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XXXIX.—*Descriptions of new and imperfectly-defined Species of Jurassic Nautili contained in the British Museum (Natural History).* By ARTHUR H. FOORD, F.G.S., and G. C. CRICK, Assoc.R.S.M., F.G.S., of the Geological Department, British Museum.

IN studying the Jurassic Nautili in the British Museum it became evident to us that many of the species required revision, Sowerby's names especially having been used by authors indiscriminately for forms which, on investigation, were found to disagree materially with the types. It has been our endeavour, with the aid of the excellent material furnished by the National Collection (which contains many of Sowerby's types), to give such definitions and figures of the species as may conduce to their correct identification by future workers. We have found it necessary to create some new species, which have been derived chiefly from the rich Jurassic fauna of Dorset and Somerset. Two species are included from the Lias of France; and we here record our indebtedness to Dr. Paul Fischer, of the Museum of Natural History, Paris, who with great kindness sent us some specimens from the d'Orbigny Collection to compare with those of the British Museum. We have also the pleasure to acknowledge the liberal assistance rendered to us by the authorities of the Woodwardian

## LIAS.

- Nautilus striatus*, J. Sowerby, Min. Conch. vol. ii. p. 183 (1817), pl. clxxxii.  
 — *intermedius*?, J. Sowerby, Min. Conch. vol. ii. p. 53 (1817), pl. cxxxv.  
 — *araris*, Dumortier, Études Paléontologiques du Bassin du Rhône, pt. iii. (1869), p. 56, pls. vi., vii.  
 — *truncatus*, J. Sowerby, Min. Conch. vol. ii. p. 49 (1816), pl. cxxiii.  
 — *senistriatus*, d'Orbigny, Pal. Franç., Terr. Jurass. vol. i. (1842), p. 149, pl. xxvi.  
 — *toarcensis*, d'Orbigny, Prodr. de Paléont. Stratigr. vol. i. (1849), p. 245 (= *N. latidorsatus*, d'Orbigny, Pal. Franç., Terr. Jurass. vol. i. (1842), p. 147, pl. xxiv.).  
 — *astacoides*, Young and Bird, Geol. Surv. Yorkshire Coast, 1828, 2nd ed. p. 270, pl. xiii. fig. 2.

## LOWER OOLITE.

- *polygonalis*, J. de C. Sowerby, Min. Conch. vol. vi. p. 56 (1826), pl. dxxx.  
 — *excavatus*, J. de C. Sowerby, Min. Conch. vol. vi. p. 55 (1826), pl. dxxxix. fig. 1,  
 — *Baberi*, Morris and Lycett, Gt. Oolite Mollusca (Mon. Pal. Soc. 1850), pt. i. p. 10, pl. i. figs. 1, 1<sup>a</sup>.  
 — *subtruncatus*?, Morris and Lycett, Gt. Oolite Mollusca (Mon. Pal. Soc. 1850), pt. i. p. 10, p. 10, pl. i. figs. 2, 2<sup>a</sup>.

## MIDDLE OOLITE.

- *hexagonus*, J. de C. Sowerby, Min. Conch. vol. vi. p. 55 (1826), pl. dxxxix. fig. 2.

1. *Nautilus similimus*, sp. nov.
2. — *Jourdani*, Dumortier.
3. — *terebratus*, Dumortier.
4. — *robustus*, sp. nov.
5. — *Fischeranus*, sp. nov.
6. — *ornatus*, sp. nov.
7. — *lineatus*, J. Sowerby.
8. — *pseudolineatus*, sp. nov.
9. — *glaber*, sp. nov.
10. — *obesus*, J. Sowerby.
11. — *inornatus*, d'Orbigny.
12. — *multiseptatus*, sp. nov.
13. — *clausus*, d'Orbigny.
14. — *perinflatus*, sp. nov.
15. — *Smithi*, sp. nov.
16. — *burtonensis*, sp. nov.
17. — *calloviensis*, Oppel.

Museum, Cambridge, and those also of the Museum of Practical Geology, who lent us specimens from their valuable collections. It may be added that all the illustrations accompanying this paper were drawn by one of us upon the wood (upon a reduced scale) with the aid of a camera, by which means accuracy of outline is secured.

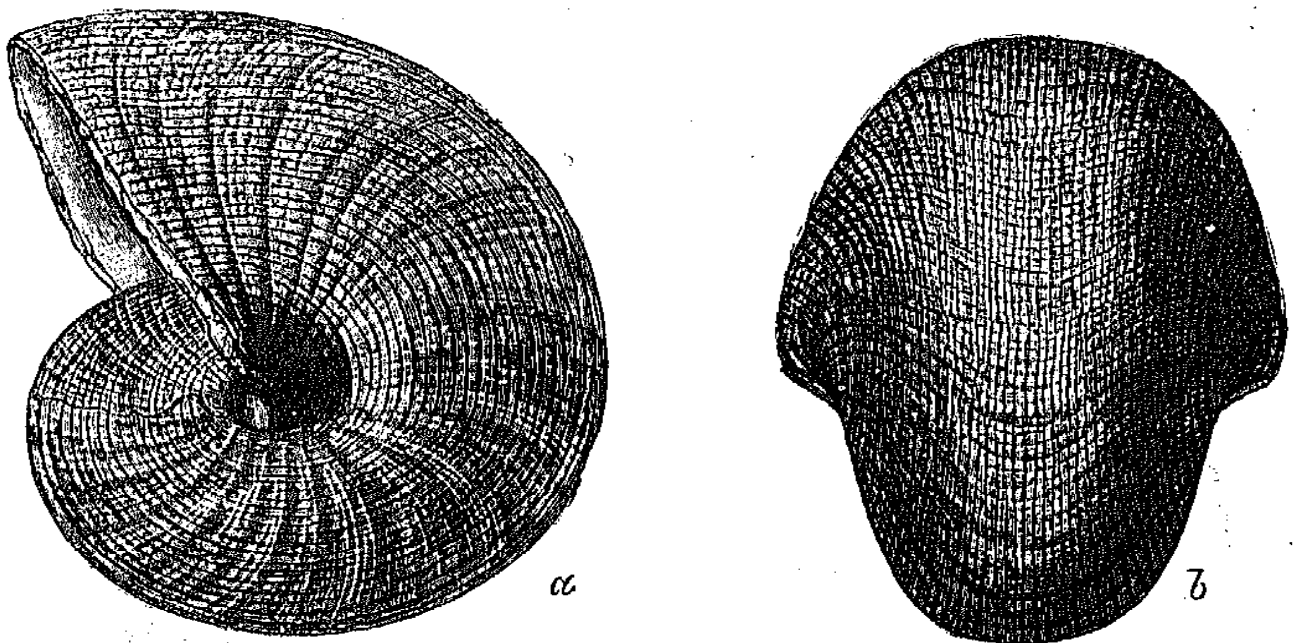
We are again indebted to the kindness of Dr. Woodward, F.R.S., for the use of the woodcuts illustrating this paper.

Appended is a list (p. 266) of the species of Jurassic Nautili contained in the British Museum. The new and revised species are placed in the first column, and in the second those which do not require revision and are therefore not described in the present paper; of each of the latter, however, we give the reference to the original description.

LIAS.

1. *Nautilus simillimus*, sp. nov.

Fig. 1.



*Nautilus simillimus*.—*a*, lateral view of a young individual, showing the closed umbilicus; *b*, peripheral view. Drawn from a specimen in the British Museum. Nearly two thirds natural size.

*Sp. char.* Shell somewhat compressed on the sides, narrowly rounded on the periphery, completely involute. Umbilicus closed by a shelly callus. Septa moderately distant; sutures slightly curved on the sides of the shell and forming a shallow sinus upon the periphery. Siphuncle unknown. Test ornamented with fine, close-set, subregular, wavy, longitudinal ridges, which are somewhat coarser on the sides of

the shell than on the periphery; finer lines are intercalated between these, and the whole are crossed by fine and numerous lines of growth, which impart a cancellated appearance to the test, especially in young shells. In addition to the finer ornaments there are a series of obscure folds radiating from the umbilicus, and dying out upon the periphery.

*Remarks.* This species resembles *Nautilus striatus*, J. Sowerby\*, in its general form and perfectly in its sculpture, but it is distinguished by its completely closed umbilicus. A large but imperfect and crushed example (no. 39850) represents the adult stage in the growth of the shell, while the young is exemplified in an exquisitely preserved specimen (no. 39887). The name *simillimus* which we have given to this species is intended to express its close resemblance to *N. striatus*.

*Horizon.* Lias.

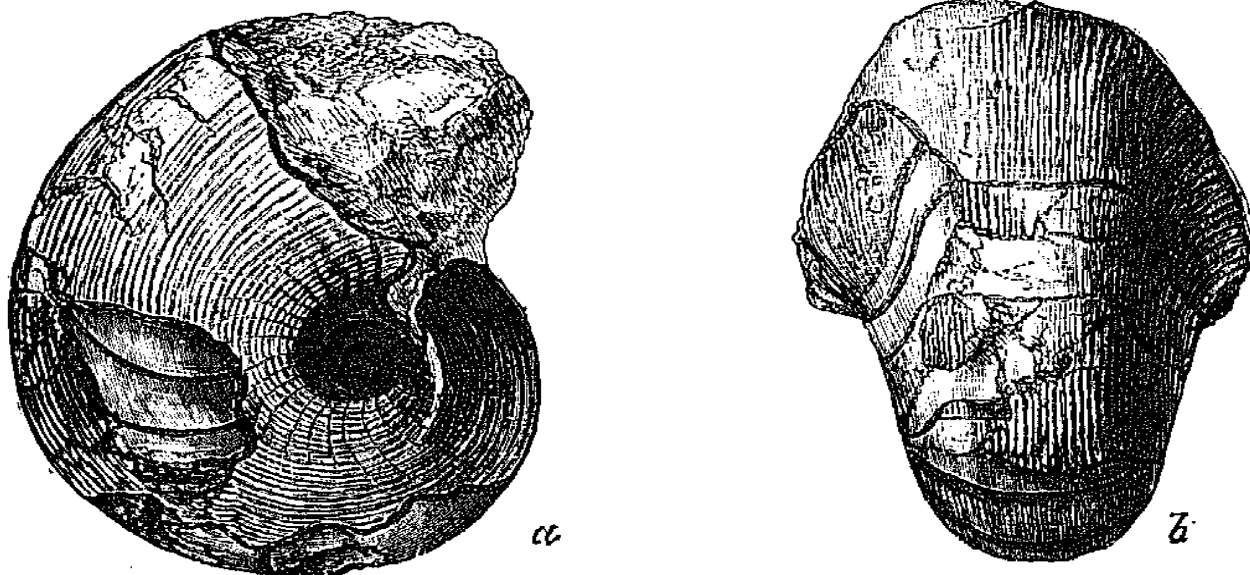
*Locality.* Charmouth, Dorsetshire.

## 2. *Nautilus Jourdani*, Dumortier.

1874. *Nautilus Jourdani*, Dumortier, Études Paléontologiques sur les Dépôts Jurassiques du Bassin du Rhône, pt. iv. (Lias Supérieur) p. 44, pl. vii. figs. 1-5.

1889. *Nautilus Jourdani*, S. S. Buckman, Quart. Journ. Geol. Soc. vol. xlv. p. 453 (footnote).

Fig. 2.



*Nautilus Jourdani*.—*a*, lateral view, showing the deep umbilicus and the ornaments of the test; *b*, peripheral view, showing the form of the sutures. Drawn from a specimen in the British Museum (no. 19587). About one half natural size.

*Sp. char.* Shell moderately inflated; umbilicus not very

\* Min. Conch. vol. ii. p. 183, pl. clxxxii.

large; whorls flattened both on the sides and on the periphery, the greatest thickness being at the umbilicus. The sides of the latter are steep and the borders subangular, the test being here very thick. The septa, of which there are about thirteen in an entire whorl, form a strongly marked sigmoidal curve upon the sides of the shell, but are only very slightly sinuous on the periphery. The siphuncle is situated a little below the centre. The test is covered with numerous, thread-like, longitudinal ridges, two or three in the space of 1 line, more approximate on the periphery than on the sides, as is usually the case with such ornaments. The ridges become partly obsolete when the shell has attained a certain diameter, say between 4 and 5 inches. Fine lines of growth are seen where the shell is well preserved, especially in the region of the umbilicus.

