

PROCEEDINGS
OF THE
Cotteswold Naturalists'
FIELD CLUB,
For 1884—1885.

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CORRIGENDUM.

Vol. VII, Pl. IV, fig 4, pp. 274 and 279—For *Nerinæa Simplex*, read "*N. Calcareæ*." It appears that the name *N. Simplex* was given to another species by DESLONGCHAMPS, in 1849.

On the Forest Marble and Upper Beds of the Great Oolite, between Nailsworth and Wotton-under-Edge. By E. WITCHELL, F.G.S.

The country situate between Nailsworth and Wotton-under-Edge has hitherto received little attention from Cotteswold Geologists.

LYCETT, in describing it in the "Geology of the Cotteswold Hills," selects, as an example of its Geology, the large quarry on the summit of Wotton hill, which, he says, "yields stone fitted for rough walls and road mending, but shells are absent"—that "there are occasional layers of fine shelly detritus, together with single plates and spines of *Echinoderms* joints of *Pentacrinites*, and, rarely, the teeth of fishes." That similar Sections are met with commonly over the plateau of the Great Oolite between Bath and Minchinhampton. "Oolitic Limestones, forming beds of no great thickness, destitute of clay or marl partings, and without a trace of organic life, are commonly met with."

This description always appeared to me so unattractive that for a long time I thought that an examination of the rocks exposed would not probably lead to the discovery of anything of an interesting or instructive character to reward me for my trouble, consequently I have never until recently examined them, nor am I aware that any member of the Club has done so since LYCETT wrote his book. In fact when the Club, a few years ago, went over a portion of the ground to visit Calcot Barn, two quarries at Tiltup's End were passed by, as they were not supposed to contain anything worth halting to examine,

but I am now inclined to think that there are few Geological Sections in the Cotteswolds that will not repay the observer for the time he may spend in their exploration, and the quarries at Tiltup's End are examples in point.

Recently, in company with two of our colleagues, Mr CHAS. PLAYNE and Mr ALFRED SMITH, of Nailsworth, I went over the ground between Nailsworth and the top of Wotton hill. Our object was chiefly to see if there was sufficient material for a programme of one of the Summer meetings of the Club. The result of our examination, so far as it relates to the Geology of that part of the Cotteswolds, is contained in the following notes, which I have put together, thinking that they might be interesting to the Geologists of the Club.

The area which I have mentioned is shown on the map of the Geological Survey as occupied by the Forest Marble and Great Oolite. In the neighbourhood west of Kingscote the Forest Marble occupies the high ground, but in that locality the two formations resemble each other so closely on the surface that it is not easy to trace the boundary lines without the aid of the Map. The White Limestone of the Great Oolite in that part of the area nearer to Nailsworth is more distinctive. These Limestone beds, which constitute the upper part of the Great Oolite, have their greatest development in the neighbourhood of Sapperton Tunnel, where they have a thickness of twenty feet, and they are probably very little thinner as they approach Minchinhampton. Dr WRIGHT describes them briefly in his paper on "The Correlation of the Jurassic Rocks of the Côte D'or with those of the Cotteswolds;" he mentions them as occurring at Minchinhampton, Cowcombe, and Sapperton, but does not allude to their extension south-westward beyond Minchinhampton.

Dr LYCETT gives a full description of the Limestone, and speaks of it as passing through the village of Avening and the Minchinhampton district, but he does not appear to have traced it in the direction of Wotton-under-Edge. This has now been done, and it is found to gradually thin out in that direction, and to disappear near Kingscote.

The first quarry on the hill south-west of Nailsworth is on the Bath road at Tiltup's End. The following is the Section :—

No.	ft.	in.	
1	2	0	—Surface rubble.
2	7	0	—Beds of Forest Marble, fissile near the top, but thicker and more regularly bedded beneath. Some of the beds appear as if they had been originally consolidated in thick blocks, but had subsequently split into thin beds. These beds are composed of sand, lime, and shelly detritus, highly crystalline, and of a greyish white in colour. They contain few fossils. The upper beds are more Oolitic, and light brown in colour.
3	0	4	—Marly and sandy band, in places replaced by reddish clay. (In the next quarry described this band is highly fossiliferous.)
4	4	0	—White Limestone (Great Oolite) in thick beds ; some parts are white and chalky, others are very hard, having a conchoidal fracture, and varying in colour from white to a pale straw or creamy white. It contains in its upper part numerous fossils, in a highly crystalline condition. The fossils include some large examples of <i>Nerinæa</i> . The base of the beds is not exposed.

