayeri*, and designate a lectotype for the latter; we also designate lectotypes for* M. exagonum *and* M. magnum*. Consequently to this nomenclatural act, the nominal genus* Mesosceptron *becomes a subjective junior synonym of* Atractites *Gümbel, 1861. We also include herein comments upon nomenclatural aspects of the co-occurring ammonite fauna.*

RIASSUNTO - [*Mesosceptron* Fucini, 1915 è un cefalopode aulacoceratide e non un ottocorallo] *- Il genere* Mesosceptron *Fucini, 1915 della Montagna del Casale in provincia di Palermo (Sicilia) è stato originariamente attribuito dal suo autore agli ottocoralli pennatulacei. Il genere nominale si basa su otto nuove specie, di cui nessuna designata come specie tipo del genere nella pubblicazione originale. La fauna ad ammoniti accompagnante, di cui si evidenziano aspetti nomenclaturali inediti, permette di riferire tutte queste specie al Sinemuriano (Giurassico Inferiore). La revisione del materiale tipo di queste specie dimostra che si tratta di rostri incompleti di coleoidei che, in base ai criteri sistematici attuali, potrebbero essere attribuiti ad uno o più generi di aulacoceratidi compresi nella famiglia Xiphoteuthididae. Per risolvere l'attribuzione sistematica del genere nominale* Mesosceptron*, vengono qui designati la specie tipo,* M. neumayeri*, così come i lectotipi delle specie nominali* M. neumayeri*,* M. exagonum *e* M. magnum*. Ciò rende possibile considerare il genere nominale* Mesosceptron *come un sinonimo junior soggettivo di* Atractites *Gümbel, 1861.*

INTRODUCTION

Since the end of the 19th century, a number of studies investigated the rich Early Jurassic mollusk and brachiopod fauna from Montagna del Casale in the Rocca Busambra area (Fig. 1) in northern Sicily (Palermo province) (Gemmellaro, 1878, 1879, 1882; Carapezza & Taglierini, 1894; Scalia, 1903; Merciai, 1904; Fucini, 1912, 1913, 1915; Vinassa de Regny, 1933; Gugenberger, 1935, 1936a, b).

The exceptionally well-preserved specimens of this fauna are at present in the collections of the Museo di Geologia "G.G. Gemmellaro" in Palermo and the Museo di Storia Naturale dell'Università di Pisa at Calci. Gemmellaro (1878, 1879, 1882) obtained his specimens through mechanical preparation. Merciai (1904) reports that more than 400 kg of rock from Montagna del Casale were brought to Pisa and then vast number of specimens, making up one of the largest collections in the museum, were obtained by semi-calcination, i.e., through the heating to a red heat and quenching of the limestone (e.g., Pojeta & Balanc, 1989).

From the collections of Pisa, after publishing the polyplacophorans (Fucini, 1912) and the gastropods (Fucini, 1913), Fucini (1915) also described the new genus *Mesosceptron* Fucini, 1915 as a pennatulacean octocoral. The genus is based on eight new species: *Mesosceptron neumayeri* Di Stefano in Fucini, 1915 also referred to as "*Xiphothenthis Neumayeri* Di Stefano (in schedis)" (sic), *M. conicum* Fucini, 1915, *M. magnum* Fucini, 1915, *M. tuberculatum* Fucini, 1915, *M. eterogeneum* Fucini, 1915, *M. zonatum* Fucini, 1915, *M. exagonum* Fucini, 1915, and *M. fusiforme* Fucini, 1915. No type species was fixed in the original publication and no subsequent author designated a type species for *Mesosceptron*. Three species by Fucini (1915), *M. tuberculatum*, *M. zonatum*, and *M. fusiforme*, have a holotype by monotypy; the remaining species are based on syntypes.

Fucini (1915) was aware that there is a strong similarity between *Mesosceptron* and the rostra of coleoid cephalopods. Notably, under the name *M. neumayeri* he recorded the provisional ("in schedis") attribution to *Xiphoteuthis* Huxley, 1864 (misspelled as *Xiphothenthis*) given by G. Di Stefano, who had communicated the specimens from the Museum of Palermo to the author. In addition, previously Scalia (1903) had recorded *Atractites* aff. *orthoceropsis* (Meneghini in Savi & Meneghini, 1851), *A.* aff. *cordieri* (Meneghini, 1867) and an unidentified belemnite species from Montagna del Casale. Fucini (1915) also recorded the co-occurrence of phragmocones of *Atractites* Gümbel, 1861 along with *Mesosceptron* at Montagna del Casale.

He also recognised the similarity of his material with a specimen identified by Wanner (1907) as "?*Atractites*" from the Triassic of Seram, Indonesia (later revised as Jurassic by Wanner in Stolley, 1929: p. 198, footnote 1).

ISSN 0375-7633 doi:10.4435/BSPI.2019.02

This specimen actually corresponds to an aulacoceratid of uncertain systematic affinity and stratigraphic range, later established as *Hibolites ingens* Stolley, 1929, which does not show any close morphological and dimensional affinity with the specimens examined for this work. *H. ingens* can neither be referred to the genus *Hibolithes* (the correct spelling of *Hibolites* is *Hibolithes* de Montfort, 1808) nor to the Belemnitina, because of its rostrum structure with conical bundles of radial fibres (Stolley, 1929), profile and outline, and chamber height. It has been recorded from Timor, Rote Island, Eastern Indonesia and Papua New Guinea (Stevens, 1965; Challinor, 1990). Following Stolley (1929), its age has been generally referred to the Middle Jurassic. However, at least in one instance, its age appears to be older: the specimens from Papua New Guinea are from the Balimbu Greywacke Formation, dated by Bain et al. (1975) as Early Jurassic (Sinemurian-Pliensbachian). Moreover, possibly conspecific specimens occur in the Sinemurian and Pliensbachian of Chile and Peru; their peculiar rostrum structure, which is not seen in Fucini's (1915) material and in other Aulacoceratida, is in progress.

