

## MARTIN LISTER'S 1678 *AMMONIS CORNU* AND THE MISREADING OF *HILDOCERAS BIFRONS* (BRUGUIÈRE, 1789). AN HISTORICAL INSIGHT ON THE RELEVANCE OF ARTWORK AND DETAILS IN TAXONOMY

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Associate Editor: Lucia Angiolini.

To cite this article: Ridente D. (2023) - Martin Lister's 1678 *Ammonis cornu* and the misreading of *Hildoceras bifrons* (Bruguière, 1789). An historical insight on the relevance of artwork and details in taxonomy. *Riv. It. Paleontol. Strat.*, 129(2): 255-266.

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**Keywords:** History of Palaeontology; ammonites; scientific illustrations; Toarcian; Rosso Ammonitico.

*Abstract.* *Hildoceras bifrons* (Bruguière, 1789) is a cosmopolite ammonite species from the Lower Jurassic of the Boreal and Mediterranean (Tethys) palaeogeographical provinces. Inter-demic and phylogenetic variability are noticeable, also affecting the most distinctive morphological trait: the spiral groove along the whorl flank. Since the XIX century, however, a number of morphotypes assigned to *Hildoceras bifrons* (many of which from the Apennines and other Italian localities) lacked a neat spiral groove, replaced by a shallow, variably evident and discontinuous inflection. Buckman (1918) provided a photographic illustration of a specimen he interpreted as corresponding to the holotype, until then represented by a drawing described by Lister (1678) as *Ammonis cornu*. Buckman's illustration assessed the well-carved spiral groove as a distinctive feature of the holotype and a trademark of the species. Nevertheless, several authors insisted on referring faintly grooved specimens to *Hildoceras bifrons*, an attitude thus envisaged as due to their negligence or inaccuracy. In contrast with this view, it is herein argued that, on one hand, the specimen illustrated by Buckman, in quality of holotype or neotype, differs from Lister's drawing to a point that it may not be the same specimen; on the other hand, Lister's drawing (never formally invalidated as holotype) could have been legitimately considered representative also of those faintly grooved *Hildoceras* now assigned to *Hildoceras lusitanicum* Meister, 1913. This alternative view clarifies the taxonomic approach held by many authors, proving the coherency of their taxonomic work rather than their attitude at a superficial evaluation of diagnostic traits.

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### INTRODUCTION

Taxonomy in Palaeontology has always represented a challenging issue. Besides the obvious problem of dealing with uncomplete remains, fos-

sil organisms are often represented by very few specimens (Ridente 2022a), their determination much relying on the clarifying definition of holotypes. Many invertebrate fossil species are based on holotypes formalized back in the XIX century or earlier, thus predating the advent of photography and modern illustrative and descriptive methods.

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Received: November 18, 2022; accepted: March 01, 2023

This has sometimes represented the source of taxonomic misperceptions, with significant bearing on the understanding of phylogenetic and biostratigraphic implications.

Once a holotype has been designated, it is not infrequent that new findings may reveal that it is not the most adequate specimen for representing a certain morphospecies. As well, redefinitions of original designations and descriptions, in the attempt of eliminating or reducing ambiguities, may lead to the opposite result, further increasing confusion around the interpretation of a particular taxon. The contrasting interpretation of *Hildoceras bifrons* (Bruguière, 1789) since the late XIX century, and during greater part of the XX century, conceals one such case, curiously remained unnoticed despite the worldwide popularity of this ammonite species.

*Hildoceras bifrons* is a most notorious species among Lower Jurassic (Toarcian) ammonites (Gabilly 1976; Howarth 1992; Ridente 2022b and references therein). The holotype of this species as well gained fame as the oldest figured ammonite type, since it first appeared in a scientific treatise dated 1678. The story of how this species became so early immortalized backs to the pioneering work of Martin Lister, between 1670 and 1681. At that time, the English virtuoso determinedly endorsed illustrations as a worthy aid to the dissemination of concepts in Natural Sciences (Rudwick 1972; Manucci & Romano 2022). However, quite in contrast with Lister's commitment and auspices, one of his illustrations would have been inadvertently at the centre of the confusion mounted around the morphological and taxonomic interpretation of *Hildoceras bifrons*.

The specimen nowadays renown as the holotype of *Hildoceras bifrons* was described (together with other ammonites) under the generic name *Ammonis cornu* in Lister's *Historiae animalium Angliae tres tractatus* (1678-81, pl. 6, fig. 2), a threefold illustrated treatise curiously combining the descriptions of spiders and molluscs (Fig. 1). To this particular *Ammonis cornu* was later given the name *Ammonites bifrons* by Bruguière (1789); finally, it was assigned to genus *Hildoceras* by Hyatt (1867). When proposing *bifrons* as the formal name for this species, Bruguière (1789: 40) quoted Lister's figure without referring to, or figuring, other specimens; this has legitimated Lister's drawing as the holotype of *Hildoceras bifrons*.

Buckman (1889) designated *Hildoceras bifrons* as the type species of the genus *Hildoceras*, and later claimed to have identified the original specimen drawn and described in Lister's treatise, of which he provided a photographic illustration (Buckman 1918: 114b-c; pl. CXIVa, fig. 2a-d); the specimen in this illustration clearly shows a well-carved spiral groove. Nevertheless, early authors, among which many Italian scholars, have persistently referred faintly grooved specimens to *Hildoceras bifrons*, an attitude commonly envisaged as denoting negligence or inaccuracy (Donovan 1950; Howarth 1992).

In contrast with this interpretation, it is herein argued that Lister's illustration of *Ammonis cornu*, later becoming Bruguière's *Ammonites bifrons* and finally *Hildoceras bifrons*, dissimulates from perceiving a clearly defined spiral groove, reason why it could have been legitimately considered also the representative of the faintly grooved morphotypes now referred to *Hildoceras lusitanicum* Meister, 1913 (Fig. 2).

This overturned perspective rehabilitates many pioneers in the study of ammonites, confirming they were keen and meticulous scholars that would hardly slip into clumsy mistakes unless motivated by a scientific rationale (Sarti 1994; Romano 2015). In this view, this account is one among other cases in the history of Geology and Palaeontology in which the supposed negligence of distinguished scholars discloses an unperceived scientific coherence; it also confirms how the appraisal of historical aspects may reveal key for the understanding of long-lasting debates that, from a present-day perspective, may appear odd and unjustified. Finally, this account shows the importance of details in the artwork supporting taxonomy (Rudwick 1972; Manucci & Romano 2022), a fact realized by natural philosophers even before the rise of evolutionary thoughts, when such details would become crucial in defining phylogenetic relationships.