At the distance of about 300 yards in the direction of Calcot Barn there is another quarry, now disused, in which the Forest Marble has been denuded, so that the White Limestone is within three feet of the surface, and is about seven feet thick. The upper stratum of the Limestone contains three or more species of *Nerinæa*, one species in large numbers. They occur in a layer about six inches thick, which is almost made up of these shells, but *Terebratula maxillata*, and *Lima* (sp) are moderately abundant; a coral, *Isastrea Beesleyi*, is also common; small lumps covered with *Bryozoa* are also abundant. The presence of *Nerinæa* in such profusion is somewhat remarkable, especially as in the quarry first mentioned the thin band between the Limestone and Forest Marble beds does not contain any fossils.

The Limestone beds may be seen in small sections between Tiltup's End and Kingscote. In a small quarry near Lasborough it forms the surface rubble, and probably thins out at no great distance beyond. In a road-side quarry south of Kingscote its thickness can be measured, and it appears to be only 10 inches; beneath is the shelly bed of the Great Oolite. In the larger

quarry, now disused, two miles beyond, towards Wotton-under-Edge, it does not appear, and has thinned out altogether. I believe it does not again occur in that direction. It may also be remarked that when the Club visited Beverstone Castle some time ago, it was noticed and recorded that the Limestone beds had thinned out in that direction also, as no trace of them could be found in the Great Oolite quarry near Beverstone.

The following fossils have been found by me in the White Limestone at Tiltup's End. Those marked with an asterisk were found only in the *Nerinæa* bed:—

BRACHIOPODA.

- **Terebratula maxillata*, *Sow.* *Waldheimia bullata*, *Sow.* var.
 **Waldheimia ornithocephala*, *Sow.*

GASTEROPODA.

- **Nerinæa Voltzii*, *Desl.* *Alaria trifida*, *Phil.*
 ———— *complicata*, n. sp. *Nerita hemisphærica*, *Rœm.*
 ———— *intermedia*, n. sp. *Natica*, sp.
 ———— *simplex*, n. sp. *Acteonina Luidii*, *Mor.* (qy.)
 ———— n. sp. *Purpuroidea*, fragments of
 ———— (*Trochalia*) *Eudesii*, *M. & L.* **Amberleya*, sp. "
Cerithium, casts of **Phasianella conica*, *M. & L.*
 *———— *quadricinctum*, *Gold.* *Monodonta Labadyei*, *Archiac* sp.
 *———— sp.

CONCHIFERA.

- Cardium pes-bovis*, *D'Arch* *Lima Cotteswoldiensis*, n. sp.
Lucina bellona, *D'Orb.* *Cyprina Loweana*, *M. & L.*
 ———— *subglobosa*, nov. sp. **Ostrea costata*, *Sow.*
 **Pecten arcuatus*, *Sow.* ———— sp.
 ———— *vagans*, *Sow.* **Isocardia minima*, *Phil.*

ECHINODERMATA.

Echinobrissus clunicularis, *Wr.*

ANTHOZOA.

- Serpula socialis* **Isastrea Beesleyi*
 **Anabacia*, sp.