It should be added that the interior of the umbilicus is ornamented with fine, radiating, flexuous ridges directed forward; these are crossed by spiral ridges somewhat widely spaced.

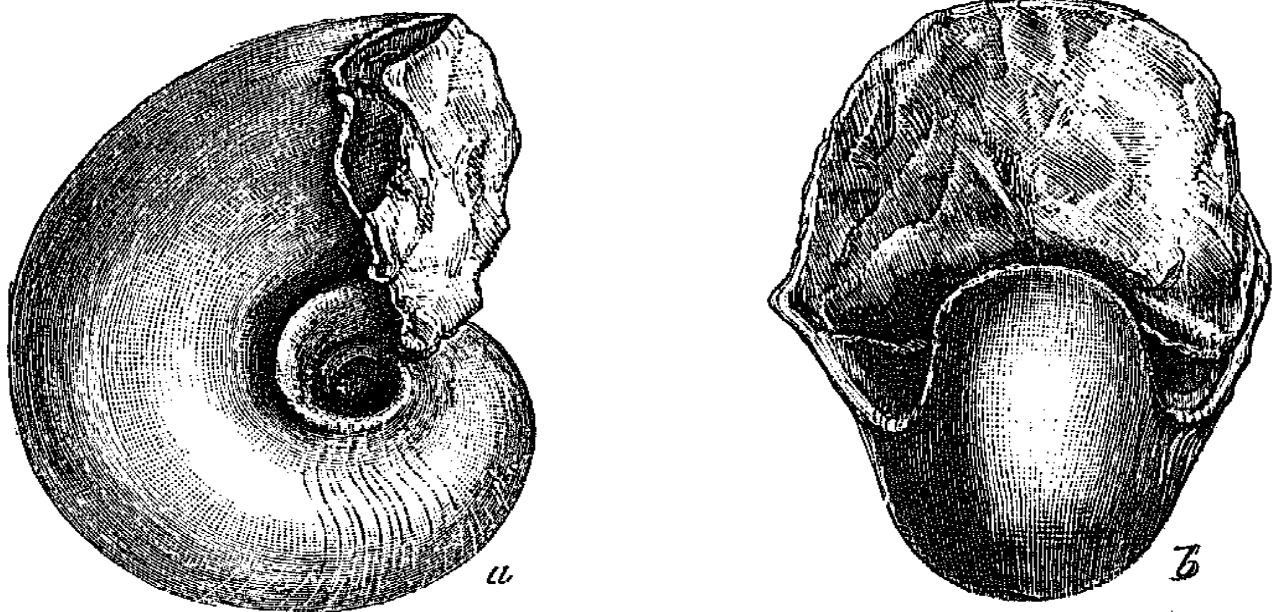
*Remarks.* This species is distinguished from *N. ornatus* (to be subsequently described), which appears to be its nearest ally, by its more compressed form, more angular umbilicus, and finer sculpture.

*Horizon.* Upper Lias.

*Locality.* Floore, Northamptonshire.

3. *Nautilus terebratus*, Dumortier.

Fig. 3.

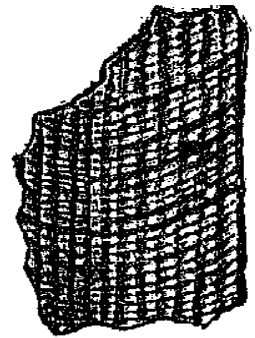


*Nautilus terebratus*.—*a*, lateral view, showing the raised border of the umbilicus; *b*, front view. Drawn from a specimen in the British Museum (no. C. 3096). Two thirds natural size. Except in well-preserved specimens the longitudinal ornaments are barely visible; we have therefore given a separate figure of them (fig. 4).

1874. *Nautilus terebratus* (Thiollière), Dumortier, Études Paléontologiques sur les Dépôts Jurassiques du Bassin du Rhône, pt. iv. (Lias Supérieur), p. 42, pl. vi. figs. 1-4.

*Sp. char.* Shell inflated, subglobose, a little compressed on the sides, and slightly flattened upon the periphery, more so in the adult than in the young shell. Aperture wider than high. Umbilicus open, exposing the inner whorls, very deep, the sides steep and having an angular border with a thickened rim, which is very characteristic. Septa rather distant, being nearly 1 inch apart on the periphery, where the height of the whorl is 2 inches in the specimen measured. Sutures very slightly bent upon the sides of the shell and forming a very shallow sinus upon the periphery. Siphuncle nearly central. Test rather thin, ornamented on the periphery with fine, close-set, longitudinal ridges, crossed by lines of growth, the latter covering the whole of the surface of the test. The accompanying woodcut (fig. 4) exhibits these ornaments drawn natural size, from a specimen in the British Museum Collection.

Fig. 4.



*Remarks.* The name *terebratus* was attached by Thiollière to a specimen in the museum at Lyons, and the species was subsequently described by Dumortier (*loc. cit.*), whose figures and descriptions enabled one of us to recognize it in the Woodwardian Museum, Cambridge, where it is well represented. The authorities of that Museum having kindly presented a specimen to the British Museum, we are enabled to give figures of this well-characterized species, which is now recorded in Britain for the first time.

This species has two characters in common with *Nautilus Jourdani*, Dumortier, viz. an angular umbilicus and longitudinal ornaments; but the latter are confined to the peripheral region, and the umbilicus has a very characteristic rim.

M. Dumortier states that he only knows this species from La Verpillière\*, where it is not very rare; but entire specimens are uncommon. He adds that it is one of the most characteristic shells of the Upper Lias of France.

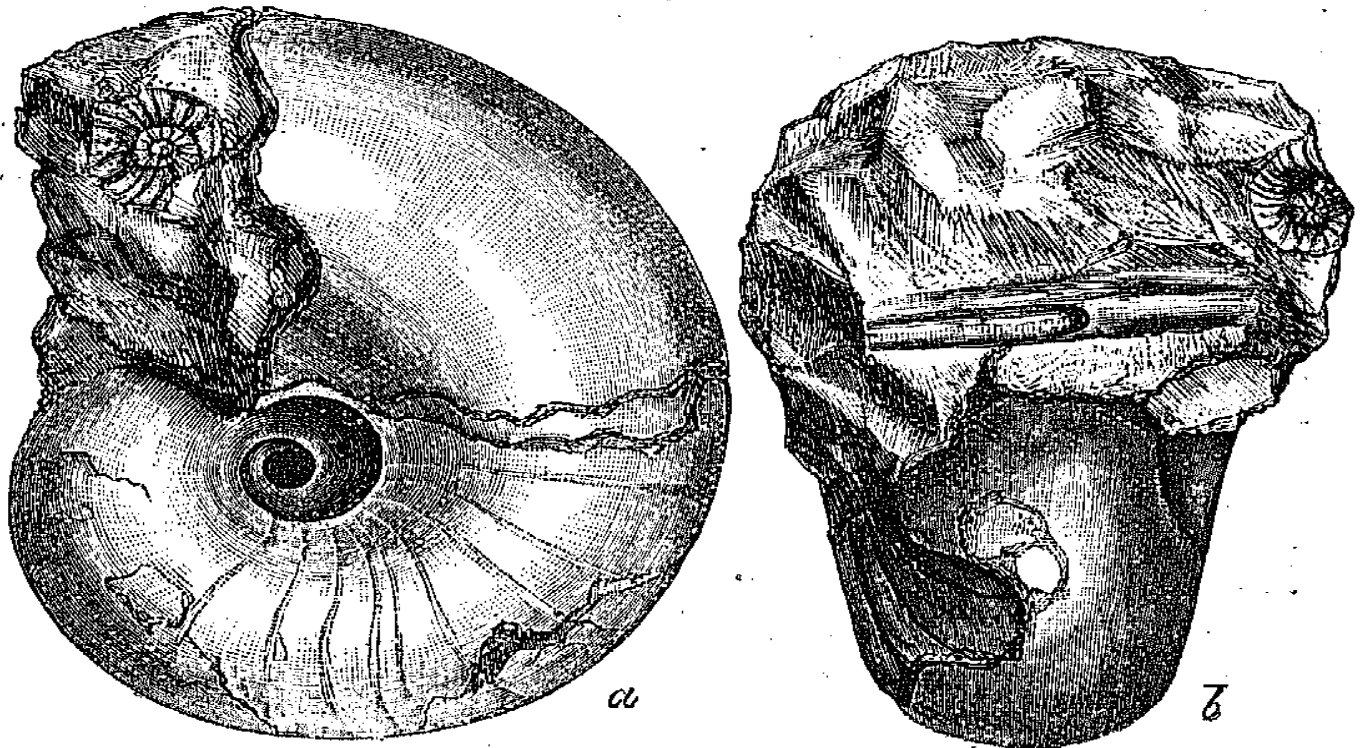
*Horizon.* Upper Lias.

*Locality.* Near Lincoln.

\* A village in the Department of Isère, about 18 miles north-east of Vienne.

4. *Nautilus robustus*, sp. nov.

Fig. 5.



*Nautilus robustus*.—*a*, lateral view, showing the cast of part of the body-chamber, the test being present in the septate part of the shell, where a few lines of growth are indicated; *b*, front view. Drawn from a specimen in the British Museum (no. 37010). Rather less than one third natural size.

*Sp. char.* Shell of robust habit, slightly compressed on the sides and flattened on the periphery, especially towards the aperture; the angles formed by the junction of the sides and periphery rounded. Umbilicus open and exposing almost all the inner whorls; its sides rounded and rather steeply sloping. Aperture wider than high. Septa 1 inch distant from each other in the median line of the periphery, where the whorl has a thickness of  $3\frac{1}{2}$  inches; in the middle of the sides their distance is only half an inch; the last two septa are only three quarters of an inch apart on the periphery. The siphuncle has not been seen. The body-chamber occupies at least one half of the last whorl. The test is very thick and its surface smooth, or marked only with lines of growth, as seen in fig. 5, *a*.

*Remarks.* There are three examples of this fine species in the British Museum Collection, two of which are adult shells and the other in the adolescent stage of growth. The largest specimen (the figured one) measures about 8 inches in its greatest diameter and about  $5\frac{1}{2}$  inches in its greatest width.

This species is most nearly allied to *Nautilus toarcensis*,

d'Orbigny \*, but is distinguished by its narrower form, more open umbilicus, and closer septa.