## HISTORICAL OVERVIEW

*Hildoceras bifrons* is characterised by a mid-flank spiral groove separating the ornamented outer flank from a smoothed inner flank. Several specimens showing a well evident spiral groove have been illustrated since the early XIX century (Fig. 3); however,

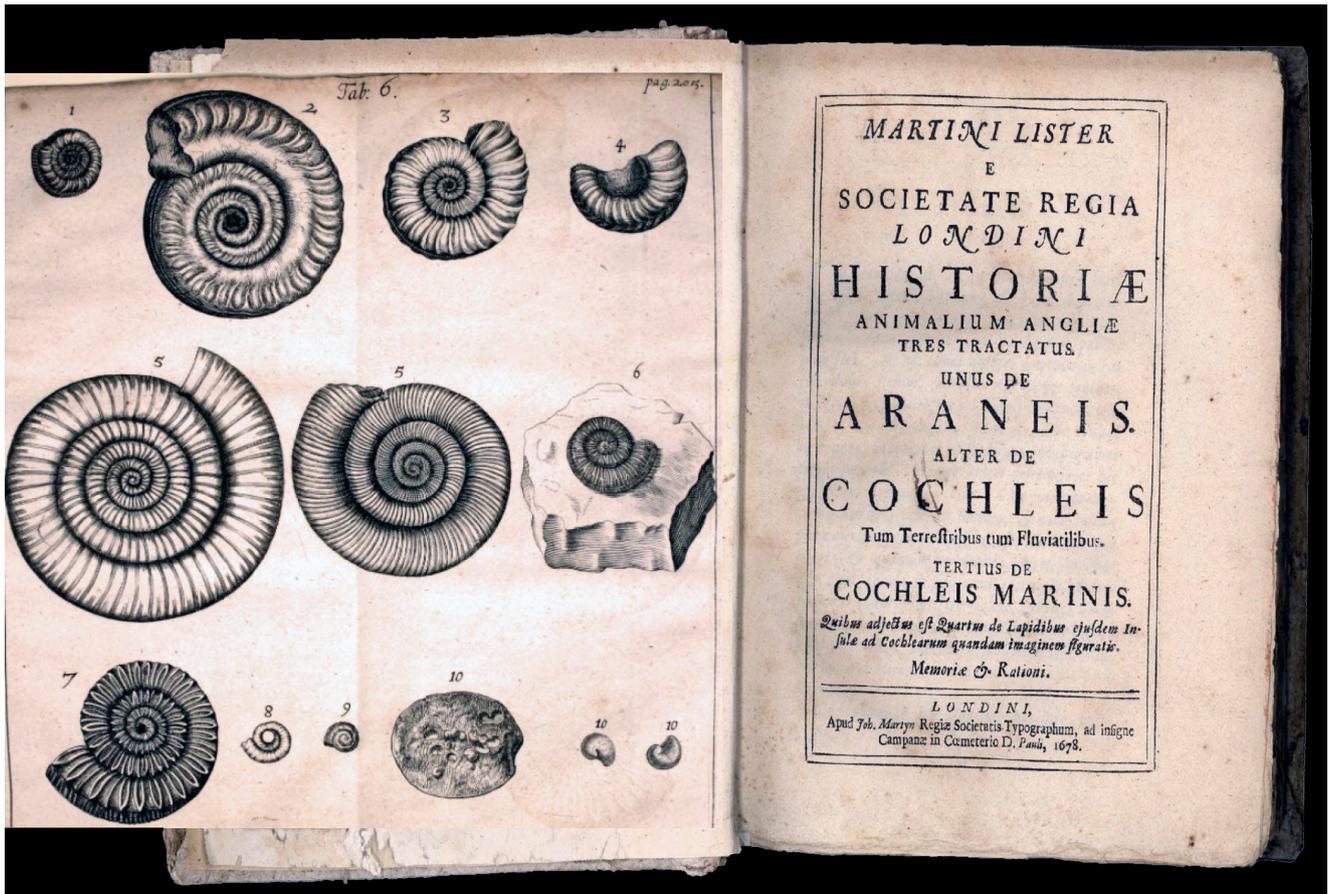


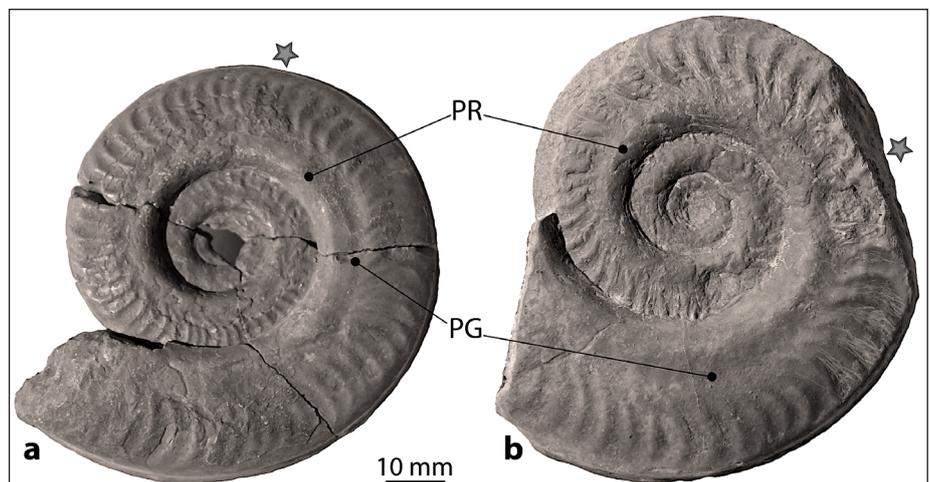
Fig 1 - Plate 6 of Lister's *Historiae animalium* (1678-81) containing several specimens of “*Ammonis cornu*” (from <https://archive.org/details/CUBiodiversity1219376/page/n21/mode/2up>). In fig. 2 (left upper corner) the specimen later described as *Ammonites bifrons* by Bruguière (1789), and thus the holotype of *Hildoceras bifrons*.

not in all cases the *bifrons* morphotype was clearly distinguished from the faintly grooved one (Fig. 4). Through the end of the XIX century and the beginning of the XX century, an increasing number of specimens assigned to *Hildoceras bifrons* lacked a well impressed and continuous spiral groove (Meneghini 1867-81; Taramelli 1880; Bellini 1900; Prinz 1904,

Fucini 1905, 1922; Renz 1911, 1913; Meister 1913; Zuffardi 1914; Principi 1915).

