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LONDON:

LONGMAN, BROWN, GREEN, AND LONGMANS.

PARIS:—FRIED. KLINCKSIECK, 11 RUE DE LILLE; BAUDRY, 9 RUE DU COQ, PRES LE LOUVRE; LEIPZIG, T. O. WEIGEL.

SOLD ALSO AT THE APARTMENTS OF THE SOCIETY.

MDCCCLV.

and greenish argillaceous and sandy beds. Shells were found in all these clay-beds, and Ammonites at different heights and in certain of the strata. Many fossils are exposed on the cliffs, and washed out on to the shore by the action of the sea.

Fossil trees are seen at low water on a reef of flat rocks near these caverns; and about three miles to the southward Capt. Garden found at the extreme point of the left bank of the Umpahlanyani* stream a piece of fossil wood, imbedded in a rock similar to that at the caves.

About half a mile beyond the caves runs the Umzambani† River, across which the cretaceous rocks are continued, appearing on its right bank; after which they are lost sight of, except at a few places: the author, however, believes this formation to extend as far as the Umtata River, having been informed by the late Mr. W. H. D. Fynn that fossil Turtle remains were to be procured from the rocks at the mouth of that river.

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4. *Description of some* CRETACEOUS FOSSILS *from* SOUTH AFRICA; *collected by* Capt. GARDEN, *of the 45th Regiment*. By WILLIAM H. BAILY, Esq., of the Geological Survey of Great Britain.

[Communicated by R. Godwin-Austen, Esq., F.G.S.]

[PLATES XI. XII. XIII.]

THE late Professor Edward Forbes having entrusted to my examination the interesting series of fossils collected on the coast of South Africa, near Natal, and brought to England by Capt. Garden‡, to whose exertions and liberality we are indebted for this valuable addition to the Colonial Department of the Museum of Practical Geology, the following communication has been drawn up on the plan of Prof. Forbes's able "Report on the Fossil Invertebrata from Southern India§," to which collection of fossils the series here described bears a close affinity, as also to the fossils from the greensand of Blackdown in our own country, and the *Craie Chloritée* of France.

CEPHALOPODA.

Genus AMMONITES, Auctorum.

There are four species of *Ammonites* in this collection; the specimens generally are in fine preservation, and of remarkable size and beauty, some of them having portions of the shell still adhering. All are allied to Cretaceous forms, and belong to the following groups:—

* Pronounced Oom-pā-thlān-yā-nĭ.

† Pronounced Oom-zām-bā-nĭ.

‡ See above, p. 453. This collection was briefly noticed in the Rep. Brit. Assoc. 1854, Transact. Sect. p. 83.

§ Transactions Geol. Soc., 2nd Series, vol. vii.

1. *Cristati*, D'Orbigny; a group of which all the species are cretaceous. To this section *Ammonites Soutonii* and *A. Stangeri* may be referred.
2. *Clypeiformes*, D'Orbigny; lower cretaceous and oolitic. *Ammonites Umbulazi* appears to belong to this group.
3. *Lævigati*, a section established by Prof. Forbes for a Pondicherry cretaceous form, and in which *Ammonites Gardeni* may now be included.

Number of specimens of each species in this collection :—

Ammonites Soutonii	2	Ammonites Gardeni	3
„ Stangeri	4	„ Umbulazi	2

Cristati.

1. Ammonites Soutonii, nov. sp. Pl. XI. fig. 1.

A. testâ discoideâ carinatâ; anfractibus 5; costis numerosis flexuosis, internis acutè tuberculatis; dorso utrinque tuberculato, medio carinato; umbilico mediocri; aperturâ ovato-ellipticâ.

Diameter, 1 foot $5\frac{1}{2}$ inches.
Diameter of disk formed by the inner whorls, 7 inches.
Length of aperture, 6 inches.
Breadth of aperture, $4\frac{1}{2}$ inches.

Shell discoidal; whorls 5, with numerous flexuous ribs, each of which bears a small tubercle on the edge of the umbilicus, and two broader ones at its termination on the back; umbilicus small; inner whorls partly concealed, flattened, with prominent tubercles upon the centre of the numerous ribs; back somewhat round, with a distinct keel, and a row of lengthened tubercles on each side. Aperture ovate and elliptical.