It is surprising that, in spite of all these indications, and especially Di Stefano's unpublished attribution of some specimens to the aulacoceratid coleoid genus *Xiphoteuthis*, Fucini (1915) interpreted the concentric and radial structure of his material as that of alcyonarian octocorals. In alcyonarians, internodes are known to possess a concentric and radial structure starting from a hollow central axis, with a characteristic alternating, oblique growth banding pattern that may be preserved also during diagenesis (Noé & Dullo, 2006). He may have been misled by the earlier misidentifications of Triassic aulacoceratid rostra as octocorals (Frech, 1890; Haas, 1909; Riegraf, 1991). Indeed, both *Prographularia triadica* Frech, 1890, and "*Graphularia*? sp." = *Pachysceptron* nom. nud. Haas, 1909 were originally introduced as octocorals. Fucini (1915) also discarded Mojsisovics' (1871) interpretation of a fragment identical with *P. triadica* as close to *Aulacoceras* Hauer, 1860. The issue of the systematic assignment of *Prographularia* Frech, 1890 was finally solved by Jeletzky & Zapfe (1967), who demonstrated that these Triassic fossils unquestionably belong to the Aulacoceratida. As in *Prographularia*, the hollow central axis and the oblique growth banding of alcyonarians cannot be observed in any of the specimens studied by Fucini (1915). In addition, alcyonarian internodes never show a central constriction like the waist that characterises many aulacoceratid rostra (Mariotti & Pignatti, 1999). Thus, Fucini's (1915) assignment of *Mesosceptron* to alcyonarians is based only on superficial resemblance, in spite of clear indications of its early identification as coleoid rostra.

The genus *Mesosceptron* has been very rarely cited, as an octocoral, by subsequent authors, and its coleoid affinity has never been recognised.

On the one hand, the main reference of *Mesosceptron* as an octocoral is the textbook on invertebrate paleontology by Woods (1946), where it is considered as an alcyonarian. The genus is recorded as an octocoral in two reviews of paleontological literature shortly after its description (Anelli, 1916; Vinassa de Regny, 1916). It is not cited in comprehensive monographs on fossil octocorals, such as the Treatise on Invertebrate Paleontology (Moore, 1956), the Osnovy Paleontologii (Sokolov, 1962), and the Index Pennatulacea (Williams, 1999).

On the other hand, *Mesosceptron* has never been mentioned in the most complete compilations on fossil coleoids, such as the Fossilum Catalogus (Bülow-Trummer, 1920; Naef, 1922; Riegraf, 1995; Riegraf et al., 1998) and the Osnovy Paleontologii (Krimholz, 1958).

The aim of the present work is to clarify the systematic attribution of the nominal genus *Mesosceptron* Fucini, 1915. Re-examination of the original material shows that it consists of fragmentary aulacoceratid rostra that must be referred to two genera (*Atractites* Gümbel, 1861 and *Xiphoteuthis* Huxley, 1864) and possibly to a genus resembling *Calliconites* Gemmellaro, 1904. Although all these validly established genera clearly predate *Mesosceptron*, the designation of a type species is deemed necessary in order to avoid issues in priority of genus names in case of further taxonomic splitting of the Xiphoteuthididae Bather in Blake, 1892 (Mariotti & Pignatti, 1992, 1994, 1996).

AGE OF THE FAUNA FROM MONTAGNA DEL CASALE

The age of this Early Jurassic fauna has been controversial. On the basis of ammonites, Fucini (1915) referred it to the "Ammonites Bucklandi" Zone (Oppel, 1858), i.e., to the lowermost Sinemurian Bucklandi Chronozone (Page, 2003; Ogg & Hinnov, 2012). In contrast, Vinassa de Regny (1933) considered it to be Triassic.

Re-examining all available specimens of ammonites from Montagna del Casale, deposited in the museums of the universities of Palermo, Catania and Pisa, Gugenberger (1935) refuted a Triassic age, stating that the simple, ceratitic suture lines observed by Vinassa de Regny (1933) derived from excessively abraded or etched specimens. In subsequent studies, Gugenberger (1936a, b) demonstrated that most of the taxa indicate the Bucklandi Zone, sensu Oppel (1858).

It is noteworthy that from the Montagna del Casale fauna, Gugenberger (1936a, b) introduced twice, in two works published in the same year, several new species and varieties and the new lytoceratid genus *Fucinites*. Contrary to widespread opinion (Meister et al., 2011; Hoffmann, 2015), the work credited for establishing *Fucinites* and Gugenberger's new species and varieties should not be the well-known monograph in Italian (Gugenberger, 1936b) but a shorter article in German (Gugenberger, 1936a). From the Archiv der Österreichischen Akademie der Wissenschaften (ÖAW) in Vienna, Drucklegungsverzeichnisse, Karton 2, Mappe 1936, all the relevant data concerning the publication of Gugenberger (1936a) have been made available to us (pers. comm., Dr. S. Wentker and Dr. S. Sienell, 12 June 2017): printing by publisher (22 April 1936), delivery by printer to the ÖAW (11 May 1936), sent out by ÖAW (12 May 1936). The publication date thus established predates that of Gugenberger (1936b), indicated on the last page of that work (30 November 1936).

It should be noted that there are several ammonite species-group taxa that have different spellings in

these two works. Thus, *Phylloceras cataniense* of Gugenberger (1936a) is the correct name for *P. catanense* of Gugenberger (1936b) (invalid emendation), and similarly *Rhacophyllites transsylvanoides* of Gugenberger (1936a) that for *R. transylvanicoides* of Gugenberger (1936b), and *Lytoceras casaliense* of Gugenberger (1936a) that for *L. casalense* of Gugenberger (1936b). In addition, *Asteroceras schafferi* of Gugenberger (1936a) corresponds to *Arietites* (*Asteroceras*) *schafferi* of Gugenberger (1936b); *Lytoceras publigi* of Gugenberger (1936a) corresponds to *Lytoceras* n. sp. ind. of Gugenberger (1936b).

Subsequent works on the taxa established by Gugenberger (1936a, b) confirm that the age of the ammonite fauna from Montagna del Casale can be referred to the Bucklandi Chronozone. Meister et al. (2011) recently revised *Fucinites*, assigning it to the lower Sinemurian, from the upper part of the Bucklandi Zone to the Turneri Zone. Also for Hoffmann (2015), the type species of *Fucinites* is from the Bucklandi Zone. Other species recorded by Gugenberger (1936a, b) also point to a Sinemurian or Sinemurian-Pliensbachian age. *Angulaticeras* (*Boucaulticeras*) *etruscum* (Fucini, 1903) (= *Schlotheimia boucaultiana* [d'Orbigny] var. *etrusca* Fucini sensu Gugenberger, 1936b) is considered to range from the lower to the upper Sinemurian (Meister et al., 2011). *Zetoceras complanatum* (Vadász, 1908) (= *Phylloceras oenotrium* Fucini var. *complanata* Vadász sensu Gugenberger, 1936b) is considered to range from the lower Sinemurian (Semicostatum Zone) up to the Pliensbachian (Meister et al., 2011).

The early Sinemurian age inferred by Gugenberger (1936a, b) for the ammonite fauna from Montagna del Casale has been generally accepted by subsequent authors (Warman & Arkell, 1954; Jenkins & Torrens, 1971), also because no additional fossils have been found since.