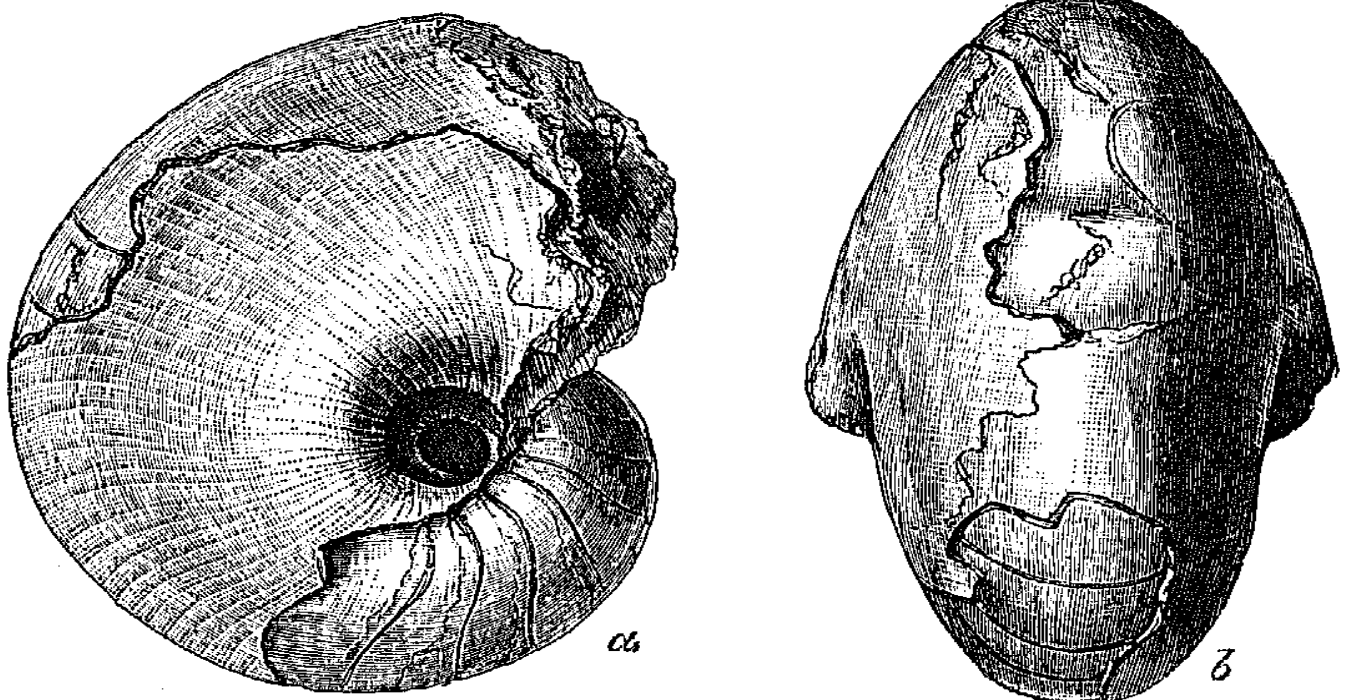
Not feeling certain that the present species had not already been described, we communicated with Dr. Paul Fischer, of the Mus. d'Hist. Nat. Paris, enclosing woodcuts of this and of another species described in the present paper under the name of *N. Fischeranus*. Dr. Fischer has kindly replied to the effect that he finds no form either in the Museum of Nat. Hist., the Museum of the École des Mines, or in that of the Sorbonne, which can be identified with certainty with either of our specimens. With regard to the form here called *N. robustus*, he observes that it resembles perhaps some specimens of *Nautilus toarcensis*, d'Orb., but that the umbilicus in the latter appears more open and the aperture more dilated. With these remarks we fully concur, and we are glad to have the opinion of so experienced a palæontologist as Dr. Fischer in confirmation of our own.

*Horizon.* Upper Lias.

*Localities.* Moutiers, Courcy † (Calvados), France.

5. *Nautilus Fischeranus*, sp. nov.

Fig. 6.



*Nautilus Fischeranus*.—*a*, lateral view, showing the test with fine lines of growth and some of the sutures, where the shell is removed; *b*, peripheral view. Drawn from a specimen in the British Museum (no. 37007). Rather more than one third natural size.

\* Prodr. de Paléont. Stratigr. vol. i. p. 245, = *N. latidorsatus*, d'Orb. Pal. Franç., Terr. Jurass. vol. i. p. 147, pl. xxiv. (not of Schlotheim).

† Courcy is a village about  $3\frac{1}{2}$  miles north-east of Falaise.



*Sp. char.* Shell compressed, with deeply embracing whorls, rapidly increasing in diameter; flattened upon the sides, with a narrowly rounded periphery. Umbilicus deep, with rather steeply sloping sides, the inner whorls exposed. Septa somewhat distant from each other, being about three quarters of an inch apart in the median line of the periphery, where the thickness of the whorl is 2 inches. Sutures slightly curved upon the sides and forming a very shallow sinus upon the periphery. Test smooth, showing only irregular lines of growth. Only a part of the body-chamber is preserved, so that the proportion it bears to the septate part of the shell cannot be ascertained.

*Remarks.* The present form is so unlike any other fossil *Nautilus*, that no comparison can be made.

A figure of the present species was submitted to Dr. Paul Fischer (along with one of *N. robustus*), and he fails to identify it with any species known to him, but suggests the possibility of its being represented in the private collection of the late Eugène Eudes-Deslongchamps at Caen. However this may be, we, like Dr. Fischer, can find no published description or figure which can be identified with it.

We have much pleasure in dedicating this beautiful species to Dr. Paul Fischer, of Paris, who has laid us under many obligations in connexion with the Jurassic Nautili.

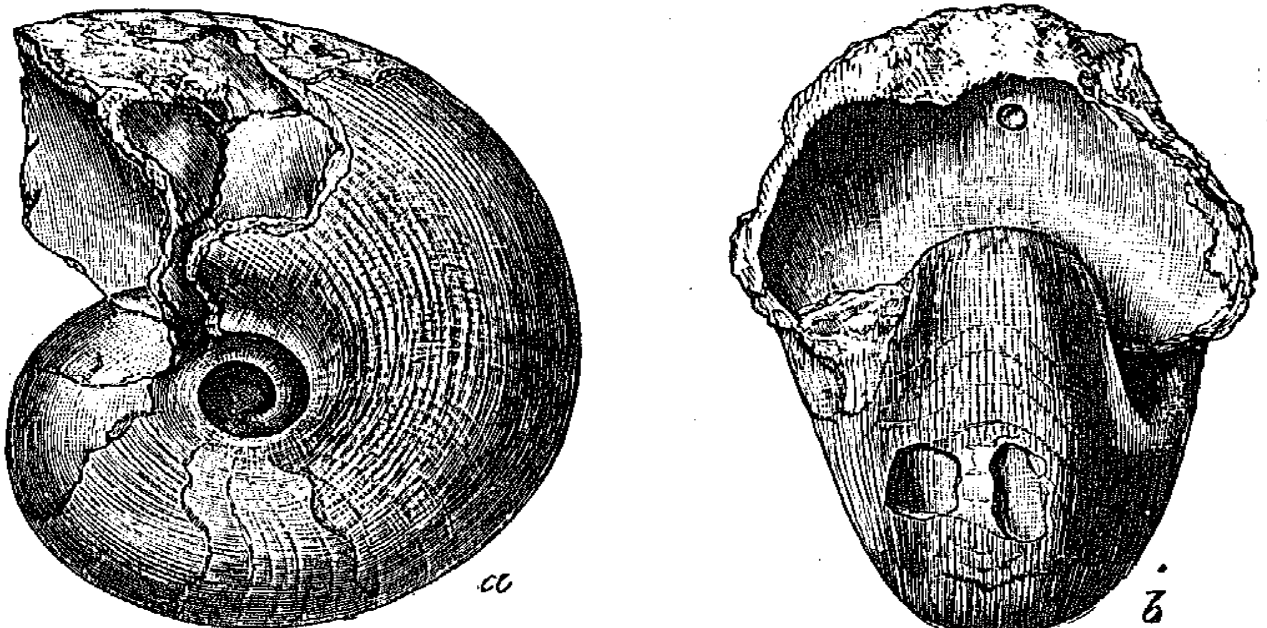
*Horizon.* Upper Lias.

*Locality.* Fontaine-Étoupe-Four (Calvados), France.

LOWER OOLITE.

6. *Nautilus ornatus*, sp. nov.

Fig. 7.



*Nautilus ornatus*.—*a*, lateral view of a young shell, showing the open umbilicus and the ornamentation of the test; *b*, front view, showing the position of the siphuncle. Drawn from a specimen in the British Museum (no. 51952). About half natural size.

*Sp. char.* Shell inflated, rapidly enlarging; sides compressed, but somewhat inflated in the middle; periphery broad, flattened. Umbilicus of moderate size and exposing a portion of the inner whorls; sides steep, margin rounded. Septa rather distant, being  $2\frac{1}{2}$  inches apart where the whorl has a height of about 6 inches. Siphuncle rather large, situated above the centre. The test is ornamented in the adult shell with a series of longitudinal flattened bands separated by incised lines; these bands are almost entirely confined to the periphery, very few of them extending to the sides of the shell; they number about thirteen to an inch. The whole of the test is covered with fine subregular lines of growth, which curve backwards on approaching the periphery, where they form a shallow sinus. In a young shell ( $4\frac{1}{4}$  inches in diameter, see fig. 7) the longitudinal ornaments cover the whole surface of the test, and they are in the form of delicate irregularly-spaced ridges, with very fine lines occupying the interspaces. The ridges are more numerous on the periphery than on the sides of the shell.

*Remarks.* The adult characters of the ornamentation of this species have been drawn up from a gigantic specimen, 2 feet in diameter, which was found at Sherborne, Dorsetshire. This is probably one of the largest examples of *Nautilus* known; at least the writers have never seen any account of a specimen approaching it in size. A smaller one from the same locality (Sherborne) measures 11 inches in its greatest diameter; it is a cast of the septate part of the shell, together with a portion of the body-chamber. Fragments of the test with its characteristic ornaments adhere to the cast in one or two places.

This species, in respect to its ornamentation, bears some resemblance to *N. Jourdani* of the Upper Lias, but can be at once distinguished by its less angular whorls and the rounded margin of the umbilicus. The latter character also distinguishes it from *N. terebratus* from the same beds, whose ornaments, like those of the adult shell of *N. ornatus*, are almost entirely confined to the peripheral area. There are no other species known to us from the Inferior Oolite with which this form can be confounded.

*Horizon.* Inferior Oolite.

*Locality.* Near Sherborne, Dorsetshire.

### 7. *Nautilus lineatus*, J. Sowerby.

1813. *Nautilus lineatus*, J. Sowerby, Min. Conch. vol. i. p. 89, pl. xli.  
 ? 1820. *Nautilites aperturatus*, Schlotheim, Die Petrefactenkunde, p. 83.