Probably for this reason, Buckman (1918) urged at refining the distinctive features of *Hildoceras Bifrons*, remarking the presence of a neat spiral groove as being a most significant trait. He reported the original descriptions of both Lister and

Fig 2 - Examples of faintly grooved *Hildoceras lusitanicum* Meister, 1913, ancestral to *Hildoceras bifrons*. Note the periumbilical relief (PR) and the variably impressed “pseudogroove” (PG) on the adult stage body chamber (stars indicate the last septal suture line), precursor of the continuous spiral groove in *Hildoceras bifrons* (see Ridente 2016 for an overview). The two specimens are from the Rosso Ammonitico Formation of two different localities in the Central Apennines: a, from Mt. Nerone, in the Marche region; b, from Polino, in the Umbria region (location in Ridente 2022b).



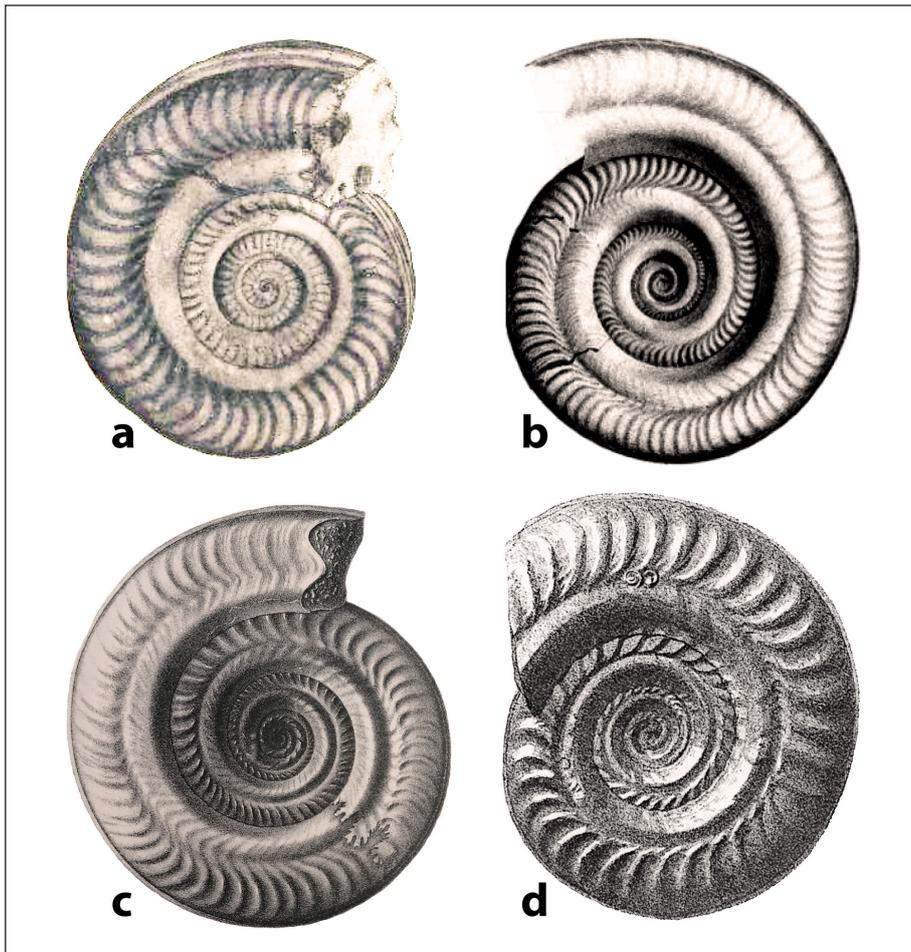


Fig. 3 - Some of the earliest and most quoted illustrations of the *bifrons* morphotype (not to scale): a = *Ammonites walcotii* Sowerby, 1815 (fig. 106); b = *Ammonites bifrons* from d'Orbigny (1842-44; pl. 56); c = *Harpoceras bifrons* from Wright (1883, pl. LIX, fig. 1); d = *Ammonites bifrons* from Dumortier (1874, pl. 9, fig. 2). Note how the artwork quality is critical in the rendering of the spiral groove engravement.

Bruguère, and reproduced Lister's original drawing together with a photographic illustration of a specimen from the Alum Shale Member (Whitby Mudstone Formation; Howarth 1962); this particular specimen was identified by Buckman as the exact one portrayed in Lister's drawing (Fig. 5): “*The agreement is remarkable enough to suggest that this is Lister's example and so is Holotype: at any rate it is a Topotype and worthy to be Neotype*” (1918: 114c). By assuming this specimen as corresponding to the holotype, or even as a neotype, Buckman made clear that *Hildoceras bifrons* was characterised by a neat and well-shaped spiral groove, continuously running from the inner to the final whorls.

Regardless of this basic information, however, some authors have continued referring faintly grooved morphotypes to *Hildoceras bifrons* throughout the XX century (e.g., Renz 1925; Mitzopoulos 1930; Merla 1933; Ramaccioni 1939; Lippi-Boncambi 1947). On this basis, Donovan (1958) concluded that Italian palaeontologists or, however, those working in Italian localities, were inclined at misidentifying *Hildoceras bifrons* because this species

was there missing and replaced by faintly grooved morphotypes (Donovan 1958: 45, 50); despite Donovan's warning, this unsought tradition occasionally reoccurred even during the early second part of the XX century (i.e., Zanzucchi 1963).

## WHICH HOLOTYPE?

### Questioning Buckman's argument

An alternative hypothesis to the misplaced interpretation of *Hildoceras bifrons* by many experts might be some kind of ambiguity in the foregone matching of Buckman's illustrated type with Lister's drawing. Buckman's identification of the specimen from the Alum Shale Member as the same figured in the original drawing by Lister has been accepted ever since; although some authors explicitly adhered to this interpretation, others have been more cautious (Donovan 1958; Dean et al. 1961). Among those that firmly supported Buckman's conclusion, Howarth (1992: 185) stated: “*There can be little doubt that this specimen is the one figured by Lister and is the holotype.*”