This very large and magnificent Ammonite, which is in fine preservation, with portions of the shell a quarter of an inch in thickness still attached, is somewhat distantly related to *Ammonites rostratus* and *A. varians* from the Lower Chalk.

It is dedicated to the memory of the late private Thomas Souton, of the Grenadier Company, 45th Regiment, who, whilst acting as Capt. Garden's servant, zealously extracted it, after much perseverance and labour, from a very hard stratum high up the cliff.

Locality.—Cliffs of the coast of S. Africa, near the Umtafuna and Umzambani Rivers.

2. Ammonites Stangeri, nov. sp. Pl. XI. fig. 2.

A. testâ discoideâ, carinatâ; anfractibus 6, angustatis; costis numerosis tuberculatis, internis bifurcatis; dorso utrinque tuberculato, medio carinato; aperturâ ovato-ellipticâ.

Diameter, 1 foot.
Diameter of disk formed by inner whorls, 8 inches.
Length of aperture, $3\frac{1}{2}$ inches.
Breadth of aperture, $2\frac{7}{10}$ inches.

Shell discoidal; whorls 6, narrow and rounded; ribs numerous, and divided into regularly arranged rather indistinct tubercles; some of the interior ribs are bifurcated; back narrow and keeled, with a row of lengthened tubercles on each side; aperture ovate.

The characters of this fine large Ammonite somewhat approach that of the last species, although the form is very distinct, being more wheel-shaped and compressed.

Named in memory of the late Dr. Stanger, of the Niger Expedition, and Surveyor-General of Natal, whose recent death in South Africa, and consequent loss to science of so able an investigator, we have to deplore.

Locality.—Cliffs of the South African coast, near the Umtafuna and Umzambani Rivers.

Clypeiformes.

3. Ammonites Umbulazi, nov. sp. Pl. XI. fig. 4.

A. testâ compressâ, carinatâ; anfractibus compressis, radiis latis flexuosis; angustissimè umbilicatâ; dorso acuto, angulato; aperturâ sagittatâ.

Diameter, 1 inch $\frac{4}{10}$ths.
Diameter of inner whorls, $\frac{7}{10}$ths of an inch.
Length of aperture, $\frac{8}{10}$ths of an inch.
Breadth of aperture, $\frac{4}{10}$ths of an inch.

Shell compressed, keeled; whorls compressed, with obtuse flexuous radiations; inner whorls partly concealed; umbilicus very small; back sharp, keeled, and angular, or bevelled off on each side; aperture lanceolate.

This small compressed Ammonite has part of the shell still adhering, and appears to be nearly related to *Ammonites Requienianus*, D'Orb., from the *Craie Chloritée*.

The specific appellation of this Ammonite is the native name of Mr. H. F. Fynn, who is mentioned in Capt. Garden's paper as the discoverer of these Cretaceous deposits, and as his companion on his visit to these cliffs.

Locality.—Cliffs of the South African coast, near the Umtafuna and Umzambani Rivers.

Lævigati.

4. Ammonites Gardeni, nov. sp. Pl. XI. fig. 3.

A. testâ compressâ, discoideâ, lævigatâ; anfractibus 6, complanatis, ad umbilicum abruptis; latè umbilicatâ; dorso carinato; carinâ simplice filiformi; lateribus sulcatis; aperturâ oblongâ, compressâ.

Diameter, 5 inches.
Diameter of inner whorls, $2\frac{1}{2}$ inches.
Breadth of outer whorl, $1\frac{1}{2}$ inch; thickness, $\frac{9}{10}$ths of an inch.
Breadth of outer whorl of larger fragment, 2 inches; thickness, 1 inch $\frac{2}{10}$ths.

Shell compressed, nearly circular, smooth, with 6 whorls, flattened, rounded towards the keel, abruptly and perpendicularly depressed at its umbilical margin; umbilicus wide; back keeled; the sides obliquely and faintly striated; aperture oblong, compressed.

This characteristic Ammonite (named after the discoverer) belongs to the section *Lævigati*, established by Prof. E. Forbes, and is nearly related to *Ammonites Rembda* from Pondicherry. The prismatic colours of the nacre are still preserved.