GEOLOGICAL SETTING

The investigated specimens come from the south-western flank of the Rocca Busambra ridge in northern Sicily (Fig. 1). The exact location of the outcrop where the classical fauna from Montagna del Casale has been collected is at present difficult to pinpoint. Some elements for its location are given in two reports on the excursion of the Geological Society of Italy in the Rocca Busambra area in 1909 (Crema, 1909; Merciai, 1910). According to Catalano et al. (2010) this fauna may come from the area of Cozzo Meriggio (1:50,000 Geological Map of Italy, Sheet 608 - Caccamo), that may correspond to Masseria del Casale of Barreca et al. (2010). Wendt (1971) considered the location of the outcrop of the Montagna del Casale fauna as lost and that the latter originated from a "Fossilnest", i.e., an areally circumscribed fossiliferous deposit. It is also possibile that this rich fossiliferous outcrop may have been completely exploited, as the weight of removed rock indicated by Merciai (1904) suggests.

The limestone from which the fauna originates has been referred to by earlier authors as "calcare cristallino delle montagne del Casale e di Bellampo" (Gemmellaro, 1878, 1879, 1882), "calcare bianco cristallino della

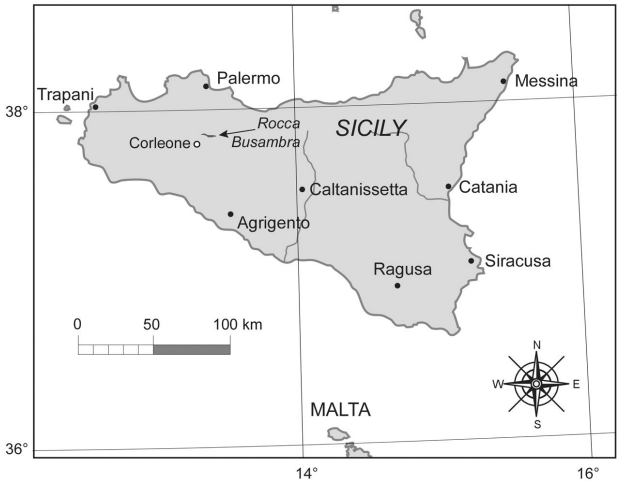

Fig. 1 - Location of the Rocca Busambra area (black arrow); the Montagna del Casale fauna originates from its western flank.

montagna del Casale" (Carapezza & Taglierini, 1894; Scalia, 1903; Fucini, 1915), or "calcare cristallino del Casale" (Merciai, 1904). Lithostratigraphically, it has been referred to the Inici Formation and represents its development in the Trapanese domain (Schmidt di Friedberg, 1964; Cita et al., 2007). This formation is more than 500 m thick (Wendt, 1971), and may reach in subsurface up to 1,100 m (Barreca et al., 2010); it represents the bulk of Rocca Busambra. Three lithofacies have been distinguished within the Inici Formation in the Monte Kumeta area (Di Stefano et al., 2002), but in the light of the impossibility of reinvestigating the lithology of the outcrop of Montagna del Casale, no certain lithofacies equivalent can be surmised. The formation is considered to range from the Upper Triassic to the Sinemurian (Martire & Bertok, 2002) or the Hettangian to the lower Pliensbachian (Cita et al., 2007).

MATERIALS

The work of Fucini (1915) was based on material at that time in the collections of the Geological Institute of the University of Pisa (at present, Museo di Storia Naturale dell'Università di Pisa, Calci; MSNUP, storage location P9 C14) and on specimens loaned through Giovanni Di Stefano from the collections of the Geological Institute of the University of Palermo (at present Museo Geologico "G.G. Gemmellaro", Università degli Studi di Palermo, Palermo; MGUP).

All the preserved specimens studied by Fucini (1915), stored at the MSNUP and the MGUP, were re-examined and photographed.

After Fucini (1915), no additional material has become available from Montagna del Casale.

NOMENCLATURAL AND SYSTEMATIC NOTES

Without establishing a type species, Fucini (1915) introduced the genus *Mesosceptron*. According to the

ICZN (1999: Art. 42.3.2), nominal taxa of the genus group established before 1931 may have had no type species fixed; in such case the first author who subsequently designates one of the originally included nominal species (Art. 67.2) validly designates the type species of that nominal genus (type by subsequent designation). As yet, no type species was designated for *Mesosceptron* by subsequent authors. Therefore, in order to fulfill the requirements of Art. 69 (Type species not fixed in the original publication), we need to designate one among the eight nominal species originally included in the genus *Mesosceptron*. These species are *Mesosceptron neumayeri*, *M. conicum*, *M. magnum*, *M. tuberculatum*, *M. eterogeneum*, *M. zonatum*, *M. exagonum*, and *M. fusiforme* (Fig. 2). In order to decide which nominal species is eligible for type fixation, since the same requirements set out in Recommendation 69A are satisfied for all the eight species (adequately described and illustrated taxa, type material still existing), all other relevant criteria set out in Rec. 69A being equal, we apply Rec. 69A.10, i.e., that preference should be given to the nominal species cited first in the work, page or line ("position precedence"). In addition, this first cited nominal species is represented by several specimens that are relatively well preserved and show the diagnostic character (regular concentric laminae) of the rostrum solidum (see Müller-Stoll, 1936). Therefore, we hereby designate the nominal species *Mesosceptron neumayeri* Di Stefano in Fucini, 1915, also referred to as "*Xiphothenthis Neumayeri* Di Stefano (*in schedis*)" by Fucini (1915), as the type species of *Mesosceptron* Fucini, 1915, applying the position precedence criterion. *Xiphothenthis* and *Xiphotheutis* (Fucini, 1915: p. 5-6) are misspellings for *Xiphoteuthis* Huxley, 1864.

We also designate here a lectotype (Fig. 3a) for *M. neumayeri* Di Stefano in Fucini, 1915, choosing one (MGUP-005.60/1) among the seven syntypes figured by Fucini (1915: pl. 1, fig. 1). In this specimen from the Di Stefano collection at the MGUP, the rostrum solidum, the waist and the rostrum cavum (see Müller-Stoll, 1936; Mariotti & Pignatti, 1992, 1994, 1999) are adequately preserved. The part of the rostrum cavum of the lectotype corresponds to the upper part of the specimen as illustrated by Fucini (1915: pl. 1, fig. 1) and the rostrum solidum to its lower part. The rostrum solidum expands markedly aborally, i.e., in the lower part of the lectotype as figured by Fucini (1915).