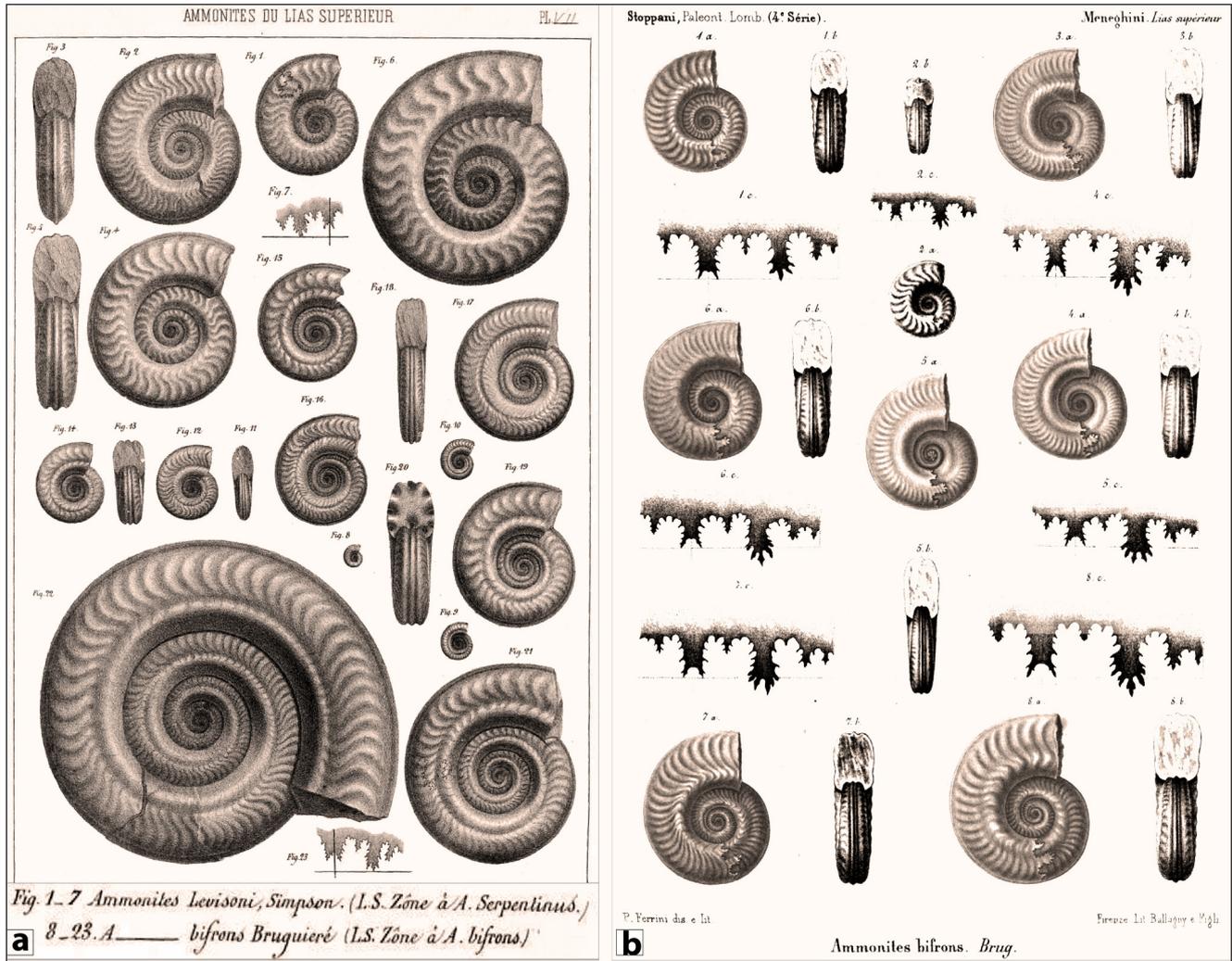


Fig. 4 - Late XIX century illustrations of “*Ammonites bifrons*” by Reynès (a, 1879) and Meneghini (b, 1867-81). Note how Reynès refers to *A. bifrons* only those specimens with a clear though variably shaped spiral groove (figs 8 to 23). Conversely, Meneghini’s interpretation of the *bifrons* morphotype is broader, and both truly and faintly grooved specimens are grouped as *A. bifrons*.

Nevertheless, despite a general resemblance, Lister’s drawing shows an ammonite lacking cracks and fractures, which are instead numerous and well evident in Buckman’s specimen (Fig. 6).

It is unlikely that the very different preservation could have not been perceived by Buckman; yet he resolutely affirmed the correspondence between the drawn and photographed specimens. Two implications inevitably derive from Buckman’s conclusion: 1) discrepancies were believed the result of the inadequate fidelity by which Lister’s specimen was drawn, likely with some adjustments and embellishment introduced by the artist (with or without Lister’s consensus); 2) notwithstanding whether Lister’s drawing actually figured the same specimen illustrated by Buckman, differences were however deemed as negligible and the main distinctive features were consi-

dered similarly evident in both illustrations, hence the more cautious closing consideration by Buckman: “...at any rate it is a *Topotype* and worthy to be *Neotype*”.

The above inferences about Buckman’s identification of the holotype are both questionable. The first one because, as it will be remarked below, it is in conflict with the strict methods and sensibility that distinguished Lister’s scientific work. The second one because, notwithstanding the supposed omission of fractures and irregularities due to preservation, in Lister’s original drawing the spiral groove is not as neatly defined (or perceivable) throughout all whorls as in Buckman’s neotype (Figs 5, 6); in this regard, the *Ammonis cornu* figured in Lister’s treatise could have been legitimately interpreted either as a truly grooved specimen or even as a faintly grooved one. The relevance of this ambiguity in perceiving

