



## Attribution of the taxon name *Echinoidea* to Schumacher, 1817

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### Abstract

The World Register of Marine Species (WoRMS), The Interagency Taxonomic Information System (ITIS, Report Taxonomic Serial No 157821), and Wikispecies all identify Leske (1778) as the author of the taxon Echinoidea. They base this attribution on the synonymy of Durham et al. (1966: U297) who stated “*Class ECHINOIDEA LESKE, 1778 [nom. transl. BRONN, 1860, p. 295 (ex order Echinoidea D’ORBIGNY, 1852 [sic], p. 114, nom correct. pro ordo Echinus LESKE, 1778, p. xvi [sic])].*” This confusing construction led to a strange result in which the taxon Echinoidea was attributed to an author who never used that name (Leske), whilst it deprived the author who established it (Schumacher) and the one who first conceived the grouping (Bruguère) of any credit. This note examines the works of various authors credited with the authorship of the taxon Echinoidea, particularly Leske, d’Orbigny, von Zittel, and Bronn, and concludes that the taxon Echinoidea should be attributed to Schumacher, 1817.

### Introduction

Nathanael Gottfried Leske edited a re-publication of Jacob Theodor Klein’s bench-mark classification of the echinoids (Klein 1734) to which he contributed major additions with plates (Klein 1778; see Stokes 2022 for details). Leske’s contributions used the same paragraph numbers as Klein (1734) to facilitate comparisons. The main differences are that Leske modified Klein’s species names to be binominal, he appended extensive descriptions and synonyms, and added the genus *Echinocyamus* with its 14 species recently established by Murk van Phelsum (1774). His *Tabula Synoptica* (Leske in Klein 1778: XVII–XX) lists, under his *Ordo ECHINUS*, all the taxa which he recognised. These are in the same order as those in Klein (1734), beginning with *Cidaris* and ending with the spatangoid genera *Brissus* and *Brissoides*. Since the great majority of his names were based on the same taxa as those in the work of Klein (albeit with many name changes) and as his ordo ‘Echinus’ included all known echinoids, it was effectively a synonym of Klein’s ‘Echinodermata’. However, his name Echinus was not unique. The name had been established earlier as the genus *Echinus* by Linnaeus (1758: 663), and it remains today a valid name for a genus of regular echinoid. Leske’s Ordo Echinus is, therefore, a primary junior homonym which is undesirable. Durham & Melville (1957: 267), Melville & Durham (1958: 503, who treated the term Echinoidea as “*objective junior synonym of Echinus Leske, 1778*”), and many subsequent authors attributed the Echinoidea to Leske (1778), but there is no virtue in retrospectively awarding the authorship to Leske. In the following we document the usage of the taxon Echinoidea during the 19<sup>th</sup> century and explore which authorities were assigned to that taxon.

### History of the name Echinoidea and the subdivision of Echinoderms

At the time that Leske re-published Klein’s ‘Naturalis Dispositio Echinodermatum’, the Echinodermata had not yet been divided into orders corresponding to the echinoderm classes as used today. In fact, in the usage of Klein, “Echinodermata” solely included echinoids. Jean-Guillaume Bruguère (1789: xi) was the first to expand the *Échinodermes* to include two distinct groups:

“1. ETOILE—*Asterias*. Le corps coriace, convex en dessus, plat ou concave en dessous, ordinairement étoilé ou radié, tentaculé & épineux ; la bouche dentée placée au centre de la face inférieure.

2. OURSIN—*Echinus*. Le corps rond ou orbiculaire, couvert d’une croûte ossuse, garnie d’épines mobiles & de plusieurs rangs longitudinaux de pores par où sortent ses tentacules, la bouche inférieure, centrale, excentrique ou marginale.”

The plates of “Vers Echinodermes” were published by Bruguière in 1792. They have running footing of “Histoire naturelle, Vers Echinodermes,” and heading of plates 96–130 reading “Asterie, *Asterias*”, and plates 131–159 “Oursin, *Echinus*.” Regrettably, Bruguière died in 1799 before he could write the text to accompany his plates. This responsibility passed to Lamarck who published his results privately (Lamarck 1801, 1809, 1816) rather than as part of the *Encyclopédie Méthodique* (Bruguière 1789).