An unfigured paralectotype in the Di Stefano collection (MGUP-005.60/2), glued on the same cardboard as the lectotype, is represented by four fragments, two of which can be easily joined. This paralectotype is particularly informative, because it is longitudinally sectioned and polished, showing both the rostrum solidum and the rostrum cavum. In the rostrum cavum part the phragmocone and the septa are visible, as well as the siphuncle (Fig. 3c1-c2); the sectioned rostrum cavum does not extend to the protoconch. The phragmocone is slightly eccentric, displaced dorsally in its early growth (Fig. 3c1); its angle is ca. 6.5°. The rostrum cavum is slightly compressed (compression index: 0.91, measured in the youngest visible chamber, as seen in Fig. 3c2). In the four youngest visible adoral chambers, the height/width ratio increases gradually (0.54, 0.55, 0.59, and 0.66). The waist, at present not preserved completely, is narrow, as illustrated by Fucini (1915: pl. 1, figs 1-2). The rostrum solidum, preserved only in its proximal part, is strongly recrystallised and does not show the laminae obscurae and laminae pellucidae (Müller-Stoll, 1936); in cross section, it is compressed (compression index: 0.64).

A second paralectotype (MSNUP I17413), illustrated by Fucini (1915: pl. 1, fig. 2a-b) shows the characteristic narrow waist, i.e., it is adorally constricted; it is unsectioned and strongly recrystallised (Fig. 3b).

The fixation of *M. neumayeri* as type species of *Mesosceptron* and the designation of the lectotype allow us to characterise this genus as an extremely narrow-waisted fusiform xiphoteuthidid. This in turn facilitates its comparison with the genera currently accepted in the Xiphoteuthididae (Mariotti & Pignatti, 1999), allowing us to exclude its synonymy with *Breviatractites* Mariotti & Pignatti, 1992, *Claviatractites* Mariotti & Pignatti, 1996, *Crassiatractites* Mariotti & Pignatti, 1992, *Delphinoteuthis* Mariotti & Pignatti, 1994, and *Metabelemnites* Flower, 1944. *Mesosceptron* differs from *Calliconites* Gemmellaro, 1904 in lacking four paired grooves, i.e., a dorsolateral and a ventrolateral groove on each flank.

Thus, the characters of *Mesosceptron,* as typified by *M. neumayeri,* permit to restrict the comparison to the genera *Atractites* Gümbel, 1861 and *Xiphoteuthis* Huxley, 1864.

In *Atractites*, the narrow-waisted rostrum is fusiform, with circular to elliptical compressed cross section, narrow-waisted near the protoconch, expanding strongly in middle of the rostrum solidum. In *Xiphoteuthis* the rostrum is much more slender than in *Atractites*, cylindrical to slightly hastate, narrow-waisted, and does not expand markedly aborally. Instead, the rostrum solidum expands markedly aborally in the lectotype of *M. neumayeri*, as well as in the paralectotype MSNUP I17413 (Fig. 3b). Therefore, *Mesosceptron* Fucini, 1915 can be considered as a junior synonym of *Atractites* Gümbel, 1861.

There are two further issues pending: a) whether the remaining paralectotypes of *M. neumayeri* are conspecific with the lectotype, and b) how many distinct valid species are represented by the seven additional nominal species of *Mesosceptron* introduced by Fucini (1915). These issues remain at present unresolved because all specimens are very fragmentary.

As concerns the paralectotypes of *M. neumayeri*, they mostly appear to be conspecific with the lectotype. Paralectotype MSNUP I17415 (Fucini, 1915: pl. 1, fig. 3a-b), being distinctly compressed, may be conspecific. The specimen illustrated by Fucini (1915) in pl. 1, fig. 4, which is not preserved in the collections of the MSNUP and MGUP, is a small fragment of rostrum solidum, extremely slender and with parallel flanks; its systematic assignment remains doubtful.

The issue of how many distinct xiphoteuthidid species are present at Montagna del Casale can only be resolved if additional less fragmentary rostra become available. At least two species, *M. exagonum* and *M. zonatum*, that are represented by fragments of rostrum solidum, strongly differ in outline and profile from *M. neumayeri* in being slender and cylindrical, but not as markedly as in *Xiphoteuthis*. In addition, as suggested by its etymology and illustrated by Fucini (1915), *M. exagonum* shows an hexagonal cross section (Fig. 3d4), i.e., one or possibly