Locality.—"White-men's Houses," coast of S. Africa, near the Umzambani River, in compact siliceous grit containing numerous fossils, and in soft greenish sandstone.

Genus Baculites, Lamarck.

Of this characteristic cretaceous genus there are three specimens, of, I believe, one species only, associated with a furrowed *Poromya* in a soft greenish sandstone.

Baculites sulcatus, nov. sp. Pl. XI. fig. 5.

B. testâ ovatâ, subcompressâ, lævi vel transversim undulatâ; dorso leviter compresso; ventre crassiore, obtuso; aperturâ obliquâ, sinuatâ; septis lobatis.

Length of the most entire specimen, 2 inches.
Greatest breadth, $\frac{4\frac{1}{2}}{10}$ths of an inch.
Thickness, $\frac{3\frac{1}{2}}{10}$ths of an inch.

Shell elongate, ovate in section, rather flattened, broadest at the aperture, and slightly tapering; with smooth transverse undulations, strongly marked near the aperture, and gradually becoming lost towards the lower extremity; back slightly compressed, ventral side rounded; aperture very oblique; septa lobed.

This species appears to be distinct from, although closely allied to, the *Baculites anceps*, figured by D'Orbigny from the *Craie Chloritée*, and differs from it in the greater rotundity of the dorsal side, and greater angularity of the transverse undulations, the section exhibiting a form more nearly approaching that of *Baculites Faujasii* from the Chalk of Ireland.

The shell is partly preserved, showing its prismatic colours.

Locality.—Cliffs of the coast of S. Africa, near the Umtafuna and Umzambani Rivers.

Gasteropoda.

Genus Solarium, Lamarck.

Solarium pulchellum, nov. sp. Pl. XII. fig. 3.

S. testâ discoideâ, spirâ parvâ, anfractibus 5, rotundatis, longitudinaliter transversimque striatis; umbilico parvo, externè crenulato; aperturâ rotundatâ.

Diameter, $\frac{3}{10}$ths of an inch.

Shell discoidal; spire small; whorls 5, rounded, transversely striated, and partially reticulated by encircling lines. The tranverse striations are strongest at the upper part of the whorls next the suture, and form crenulations at the umbilicus, which is small; mouth round.

This beautiful little *Solarium* appears to be not uncommon in this deposit, three very perfect specimens having been extracted from one small piece of the soft greenish sandstone in which they are imbedded.

Locality.—Cliffs of the coast of S. Africa, near the Umtafuna and Umzambani Rivers.

Genus Turritella, Lamarck.

Turritella Bonei, nov. sp. Pl. XII. fig. 7.

T. testâ conicâ; anfractibus 12, convexis, transversè 3-costatis; costis simplicibus; suturis profundis; aperturâ subquadratâ; basi convexo.

Length, 2 inches.
Breadth of last whorl, $\frac{6}{10}$ths of an inch.

Shell moderately elongated, tapering, with about 12 rather ventricose whorls, divided by a deep suture. The whorls have three large ridges, not granulated, and are numerously striated spirally; the base is convex, and the aperture round.

It is allied to *Turritella difficilis* of D'Orbigny, from the *Craie Chloritée* of France, but differs in having fewer ribs, and in being striated in the interspaces; it also bears a considerable resemblance to *Turritella monilifera* from Pondicherry.

Named after Mr. C. Bone of the Geological Survey.

Locality.—Cliffs of the coast of South Africa, near the Umtafuna and Umzambani Rivers.

Turritella Meadii, nov. sp. Pl. XII. fig. 6.

T. testâ conicâ; anfractibus 12, transversim inæqualiter striatis, longitudinaliter plicatis; plicis flexuosis; suturis profundis; aperturâ ovali.

Length, $\frac{7}{10}$ths of an inch.
Breadth of last whorl, $\frac{2}{10}$ths of an inch.

Shell conical; whorls 12, unequally and faintly striated by transverse and longitudinal flexuous plications; aperture oval.

Found associated with *Ammonites Umbulazi* in compact siliceous grit.

Named after Mr. Mead of the Geological Survey.