Jean-Baptiste de Lamarck (1801: 345) added the holothurians (which Bruguière had left in the Vers Mollusques) to the echinoderms, giving a three-fold subdivision: “1°. Les ÉCHINIDES. Radiaires échinodermes à corps court, et qui ont l’anus distinct de la bouche. 2°. Les STELLERIDES. Radiaires échinodermes à corps court, et dont l’anus est confondu avec la bouche. 3°. Les FISTULIDES [holothurians]. Radiaires échinodermes à corps allongé, cylindracé, fortement contractile.” He included eight genera in his Échinides, all of which (except *Ananchites*) are echinoid genera still in use today: *Echinus*, *Galerites*, *Echinoneus*, *Nucleolites*, *Ananchites*, *Spatangus*, *Cassidulus*, and *Clypeaster*. This new subdivision of echinoderms into three sections was immediately picked up in subsequent textbooks and dictionaries (e.g., Latreille 1804: 205; Agassiz 1837: 271). The Stellerides were later further subdivided into 3 distinct orders: Asteirides, Ophiures, and Crinoïdes (Agassiz & Desor 1846: 308, 309).

Christian Friedrich Schumacher (1817: 83) appears to be the first to establish a Latin name, Echinoidea, for the vernacular “Échinides”. In a footnote he stated: “J’ai suivi Klein dans son *Naturalis dispositio Echinodermatum*; ainsi que je ne comprends sous cette dénomination que ces habitations calcaires, connues sous le nom vulgaire d’Oursins (*Echinus*); et la première note du dit auteur pag. 9, aussi bien que les motifs ci-dessus nommés, m’ont paru assez fondés, pour que j’aie mis ces habitations au nombre de celles de vers testacés.” [“I followed Klein in his *Naturalis dispositio Echinodermatum*; I understand under this denomination only these calcareous shells, known under the vulgar name of Oursins (*Echinus*); and the first note of the said author pag. 9, as well as the above-named motives, seemed to me well founded, for me to place these shells among those of testaceous worms.”]. The next use of the term “Echinoidea” is in Leuckart (1825: 708), an excerpt of Schumacher’s classification, followed by Streubel (1846: 819), a translation of Cuvier’s “*Le règne animal...*” into German (note, however, that term “Echinoidea does not appear in the 1817, 1830 or 1836–1849 French editions of Cuvier’s work).

Later authors have apparently largely missed Schumacher’s work and attributed Echinoidea to a variety of other authors, possibly due to the fact that contemporary authors considered his work as of little value (“*hat jedoch wenig Werth*” according to Heß 1891: 32) as he only classified organisms according to external (skeletal) characteristics. D’Orbigny, for example, is commonly given as author of the class, possibly deriving from the influential work of Lambert & Thiéry (1910: 117), who began their classification of the Échinides with “*Classe: ECHINOIDEA d’Orbigny 1069, p. 114; 1851 [sic]*” the number 1069 referring to their bibliography which, on p. 92, gave the correct year of publication as 1849. Adkins (1928: 268), Szörényi (1955: 14, 157), and Melville & Durham (1958: 503, but see p. 501) followed this designation. D’Orbigny (1849: 114; 1854: 11) himself did not identify himself as author of the “2° ordre ECHINOIDEA” although, five lines above, he did claim authorship of the “1<sup>er</sup> ordre HOLOTHURIDEA, d’Orb.” (D’Orbigny 1854: 11), so he clearly did not consider himself the author of “Echinoidea”. This is unlikely to be an oversight since he did not mention authorities for any other of the higher taxa mentioned in the introduction of his 1854 work.

Heinrich Georg Bronn (1860: 295, 297) did not give an author for the class, but did point out that the names Echinidae or Echinoidea could be used for Order or Class, acknowledging that these names were already available. Bell (1892: 27, 28), likewise, did not state an author for his “Class XI Echinoidea” nor did he mention d’Orbigny, but he gave a list of synonyms and their authors which ended with “Echinoidea, Bronn, *Klass. u. Ordn.* ii (1860) p. 295; *Duncan, J. Linn. Soc.* xxviii (1889) p. 4.” This may have led subsequent authors to regard this as indicating a designation by Bronn (e.g., Meissner in Ludwig & Hamann 1904: 1339; D’yakonov 1923 transl. 1969: 86; Clark 1925: 1; Maury 1934: 1; Grant & Hertlein 1938: 4; Hall 1962: 65; Tortonese 1965: 295). Zardini (1976: 9) attributed the Echinoidea to ‘Braun’ but this is almost certainly a misspelling of ‘Bronn’. Bell’s work clearly influenced Durham et al. (1966: U297) who included a similar list of older synonyms.

In his book on the coelenterates and echinoderms of the Adriatic Sea, Camil Heller (1868: 49, 64, 85) gave Agassiz (presumably Louis Agassiz) as author of the class Echinoidea.