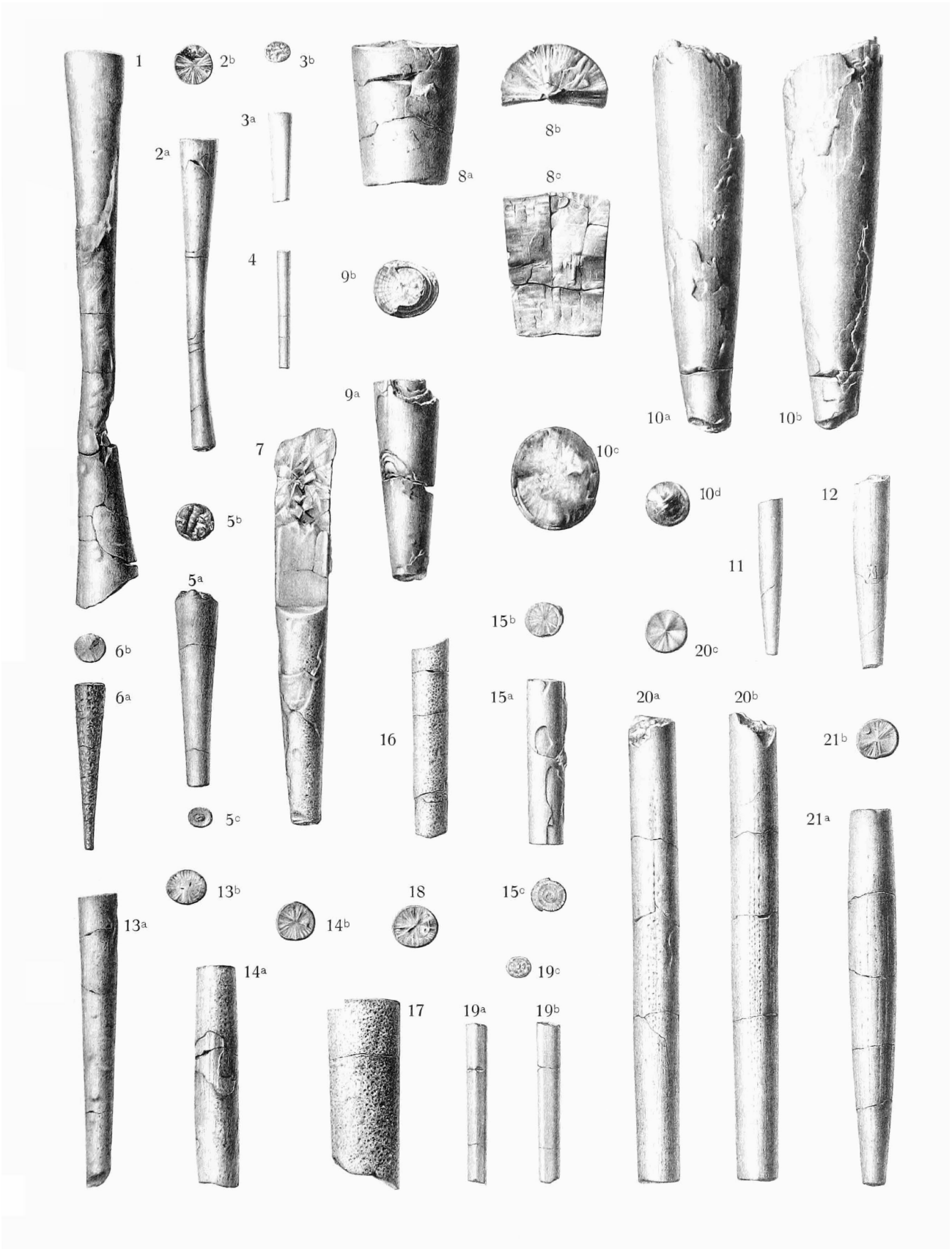

Fig. 2 - Plate 1 of Fucini (1915). 1-7) *Mesosceptron neumayeri*; 8-9) *M. conicum*; 10-12) *M. magnum*; 13) *M. tuberculatum*; 14-18) *M. eterogeneum* (specimens 16-18 are doubtfully referred to this species by Fucini, 1915); 19) *M. exagonum*; 20) *M. zonatum*; 21) *M. fusiforme*. All ×1, except figs 20 and 21 that are ×2, as indicated by a handwritten note on the plate caption of Fucini (1915), in which also the numbering of figs 19 and 20 is inverted (see also Vinassa de Regny, 1916).

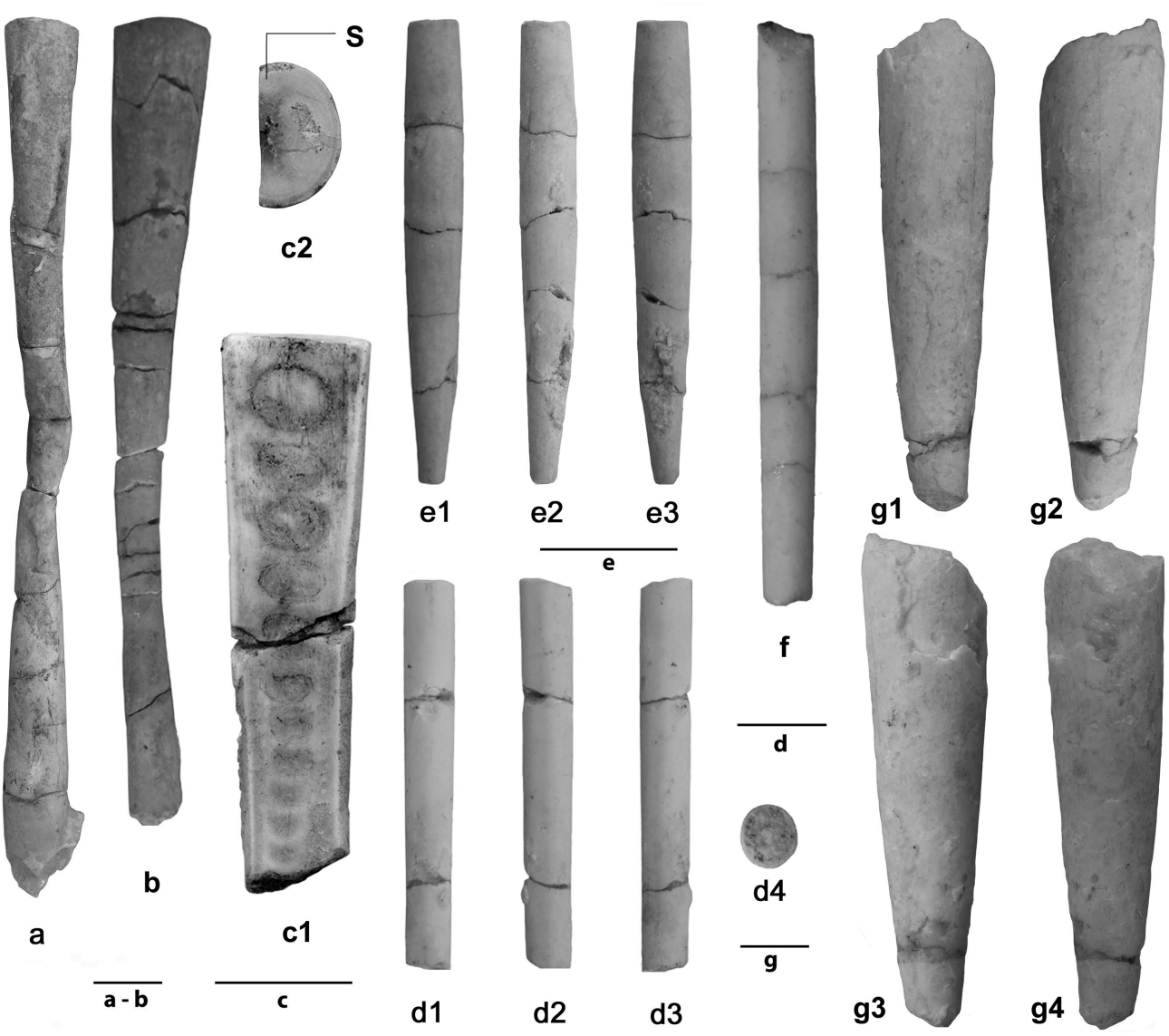

Fig. 3 - Representative specimens of the taxa established in Fucini (1915) from museum collections. a-c) *Mesosceptron neumayeri* Di Stefano in Fucini, 1915: a) lectotype (MGUP-005.60/1) (×1); b) paralectotype, rostrum solidum (MSNUP I17413) (×1); c1) longitudinal section of rostrum cavum (ventral side and siphuncle are on the left; we did not remove the faint pencil lines contouring the chambers), unfigured paralectotype (MGUP-005.60/2); c2) cross section at upper end of rostrum cavum (S indicates the position of the siphuncle) (×2). d) *M. exagonum* Fucini, 1915, lectotype (MSNUP I17429): d1) dorsal view of rostrum solidum; d2) lateral right view; d3) lateral left view; d4) cross section of rostrum solidum (×1.3). e) *M. fusiforme* Fucini, 1915, holotype by monotypy (MSNUP I17425): e1) dorsal view of rostrum solidum; e2) lateral right view; e3) ventral view (×2). f) *M. zonatum* Fucini, 1915, holotype by monotypy (MSNUP I17427): view of rostrum solidum (×2). g) *M. magnum* Fucini, 1915, lectotype (MSNUP I17430): g1) dorsal view of rostrum solidum; g2) lateral left view; g3) lateral right view; g4) ventral view (×1). Scale bars = 1 cm.

two longitudinal depressions on each side (Fig. 3d1-3) resembling those in *Calliconites.* The fragment of *M. exagonum* (MSNUP I17429) is hereby designated as lectotype with the purpose of clarifying the application of this name, fixing it to the only specimen illustrated by Fucini (1915: pl. 1, fig. 19a-c). The lectotype is a long rostrum solidum; in *Calliconites* instead the rostrum cavum is very developed, i.e., the phragmocone deeply penetrates within the rostrum (Gemmellaro, 1904; Jeletzky, 1966). This fragment thus cannot be confidently referred to either the thick-waisted genus *Calliconites* or the narrow-waisted genera *Atractites* or *Xiphoteuthis*.