It may be here remarked that *LYCETT*, in his description of the White Limestone, speaks of it as upon the whole remarkably

destitute of organic remains, but he mentions two exceptions, first, the *Pachyrisma* bed at Bussage and Cowcombe, at the base of the Limestone, in which that shell, two species of *Natica*, and two of *Purpuroidea* are abundant,—and secondly, a single locality east of Minchinhampton, where the uppermost bed of the series, described as a sandy buff-coloured rock, contains *Pholadomya socialis*, *Lucina Bellona*, *Ceromya concentrica*, *C. Symondsii*, *C. undulata*, *Cyprina Loweana*, *Purpuroidea Morrissii*, *P. nodulata*, *Nerita rugosa*, *Nerinea funiculus*, *Alaria armata*, *A. paradoxa*, *Cardium pes-bovis*, and *Goniomya litterata*, in greater or less abundance. It is singular that our *Nerinea* bed, which is exactly on the same horizon, contains a larger assemblage of shells, but all except two, or at the utmost three, are of different species. The existence of these beds of fossils on the same horizon but some five miles distant from each other, suggests the probability that other like assemblages occur in the surrounding neighbourhood, and that the close of the Limestone period was marked by an accumulation of shells in patches on the floor of the Oolitic sea, constituting a zone of life not altogether identical with that of the period of the shelly Weatherstones, which preceded the formation of the Limestone.

A mile beyond Tiltup's End, on the Bath road, and near Calcot Barn, there is a small quarry, used for obtaining road-stone. It is about ten feet deep, of which the lower five feet consist of thick compact beds, which at first sight somewhat resemble the White Limestone, but on closer examination they are found to differ in structure and colour, and are identical with the lower beds of Forest Marble at Tiltup's End. The formation is coloured "Forest Marble" on the Geological Survey Map. From the resemblance of these beds to those at Tiltup's End I have no doubt that they occupy a similar position, and that the White Limestone is beneath. It confirms the opinion I have before expressed that the Forest Marble of this area was originally thick bedded and not fissile, as it is usually seen in the neighbourhood of Cirencester.

All the fossils in these beds are either in the form of casts or are so highly crystalline as to defy almost every effort to

extract them. An accidental fracture may expose the internal structure, or the external surface of part of a shell, which may possibly with very great care and patience be cleared. In this way I obtained a very fine specimen of a *Trigonia*, belonging to the *undulata*. I consider it to be a variety of *T. undulata*, as it differs in form from that shell, as described by LYCETT in the monograph of the *Trigoniæ*, published by the Palæontographical Society. It is much higher in comparison with its breadth, and has a narrower area and more curved umbones than is shown in the published figures, and is much larger in size. (Plate IV., fig. 6.)

The shelly Weatherstones of the Great Oolite do not appear on the surface in the area under description. They occur in the greater part of the Cotteswolds, and come next to the White Limestone, which they underlie. They extend beyond the margin of the Limestone area in almost every direction. At Minchinhampton Common they are about fifteen feet thick. At Tiltup's End the Section is not sufficiently deep to expose them, but they may be seen in the road-side quarry near Kingscote, as before mentioned, where they appear to have become less shelly, except the upper two feet, which contain a fair assemblage of shells. Here they agree with a similar bed in the village of Nympsfield, half a mile south of Frocester hill, where there is a small section of Great Oolite, containing a shelly bed, three feet thick. A mile west of Kingscote, on the Wotton-under-Edge road, the beds are well exposed in a large road-side quarry, but they are no longer shelly, as at Minchinhampton; a few fossils, chiefly small valves of Oysters, occur, but the character of the beds is that of a rock composed of shelly detritus Oolitic granules and sand.

At the Ridge, and not far from the top of Wotton hill, is the quarry probably alluded to by Dr LYCETT, whose description of the rock as quoted above, is perfectly accurate. The shelly beds therefore may be described as commencing west of Kingscote, and a line drawn from thence to Frocester hill will sufficiently indicate their western extremity. Possibly they did not quite thin out at this line, but owing to the denudation of

the Uley valley and the escarpments of Frocester hill and Uley Bury, no trace of the shelly Great Oolite can now, so far as I am aware, be found to the south-westward of the line. The beds gradually increase in importance towards Minchinhampton Common, where the typical section is seen. From thence they extend eastwards through the hills north and south of the valley of the Frome at Chalford, and finally dip under the White Limestone in the Edgeworth valley.