Locality.—"White-men's Houses," near the Umzambani River, S. Africa.

Turritella Renauxiana, D'Orbigny, *Ter. Crét.* pl. 152. figs. 1–4.

A much-worn specimen from Umpahlanayani River, included in

this collection, appears to be identical with the peculiarly formed shell described by D'Orbigny under the above name from the *Craie Chloritée* of France.

Genus Scalaria, Lamarck.

Scalaria ornata, nov. sp. Pl. XII. fig. 2.

S. testâ turritâ, imperforatâ; anfractibus 9, longitudinaliter costatis (costis in ultimo anfractu 16); interstitiis striatis; ultimo anfractu anticè carinato; aperturâ suborbiculari.

Length, 2 inches.
Breadth of last whorl, $\frac{8}{10}$ths of an inch.

Shell conical, not umbilicated; whorls about 9, which are crossed by 16 equal elevated continuous ribs; the whorls are closely striated transversely, and decussated with very fine lines of growth, forming a terminal edge upon each rib; aperture suborbicular.

This beautiful species is closely allied to *Scalaria Dupiniana*, D'Orbigny, but has a greater number of ribs, and is more finely striated transversely.

Locality.—Cliffs of the coast near the Umtafuna and Umzambani Rivers, S. Africa.

Genus Chemnitzia, D'Orbigny.

Chemnitzia Sutherlandii, nov. sp. Pl. XII. fig. 5.

C. testâ turritâ; anfractibus 10, convexis, longitudinaliter plicatis; plicis flexuosis; aperturâ elongatâ, ovatâ.

Length, 3 inches $\frac{8}{10}$ths.
Breadth of last whorl, 1 inch $\frac{1}{10}$th.

Shell turreted, elongated; whorls 10, convex, with longitudinal incurved plications; aperture elongated and ovate.

Named after Dr. P. C. Sutherland, late Surgeon to the Arctic Expedition, and now in Natal, to whose valuable researches science is greatly indebted.

Locality.—Cliffs of the S. African coast near the Umtafuna and Umzambani Rivers.

Genus Voluta, Linnæus.

Voluta rigida, nov. sp. Pl. XII. fig. 4.

V. testâ oblongâ; spirâ conicâ; anfractibus supernè angulatis, longitudinaliter costatis; costis in angulis turgidis, et prope suturam subobsoletis, spiraliter sulcatis; aperturâ angulatâ, elongatâ.

Length of broken specimen, 1 inch $\frac{5}{10}$ths; probable entire length, 1 inch $\frac{8}{10}$ths.
Breadth $\frac{17}{20}$ths of an inch.

Shell somewhat cone-shaped, with about 18 longitudinal ribs; coarsely striated spirally. The summit of the whorls is formed at the suture into a rim with slight continuations of the longitudinal

costæ and striæ of growth. The plications of the columella are not exposed.

This species is nearly related to *Voluta cincta*, Sowerby, from Pondicherry.

Locality.—Cliffs of the coast near the Umtafuna and Umzambani Rivers, S. Africa.

Genus Natica, Lamarck.

Natica multistriata, nov. sp. Pl. XII. fig. 8.

N. testâ subconicâ; spirâ elatâ; anfractibus 5, convexis, transversim striatis; aperturâ obliquè ovatâ.

Length, $\frac{8}{10}$ths of an inch.
Breadth, $\frac{7}{10}$ths of an inch.

Shell subconical; spire elevated; whorls 5, rounded, with numerous transverse striations; mouth obliquely ovate.

This form is nearly related to *Natica pagoda*, from Pondicherry.

Locality.—Cliffs of the coast of S. Africa, near the Umtafuna and Umzambani Rivers.

Several small Gasteropoda, which have been obtained in clearing out the larger fossils, appear to belong to the genera *Trochus*, *Phasianella*, and *Natica*. They are mostly too obscure, however, for specific determination.

Lamellibranchiata.

Genus Cardium, Linnæus.

Cardium denticulatum, nov. sp. Pl. XIII. fig. 4.

C. testâ suborbiculatâ, convexâ, anticè rotundatâ, posticè truncatâ; transversim costatis, costis 34, elevatis, imbricatis, et denticulatis; interstitiis concentricè striatis.