Jules Lambert (1911: 27) attributed the class Echinoidea to Latreille, 1825, arguing in Footnote 1 that “*L’adjonction d’une lettre dans un mot pour le mettre en harmonie comme désinence avec les autres termes d’une classification, ne saurait constituer un terme nouveau. Echinoidea d’Orbigny, 1851, me parait donc synonyme d’Echinoida Latreille.*” (Translating to: “*The addition of a letter to a word to bring it into harmony as an ending with the other terms of a classification cannot constitute a new term. Echinoidea d’Orbigny, 1851, therefore seems to me to be synonymous with Echinoida Latreille.*”)

No author for the class is given in Mortensen’s influential *Monograph of the Echinoidea* (1935: 4), while Termier & Termier (1953: 857) attributed the Echinoidea to Zittel (1883), which was followed by Nicolaus (1963: 217) and Janssen (1972: 99). Zittel (1876–80: 476, 477), like Duncan (1899: 4), however, did not give an author for the Class, although both did so for the Subclasses Palechinoidea Zittel and Euechinoidea Bronn.

Finally, Melville & Durham (1958) attributed Echinoidea to “*d’Orbigny, 1852*”, stating that this was “*the first use known to us of exactly this spelling [...] for a taxon in the Order/Class-group including all Echinoids*”. They did, however, subsequently attribute it to “*Leske, 1778*” Durham et al. (1966: U297), because they (Melville & Durham 1958: 503) considered “*Echinoidea d’Orbigny, 1852*” as objective junior synonym of the order Echinus Leske, 1778 (based on their designation of the genus *Echinus* Linnaeus, 1758 as type for both taxa) and proposed the latter to be adopted “*in the form of Echinoidea, as a Class-name*” (Melville & Durham 1958: 501). While the logic behind this choice is difficult to understand from our present viewpoint, one has to consider that this decision was taken during a time in which the 3<sup>rd</sup> edition of the ICZN Code was developed, and during which the topic of stabilisation of names and authorities for taxa of higher rank was intensely discussed (Hemming 1958), with a variety of conflicting drafts for the regulation of taxa above the family group being proposed by different parts of the scientific community (none of which was ultimately included in the final version of the Code). From their point of view (compare also the draft “*regles*” for Article 24 given in Melville 1958), the choice of Leske, 1778 as authority for the name Echinoidea seems to have been influenced by A) the general consensus that homonymy between names of categories at different levels ought to be avoided, B) the idea “*that a name introduced for a taxon at one level in the [Order/Class-] group is regarded as available with its original authorship and priority at all other levels in the group*”, and C) the assumptions that “*a nominal genus selected as type-genus of a nominal taxon at any level in the Order/Class-group must ipso facto be type-genus of a taxon at every lower level in the group*” and “*that the type-genus of a nominal taxon in the Order/Class-group must be selected from among the genera explicitly included in the taxon by the author of the name at the time when he first proposed it*” (Melville & Durham 1958: 498, 500). It seems, however, to conflict with their statements that they gave names proposed without any category and in vernacular form “*priority only from their first usage in Latinized form for taxa in the Order/Class-group*” (Melville & Durham 1958: 498) and that “*only identical words have been treated as homonyms*” (Melville & Durham 1958: 499).

## Discussion

The absence of regulations governing the priority and correct authority attribution of higher taxa allows for a wide range of opinions. In our age of increasing use of digital biodiversity databases the topic of consistent authority attribution becomes more relevant than ever before, as has been discussed in depth by Welter-Schultes (2011), in a paper on authorship of taxonomic names in molluscs. Regarding usage of names the discussion revolves around two different core ideas: A) the strict application of the principle of priority and B) consideration of prevailing usage. In relation to taxon authorities, opinions differ as to how the Principle of Coordination should be applied for higher taxa and how higher taxa interact with other names in relation to homonymy (Melville 1958). The latter is further convoluted by changing endings at different ranks, elevation of names to different ranks (vs. creating new taxa with new authorities), and the question how this relates to identifying the “*correct*” author of a name. Davie et al. (2015: 1053) and Poore (2016: 250) argue that credit for a name should lie with the author, who conceived the grouping, even if in vernacular form, rather than the author who first used it in Latinized form, invoking “*the spirit of fairness*”. Welter-Schultes (2011: 41) correctly argues that “*introducing fairness as a criterion in this discussion [i.e., the question of authorships of taxonomic names] would inevitably complicate things*” and that “*various taxonomists would come to different results concerning authorship*”.