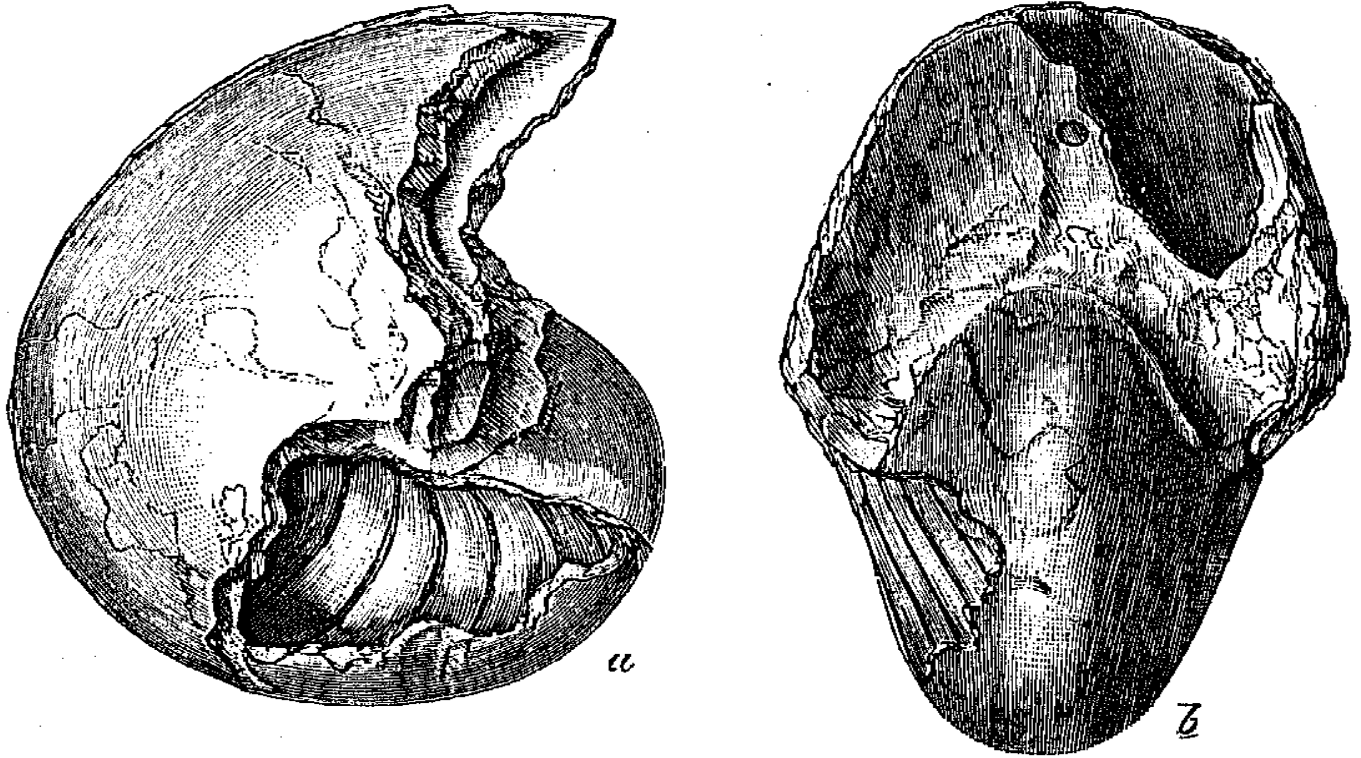
1821. *Nautilus lineatus*, Winch, Trans. Geol. Soc, vol. v. pt. ii. p. 555.  
 1830. *Nautilites lineatus* (?), Zieten, Les Pétrifications de Wurtemberg, p. 23, tab. xviii. figs. 2 a-c.  
 1832. *Nautilus lineatus*, Lonsdale, Trans. Geol. Soc. ser. ii. vol. iii. pt. ii. p. 272.  
 1835. *Nautilus lineatus*, Phillips, Geology of Yorkshire, pt. i. p. 129.  
 1836. *Nautilus lineatus*, Roemer, Die Verstein. des norddeutschen Oolithen-Gebirges, p. 179.  
 1840. *Nautilus lineatus*, Millet, Bull. Soc. Géol. de France, vol. xi. p. 365.  
 1845. *Nautilus lineatus*, Murchison, Outline of the Geology of the Neighbourhood of Cheltenham, new ed. p. 80.  
 1849. *Nautilus lineatus*, Quenstedt, Die Cephalopoden, p. 56, tab. ii. fig. 16.  
 1850. *Nautilus lineatus*, Lycett, Ann. & Mag. Nat. Hist. ser. 2, vol. ii. p. 412.  
 1852. *Nautilus lineatus*, Giebel, Fauna der Vorwelt, Band iii. Abth. i. p. 154.  
 1854. *Nautilus lineatus*, Morris, Cat. British Fossils, 2nd ed. p. 307.  
 1857. *Nautilus lineatus*, Etheridge, in Mem. Geol. Surv. Great Britain; Hull, On the Geology of the Country around Cheltenham, pp. 42, 48.  
 1858. *Nautilus lineatus*, Ooster, Cat. des. Céphalopodes Fossiles des Alpes Suisses, pt. iii. p. 8.  
 1858. *Nautilus lineatus*, Quenstedt, Der Jura, p. 284.  
 1858. *Nautilus lineatus*, Opperl, Die Juraformation Englands, Frankreichs und des südwestlichen Deutschlands, p. 366.  
 1860. *Nautilus lineatus*, Wright, Quart. Journ. Geol. Soc. vol. xvi. p. 40.  
 1860. *Nautilus lineatus*, Coquand, Synop. des Foss. Second. de la Charente, de la Charente-Inférieure, et de la Dordogne, p. 9.  
 1864. *Nautilus lineatus*, Ebray, Etudes Géologiques sur le Département de la Nièvre, fasc. 13, 14, p. 269.  
 1867. *Nautilus lineatus*, Waagen, Ueber die Zone des *Ammonites Sowerbyi* (Geogn. Paläont. Beiträge, Band i.) p. 590 (84).  
 1871. *Nautilus lineatus*, Phillips, Geology of Oxford and the Valley of the Thames, pp. 131, 164.  
 1875. *Nautilus lineatus*, Lepsius, Beiträge zur Kenntn. der Juraformation im Unter-Elsass, p. 26.  
 1879. *Nautilus lineatus*, Stoddart, Proceed. Bristol Naturalists' Soc. vol. ii. pt. iii. p. 279.  
 1880. *Nautilus lineatus*, Choffat, Étude Stratigraphique et Paléontologique des Terrains Jurassiques du Portugal, livr. i. p. 41.  
 1884. *Nautilus lineatus*, Mallada, Boletín de la Comisión del Mapa Geológico de España, Sinopsis de las Especies Fósiles de España, vol. xi. p. 228 (figured *ibid.* vol. v. 1878, pl. iv. figs. 5, 6).  
 1884. *Nautilus lineatus*, Damon, Geology of Weymouth, Portland, and Coast of Dorsetshire, new ed. p. 220.  
 [Not 1842. *Nautilus lineatus*, d'Orbigny, Paléont. Franç., Terr. Jurass. vol. i. p. 155, pl. xxxi.]

*Sp. char.* "Flatted, spheroidal, umbilicate, surface obscurely striated, back flat, broad, with a concave line in the interior (which appears convex around the cast). Aperture rather square, deeply indented by the preceding whorl; septa numerous. . . . Diameter about one third longer than the thickness. The septa are very concave, with three slight waves

in their margins. The siphunculus is near the middle of each septa" [septum] (*Sowerby*).

*Remarks.* The unsatisfactory character of *Sowerby's* description and figures of this species has given rise to much

Fig. 8.



*Nautilus lineatus.*—*a*, lateral view, showing the closed umbilicus, and parts of the septa where the test is broken away; *b*, front view, showing the position of the siphuncle and the compressed form of the shell. Drawn from a specimen in the British Museum (no. 43854 *a*), "Sowerby Collection." A little less than one half natural size.

confusion regarding its identity, and more than one species has doubtless been included under the name *lineatus*.

Though neither of the figured types of *lineatus* are contained in the British-Museum Collections, yet there is a specimen (one of those (a cast) numbered 43854) labelled in *Sowerby's* handwriting "*Nautilus lineatus*, M. C. 41," which agrees in all respects with his figures in the 'Mineral Conchology' (vol. i. pl. xli.). He, however, describes the species as "umbilicate," a statement which is not borne out by his figures; and we think it highly probable that *Sowerby's* figured specimens (which are both casts) had a closed umbilicus, because if the shell were present it would entirely fill up the cavity seen in the cast. Another specimen (cut and polished and also numbered 43854) is also labelled by *Sowerby* "*Nautilus lineatus*, M. C.," but it differs from his figured types in more than one particular, viz. in its more flexuous and less

numerous septa, and in the siphuncle, which, instead of being near the centre, as in the type (lower figure of Sowerby's plate), is above. To this form we have therefore given a new name—*Nautilus pseudolineatus*.

*Nautilus lineatus* must now be restricted to shells of a somewhat robust habit of growth, with flattened sides and broad flattened periphery, closed umbilicus, numerous, very slightly flexuous septa, and a nearly central siphuncle. It may be added that the shell had a perfectly smooth surface.

The name *lineatus*, which was clearly intended by its author to have reference to the faint ridge seen upon casts along the median line of the periphery, has apparently misled many palæontologists, for we have seen in collections various Jurassic Nautili labelled "*lineatus*" which certainly belonged to more than one species. In point of fact this median line or ridge is the "Normallinie" of the Brothers Sandberger\*, and cannot be used as a specific character, since it is found not only in numerous species of the Nautilidæ, but also in some species of the Orthoceratidæ.

The following species are evidently closely related, viz. :—*Nautilus lineatus*, *N. pseudolineatus*, sp. nov., *N. polygonalist*†, and *N. glaber*, sp. nov.

*Horizon.* Inferior Oolite.

*Locality.* Yeovil, Somersetshire. The specimen already referred to as bearing one of Sowerby's labels ("*Nautilus lineatus*, M. C. 41") is not localized.

### 8. *Nautilus pseudolineatus*, sp. nov.

*Sp. char.* Shell subcompressed, flattened upon the sides and periphery, the latter being moderately broad and having a subangular border. Umbilicus closed. Whorls about three, increasing rather slowly in diameter. Body-chamber occupying about half a volution; aperture wider than high. Septa rather deeply concave, nineteen or twenty in the last whorl, the last two very approximate. Sutures forming a sigmoid curve on the sides of the shell and a slight sinus on the periphery. Siphuncle rather large, subcentral. Test thick, smooth. Anterior border of muscular impression well defined, broadly arched (see fig. 9).

*Remarks.* The greatest diameter of the largest specimen in the Collection (no. C. 324) is  $6\frac{1}{4}$  inches.

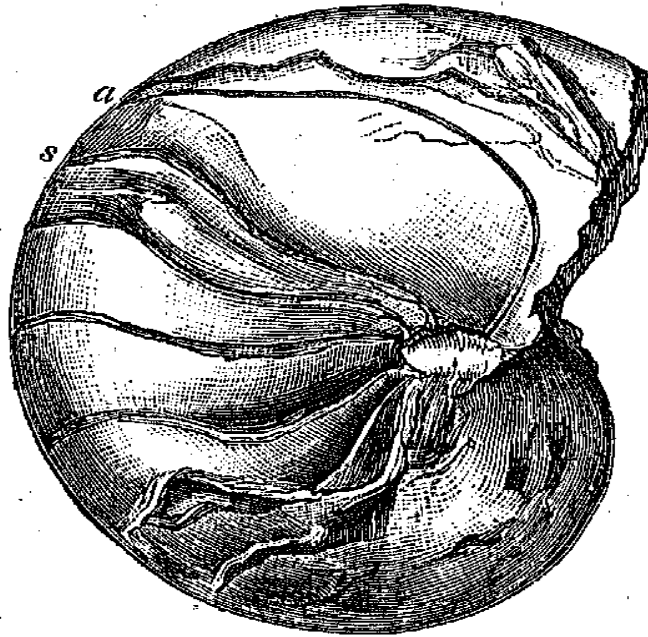
The slow rate of increase of the whorls in this species is

\* 'Die Versteinerungen des rheinischen Schichtensystems in Nassau,' G. and F. Sandberger, 1850-56, p. 41.

† J. de O. Sowerby, Min. Conch. vol. vi. p. 56, pl. dxxx.

its distinguishing character. It is nearly allied to *N. lineatus*, Sow., but differs therefrom in its more distant and flexuous

Fig. 9.



*Nautilus pseudolineatus*.—Lateral view of a specimen, showing the closed umbilicus and several of the septa; *a* indicates the anterior border of the impression of the shell-muscle, *s* points to the last-formed septum. Drawn from a specimen in the British Museum (no. 69767). One third natural size.

sutures, more concave septa, the position of its siphuncle, and its slower rate of increase.

*Horizon*. Inferior Oolite.

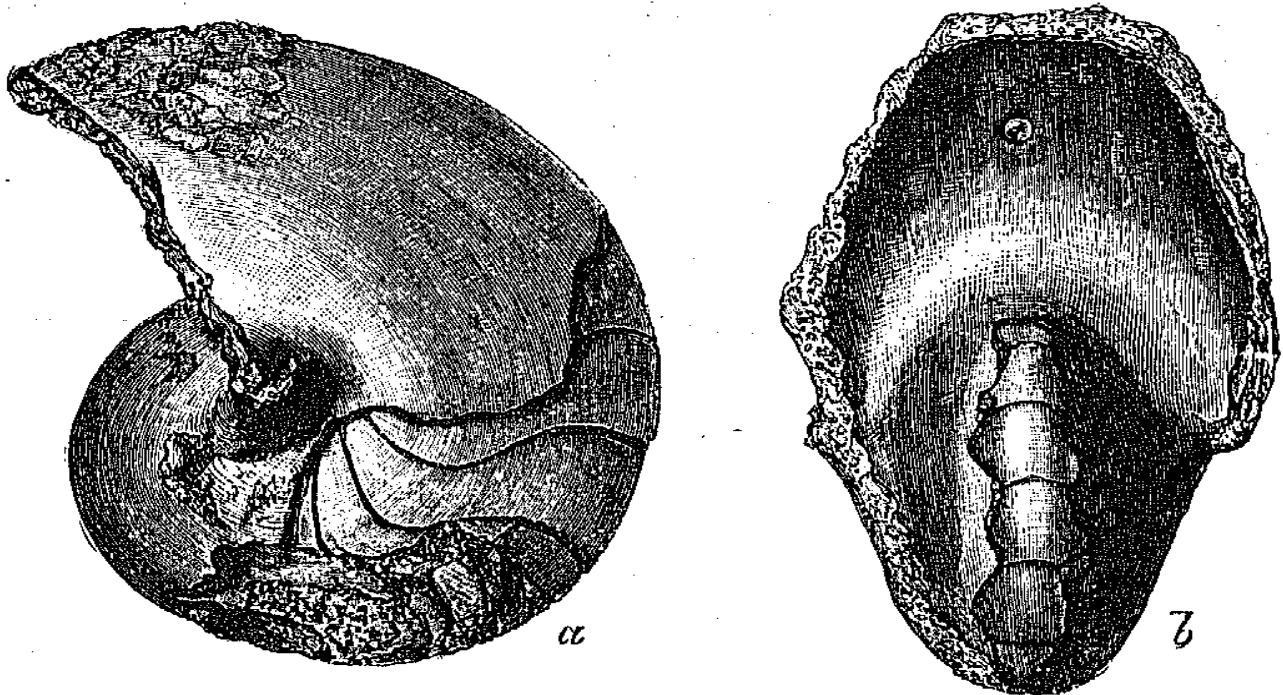
*Localities*. Sherborne, Bridport, Burton-Bradstock, Dorsetshire; Yeovil, Somersetshire. A fine specimen—a section (no. C. 324 *b*)—is also recorded from Somersetshire, but from what place in that county is not known. Two specimens, numbered respectively 43854 (“Sowerby Coll.”) and C. 2942, have no locality recorded against them in the register.