From the circumstance of these beds merging into Weatherstones, composed chiefly of sand and shelly detritus, it seems probable that the shells were originally deposited not far from a shore, and were ground up into fine detritus, which was spread over a large area, and eventually consolidated into the Weatherstones, as described by LYCETT.—that another large deposit of shells took place, under conditions more favourable to their preservation, as will appear from an examination of the shelly beds of Minchinhampton Common, but even in these favoured areas the conditions ultimately changed, as is shown by the condition of the shells found in the planking beds, which are usually worn, and appear to have undergone much rolling before they were finally deposited. Other evidence of the proximity of land is seen in the abundance of plant remains in the Weatherstones, as well as the Forest Marble, throughout the area I have described.

The break between the White Limestone and the overlying beds is well defined in the Sections at Tiltup's End, and the occurrence of a layer of fossils in two localities just at the line of junction—the beds above and below not being very fossiliferous—followed by a change in the character of the deposits from a pure fine-grained chalky Limestone to a coarse sandy rock, made up of shelly detritus, sand, and Oolitic granules, points to a period of cessation of deposits, followed by a change of conditions, and probably of elevation of sea bottom. The Geological Surveyors were therefore right in making this horizon the line of separation between the Great Oolite and the Forest Marble, although this line is now considered merely as one of sub-division; and the Forest Marble is more usually regarded as a member of the Great Oolite series.

DESCRIPTION OF THE SPECIES FIGURED

LUCINA SUBGLOBOSA, n. sp. Pl. IV., fig. 1

Shell orbicular, globose, umbones tumid, mesial, curved, hinge margin nearly straight, oblique, lunule moderately large, concentric folds regular, nearly flat, having fine longitudinal striations. The thickness through both valves is equal to two thirds of the lateral diameter, height and breadth each ten lines.

The concentric folds resemble those of *Lucina Bellona*, D'ORB., with which it is found, and it may possibly be a variety of that species, but it is very much smaller, is more globose in comparison with its diameter, and is destitute of the oblique obscure elevation from the umbones to the inferior and posterior border, which is one of the characteristics of that species.

Locality.—Tiltup's End, near Nailsworth, in the White Limestone (Great Oolite.)

NERINÆA COMPLICATA. n. sp. Pl. IV., fig. 2, 2a

Shell very long, slender, conico-cylindrical, upper whorls concave, ornamented with five transverse minute ribs; the lower whorls gradually become flatter and smooth—the last few whorls thickened at the suture, which gives a slight convexity to the whorls. Columella solid, with three folds, the anterior fold bifurcated, the anterior branch of the bifurcation angulated, or slightly bifurcated; the middle fold angulated, the posterior fold bifurcated, there is also a small fold, sometimes scarcely visible, on the posterior wall. The outer wall has three principal folds, the upper or posterior fold is simple, the middle fold is sharply angulated and broad at the base; the anterior fold is also broad, and is more produced anteriorly. There is also a minute fold between the upper and middle principal folds; aperture sub-quadrate; length about five inches. The diameter of the whorls is slightly greater than the height.

The external characters of this shell resemble those of *Nerinea implicata*, D'ORB., and the internal characters approximate closely to those of that shell, as also to *N. bacillus*, D'ORB., and *N. Trachea*, DESL.; they do not however quite agree with those species. In *N. implicata* and *N. bacillus* the posterior fold on the outer wall is broad and angulated, in *N. complicata* it is narrow and rounded at the end. The fold next below, which is almost obsolete in *N. complicata*, is acute and deep in the two other species; the anterior fold is bifurcated in *N. complicata*, in the other species it is angulated only. There are also differences in the folds on the columella; in *N. complicata* the posterior fold is strongly bifurcated, in the other species it is merely angulated; the middle fold is angulated, in *N. bacillus* it is a round knob, larger than its base. *N. trachea* differs in having simple folds on the columella, and the posterior fold on the outer wall bifurcate.

Locality.—Tiltup's End, near Nailsworth, in the Great Oolite, where it is abundant.

NERINEA (TROCHALIA) EUDESII. Pl. IV., fig. 3, 3a, 3b, 3c

Nerinea (Trochalia) Eudesii, Mor. & Lyc., G. Ool. Mon.