In order to clarify the application of this name, we also designate as lectotype for *M. magnum* specimen MSNUP I17430, which is the largest rostrum solidum fragment among the species established by Fucini (1915: pl. 1, fig.10a-d), showing an adorally slightly compressed cross section (Fig. 3g1-g4).

The illustrated specimens of *M. zonatum* (MSNUP I17427) (Fig. 3f) and *M. fusiforme* (MSNUP I17425) (Fig. 3e1-e3), and specimen MSNUP I17421 of *M. tuberculatum* are holotypes by monotypy (ICZN, 1999: Art. 73.1.2). Fucini (1915) states that *M. tuberculatum* is represented only by the figured specimen; however, we found some small additional fragments labelled as *M. tuberculatum* (MSNUP I17422).

The fragmentary material on which these last and the remaining species established by Fucini (1915) are

based prevents comparison with other Early Jurassic xiphoteuthidid species. None of the species shows affinities with the narrow-waisted *Atractites jeletzkyi* Mariotti & Pignatti, 1997 from the Hettangian of the Alps.

CONCLUSIONS

Re-examination of the specimens on which Fucini (1915) established the species referred by him to his new genus *Mesosceptron* shows that it cannot belong to the Octocorallia or other Cnidaria. His material consists of fragmentary xiphoteuthidid rostra (Coleoidea, Aulacoceratida). In addition to the general morphology of the rostra (waisted fusiform or cylindrical), a longitudinally sectioned rostrum cavum shows a phragmocone with its septa and chambers (Fig. 3c1; MGUP-005.60/2), a siphuncle is visible in a cross section of the rostrum cavum (Fig. 3c2; MGUP-005.60/2), and various specimens show the regular concentric laminae of the rostrum solidum. These features strongly contrast with those of alcyonarian octocorals with their hollow internodes showing irregular concentric growth and oblique growth banding.

The designation of *M. neumayeri* as type species of *Mesosceptron* and of a lectotype for this species allow us to characterise this genus as an extremely narrow-waisted xiphoteuthidid. The nominal genus *Mesosceptron* Fucini, 1915 becomes thus a subjective junior synonym of *Atractites* Gümbel, 1861.

ACKNOWLEDGEMENTS

We are indebted to Oksana Dzyuba and Robert Weis for their constructive reviews. We thank Dr. S. Wentker and Dr. S. Sienell (Bibliothek, Archiv, Sammlungen: Information & Service, Österreichische Akademie der Wissenschaften, Wien) for their invaluable help in tracing the publication date of Gugenberger (1936a). We are grateful to Riccardo Manni for photographic work and Laura Di Pietro and Marco Albano (CNR-IGAG) for help in the illustrations.

REFERENCES

Anelli M. (1916). Rassegna delle pubblicazioni italiane: Fucini A. Pennatulidi del Lias inferiore del Casale in Provincia di Palermo. *Rivista italiana di Paleontologia*, 22: 4-5.

Bain J.H.C., Mackenzie D.E. & Ryburn R.J. (1975). Geology of the Kubor Anticline, central highlands of Papua New Guinea. *Bureau of Mineral Resources, Australia, Bulletin*, 155: 1-106.

Barreca G., Maesano F.E. & Carbone S. (2010). Tectonic evolution of the Northern Sicanian-Southern Palermo Mountains range in Western Sicily: insight on the exhumation of the thrust involved foreland domains. *Italian Journal of Geosciences*, 129: 429-440.

Blake J.F. (1892). The evolution and classification of the Cephalopoda, an account of recent advances. *Proceedings of the Geologists' Association*, 12: 275-295.

Bülow-Trummer E., von (1920). Cephalopoda Dibranchiata. *In* Diener C. (ed.), Fossilium Catalogus I: Animalia, Pars 11. 313 pp. W. Junk, Berlin.

Carapezza E. & Taglierini F.P. (1894). Sopra talune nuove specie di fossili provenienti dal calcare bianco cristallino della montagna del Casale presso Busambra in provincia di Palermo. *Bullettino della Società di Scienze Naturali ed Economiche di Palermo*, 1894: 1-8.

Catalano R., Avellone G., Basilone L., Gasparo Morticelli M. & Lo Cicero G. (2010). Note illustrative della Carta geologica d'Italia alla scala 1:50.000. Foglio 608 Caccamo. 221 pp. Servizio Geologico d'Italia-ISPRA, Roma.

Challinor A.B. (1990). A belemnite biozonation for the Jurassic-Cretaceous of Papua New Guinea and a faunal comparison with eastern Indonesia. *Bureau of Mineral Resources Journal of Australian Geology & Geophysics*, 11: 429-447.

Cita M.B., Abbate E., Aldighieri B., Balini M., Conti M.A., Falorni P., Germani D., Groppelli G., Manetti P. & Petti F.M. (2007). Carta Geologica d'Italia - 1:50.000, Catalogo delle Formazioni – Unità tradizionali (1). *Quaderni APAT, Dipartimento Difesa del Suolo, Servizio Geologico d'Italia*, *serie III*, 7: 1-318.

Crema C. (1909). Riunione annuale della Società geologica italiana in Sicilia. *Bollettino del Reale Comitato Geologico d'Italia*, 40: 346-354.

Di Stefano P., Galácz A., Mallarino G., Mindszenty A. & Vörös A. (2002). Birth and early evolution of a Jurassic escarpment: Monte Kumeta, Western Sicily. *Facies,* 46: 273-298.

Flower R.H. (1944). *Atractites* and related coleoid cephalopods. *American Midland Naturalist*, 32: 756-770.

Frech F. (1890). Die Korallenfauna der Trias. I. Die Korallen der juvavischen Triasprovinz (Zlambachschichten, Hallstätter Kalke, Rhaet). *Palaeontographica*, 37: 1-116.