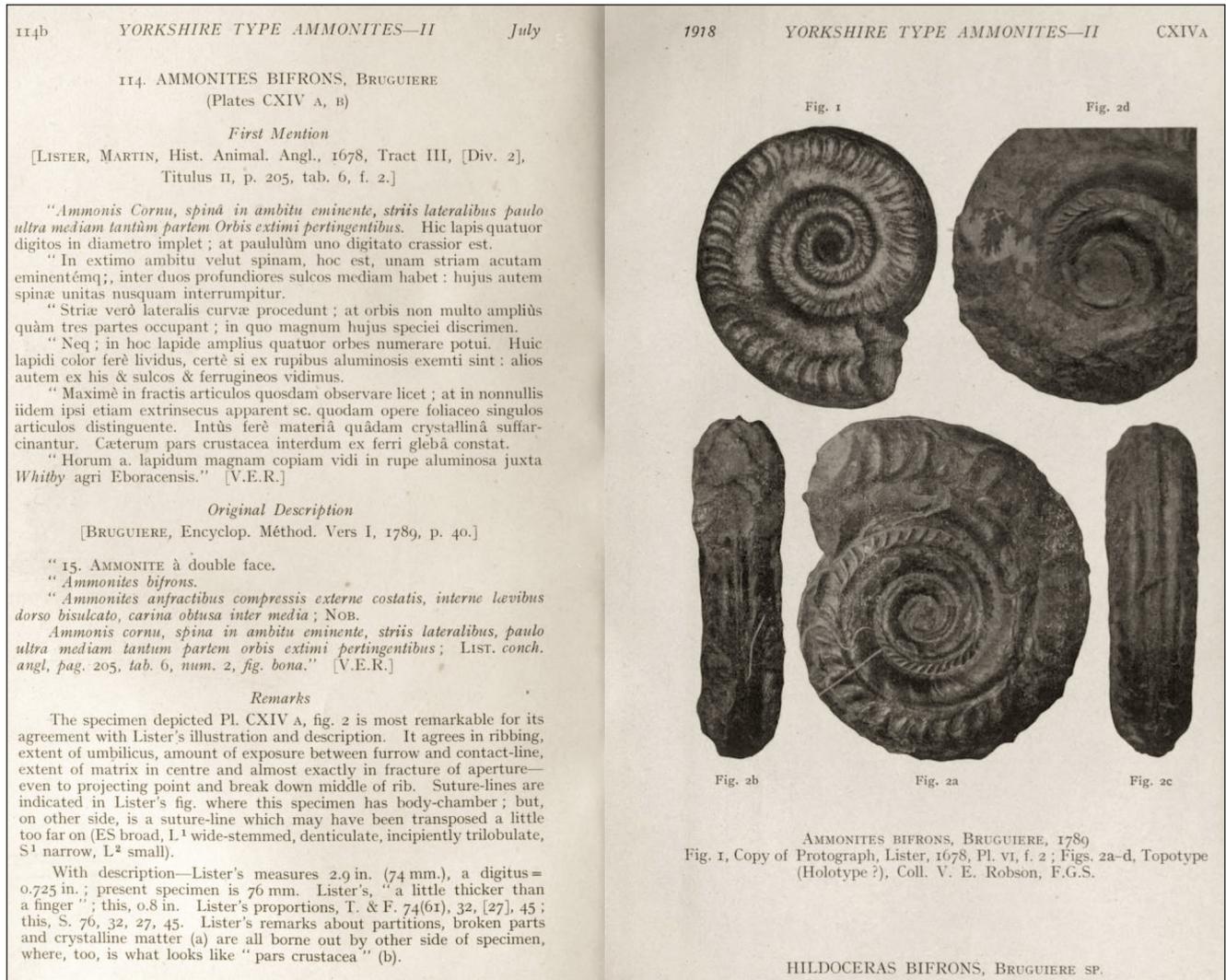


Fig. 5 - On the left: the original descriptions by Lister (1678) and Bruguière (1789) as reported and commented by Buckman (1918). On the right: illustration reporting Lister's type (fig 1) and the specimen supposed to be the model from which it was drawn (fig 2a-d).

the spiral groove in Lister's drawing emerged only when the faintly grooved "bifrons" revealed abundant

in the stratigraphic record, perhaps overwhelming the truly grooved morphotypes.

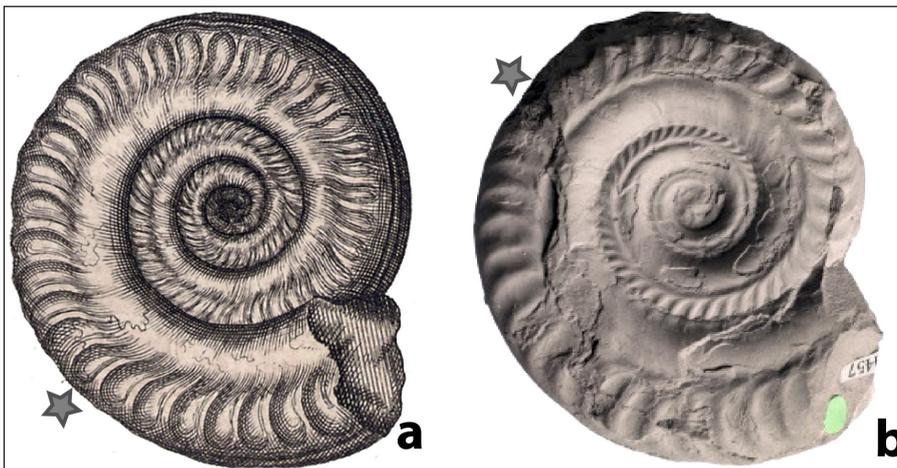


Fig. 6 - Lister's holotype (a, same as in Fig. 1) is compared with a modern image (b, from 'GB3D Type Fossils', <http://www.3d-fossils.ac.uk/home.html>) of Buckman's neotype (see Fig. 5). Note the large cracks that obliterate the spiral groove in the final whorl of the neotype. Also note the discrepancy in the point of onset of the living chamber (star in a and b): a clear suture line is reproduced in Lister's drawing where in Buckman's type runs the body chamber. (a = 74 mm according to Lister; b = 76 mm according to Buckman).

### Lister's idea of illustrated science

Palaeontologists have commonly dated the early representation of *Hildoceras bifrons* along with the date of publication of Lister's *Historiae animalium* (1678). It is worth noting, however, that the volume issued in 1678 did not include a discussion and illustration of fossils. The three first published treatises were indeed dedicated to spiders, freshwater snails and marine snails, respectively. Only in 1681 Lister included a fourth section dedicated to fossils, also enriching the text with nine plates, among which the one portraying diverse specimens of *Ammonis cornu* (Fig. 1). At that time, Lister had already published other valuable and appreciated works on those "curiosities" known as "figured stones".

In 1673, Lister was the first naturalist to publish a study on fossils in the *Philosophical Transactions*, after presenting on this subject to the Royal Society in the same year. The title of the illustrated manuscript was "*A description of certain stones figured like plants, and by some observing men esteemed to be plants petrified*". The fossils there discussed were crinoids, and several illustrations were used to support the description and help visualize the variable morphology of these "curiosities" (Fig. 7). Although adhering to the abiogenic current as far as concerning

the origin of fossils, the contribute of Lister's work to the birth of Palaeontology was paramount, and his 1673 article can be acknowledged for setting the issue of the relevance of accurate illustrations in comparative studies (Brasier 2015).

Lister took in high consideration the explanatory importance of illustrations and entertained a professional relationship with William Lodge and Francis Place, two artists working for him as illustrators between 1670 and 1682. Unwin (1995) well outlines this relationship based on the correspondence between the parties:

"In the summer and autumn of 1673, Lister was engaged in preparing a paper setting out his detailed observations of fossils and, when he invited Lodge to draw a sample from his cabinet, he probably intended to find out the range of the illustrator's skills. Lodge acknowledged the commission with an assurance that he had 'with my best endeavours imitated the Stone you left with me at Carleton (which as it was curious so was it the more difficult to represent in design)'" (Unwin 1995).