Pl. 7, fig. 6

This shell is figured and described by MORRIS and LYCETT, the figure drawn is that of a young form. It is described as turreted, conical, excavated, whorls (ten) concave, narrow, with numerous transverse lines, sutures carinated, carinae elevated and smooth, base flattened, canal short, aperture sub-quadrate. It is said to be rare. The internal characters were not fully known to the authors, but as far as they could observe them they described the outer lip as simple, the columella plicated with one fold, and the upper portion of the volution having a very slight fold.

The external description given is correct, but MORRIS and LYCETT's figure bears slight proportion, as regards size, to the adult shell, which cannot be less than seven inches in length. The internal structure as described is inaccurate. The shell has a columella imperforate, with a blunt rounded fold upon it,

rather below the middle of the volution; the outer wall has a large conical acute fold at the middle of the volution; the slight fold referred to on the upper portion of the volution is doubtful.

Locality.—Tiltup's End, near Nailsworth, in the White Limestone (Great Oolite.)

a. this *ner.* **NERINÆA** [SIMPLEX, n. sp.] Pl. IV., fig. 4, 4a.

Shell smooth, conico-cylindrical; whorls flat, numerous, the height equal to two-thirds of the diameter, sutures moderately deep; columella perforated; outer wall with one small mesial fold; there is also a small fold in the posterior wall.

This shell is closely allied to *Nerinea gracilis*, Lyc., but is more conical, the whorls are much greater in diameter as compared with their height, the fold on the posterior wall also distinguishes it from that species.

Locality.—Tiltup's End, Nailsworth, in the White Limestone (Great Oolite.)

NERINÆA INTERMEDIA, n. sp. Pl. IV., fig. 5, 5a, and Pl. V. fig. 1, 1a.

Shell conical, volutions smooth, flat, suture slightly shown; aperture elongated, terminating in a channel, which is somewhat lengthened and curved backward; columella perforated, having one acute conical fold anterior to the middle of the volution; on the wall one deep blunted fold; on the posterior wall one deep acute fold. Length of adult specimen four to five inches.

Although specimens of this shell are exceedingly numerous in the *Nerinea* bed, it is difficult to obtain them otherwise than in fragments, and the best examples are somewhat worn on the surface, and are not sufficiently well preserved to enable me fully to show the external character of the species.

Locality.—Tiltup's End, near Nailsworth, in the *Nerinea* bed, between the Great Oolite and Forest Marble—abundant.

NERINÆA VOLTZII, Desl. Pl. V., fig. 3.

This shell is believed to be a full grown example of *N. Voltzii*, but in consequence of its crystalline condition its internal structure cannot be ascertained, it must therefore be judged only from its external appearance, but it differs only in size from some of the examples of that species from Minchinhampton. If this view be correct, it would seem that the shells figured by D'ORBIGNY and MORRIS and LYCETT were immature forms; the specimen now figured is many times larger than either of those figured by the authors named.

Locality.—Tiltup's End, near Nailsworth, in the *Nerinæa* bed, between the White Limestone and Forest Marble.

NERINÆA. sp. Pl. V., fig. 2, 2a.

Shell elongated, conico-cylindrical, volutions nearly flat, their height one-fourth less than the diameter; suture sub-obsolete, aperture nearly quadrate, outer lip angulated, channel small, curved backward, height probably four inches.

The form of the aperture distinguishes this species from *N. intermedia*, with which it is associated; there are traces of ornamentation upon the surface, in the form of encircling lines. The internal character is unknown. Having found only one fragment of this shell, I defer naming it until further specimens have been obtained.

Locality.—Tiltup's End, near Nailsworth, in the White Limestone (Great Oolite.)

NERINÆA ? DUBIA, n. sp. Pl. V., fig. 9, 9a.

Shell small, acute, volutions (eight) ornamented with very faint encircling lines, the last volution equal to two-fifths of the entire length, aperture small, sub-quadrate, channel slightly curved.

This shell may perhaps be only a young example of *Nerinæa*; its crystalline condition prevents an examination of its internal structure. It may possibly be a *Cerithium*.

Locality.—Bussage, in the Great Oolite.

CERITHIUM BUSSAGENSIS, n. sp. Pl. V., fig. 5, 5a, 5b.