Fucini A. (1903). Cefalopodi liassici del Monte di Cetona. Parte 3. *Palaeontographia italica*, 9: 125-185.

Fucini A. (1912). Polyplacophora del Lias inferiore della Montagna del Casale in Sicilia. *Palaeontographia italica*, 18: 105-127.

Fucini A. (1913). Gasteropodi nuovi od interessanti del Lias inferiore della Montagna del Casale. *Palaeontographia italica*, 19: 1-30.

Fucini A. (1915). Pennatulidi del Lias inferiore del Casale in Provincia di Palermo. *Atti della Accademia Gioenia di Scienze Naturali in Catania*, *Serie 5*, 8: 1-9.

Gemmellaro G.G. (1878). Sui fossili del calcare cristallino delle montagne del Casale e di Bellampo nella Provincia di Palermo. *Giornale di Scienze Naturali ed Economiche di Palermo*, 13: 116-212.

Gemmellaro G.G. (1879). Sui fossili del Calcare cristallino delle montagne del Casale e di Bellampo nella provincia di Palermo. *Giornale di Scienze Naturali ed Economiche di Palermo*, 14: 157-212.

Gemmellaro G.G. (1882). Sui fossili del Calcare cristallino delle montagne del Casale e di Bellampo nella provincia di Palermo. (Continuazione e fine). *Giornale di Scienze Naturali ed Economiche di Palermo*, 15: 98-137.

Gemmellaro G.G. (1904). I cefalopodi del Trias superiore della regione occidentale della Sicilia. *Giornale di Scienze Naturali ed Economiche di Palermo*, 24: i-xxviii + 1-322.

Gugenberger O. (1935). Über die stratigraphische Stellung der Cephalopodenfauna von den Casale-Bergen, Prov. Palermo. *Anzeiger der Akademie der Wissenschaften in Wien, mathematisch-naturwissenschaftliche Klasse*, 72: 131-134.

Gugenberger O. (1936a). Zur Kenntnis einiger unbekannter Arten aus dem Unterlias (Bucklandi-Zone) der Provinz Palermo. *Sitzungsberichte der Akademie der Wissenschaften, mathematisch-naturwissenschaftliche Klasse*, 145: 48-58.

Gugenberger O. (1936b). I Cefalopodi del Lias inferiore della Montagna del Casale in provincia di Palermo (Sicilia). *Palaeontographia italica*, 36: 135-213.

Gümbel C.W. (1861). Geognostische Beschreibung des bayerischen Alpengebirges und seines Vorlandes. 950 pp. Perthes Verlag, Gotha.

Haas O. (1909). Bericht über neue Aufsammlungen in den Zlambachmergeln der Fischerwiese bei Alt-Aussee. *Beiträge zur Paläontologie und Geologie Österreich-Ungarns und des Orients*, 22: 143-167.

Hauer F. von (1860). Nachträge zur Kenntniss der Cephalopoden-Fauna der Hallstätter Schichten. *Sitzungsberichte der*

kaiserlichen Akademie der Wissenschaften, mathematisch-naturwissenschaftliche Classe, 41: 113-148.

Hoffmann R. (2015). Systematic descriptions of the Lytoceratoidea. Part L, Revised, Volume 3B, Chapter 3. *Treatise Online,* 70: 1-34. Paleontological Institute, University of Kansas, Lawrence.

Huxley T.H. (1864). On the structure of the Belemnitidae; with a description of a more complete specimen of Belemnites than any hitherto known, and an account of a new genus of Belemnitidae, *Xiphoteuthis*. *Memoirs of the Geological Survey of the United Kingdom, Figures and Descriptions Illustrative of British Organic Remains, Monograph*, 2: 1-22.

ICZN (1999). International Code of Zoological Nomenclature. Fourth edition. xxix + 306 pp. The International Trust for Zoological Nomenclature, London.

Jeletzky J.A. (1966). Comparative morphology, phylogeny, and classification of fossil Coleoidea. *University of Kansas Paleontological Contributions*, *Mollusca* 7: 1-162.

Jeletzky J.A. & Zapfe H. (1967). Coleoid and orthocerid cephalopods of the Rhaetian Zlambach Marl from the Fischerwiese near Aussee, Styria (Austria). *Annalen des Naturhistorischen Museums in Wien*, 71: 69-106.

Jenkins H.C. & Torrens H.S. (1971). Palaeogeographic evolution of Jurassic seamounts in western Sicily. *Annales Instituti Geologici Publici Hungarici*, 54: 91-104.

Krimholz G.Ya. (1958). Podklass Vnutrennerakovinnye (Subclass Endocochlia). *In* Luppov N.P. & Drushchits V.E. (eds), Osnovy Paleontologii (Fundamentals of Paleontology), Vol. 6, Mollyuski - Geolovonogie II (Mollusca - Cephalopoda II). Izdatelstvo Akademii Nauk SSSR, Moskva: 145-178.

Mariotti N. & Pignatti J.S. (1992). Systematic remarks on *Atractites*-like coleoid cephalopods: *Crassiatractites* gen. nov., *Breviatractites* gen. nov. *Paleopelagos*, 2: 109-141.

Mariotti N. & Pignatti J.S. (1994). Remarks on the genus *Atractites* Gümbel, 1861 (Coleoidea: Aulacocerida). *Geologica Romana*, 29: 355-379.

Mariotti N. & Pignatti J.S. (1996). *Claviatractites*, a new xiphoteuthidid cephalopod from the Upper Triassic of Timor. *Palaeopelagos*, 5: 45-52.

Mariotti N. & Pignatti J.S. (1997). *Atractites jeletzkyi* n. sp., a new xiphoteuthidid coleoid from the Lower Lias of Tyrol (Austria). *Geologica Romana*, 32(1996): 211-217.

Mariotti N. & Pignatti J.S. (1999). The Xiphoteuthididae Bather, 1892 (Aulacocerida, Coleoidea): An outline classification. *In* Olóriz F. & Rodríguez-Tovar F.J. (eds), Advancing research on living and fossil cephalopods, Kluwer Academic/Plenum Publishers, New York: 161-170.

Martire L. & Bertok C. (2002). Stop 9 - Rocca Busambra: the Jurassic margin of a pelagic platform and its Cretaceous evolution. *In* Santantonio M. (ed.), General Field Trip Guidebook, 6th International Symposium on the Jurassic System, 12-22 September 2002, Palermo, Litografia GEDA, Nichelino (TO): 156-164.

Meister C., Schlögl J. & Rakús M. (2011). Sinemurian ammonites from Male Karpaty Mts., Western Carpathians, Slovakia. Part 1: Phylloceratoidea, Lytoceratoidea, Schlotheimiidae. *Neues Jahrbuch für Geologie und Paläontologie Abhandlungen*, 259: 25-88.