The meticulous approach to illustrations held by Lister is even more evident in the "*Ad Lerctorem*" notes included in the *Historiae animalium*, in which the author claims to have personally supervised the artwork, even by pointing out with his own finger the details in each specimen that deserved to be evi-

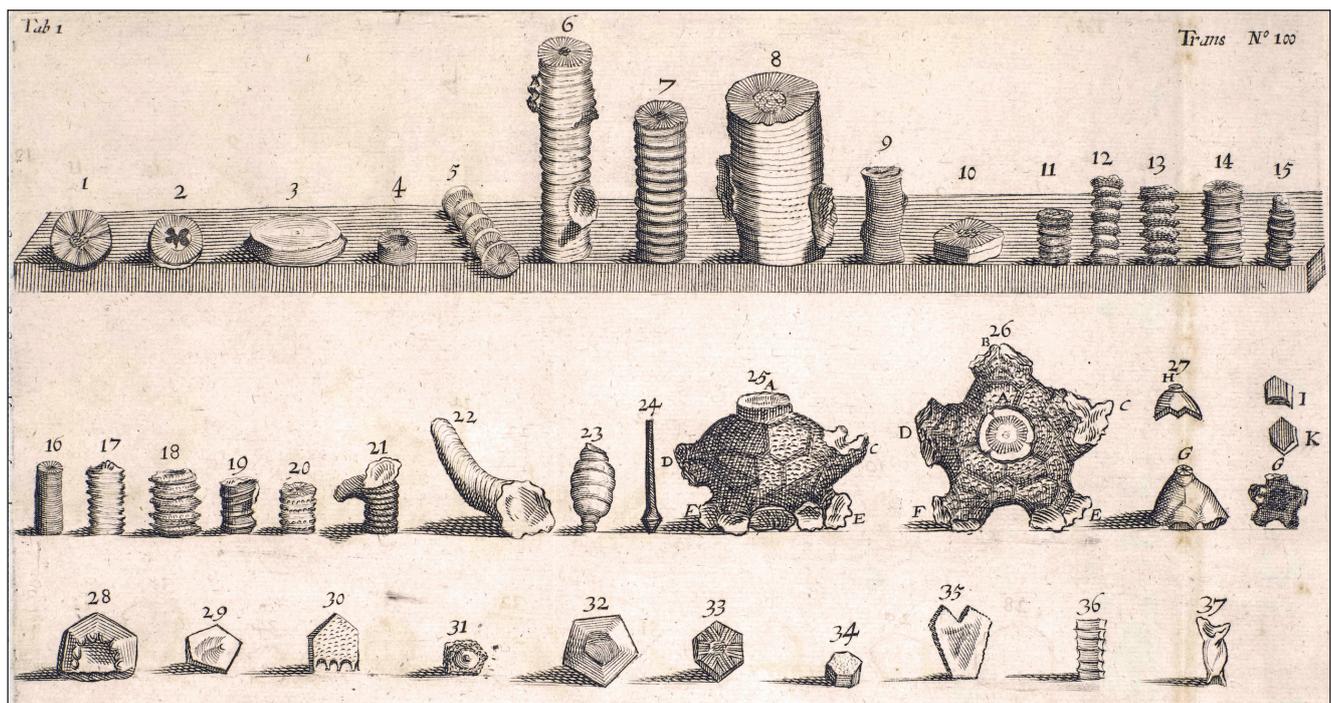


Fig. 7 - Example of illustrated fossils in the scientific literature by Lister (1673), here used to aid on the issue of whether they represent "stones figured like plants" or "plants petrified".

denced, and in order to prevent any attempt of the artist at any stylistic modification or interpretation (Fig. 8). The illustrations that accompanied the *Historiae animalium* where in part produced by Francis Place, who supplied for William Lister's difficulty to keep up with Lister's work and requests (Unwin 1995). The note reported in Figure 8 clearly refers to illustrations of extant animals, since the fourth section including fossils was added in the 1681 edition of *Historiae animalium*. Nonetheless, there is no reason to suppose that Lister may had devoted less attention to the illustrations of fossils, since they were at the centre of a lively debate concerning their meaning and origin.

In the same year (1681), Lister was completing an English edition of *Johannes Godartius of Insects* (published in 1682), with illustrations again provided by Francis Place. The acknowledgement that Lister directs to the artist enlightens once more how far he considered valuable the aid of high-quality illustrations:

*“Also I have taken care of the Designs, in transferring them upon Copper Plates; which I dare promise are Exquisitly performed, by the best of our English Artists: which was my expense; and which the Book-sellers were not willing to Reimburce me; So that this Impression consists but of 150. Coppys, which were intended only for the curious. And upon this occasion I must needs say, that Naturall History is much injured, through the little incouragement, which is given to the Artist, whose Noble performances can never be enough rewarded; being not only necessary, but the very beauty, and life of this kind of learning”* (Lister 1682).

Based on the evident commitment of Lister in fostering the importance of realistic representations of extant organisms and fossils, it is hardly conceivable that he would have accepted any personal re-interpretation by the artist of his *Ammonis cornu*, to a point that features like cracks and cemented parts, usually meticulously described by him, were completely omitted.

### Buckman's illustrative style

In addition to the lack of cracks and cemented parts, or the different shape of the mouth aperture, Buckman's type is different from Lister's drawing in having the final half of the last whorl occupied by the body chamber (Fig. 6). This evidence generates a discrepancy between the two figured specimens, since in Lister's drawing the suture lines are reproduced on the last whorl closer to

*Rursus omnium ferè Animalium figuras coram me delineandas curavi; ut optimus artifex, non suum tantum conceptum, ut fieri solet, exprimeret; sed, quò faciliùs acciperet, quæ uniuscujusq; speciei maximè depingendæ essent Notæ, eas primùm digito indicavi. Nam in his hominibus, quæ aliàs laudabilis, nunc nè concedenda quidem licentia est; siquidem non hęc quid in positu, aut animalis figura jucundius; sed quid ei vivo simillimum sit, & quo promptiùs rectiùsq; à reliquis discriminetur, præcipuè desideratur. Id quod maxima ex parte præstitum esse confido. Aliquot, fateor, & me malè habet, è multis Piçturæ defunt; quòd ipsa animalia, cùm Piçtor mecum adfuit, habere non potui: at eæ admodum paucæ sunt, sc. asteriscis in Tabulà notatæ.*