Length, $\frac{6}{10}$ths of an inch.
Breadth, $\frac{5}{10}$ths of an inch.

Shell suborbicular, convex, anterior side rounded, posterior truncated; ribs about 34, angular, and elevated, with scale-like markings and concentric striæ between; posterior margin deeply indented by the sharp ribs.

This small *Cardium*, which is beautifully preserved, is very unlike any other known fossil species, the deeply serrated posterior margin distinguishing it from all others, and giving it a greater resemblance to living forms.

Locality.—Cliffs on S. African coast, near the Umtafuna and Umzambani Rivers.

Genus Arca, Linnæus.

Arca Umzambaniensis, nov. sp. Pl. XIII. fig. 1.

A. testâ inflatâ, gibbâ, obliquè trigonâ, abruptè truncatâ, fortiter

carinatâ, carinâ elevatâ, longitudinaliter concentricèque striatâ; umbonibus approximatis; areâ ligamenti angustatâ.

Length, 2 inches $\frac{3}{10}$ths.
Breadth, 2 inches $\frac{2}{10}$ths.

Shell gibbous, obliquely triangular, very abruptly truncate and carinate. The keel is elevated, and is the highest part of the shell; umbos approximating; hinge-area narrow.

The two valves of this fine large *Arca*, which are still united, have a reticulated appearance, caused by the radiating lines being crossed by transverse furrows of growth.

It is allied to *Arca fibrosa*, from the Greensand of Blackdown; also to *A. Trinchinopolitensis*, Forbes.

Locality.—Cliffs on S. African coast, near the Umtafuna and Umzambani Rivers.

Arca Natalensis, nov. sp. Pl. XIII. fig. 2.

A. testâ subinflatâ, carinatâ, transversè ovatâ, anticè obliquè truncatâ, angulatâ, posticè rotundatâ; lateribus striatis, in medio sulcato-striatis; areâ cardinali latâ, 4-striatâ; umbonibus distantibus.

Length, 1 inch $\frac{4}{10}$ths.
Breadth, 1 inch $\frac{1}{10}$th.

Shell somewhat inflated, carinated, transversely ovate; anterior side obliquely truncated, and angular; longitudinally sulcated; cardinal area large, with four striations; umbos distant.

This description is founded on a single valve, in beautiful preservation, and showing the interior and hinge-area. The strongly ridged exterior and difference of form sufficiently distinguish it from the last species. It closely resembles *A. Japetica*, from Pondicherry.

There is also another species of *Arca*, too imperfect to determine.

Locality.—Cliffs of S. African coast, near the Umtafuna and Umzambani Rivers.

Genus Trigonia, Bruguière.

Trigonia elegans, nov. sp. Pl. XIII. fig. 3.

T. testâ ovato-trigonâ, anticè rotundatâ, posticè productâ et rostratâ; costis arcuatis, obliquè crenulato-rugosis, umbonibus obtusis subrecurvis; areâ longitudinaliter sulcatâ, transversim costatâ; carinis marginali et internâ depressis.

Length $\frac{8}{10}$ths of an inch.
Breadth $\frac{6\frac{1}{2}}{10}$ths of an inch.

Shell ovately trigonal, moderately convex; anterior extremity rounded; posterior extremity produced and rostrated; ribs somewhat arched and crenulated obliquely; umbos obtuse, slightly recurved; area longitudinally sulcated and transversely striated; striations of inner carina less numerous and more distinct; carina depressed.

This small *Trigonia*, in very perfect condition, both valves being united and the ligament preserved, is distantly related to *Trigonia crenularis*, Lamarck, figured by D'Orbigny, from the *Craie Chloritée*.

Locality.—Cliffs on coast of S. Africa, near the Umtafuna and Umzambani Rivers.

Fragments of another species of *Trigonia* accompany this with large tubercles like *Trigonia rudis*.

Genus Inoceramus, Parkinson.

Inoceramus expansus, nov. sp. Pl. XIII. fig. 5.

I. testâ ovato-obliquâ, subdepressâ, subæquivalvi, concentricè plicatâ; margine cardinali elongato.

Length of fragment $5\frac{1}{2}$ inches.