Meneghini G. (1867). Monographie des fossiles du calcaire rouge ammonitique (Lias supérieur) de Lombardie et de l'Apennin central. *In* Stoppani A. (ed.), Paléontologie lombarde ou Description des fossiles de Lombardie, Série 4. 242 pp. Rebeschini, Milano.

Merciai G. (1904). Lamellibranchi liassici del calcare cristallino della montagna del Casale presso Busambra in provincia di Palermo. *Bollettino della Società Geologica Italiana*, 23: 211-287.

Merciai G. (1910). Escursione alla montagna della Ficuzza eseguita dalla Società Geologica Italiana l'8 settembre 1909. *Bollettino della Società Geologica Italiana*, 28 (1909) (3): clxi-clxxi.

Mojsisovics E. (1871). Ueber das Belemniten-Geschlecht *Aulacoceras* Fr. v. Hauer. *Jahrbuch der kaiserlich-königlichen Geologischen Reichsanstalt*, 21: 41-58.

Montfort D. de (1808). Conchyliologie systématique, et classification méthodique des coquilles. Tome premier. lxxxvii + 409 pp. Schoell, Paris.

Moore R.C., ed. (1956). Treatise on Invertebrate Paleontology, Part F, Coelenterata. xx + 498 pp. Geological Society of America and University of Kansas Press, Lawrence.

Müller-Stoll H. (1936). Beiträge zur Anatomie der Belemnoidea. *Nova Acta Leopoldina,* 20 (neue Folge, 4): 159-226.

Naef A. (1922). Die fossilen Tintenfische; eine paläozoologische Monographie. 322 pp. Fischer, Jena.

Noé S.U. & Dullo W.-Ch. (2006). Skeletal morphogenesis and growth mode of modern and fossil deep-water isidid gorgonians (Octocorallia) in the West Pacific (New Zealand and Sea of Okhotsk). *Coral Reefs*, 25: 303-320.

Ogg J.G. & Hinnov L.A. (2012). Jurassic. *In* Gradstein F.M., Ogg J.G., Schmitz M. & Ogg G. (eds), The Geologic Time Scale 2012, Elsevier, Oxford: 731-791.

Oppel A. (1858). Die Juraformation Englands, Frankreichs und des südwestlichen Deutschlands, nach ihren einzelnen Gliedern eingetheilt und verglichen. *Jahreshefte des Vereins für vaterländische Naturkunde Württembergs*, 14: 129-291.

Page K.N. (2003). The Lower Jurassic of Europe: its subdivision and correlation. *Geological Survey of Denmark and Greenland Bulletin*, 1: 23-59.

Pojeta J. & Balanc M. (1989). Heating and quenching of fossils. *The Paleontological Society Special Publications*, 4: 218-222.

Riegraf W. (1991). Triassic Belemnoids (Cephalopoda, Coleoidea) formerly described as Corals versus Tertiary Corals described as Belemnites (or The Fairy Tale of Tertiary "Belemnites"). *Fossil Cnidaria, International Newsletter*, 20 (1.1): 40-45.

Riegraf W. (1995). Cephalopoda dibranchiata fossiles (Coleoidea). *In* Westphal F. (ed.), Fossilium Catalogus I: Animalia, Pars 133. 411 pp. Kugler, Amsterdam/New York.

Riegraf W., Janssen N. & Schmitt-Riegraf C. (1998). Cephalopoda dibranchiata fossiles (Coleoidea) II. *In* Westphal F. (ed.), Fossilium Catalogus I: Animalia, Pars 135. 512 pp. Backhuys Publishers, Leiden.

Savi P. & Meneghini G. (1851). Osservazioni stratigrafiche e paleontologiche concernenti la geologia della Toscana e dei paesi limitrofi. 249 pp. Stamperia Granducale, Firenze.

Scalia S. (1903). Sopra alcune nuove specie di fossili del calcare bianco cristallino della Montagna del Casale. *Bollettino dell'Accademia Gioenia*, 76: 33-37.

Schmidt di Friedberg P. (1964). Litostratigrafia petrolifera della Sicilia. *Rivista Mineraria Siciliana*, 88/90: 198-217.

Sokolov B.S., ed. (1962). Gubki, arkheotsiaty, kishechnopolostnye, chervi (Sponges, archaeocyathids, coelenterates, worms). *In* Orlov Yu.A. (ed.), Osnovy Paleontologii (Fundamentals of Paleontology). 485 pp. Izdatelstvo Akademii Nauk SSSR, Moskva.

Stevens G.R. (1965). The Jurassic and Cretaceous belemnites of New Zealand and a review of the Jurassic and Cretaceous belemnites of the Indo-Pacific region. *New Zealand Geological Survey, Paleontological Bulletin*, 36: 1-231.

Stolley E. (1929). Über ostindische Jura-Belemniten. *In* Wanner J. (ed.), *Paläontologie von Timor*, 16(29), Schweizerbart, Stuttgart: 91-213.

Vadász M. (1908). Die unterliassische Fauna von Alsórákos im Komitat Nagyküküllö. *Mitteilungen aus dem Jahrbuche der königlich ungarischen Geologischen Reichsanstalt*, 16: 307-406.

Vinassa de Regny P. (1916). Rassegna delle pubblicazioni italiane: Fucini A. Pennatulidi del Lias inferiore del Casale in Provincia di Palermo. *Rivista italiana di Paleontologia*, 22: 32.

Vinassa de Regny P. (1933). Sull'età del calcare bianco della Montagna del Casale presso Palermo. *Atti della Reale Accademia nazionale dei Lincei*, (6), 17: 1038-1041.

Wanner J. (1907). Triaspetrefakten der Molukken und des Timorarchipels. *Neues Jahrbuch für Mineralogie, Geologie und Paläontologie*, Beilage-Band, 24: 161-220.

Warman H.R. & Arkell W.J. (1954). A review of the Jurassic of Western Sicily based on new ammonite faunas. *Quarterly Journal of the Geological Society,* 110: 267-282.

Wendt J. (1971). Genese und Fauna submariner sedimentärer Spaltenfüllungen im mediterranen Jura. *Palaeontographica*, *(A)*, 136: 121-192.

Williams G.C. (1999). Index Pennatulacea – Annotated bibliography and indexes of the sea pens (Coelenterata: Octocorallia) of the World 1469-1999. *Proceedings of the California Academy of Sciences*, 51: 19-103.

Woods H. (1946). Palaeontology - Invertebrate. 8th edition. 477 pp. University Press, Cambridge.

Manuscript received 10 July 2018
Revised manuscript accepted 28 February 2019
Published online 11 July 2019
Editor Annalisa Ferretti