Fig. 8 - A segment of the “introductory remarks to the reader” from the *Historiae animalium*: “I have made sure that practically all the drawings of the animals were carried out in my presence. My aim was to see that the excellent artist did not merely (as is often the case) express his own personal conception. To facilitate this I first of all indicated with my finger the characteristics of each species that I most particularly wished to have depicted... Now we ask ourselves not what would make a more pleasant picture as regards the animal's shape or position, but what drawing resembles the living animal most closely and would more readily and accurately be recognized by other people...”

the mouth border (where cracks obliterate the ornamentation in Buckman's specimen), thus representing a phragmocone almost completely lacking the body chamber (Fig. 6). This evidence is crucial beyond the morphological contrast itself, because it unveils the attention devoted to details: even by admitting the removal of badly preserved parts for embellishment, why adding some odd traits (so realistically drawn) like septal suture lines, the meaning of which was completely unknown at Lister's time?

Other details are differently weighed by Buckman; for instance, in his remarks on the two specimens (herein reported in Fig. 5) there is only one reference to preservation state, in which Buckman suggests that the “extent of matrix in centre” is comparable in the two specimens. Again, why should the artist or Lister decide to perfectly reproduce the umbilical matrix while removing all other imperfections?

Apart from the scarce relevance that Buckman assigned to various inconsistencies, there is evidence of some effort also at attenuating the visual impact of the dissimilarities between Lister's

type and his neotype. For instance, Buckman displays the drawing of Lister's *Ammonis cornu* oriented upside-down with respect to standards, that is, with the aperture at the bottom (Fig. 5). This is quite unconventional, particularly if other accompanying images are traditionally oriented. If we assume that a common or standard way of orienting illustrated specimens was adopted for facilitating comparison, it can be surmised that Buckman's option may aim at the opposite result: attenuating the strength, at first glance, of the contrasting features (however perceptible) between the two types. For instance, a direct comparison of similarly oriented specimens would have rendered even more striking the different shape of the aperture border in the two images.

Figure 2d of Buckman's illustration shows the reverse side of the specimen from the Alum Shale Member; however, the image is truncated not allowing to show the aperture (Fig. 5), which, on this side, has a border even more different from the clean one shown in Lister's drawing. Nevertheless, Buckman remarks that the specimen agrees with Lister's drawing "almost exactly in fracture of aperture" (Buckman 1918: 114b; herein reported in Fig. 5). All the above considered, it is reasonable to hypothesize that the specimen illustrated by Buckman (1918, pl. CXIVa, fig. 2a-d) may not be the same specimen figured in Lister's drawing; at any rate, the two specimens show differences in terms of what should be considered distinctive of *Hildoceras bifrons* compared to other *Hildoceras* species.

## DISCUSSION

Notwithstanding the validity of Buckman's specimen as neotype, it differs from Lister's drawing in other traits apart from the lack of cracks and other preservation features. The question herein posed focuses on the different way the two illustrations may transmit information about the presence or absence of the spiral groove, a distinction often biased by the variable degree of development and impression of the mid-flank inflection occasionally occurring in species ancestral to *Hildoceras bifrons* (Fig. 2). In Lister's original figure, the spiral groove does not appear clearly defined in continuity and neat development of its borders; it also shows a greater impression close to the aperture, progressively fading out towards the inner whorls (Fig.

6a). Together with the broadness of the smooth periumbilical band, typically more rounded near the aperture, the resulting figure fairly resembles the faintly grooved specimens most frequently occurring in the Apennines and other Mediterranean localities, as for instance *Hildoceras lusitanicum* (compare Fig. 2 and Fig. 6a).

It is conceivable that, even after the photographic illustration of the neotype, some authors may have continued referring to Lister's figure when assigning the faintly grooved morphotypes to *Hildoceras bifrons*. This attitude, rather than an inaccurate analysis of distinctive characters, has been the source of the presumed incorrect interpretation of the *bifrons* species by Italian scholars. The diverging of Lister's holotype and Buckman's neotype sets the tendency of distinguishing "typical" (with neat spiral groove) and "non-typical" *bifrons* (with a faint spiral groove or "pseudogroove"; Ridente 1996, 2016, 2022b). Interestingly, prior to the election of Buckman's neotype, the interpretation of the typical versus non-typical *bifrons* may had been reversed, with the specimen defined less typical being the one displaying a more engraved spiral groove; this fact, instead of being dismissed as an even more evident case of "oversighting" among Italian authors, further testifies that Lister's original type could have been perceived as characterized by a less evident spiral groove.

An example of this reversal in considering typical vs. non-typical morphotypes can be found in the work of Bellini (1900). In his discussion and proposal of new varieties of *Hildoceras bifrons*, Bellini indicates a specimen deprived of a neat spiral groove (Bellini 1900: 146, fig. 10) as the "type" *bifrons* with respect to another specimen showing a clear spiral groove (Bellini 1900: 146, fig. 11) figured in the same page (both specimens are herein reproduced in Fig. 9). Such kind of inconsistencies cannot be explained by simply assuming a case of naive misinterpretation. Conversely, they are an indication of how the frequent attribution to *Hildoceras bifrons* of faintly grooved or non-grooved specimens was determined by testing the correspondence with the original figure of Lister, the only available at the time of Bellini's proposal. Interestingly, if not paradoxical, Bellini (1900) distinguishes the specimen with a marked spiral groove as a new variety named "*sulcosa*", which literally means "groovy".