In the present case of the class name Echinoidea, it is indeed very hard to attribute the concept of the group to any particular author. Echinoids are known and recognized as a group since Antiquity (e.g., Aristotle's *Historia animalium*: book 4, chapter 5). As outlined above, starting from Linnaeus (1758) all authors considered echinoids as separate group (assigning various taxonomic ranks to that grouping, depending on the complexity of the respective classification). A point could be made that the concept should be attributed to Lamarck (1801), who was the first to formally subdivide echinoderms into groups encompassing several genera each. This—and many other possible attributions—however, give a lot of room to interpretation and opinion. In light of general idea of the Code to promote stability, it would be best, in our opinion, to attribute the name Echinoidea to the author first using it in Latinized form, the only criterion that can be objectively identified in the present case.

## Conclusion

Given the absence of any cogent argument to the contrary, the taxon name Echinoidea, currently applied to a Class in the Phylum Echinodermata, should be attributed to Schumacher, 1817, page 41.

## Synonymy

Note that this list is not exhaustive, it was compiled with a focus on works containing classifications that include echinoids between 1734 and 1849 (i.e., the previously reported first usage of the term Echinoidea), plus later sources that provide an authority for the name “Echinoidea”. The terms used in the respective sources are listed below in the exact spelling as found in the cited source.

Note that other names for the echinoids (e.g., Klote-Oken 1815: 353 [work rejected for nomenclatural purposes, see ICZN opinion 417]; Echinata-Fischer [von Waldheim] 1823: 27 [junior synonym]; Cirrhi-Spinigrada-Forbes 1841: xv [junior synonym]) were coined in the past, but neither have these names been adopted by the scientific community, nor are they relevant for the question of the authority of the name Echinoidea and have thus not been included in the synonymy list below. Durham et al. (1966: U297) also list Pedicellata Griffith & Pidgeon, 1834 as a synonym of Echinoidea, but judging from the original source, this order included all echinoderms, except some holothuroids: *Molpadia* was excluded and placed (together with priapulids, sipunculids etc.) in a second order (“Echinodermata apedicellata”), making “Pedicellata” paraphyletic. Durham & Melville (1957: 267) also treated Adelostellata Austin & Austin, 1842 as objective junior synonym of Echinoidea, but Austin & Austin (1842: 111) included both echinoids, as well as forms such as cystoids and blastoids in this group, making it polyphyletic.

1734 Echinorum Marinorum—Klein: title page.

1758 [Genus] *Echinus*—Linnaeus: 663.

1778 Ordo. Echinus.—Leske in Klein: xvii.

1778 Ordo. Echinus.—Leske: xvii.

1789 Genre Oursin.—Echinus.—Bruguère: xii.

1797 63. Echinus. See=igel. (Engl. sea hedgehog.)—Blumenbach<sup>1</sup>: 456. [5<sup>th</sup> ed.]

1801 Les échinides.—Lamarck: 345, 346.

1803 1. *Echinus*, sea hedgehog.—Blumenbach: xxxiii. [English translation]

1804 Section Seconde. Echinides—Latreille: 206.

1807 LXIII. Les Oursins\* (lat. *Echinus*, all. *See-igel*, angl. *sea Hedgehog*).—Blumenbach: 75. [French translation]

1809 Les échinides.—Lamarck: 294.

1811 Echinites—Parkinson: 8.

1817 Echinides.—Bosc: 61. [“*Nom d'une section des animaux sans vertèbres de Lamarck*”]

1817 Les oursins. (Echinus. L.), vulgairement Hérissons de Mer.—Cuvier: 12. [“L.” referring to Linnaeus here]

1817 Première Subsection. Echinoides. | Subsection Prima. Echinoidea.—Schumacher: 23, 82. [first use of “Echinoidea” known to us]

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<sup>1</sup> Many additional editions and translations of Blumenbach's “*Handbuch der Naturgeschichte*” exists—not all of them were consulted, but those that were, consistently treated echinoids under the name “Echinus” within the Echinodermata, that themselves were included within Crustacea.