### 9. *Nautilus glaber*, sp. nov.

*Sp. char.* Shell completely involute, slowly increasing in diameter, compressed laterally, flattened on the periphery. Whorls wider than high, widest just above the umbilical region. Umbilicus completely closed. Septa moderately distant, shallowly concave; the sutures strongly bent backwards on the sides and very slightly sinuated upon the periphery. Siphuncle situated markedly above the centre. Surface of the test quite smooth. Body-chamber unknown. The larger specimen of the two representing this species in

the British-Museum Collection measures about  $5\frac{1}{2}$  inches in its greatest diameter.

Fig. 10.



*Nautilus glaber*.—*a*, lateral view, showing the closed umbilicus and some of the septa exposed by the removal of part of the test; *b*, front view, showing the position of the siphuncle and parts of the sutures where the test is broken. Drawn from a specimen in the British Museum (no. C. 2840). Rather less than half natural size.

*Remarks.* This species is nearly related to *N. pseudo-lineatus*, but differs therefrom in its compressed form, more distant septa, and strongly bent sutures, as well as in the more nearly marginal position of the siphuncle. It has also somewhat close affinities with *N. polygonalis*, J. de C. Sowerby\*, especially in the curved form of its sutures and the position of its siphuncle. It may be distinguished from that species by its more compressed form, closer septa, and the siphuncle being further removed from the margin.

*Horizon.* Inferior Oolite.

*Localities.* Somersetshire; Bayeux (Calvados), France.

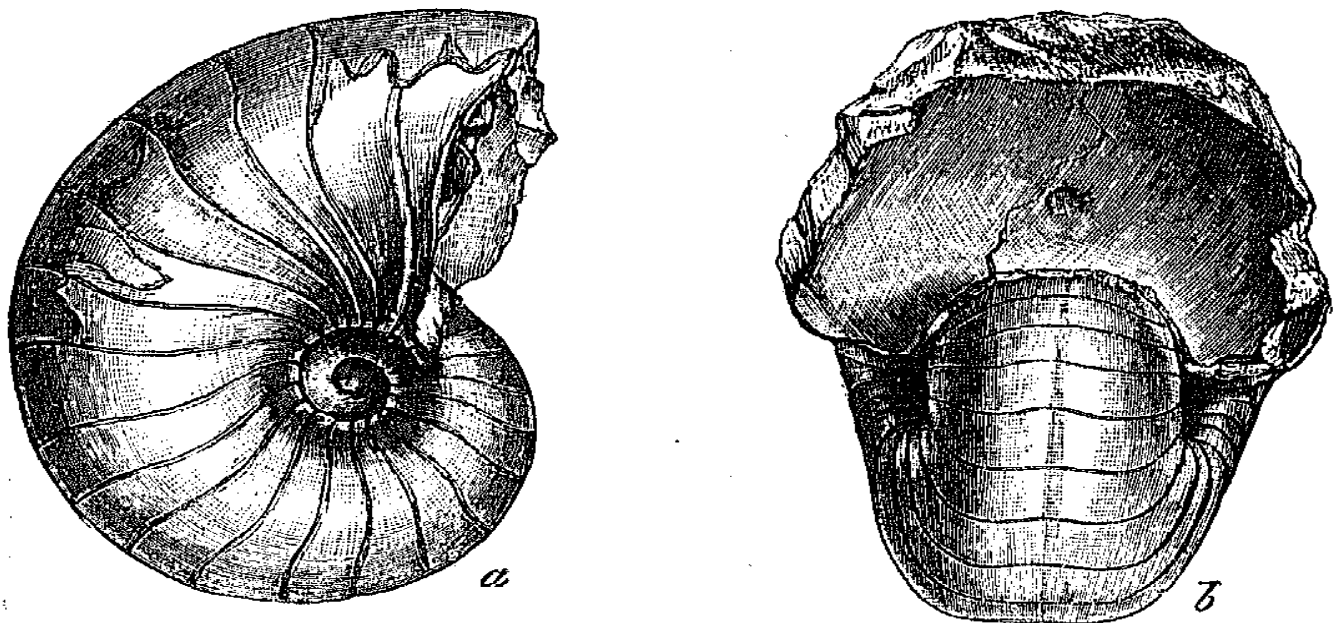
#### 10. *Nautilus obesus*, J. Sowerby.

1816. *Nautilus obesus*, J. Sowerby, Min. Conch. vol. ii. p. 51, pl. cxxiv.  
 1832. *Nautilus obesus*, Lonsdale, Trans. Geol. Soc. ser. ii. vol. iii. p. 273.  
 1834. *Nautilus obesus*, Robert, Bull. Soc. Géol. de France, vol. iv. p. 312.  
 1842. *Nautilus lineatus*, d'Orbigny, Paléontologie Française, Terr. Jurass. vol. i. p. 155, pl. xxxi. (not of J. Sowerby).

\* Min. Conch. vol. vi. p. 56, pl. dxxx.

1845. *Nautilus obesus*, Murchison, Outline of the Geology of the Neighbourhood of Cheltenham, new ed. p. 80.  
 1852. *Nautilus obesus*, Giebel, Fauna der Vorwelt, Band iii. Abth. i. p. 165.  
 1854. *Nautilus obesus*, Morris, Cat. British Fossils, 2nd ed. p. 307.  
 1857. *Nautilus obesus*, Etheridge, in Mem. Geol. Surv. Great Britain; Hull, On the Geology of the Country around Cheltenham, p. 48.  
 1860. *Nautilus obesus*, Wright, Quart. Journ. Geol. Soc. vol. xvi. p. 40.  
 1871. *Nautilus obesus*, Phillips, Geology of Oxford and the Valley of the Thames, p. 164.  
 1873. *Nautilus obesus*, Sharp, Quart. Journ. Geol. Soc. vol. xxix. pp. 294, 299.  
 1879. *Nautilus obesus*, Stoddart, Proceed. Bristol Naturalists' Soc. vol. ii. pt. iii. p. 279.  
 1888. *Nautilus obesus*, Beeby Thompson, The Middle Lias of Northamptonshire, p. 54.

Fig. 11.



*Nautilus obesus*.—*a*, lateral view of a cast, showing the septa and the open umbilicus; *b*, front view, showing the position of the siphuncle. Drawn from a specimen in the British Museum (no. 39623). Rather more than one third natural size.

*Sp. char.* "Gibbose, umbilicate, plain; back broad, flat; mouth large, squarish; septa very numerous, not recurved; siphuncle nearly central. . . . Thickness about three fourths the diameter. The mouth is large, being two thirds the diameter long. The septa are very numerous; their angles not being recurved gives a very open form to the umbilicus. The siphuncle is transversely oval." (*Sowerby*.)

*Remarks.* We may add to this description that there is a specimen in the Woodwardian Museum from Bridport, Dorsetshire, on which the test remains; it is marked only with lines of growth. This shell is 4 inches in diameter.

This species appears to be most nearly allied to *Nautilus*



*toarcensis*, d'Orbigny, but the latter is readily distinguished by its much thicker and broader shell, larger umbilicus, and more distant septa.

It is often a matter of very great difficulty to identify the species of *Nautilus* figured in the 'Mineral Conchology,' owing partly to the brief descriptions and partly to the figures being foreshortened, with the object of economizing space by showing as much of the specimens as possible in one view. Two views at least of each species are essential in order to give a correct idea of the form of the shell. There can be little doubt, however, that the specimens we have, after very careful comparison, referred to *N. obesus* are identical with Sowerby's fossil. Though the *type* specimen is unfortunately not in the "Sowerby Collection," there is an example in that collection labelled, probably by Sowerby himself, "*N. obesus*," which sufficiently agrees with the figure and description in the Min. Conch. to justify its reference thereto. Besides this individual there are several others both from England and France which, though young shells, possess unmistakably the characters of the present species. It is hoped that the figures here given of *N. obesus* may help to make it recognizable.

On comparing examples of this species from the Inferior Oolite of Courcy, Normandy, with d'Orbigny's figure of *Nautilus lineatus*\*, we find that they agree remarkably well, and we have therefore placed the *N. lineatus* of d'Orbigny in the synonymy of the present species.

*Horizon.* Inferior Oolite.

*Localities.* Bath, Dundry, Somersetshire; Minchinhampton, Gloucestershire: Courcy, Normandy.

### 11. *Nautilus inornatus*, d'Orbigny.

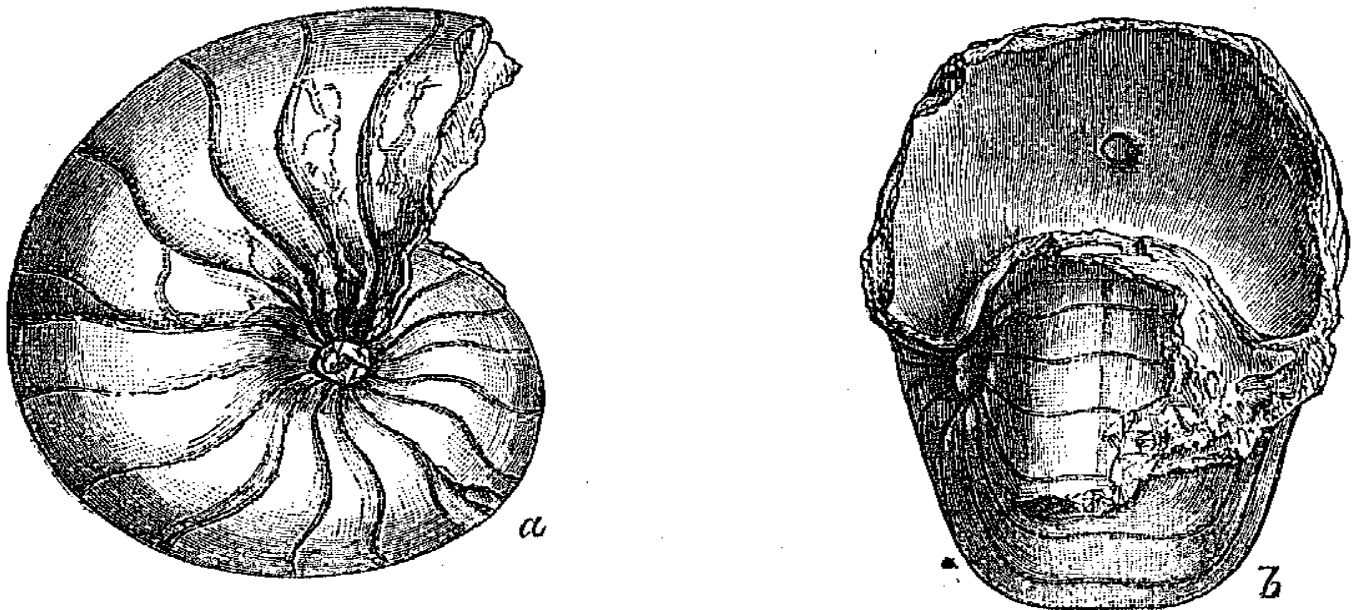
1842. *Nautilus inornatus*, d'Orbigny, Paléontologie Française, Terr. Jurass. vol. i. p. 152, pl. xxviii.  
 1845. *Nautilus inornatus*, Murchison, Outline of the Geology of the Neighbourhood of Cheltenham, new ed. p. 91.  
 1849. *Nautilus inornatus*, d'Orbigny, Prodr. de Paléont. Stratigr. vol. i. p. 245.  
 1857. *Nautilus inornatus*, Etheridge, in Mem. Geol. Surv. Great Britain; Hull, On the Country around Cheltenham, p. 27.  
 1858. *Nautilus inornatus*, Ooster, Cat. des Céphalopodes Fossiles des Alpes Suisses, pt. iii. p. 8.  
 1863. *Nautilus inornatus*, Day, Quart. Journ. Geol. Soc. vol. xix. p. 291.  
 1864. *Nautilus inornatus*, Eudes-Deslongchamps, Études sur les Étages Jurassiques Inférieurs de la Normandie, p. 83.