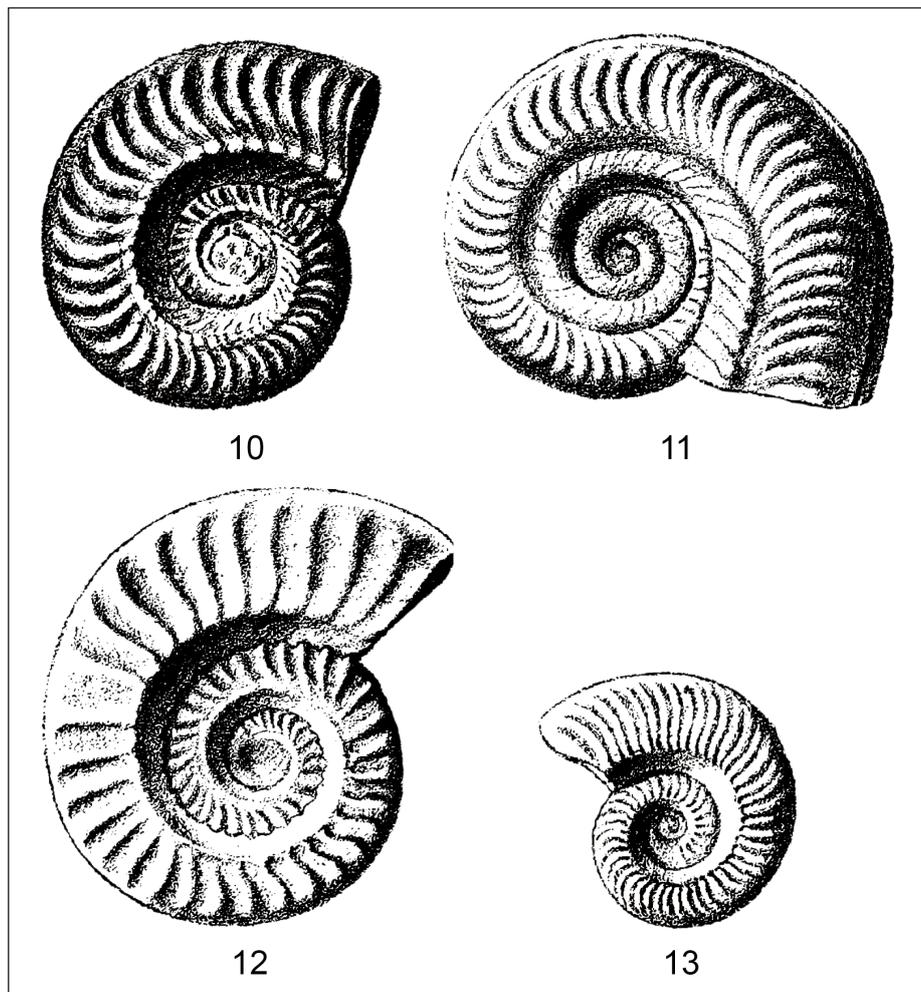


Fig. 9 - Original figure by Bellini (1900) illustrating three new varieties (figs 11-13) compared to the "typical" *Hildoceras bifrons* (fig. 10). The new varieties are named *Hildoceras bifrons* var. *sulcosa* (fig. 11), *Hildoceras bifrons* var. *laticosta* (fig. 12), and *Hildoceras bifrons* var. *serraticosta* (fig. 13). Note that the specimen in fig. 11 is the only with a neat spiral groove.

Buckman listed three out of the four morphotypes figured by Bellini (1900) among the species considered by him as comparable to *Hildoceras bifrons* (Buckman 1918: 114c), namely: *Hildoceras bifrons* var. *sulcosa* (Bellini 1900, p. 146, fig. 11), *Hildoceras bifrons* var. *laticosta* (Bellini 1900: 146, fig. 12), and *Hildoceras bifrons* var. *serraticosta* (Bellini 1900: 146, fig. 13). Interestingly, the only of Bellini's specimens omitted in Buckman's list of comparable species was the one that Bellini indicated as the most similar to the type, thus naming it straightforwardly *Hildoceras bifrons* (Bellini 1900: 146, fig. 10). This specimen differed from the others in being intermediate with respect to the apparent presence or absence of the spiral groove (Fig. 9). Indeed, whereas *Hildoceras* var. *sulcosa* displayed a true spiral groove, and both *Hildoceras* var. *laticosta* and *serraticosta* lacked any kind of inflection between the termination of the ribs and the smooth periumbilical band, the "typical *bifrons*" of Bellini was characterized by a periumbilical relief along which the flank appears slightly depressed, forming a pseudogroove (Fig. 9, compare with Fig.

2). In this, I believe, Bellini relied for consciously (not mistakenly) interpreting this specimen (and not his *Hildoceras* var. *sulcosa*) as the "typical" *Hildoceras bifrons*.

## SUMMARY AND CONCLUDING REMARKS

During the late XIX to mid XX century, it was not uncommon that respectful scholars insisted on assigning faintly grooved morphotypes to *Hildoceras bifrons*, declining any taxonomic distinction between these morphotypes and specimens characterized by a well-marked spiral groove. Because many of the faintly grooved specimens came from the Apennines and other Italian localities, their interpretation as *Hildoceras bifrons* has been remarked as an improper attitude of scholars sampling localities where *Hildoceras bifrons* was absent and likely replaced by different, though related, species (Donovan 1958; Howarth 1992). Although possible, the notion that a somewhat superficial interpretation of *Hildoceras bifrons* was a common practise of early authors appears in

striking contrast with the rigorous application of taxonomic rules usual to these scholars. More likely, the attribution to *Hildoceras bifrons* of non-grooved specimens may have been an evidence-based decision, rather than the consequence of early authors overlooking or misconceiving its most distinctive character. In this view, it is herein argued that two different holotypes were available in the literature, somehow making less metaphoric the “*bifronte*” nature of this species.

The doubling of the holotype was caused by Buckman’s direct matching of his neotype with the type in Lister’s original drawing. A close comparison reveals some evident mismatching of the two ammonites, with apparent inconsistencies that would imply a non-faithful representation of the model specimen used in Lister’s drawing. This inference is herein questioned based on Lister’s documented scientific professionalism. On the other side, even by accepting the correspondence between the specimen featuring in Lister’s drawing and the specimen in Buckman’s photographic illustration, it is a matter of fact the Lister’s drawing fails in expressing a neat difference between a true spiral groove and a faint one. Indeed, in Lister’s original drawing, the most prominent (or perceptible) morphological feature is the smooth and rounded half dorsal flank determining the “double-faced” look that inspired Bruguière’s naming, with the spiral groove appearing subdued until the final whorl. From this perspective, by referring to Lister’s holotype, actually never invalidated (Howarth 1992: 176), one would have had all the rights at assigning to *Hildoceras bifrons* those faintly grooved specimens now referred to as *Hildoceras lusitanicum* (Gabilly 1976; Howarth 1992).

These considerations are not meant at redefining and overturning currently accepted taxonomic schemes, consolidated by more than a century of application; instead, they are envisaged as a worth knowing account on the relevance of details in the science of taxonomy; many of such “details” can hardly translate into numbers, codes and statistical tables, yet they remain crucial in defining morphological affinities from which to derive phylogenetic relationships and evolutionary paths. More in general, this account is an example of how historical insights may clarify how contrasting ideas and scientific debates arise, thus providing a key for their unravelling.

*Acknowledgements:* I am grateful to Marco Romano and an anonymous reviewer for the insightful comments and suggestions that allowed this manuscript to be improved.

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