- 1819 Echini—Macleay: 313.  
 1819 Echinidæ—Macleay: 313.  
 1819 Echinida—Macleay: 316.  
 1824 Echinides, Echinideae.—Lamouroux, 32.  
 1825b 65. Echinus\*). See=Igel. (Engl. sea hedgehog.)—Blumenbach: 405. [11<sup>th</sup> ed.]  
 1825a 63. Echinus\*. Sea-hedgehog. *Ger.* See-igel. *Fr.* Oursin—Blumenbach: 267. [Engl. translation of the 10<sup>th</sup> German ed.]  
 1825 Class 1.? Order 1.? Echinida, Macleay, Les echinides. Lam, *Echinus*, Lin, Cuv.—Gray: 423.  
 1825 Premier Ordre. Échinoides. Echinoida.—Latreille: 532.  
 1825 Echinoidea.—Leuckart: 707–708.  
 1829 I. Echinides. Seeigel.—Goldfuss: 115.  
 1830 Les oursins. (Echinus. L.), vulgairement Hérissons de Mer.—Cuvier: 230.  
 1832 65. Echinus\*). See=Igel. (Engl. sea hedgehog.)—Blumenbach: 320. [12<sup>th</sup> ed.]  
 1835 Échinides—des Moulins: 167 ff.  
 1835 8. Zunft. Meer=Igel.—Oken: 585. [no Latin name for the group is used]  
 1836–1849 Les oursins. (Echinus. L.) vulgairement Hérissons de Mer.—Milne Edwards: 23.  
 1837 les Échinides—L. Agassiz: 271.  
 1837 Échinides—des Moulins: 57.  
 1841 Echinidae—Forbes: 141.  
 1846 les Échinides—L. Agassiz & Desor: 305, 308–309.  
 1846 Echinodea.—Düben & Koren: 255.  
 1846 Echinoidea—Streubel: 819.  
 1849 1<sup>er</sup> Ordre. Echinoidea (1).—d’Orbigny: 114.  
 1852 Order Echinidea.—Forbes: 1.  
 1854 2<sup>e</sup> ordre. Echinoidea.—d’Orbigny: 11.  
 1857 Order III. Echinoidea.—Wright: 4, 6 ff.  
 1860 Achte Klasse Igel-Strahler: Echinoidea. (Seeigel.)—Bronn: 295.  
 1862 Échinides—Dujardin & Hupé: 440.  
 1868 Ordo IV. Echinoidea Ag.—Heller: 49, 64, 85. [first use of Agassiz as author for Echinoidea]  
 1876 3. Classe. Echinoidea. Seeigel, Igelstrahler \*).—Zittel: 467.  
 1883 3<sup>e</sup> classe Echinoidea<sup>1</sup>, Oursins, Hérissons de mer (Seeigel, Igelstrahler) —Zittel: 467.  
 1889 Class Echinoidea.—Duncan: 4.  
 1892 Class XI. Echinoidea.—Bell: 27, 28.  
 1900 Class III. Echinoidea.—Gregory in Bather: 282.  
 1903 3<sup>e</sup> Classe Échinidies.—Echinidia—Delage & Herouard: 160. [“Echinoidea (Düben et Koren)” is listed as a synonym]  
 1903 1. Klasse. Echinoidea. Seeigel.—von Zittel: 195.  
 1904 Echinoidea Bronn (1. Aufl. dieses Werkes) 1860.—Meissner: 1339. [first use of Bronn as author for Echinoidea]  
 1910 Classe: Echinoidea d’Orbigny 1069, p. 114; 1851 [sic]—Lambert & Thiéry: 117. [first use of d’Orbigny as author for Echinoidea]  
 1911 Echinoidea.—Bather: 59.  
 1911 Class Echinoidea Latreille, 1825.—Lambert: 27. [arguing that Echinoidea d’Orbigny, 1851 [sic] is a synonym of Echinoida Latreille]  
 1925 Class Echinoidea, Bronn—H.L. Clark: 1.  
 1928 Class: Echinoidea d’Orbigny—Adkins: 268.  
 1934 Class Echinoidea Bronn—Maury: 1.  
 1935 Class Echinoidea—Mortensen: 4.  
 1938 Class Echinoidea Bronn—Grant & Hertlein: 4.  
 1953 Echinoidea Zittel, 1883—Termier & Termier: 857. [first use of Zittel as author for Echinoidea]  
 1955 Classis: Echinoidea Orbigny—Szörényi: 14, 157.  
 1957 Echinoidea Leske, 1778—Durham & Melville: 267.

- 1958 Echinoidea d'Orbigny, 1852—Melville & Durham: 503. [treated as objective junior synonym of Echinus Leske, 1778]
- 1960 Class Echinoidea Leske—Hertlein & Grant: 101.
- 1962 Class Echinoidea Bronn—Hall: 65.
- 1963 III. Klasse Echinoidea Zittel 1883 (Seeigel)—Müller: 461.
- 1963 Classis Echinoidea Zittel, 1883—Nicolaus: 217.
- 1965 Classis Echinoidea—Tortonese: 277.
- 1966 Class Echinoidea Leske, 1778.—Durham et al.: U297. [first use of Leske as author for Echinoidea]
- 1972 Klasse Echinoidea Zittel, 1883—Janssen: 99.
- 1978 IV. Klasse Echinoidea Leske 1778 (Seeigel)—Müller: 508.

## Acknowledgements

The constructive reviews of two anonymous reviewers are gratefully acknowledged.

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