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\* Paléont. Franç., Terr. Jurass. vol. i. p. 155, pl. xxxi. figs. 1, 2.  
*Ann. & Mag. N. Hist.* Ser. 6. Vol. v. 21

1871. *Nautilus inornatus*, Phillips, Geology of Oxford and the Valley of the Thames, pp. 131, 164.  
 ? 1877. *Nautilus inornatus*, J. Buckman, Quart. Journ. Geol. Soc. vol. xxxiii. p. 2.  
 1879. *Nautilus* cf. *inornatus*, d'Orb., Branco, Der Untere Dogger Deutsch-Lothringens (Abh. zur geol. Specialkarte von Elsass-Lothringen), Band ii. Heft i. p. 57.  
 1884. *Nautilus inornatus*, Mallada, Bol. Com. del Mapa Geol. de España, Sinopsis de Fósiles de España, vol. xi. p. 228 (figured *ibid.* vol. v. 1878, pl. iii. figs. 5, 6).

Fig. 12.



*Nautilus inornatus*.—*a*, lateral view of a cast, showing the septa and very small umbilicus; *b*, front view, showing the siphuncle, "normal line," and the septa. Drawn from a specimen in the British Museum (no. C. 2843). Rather less than one half natural size.

*Sp. char.* Shell inflated, smooth, slightly umbilicated, flattened on the sides and periphery, making the section subquadrate, the greatest thickness being just above the umbilicus. Aperture wider than high. Sutures rather flexuous on the sides and curved backwards in crossing the periphery. There is a small dorsal (internal) lobe. Siphuncle a little above the centre. Body-chamber unknown.

*Remarks.* This species most nearly resembles *Nautilus obesus*, J. Sowerby, but it may be readily distinguished by its less robust shell, wider septa, and less open umbilicus, as well as by the slightly different position of the siphuncle.

The French specimen is a natural cast showing the sutures, siphuncle, and internal lobe, but the ornamentation of the inner whorl or young shell only is preserved. This consists of very fine lines of growth, crossed by fine, longitudinal, thread-like lines, the decussating sculpture characteristic of the young of *Nautilus*.

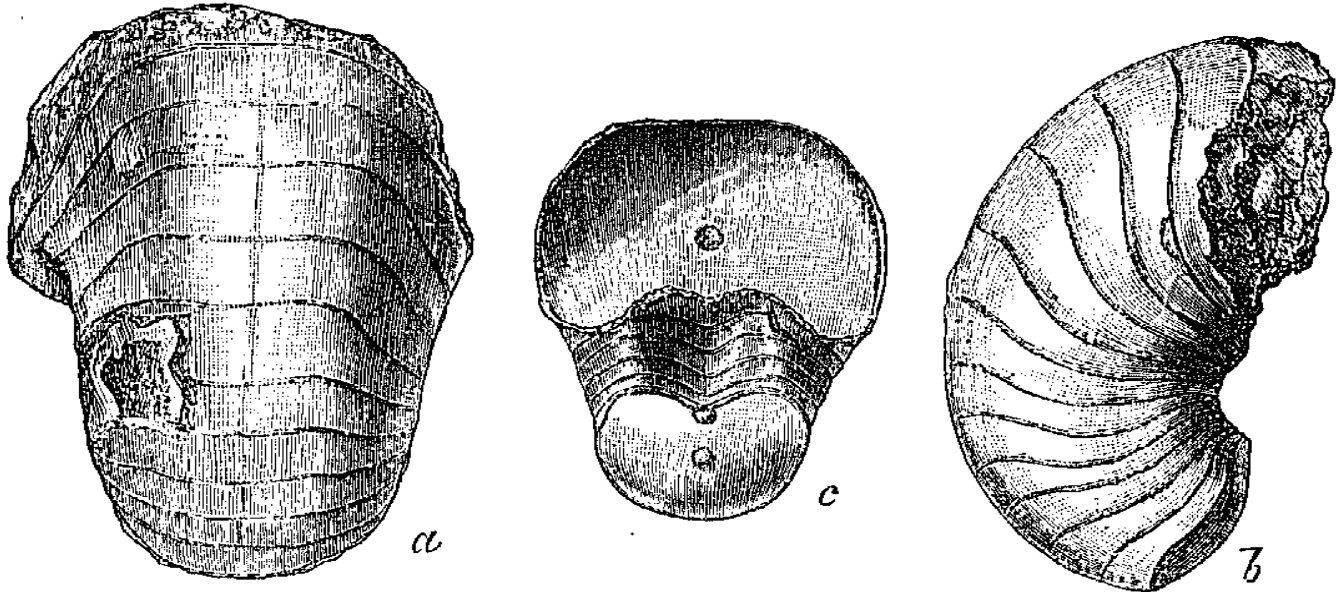
It is very doubtful whether the English references to this species are correct, because d'Orbigny's figure in the 'Paléontologie Française' does not correctly represent this species, a specimen of which from the d'Orbigny Collection we have had the opportunity of examining.

*Horizon.* Inferior Oolite.

*Locality.* Burton-Bradstock, Dorsetshire.

12. *Nautilus multiseptatus*, sp. nov.

Fig. 13.



*Nautilus multiseptatus.*—*a*, peripheral view of the septate part of the shell, showing the sutures and "normal line;" *b*, lateral view of the same; *c*, interior whorl of another specimen, showing the siphuncle and the inner (dorsal) lobe of the sutures. Drawn from specimens in the British Museum (no. 82379). *a* and *b* rather more than half natural size; *c*, natural size.

*Sp. char.* Shell compressed at the sides and somewhat flattened on the periphery, so that the whorls have a sub-quadrate section. Umbilicus open, of moderate size, with rather steeply sloping sides, probably exposing the inner whorls, but the specimens are not complete enough to determine the amount of enrolment. Septa very numerous, thirteen in about half a volution; sutures gently curved upon the sides of the shell and nearly straight upon the periphery. Internal (dorsal) lobe very conspicuous (see fig. 13, *c*). The cast is marked with a very distinct "normal line" along the median line of the periphery (see fig. 13, *a*). Siphuncle below the centre. Some detached body-chambers, probably belonging to this species, have portions of the test preserved, and this is quite smooth.

*Remarks.* This species appears to be nearly related to

*Nautilus obesus* (see fig. 11), but it is distinguished by its closer septa, the position of its siphuncle, its more slender whorls, and narrower periphery.

The specimens were all obtained in the Northamptonshire Ironstone, and from most of them the shell has been dissolved away, leaving hollow spaces surrounding the casts.

*Horizon.* Inferior Oolite.

*Locality.* Duston, Northamptonshire.

### 13. *Nautilus clausus*, d'Orbigny.

1842. *Nautilus clausus*, d'Orbigny, Paléontologie Française, Terr. Jurass. vol. i. p. 158, pl. xxxiii.
1849. *Nautilus clausus*, d'Orbigny, Prodr. de Paléont. Stratigr. vol. i. p. 260.
1852. *Nautilus clausus*, Giebel, Fauna der Vorwelt, Band iii. Abth. i. p. 155.
1858. *Nautilus clausus*, Quenstedt, Der Jura, p. 350.
1858. *Nautilus clausus*, Chapuis, Nouv. Rech. sur les Foss. des Terr. Secondaires de la Province de Luxembourg (Acad. Roy. de Belgique, tom. xxxiii. des Mém.) pt. i. p. 14, pl. iii. fig. 1.
1860. *Nautilus clausus*, Wright, Quart. Journ. Geol. Soc. vol. xvi. p. 13.
1860. *Nautilus clausus*, Coquand, Synop. des Foss. Secondaires de la Charente, de la Charente-Inférieure, et de la Dordogne, p. 9.
1864. *Nautilus clausus*, Ebray, Etudes Géologiques sur le Département de la Nièvre, fasc. 13, 14, p. 270.
1868. *Nautilus clausus*, Dewalque, Prodrome d'une Description Géologique de la Belgique, p. 352.
1873. *Nautilus clausus*, Sharp, Quart. Journ. Geol. Soc. vol. xxix. p. 299.
- ? 1878. *Nautilus clausus*, Bayle, Explication de la Carte Géologique de la France, vol. iv., Atlas, pl. xxxvi.
1884. *Nautilus clausus*, Mallada, Boletín de la Comisión del Mapa Geológico de España, vol. xi., Sinopsis de las Especies Fósiles de España, p. 228.

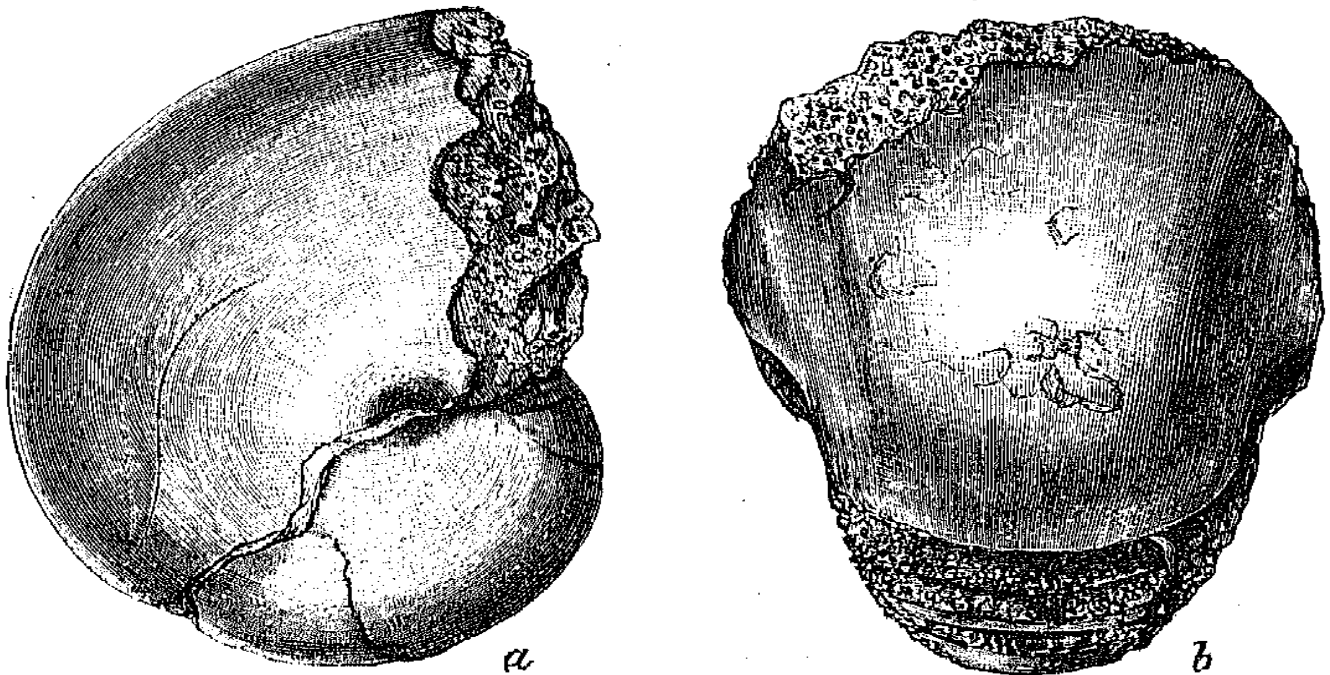
*Sp. char.* Shell inflated, rapidly enlarging, somewhat compressed on the sides, broad and flattened on the periphery; surface of test smooth or marked only with very fine subregular lines of growth. Whorls completely involute, widest in the region of the umbilicus, which is closed by a shelly callus. Aperture much wider than high. Septa slightly curved on the sides and forming a shallow sinus on the periphery. Siphuncle a little below the centre.