Shell small, inflated, sub-cylindrical, volutions (seven) convex, having perpendicular ribs, narrow, slightly curved, crossed by four encircling costæ, the posterior of which is crenulated, the others elevated, giving a rough appearance to the surface; there are additional costæ round the base, suture deep, aperture nearly circular.

Locality.—Bussage in the Great Oolite.

CERITHIUM COTTESWOLDIENSIS, n. sp. Pl. V., fig. 8, 8a.

Shell small, sub-cylindrical, volutions (seven) convex, ornamented with very numerous oblique ribs, which disappear on the anterior part of the volution; each volution has six encircling lines; suture deep; aperture ovate; canal short.

The large number of ribs will readily distinguish this from contemporaneous species.

Locality.—Bussage, in the Great Oolite.

PHASIANELLA CONOIDEA, n. sp. Pl. V., fig. 6, 6a.

Shell small, smooth, conical, spire acute, volutions (five) flattened, the last volution inflated and slightly angulated near the middle, aperture ovately rounded; height four lines.

The outline of this shell is more angular than is usual in this genus, by which feature and by its more rounded base it is distinguished from *P. parvula*, M. & L., to which it bears some resemblance.

Locality.—Bussage, near Stroud, in the Great Oolite.

CHEMNITZIA SPARSILINEATA, n. sp. Pl. V., fig. 7.

Shell turreted, spire regular, elevated, volutions concave, transversely costated, costæ widely separated, longitudinally striated; striæ faintly marked, suture deep, aperture nearly round.

This shell may be readily distinguished from contemporaneous species by its general aspect. The costæ are fine lines, five on the penultimate volution; the height of each volution is rather less than the diameter. In the only example discovered the upper part of the spire is broken off, its height cannot therefore be determined, but it is probably about nine lines.

Locality.—Bussage, in the Great Oolite.

TRIGONIA UNDULATA, FROM. var. PLAYNEI, Wiltc. Pl. V., fig. 6.

Shell sub-ovate, erect, convex, umbones curved and bent forward, area convex, crossed by transverse plications, marginal carina nearly obsolete; median furrow without carina; rows of costæ numerous, moderate in size, tuberculated, tubercles distinct on the upper rows of costæ, more obsolete on those below; costæ irregular over the lower half of the shell. Compared with the examples of this species figured by LYCETT (Brit. Foss., *Trigonia*, Pl. XVI, figs. 9, 10, 11, and Pl. XVII, figs. 5, 6,) this shell is more erect, larger and more convex; the umbones are much more curved. Its length in proportion to its diameter is as four to three, whereas LYCETT's figures are nearly as wide as long. These differences are considered sufficient to constitute this shell a variety of *T. undulata*.

Locality.—Calcot, near Kingscote, from the lower beds of the Forest Marble (abundant.)

I have named this shell after my late esteemed friend and colleague G. F. PLAYNE, deceased, who was an indefatigable member of the Cotteswold Club, and the author of several valuable papers which appear in the Transactions.

LIMA COTTESWOLDIENSIS, n. sp. Pl. V., fig. 4, 4a, 4b.

Shell tumid, nearly upright, umbones sub-mesial, ribs (52 to 54) regular, rounded, moderately elevated, but nearly obsolete in proximity to the umbones, the diameter equal to the interstitial spaces, which are striated, striæ rather closely arranged,

auricles moderately large and obliquely striated; lunule excavated; height two and a quarter inches, diameter two inches, thickness through both valves 17 lines.