*Remarks.* This species bears some resemblance to *Nautilus subtruncatus*, Morris and Lycett\*, and it is also like *N. Baberi* of the same authors; it differs from the former in its smooth test and from the latter in the same feature and also in its closed umbilicus.

\* Mon. of the Mollusca from the Great Oolite, Pal. Soc. 1850, pt. i. p. 10, pl. i. figs. 1, 2.

We have lately had the great advantage of examining a specimen of the present species from the d'Orbigny Collection of the Museum of Natural History, Paris, and there is in

Fig. 14.



*Nautilus clausus*.—*a*, lateral view, showing the septate part of the shell covered with the test, and the cast of the body-chamber with part of the anterior border of the muscular impression, represented by the curved line; *b*, peripheral view, showing some of the septa at the lower part of the figure. Drawn from a specimen in the d'Orbigny Collection of the Museum of Natural History, Paris. About one half natural size.

the British Museum a good representative of it from Moutiers (Calvados). We have also seen a young specimen in the Woodwardian Museum, Cambridge, which appears to belong to this species; it is from Dundry, the only British locality mentioned by d'Orbigny. *N. clausus* is evidently rare in England, for it is not recorded in any of the papers on the geology of Somerset, by Etheridge, Tawney, and Stoddart; and Mr. E. Wilson has informed us that there are no examples of it in the Bristol Museum. Under these circumstances the determination of this species by Wright from Leckhampton Hill (Gloucestershire), and by Sharp\* from the Northampton Sands, must, in the absence of descriptions and figures, be accounted of doubtful accuracy. The finest specimen of this species that we have seen is from Sherborne, Dorsetshire; it measures 9 inches in diameter and  $6\frac{1}{4}$  inches in width.

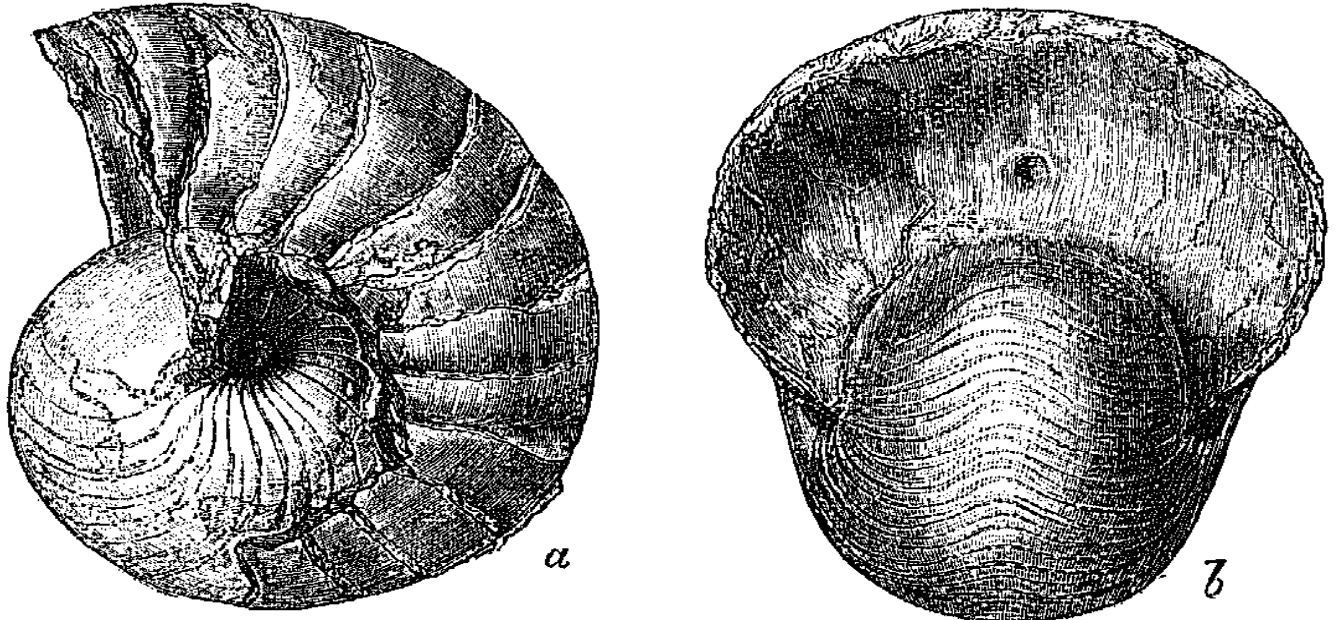
\* For references to these authors' papers see the table of synonymy above.

*Horizon.* Inferior Oolite.

*Localities.* Dundry, Somersetshire; Sherborne, Halfway House, Dorsetshire.

14. *Nautilus perinflatus*, sp. nov.

Fig. 15.



*Nautilus perinflatus*.—*a*, lateral view of septate part of the shell, showing the small umbilicus, with a portion of the test; *b*, front view, showing the position of the siphuncle. Drawn from a specimen in the British Museum (no. 18398). Rather more than one third natural size.

*Sp. char.* Shell much inflated, very slightly flattened on the sides; peripheral area scarcely defined. Whorls semi-lunate in section, rather more than twice as wide as high, deeply embracing. Umbilicus very small. Septa rather approximate; sutures slightly curved on the sides of the shell and forming a shallow sinus on the periphery. Siphuncle near the inner margin. Test thick, marked only with lines of growth.

*Remarks.* This species closely resembles the *N. subinflatus* of d'Orbigny\*, but differs in the position of its siphuncle and the greater size of the shell. Moreover, the examples upon which d'Orbigny's species was founded were obtained from the Kimmeridge Clay of Chatelaillon, near Rochelle (Charente-Inférieure), Honfleur (Calvados), and other localities, whereas the English specimens are from the Inferior Oolite of Bradford-Abbas, Dorsetshire, and Bristol.

\* Prodr. de Paléont. Stratigr, 1850, vol. ii. p. 43; this species was originally called *inflatus* (Paléont. Franç., Terr. Jurass. 1842, vol. i. p. 165, pl. xxxvii.).

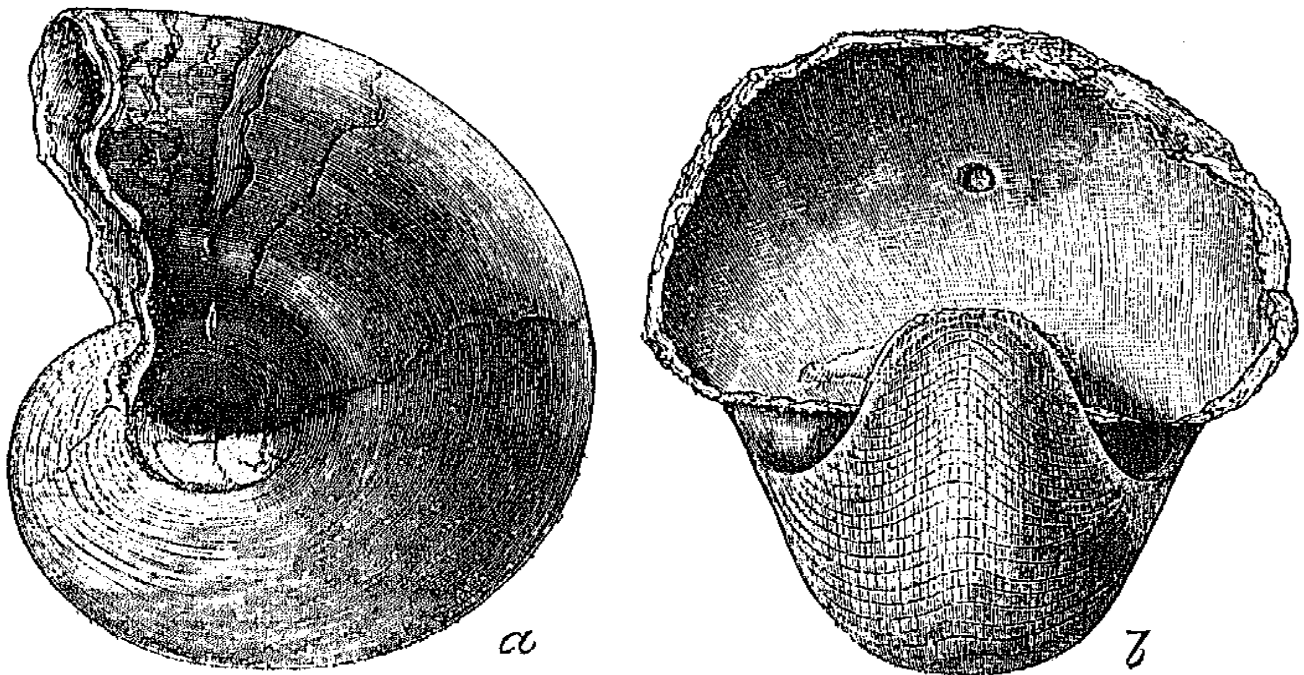
The largest specimen known to us is from the Inferior Oolite of Sherborne, Dorsetshire; its greatest diameter is 8 inches and greatest width  $6\frac{1}{2}$  inches. Distinct traces of the anterior border of the muscular impression are observable on the cast of its body-chamber.

*Horizon.* Inferior Oolite.

*Localities.* Bradford - Abbas, Sherborne, Dorsetshire; Bristol, Somersetshire.

15. *Nautilus Smithi*, sp. nov.

Fig. 16.



*Nautilus Smithi.*—*a*, lateral view; *b*, front view, showing the ornaments of the young shell and also the position of the siphuncle. Drawn from a specimen in the British Museum (no. C. 747). About two thirds natural size.

*Sp. char.* Shell inflated, rapidly increasing, slightly compressed on the sides, broadly rounded on the periphery. Whorls much wider than high, widest in the region of the umbilicus. The latter is small, with a subangular margin and steeply sloping sides. The septa are rather distant from each other on the periphery, being half an inch apart where the height of the whorl is  $1\frac{3}{4}$  inch. The sutures are but slightly curved on the sides and form a very shallow sinus on the periphery. The siphuncle is slightly above the centre. The test is ornamented with fine lines of growth, which tend to gather into obscure folds and form a deep sinus on the periphery; these are crossed by close-set longitudinal lines, more distinct in the young shell.

*Remarks.* The chief distinguishing character of this species

is the subangular border of the umbilicus. In this last feature and also in the wide and semilunate section of the whorl this species resembles *Nautilus excavatus*\*; but the latter has a much larger umbilicus and closer septa. It may also be compared with *N. Malherbi*, Terquem †; but the latter is at once distinguished by its less globose form and much larger umbilicus.

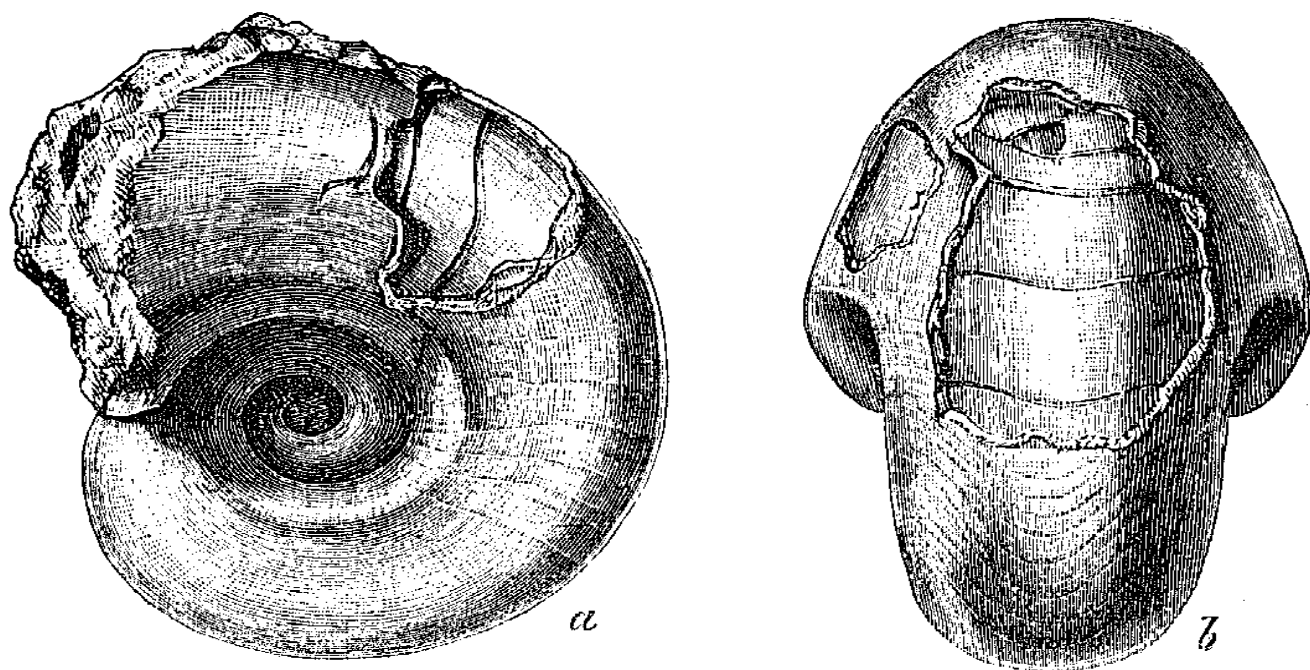
The type of this species (B. M. no. C. 747) is in the "Wm. Smith Collection;" hence the specific name. There is a fine example from Sherborne, Dorsetshire, in the Woodwardian Museum, Cambridge, in which the test is beautifully preserved. Two smaller ones in the same Museum are from Halfway House, Dorsetshire, and one shows the sculpture of the young shell perfectly.

*Horizon.* Inferior Oolite.

*Localities.* Burton-Bradstock, Halfway House, Bradford-Abbas, Dorsetshire. Two specimens in the British Museum (nos. C. 747 and C. 3095) are without localities, but are undoubtedly British.

16. *Nautilus burtonensis*, sp. nov.

Fig. 17.



*Nautilus burtonensis*.—*a*, lateral view, showing the large umbilicus exposing the inner whorls; *b*, peripheral view, showing some of the sutures where the test is removed. Drawn from a specimen in the British Museum (no. C. 2841). Somewhat less than half the natural size.

\* J. de C. Sowerby, *Min. Conch.* vol. vi. p. 55, pl. dxxix. fig. 1.

† *Mém. Soc. Géol. France*, sér. ii. vol. v. pt. ii. 1855, p. 243, pl. xii. figs. 5, 5 *a*, 5 *b*.



*Sp. char.* Shell subglobose, compressed on the sides and periphery, the latter at first narrow and considerably flattened, but in the later stages of growth becoming wider and more rounded. The umbilicus is very large in proportion to the shell-diameter, its greatest width being  $1\frac{1}{2}$  inches, while that of the shell is about 5 inches; it is moderately deep and exposes all the inner whorls, the sides slope steeply, and the outer border is subangular. The test, which is admirably preserved, is thick, and its surface is marked only with fine lines of growth, which make a deep sinus upon the periphery (see fig. 17, *b*). The septa are rather wide apart; the sutures slightly sinuous on the sides of the shell and forming a slight sinus on the periphery. In a young shell ( $2\frac{1}{4}$  inches in diameter) the inner lobe is very conspicuous. The siphuncle is a little below the centre.

*Remarks.* This fine species is unlike any other known to us in the Jurassic rocks, but it bears some resemblance in the character of its umbilicus to the recent *Nautilus umbilicatus*, from which species it differs, however, in the proportionately greater size of its umbilicus and more flattened periphery.

*Horizon.* Inferior Oolite.

*Locality.* Burton-Bradstock, Dorsetshire.

#### MIDDLE OOLITE.

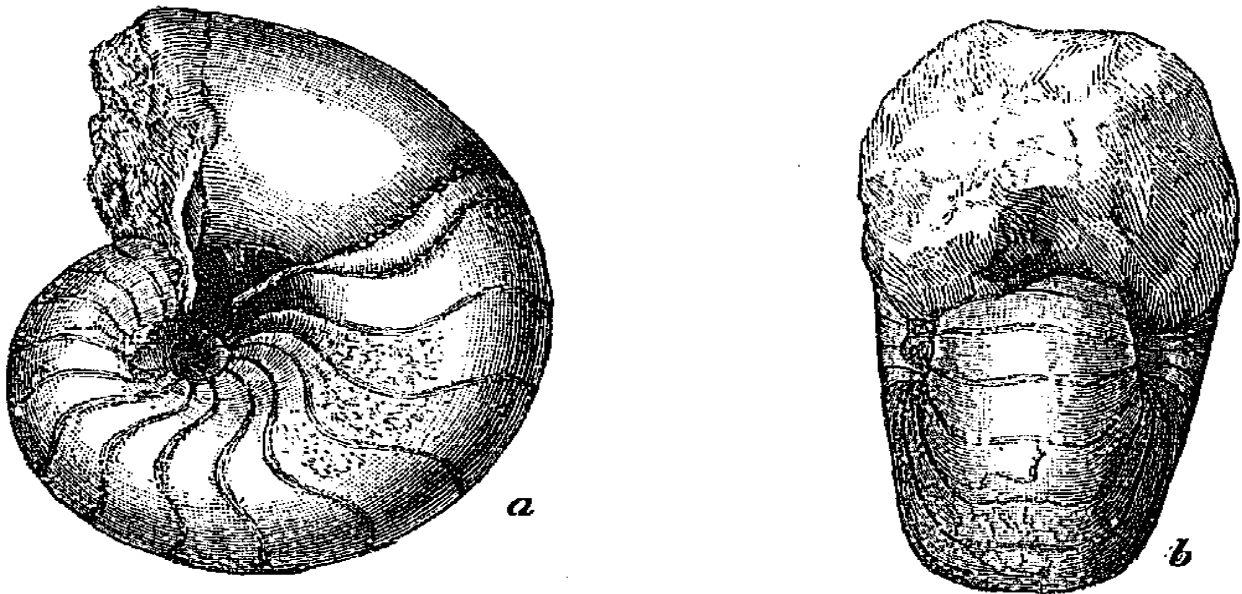
##### 17. *Nautilus calloviensis*, Oppel.

1840. *Nautilus hexagonus*?, J. de C. Sowerby, in Grant's Fossils of Cutch, in Trans. Geol. Soc. ser. ii. vol. v. pt. ii. p. 329, pl. xxiii. fig. 4 (not of Sowerby).
1842. *Nautilus hexagonus*, d'Orbigny, Paléontologie Française, Terr. Jurass. vol. i. p. 161, pl. xxxv. figs. 1, 2 (not of Sowerby).
1858. *Nautilus calloviensis*, Oppel, Die Juraformation Englands, Frankreichs und des südwestlichen Deutschlands, p. 547.
1875. *Nautilus calloviensis*, Waagen, Mem. Geol. Surv. India, Palæont. Indica, Jurassic Fauna of Kutch, vol. i. p. 18, pl. iii. figs. 2, *a*, *b*.
1884. *Nautilus calloviensis*, Lahusen, Mémoires du Comité Géologique [Russia], vol. i. no. 1, p. 42, Taf. iii. figs. 28, *a*, *b*, and 29, *a*, *b* (young).
1884. *Nautilus hexagonus*, Mallada, Boletín de la Comisión del Mapa Geológico de España, Sinopsis de las Especies Fósiles de España, vol. xi. p. 229 (figured 1878, vol. v. pl. iv. fig. 9).

*Sp. char.* General form of the shell somewhat compressed, smooth, or marked only by faint, very fine, close-set lines of growth. The whorls are obtusely angular, flattened at the sides, and broadly truncated upon the periphery, the greatest thickness being at the umbilical margin. The umbilicus is very small. The septa form a sigmoid curve upon the sides of the shell and are slightly sinuous upon the periphery.

Siphuncle central. The ornaments of the test are described more exactly by Dr. Waagen\* as follows:—"The shell itself is covered with two systems of fine striæ, of which the parallel ones, which follow the direction of the spiral, are limited to the external part of the shell. The others—striæ

Fig. 18.



*Nautilus calloviensis*.—*a*, lateral view of a cast, showing the septation and part of the body-chamber; *b*, front view. Drawn from a specimen in the British Museum (no. 88979). Nearly two thirds natural size.

of growth—cover the whole shell, are somewhat falciform on the sides, but bend strongly backward on the external part. On very large specimens these lines become very strong and numerous, and look as if cut in with a knife; the other system of striæ then entirely disappears. . . . On the cast the normal line is often very strongly pronounced."

*Remarks.* This species is rather near to *N. lineatus*, but it is distinguished by its more sinuous and approximate septa and narrower umbilicus.

The differences which separate the present species from *N. hexagonus*, J. de C. Sowerby, have been pointed out by that author in his description of the Kutch fossils collected by Captain Grant †. He says, "This [*N. hexagonus*?] differs from *N. hexagonus* in having a smaller umbilicus and in being more rounded."

Oppel distinguished this species from Sowerby's by its wider aperture; it may also be known by its deeply-lobed

\* Mem. Geol. Surv. India, Palæont. Indica, Jurassic Fauna of Kutch, vol. i. p. 18.

† Trans. Geol. Soc. ser. ii. vol. v. pt. ii. 1840, Explanation of Plates.

sutures, in which character it approaches *Nautilus* (*Herzoglossa*) *franconicus*, Oppel.

*Horizon.* Calcareous Grit and Kelloway Rock.

*Localities.* Wiltshire; Marcham, Berkshire (Calcareous Grit). Scarborough, Yorkshire (Kelloway Rock).

XL.—On the Dentition of *Pleuroplax* (*Pleurodus*), *A. S.*  
Woodw. By JAMES W. DAVIS, F.L.S.

[Plate XIII.]

IN May 1879 \* I described the teeth and spines of *Pleuroplax* (*Pleurodus*) *affinis*, Agass., occurring in a thin shale above the Better-bed Coal of Clifton and Lowmoor, near Halifax. A comparison of these spines with similar ones from the Staffordshire Coal-field, in the cabinet of Mr. John Ward, of Longton, showed them to be closely related. In connexion with one of the Staffordshire spines were a few fragments of teeth, referred with probability to the genus *Helodus*, and the inference was drawn that the two genera had similar spines.

Mr. Ward has just issued an admirable account of the North Staffordshire Coal-field †, in which he refers to the occurrence of numerous teeth of *Helodus simplex*, Ag., in association with a spine much resembling that of *Pleuroplax*, the full description of which he reserves to a future time. Mr. Ward also describes a specimen in his collection from the Northumberland Low Main Coal of the jaw of *Pleuroplax Rankinei*, Ag. It "is somewhat in the shape of a horseshoe, with a blunt rounded extremity, the articular ends expanded. Both rami support teeth, several of which unfortunately are displaced. Those in position are arranged upon the jaw with the lateral expansions pointing antero-posteriorly. The anterior teeth are relatively narrower than the posterior. The most posterior tooth, at least, has the summit of the crown crenulated."

Recently, whilst on a visit to Glasgow with my friend Mr. A. Smith Woodward, we found two specimens of *Pleuroplax* which prove not only that the two genera had similar spines, but that they are one species with the same spine. One of the specimens is from the University Museum, Glasgow, and

\* Quart. Journ. Geol. Soc. vol. xxxv. p. 181, pl. x. figs. 1-11.

† "The Geological Features of the North Staffordshire Coal-fields," by John Ward: Trans. N. Stafford. Inst. of Mining and Mechanical Engineers, vol. x. (1890).