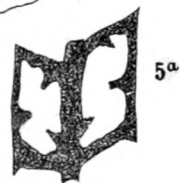
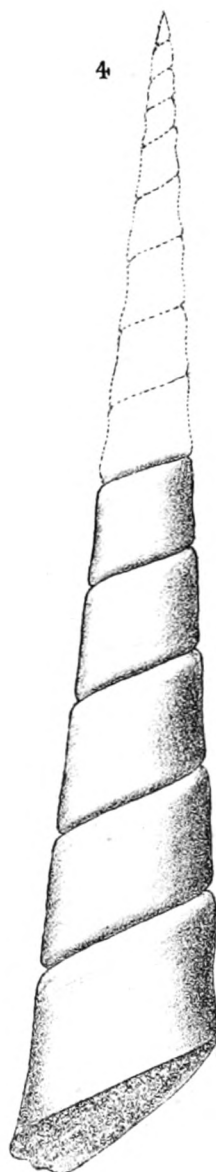
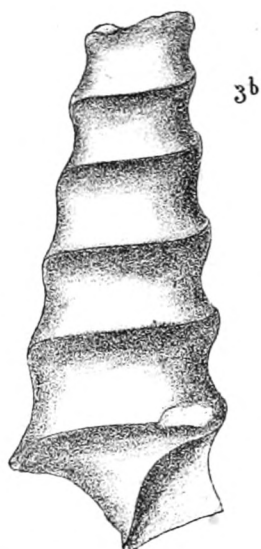
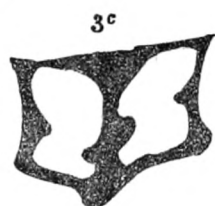
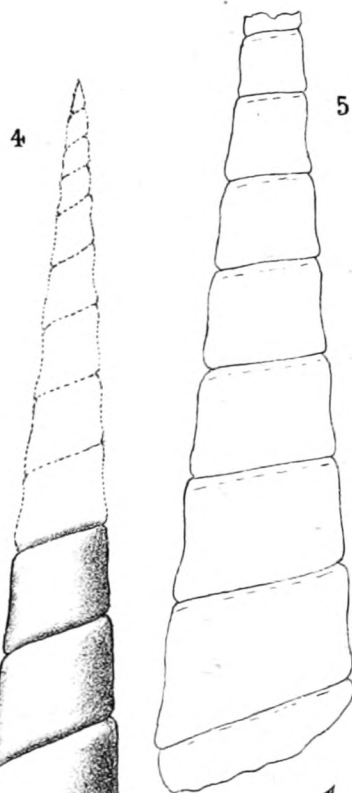
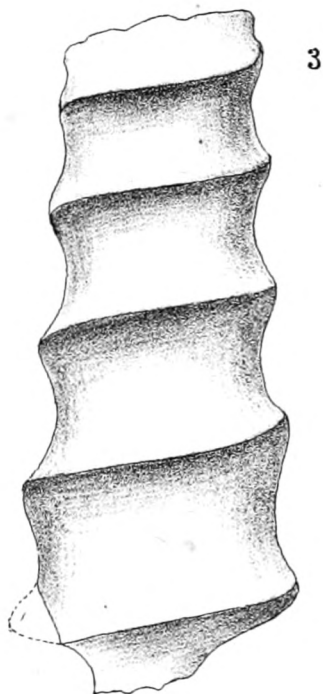
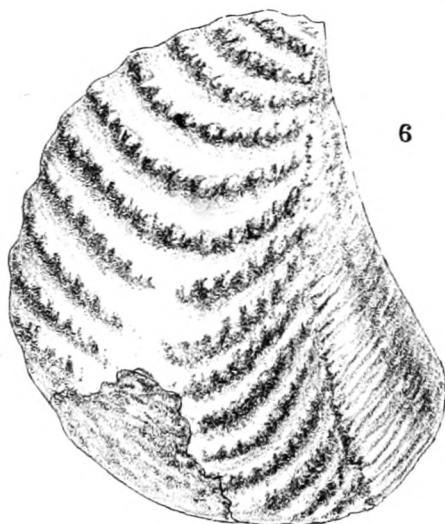
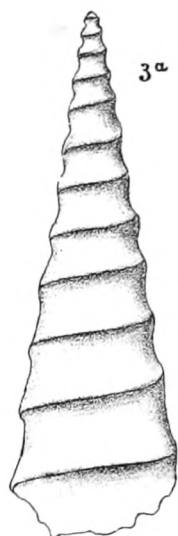
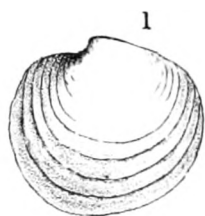
This shell differs from *L. cardiiformis*, Sow., in being more equilateral and upright, more tumid, and the ribs more regular. In outline the figure approaches *L. impressa*, Lyc., but the ribs are quite different. There is a *Lima* in the lower beds of the Freestone in the Inferior Oolite as yet undescribed, which seems to be closely allied to this shell, but it has smaller ribs and is slightly more oblique.

Locality.—Tiltup's End, near Nailsworth, in the White Limestone, (Great Oolite) and in the overlying Nerinæa bed, where it is somewhat rare.

Addendum to the description of Fossils from the Clypeus Grit of the Inferior Oolite. Vol. VII., page 128.

NERINÆA GUISEI, *Witc.*, Pl. V., fig. 10, 10a, and Vol. VII.,
Pl. IV., fig. 2a, 2b, 2c.

I have found a fragment of this shell which, though not well preserved, indicates the character of the aperture, which may be described as sub-quadrate, widening at the termination, the outer lip having a sharp angle; channel small. The specimen now figured shows that in the young forms the relative height of the volution to the diameter is greater than in a more advanced stage of growth. Fig. 10a shows the internal characters more clearly than they are represented in the previous figures.



EXPLANATION OF THE PLATES.

 PLATE IV.

1. *LUCINA SUBGLOBOSA*, n. sp., natural size. Great Oolite, Tiltup's End, near Nailsworth. (Page 272.)
2. *NERINÆA COMPLICATA*, n. sp., natural size. Great Oolite, Tiltup's End. (Page 272.)
- 2a. " " section magnified.
3. " (TROCHALIA) *EUDESII*, *M. & L.*, natural size. Great Oolite, Tiltup's End. (Page 273.)
- 3a. " " " another example, natural size.
- 3b. " " " another example, showing the aperture.
- 3c. " " " section of the interior of one of the volutions.
4. " [*SIMPLEX*], n. sp., natural size. *Nerinæa* bed, Great Oolite, Tiltup's End. (P. 274.)
- 4a. " " section of the interior.
5. " *INTERMEDIA*, n. sp., natural size. *Nerinæa* bed, Great Oolite, Tiltup's End, and Pl. V., fig. 1, 1a. (P. 274.)
- 5a. " " section of the interior.
6. *TRIGONIA UNDULATA*, *From.* var. *PLAYNEI*, natural size. Forest Marble, Calcot. (P. 277.)

 PLATE V.

1. *NERINÆA INTERMEDIA*, n. sp., natural size. *Nerinæa* bed, Great Oolite, Tiltup's End, near Nailsworth. (Page 274.) and Pl. 1, fig. 5.
- 1a. " " section of the interior.

2. *NERINÆA* n. sp., natural size. *Nerinæa* bed, Great Oolite, Tiltup's End. (Page 275.)
- 2a. „ „ section of the interior.
3. „ *VOLTZII*, *Desl.*, natural size. Great Oolite, Tiltup's End. (Page 275.)
4. *LIMA COTTESWOLDIENSIS*, n. sp., natural size. Great Oolite, Tiltup's End. (Page 277.)
- 4a. „ „ side view of same.
- 4b. „ „ portion of the costæ.
5. *CERITHIUM BUSSAGENSIS*, n. sp., natural size. Great Oolite, Bussage. (Page 276.)
- 5a. „ „ another view of same.
- 5b. „ „ volution enlarged.
6. *PHASIANELLA CONOIDEA*, n. sp., enlarged. Great Oolite, Bussage. (Page 276.)
- 6a. „ „ another view of same.
7. *CHEMNITZIA SPARSILINEATA*, n. sp., enlarged. Great Oolite, Bussage. (Page 276.)
8. *CERITHIUM COTTESWOLDIENSIS*, n. sp., natural size. Great Oolite, Bussage. (Page 276.)
- 8a. „ „ volutions magnified.
9. *NERINÆA* ? *DUBIA*, n. sp., natural size. Great Oolite, Bussage. (Page 275.)
- 9a. „ „ volution magnified.
10. „ *GUISEI*, *Witc.*, natural size. Inferior Oolite Rodborough. (Page 278.)
- 10a. „ „ section of interior of another example. (Slightly enlarged.)