Shell ovate, oblique, rather depressed, subæquivalve, with concentrically prominent plications; hinge-margin elongated.

Several fragments were procured, showing the lengthened hinge and great dilatation of this species *. One specimen has the valves united. They are from soft greenish sandstone and hard siliceous conglomerate, containing numerous fragments of broken shells. It approaches slightly the *Inoceramus latus* of the Lower Chalk and Upper Greensand.

Locality.—Cliffs on coast of S. Africa, near the Umtafuna and Umzambani Rivers.

Genus Pecten, Bruguière.

Pecten quinquecostatus, Sowerby.—A small but perfect specimen, associated with the *Inoceramus*, is identical with the Upper Greensand species from Warminster.

Locality.—Cliffs of S. African coast, near the Umzambani River.

Pecten, sp.; allied to *P. virgatus*, Nilsson. A fragment too imperfect for description; found associated with the *Voluta*.

Locality.—Cliffs of S. African coast, near the Umzambani River.

Genus Ostræa, Linn. There are two small species of *Ostræa*, one of them attached to *Inoceramus*, too imperfect to determine.

Locality.—Cliffs of S. African coast, near the Umzambani River.

Genus Teredina, Lamarck. A large mass of the tubes formed by this shell in fossil wood, much weathered, with indistinct traces of the valves, undistinguishable from the London clay species.

Locality.—"White Men's Houses," near the Umzambani River.

A group of smaller tubes from the same locality exactly resembles *Teredo antenautæ* of the London clay; probably they are formed by younger specimens of the first-mentioned species.

* See also above, p. 453.

Small bivalve shells of what appear to be the following genera, but too indistinct to determine specifically, were also included in this collection :—

Corbula; like *C. carinata*, D'Orb.
Poromya?; furrowed form.
Lucina; like *L. caperata*, from Blackdown.
Pectunculus.
Cardium.
Lucina, Nucula, Astarte, and Solecurtus?

ECHINODERMATA.

Genus Hemiaster, Desor.

Hemiaster Forbesii, nov. sp. Pl. XII. fig. 1.

This, the only Echinoderm in the collection, is deprived of nearly all trace of its test; some fragments, however, accompany it with the tubercles and pores well preserved.

The contour is broadly cordate, with the greatest elevation posteriorly, and slightly declining anteriorly. The dorsal ambulacra are widely petaloid, very unequal, and all lodged in deep excavations. The antero-lateral ones are $1\frac{1}{2}$ time as long as the postero-laterals. The latter are broadly ovate and have about 20 pairs of pores in each row. The antero-laterals are oblong ovate, and have about 30 pairs of pores in each series, lodged in rather broad transverse grooves. The hollowed-out portion of the odd ambulacrum is very broad and extends round to the mouth. The elevated spaces between the petals are narrow, and as if pinched up. The sides are very prominent; the caudal extremity is obtuse; the vent is obscured. The mouth is transversely oval. A fragment of the shell of another specimen of this species, from between the anterior and posterior ambulacra, is covered with slightly scattered small equal tubercles, the interspaces being granulated. The specimen is not sufficiently perfect to distinguish its fasciole.

Length 1 inch $\frac{1}{10}$th. Breadth 1 inch $\frac{2}{10}$ths.

Dedicated to the late Professor Edward Forbes, who has added so much to our knowledge of this class of animals, both recent and fossil, and by whose much-lamented death science has lost one of her most able advocates.

Locality.—Cliffs of S. African coast, near the Umtafuna and Umzambani Rivers.

PISCES.

Placoid Order. Squaloid Family.

Corax. Represented by a tooth, nearly allied to *C. incisus*, Egerton *, from Pondicherry.

Locality.—Cliffs of S. African coast, near the Umtafuna and Umzambani Rivers.

* Trans. Geol. Soc. 2 ser. vol. vii. p. 92.

REPTILIA.

The fragments of Reptilian bones comprised in Capt. Garden's collection, eight in number, were submitted to Professor Owen, who kindly determined such as were sufficiently perfect. He considers them to be all *Chelonian*, and described them as follows:—

1 and 2. Portions of a rib, with carinated costal plate, of a flat-formed Chelonian.

3. Apparently the coracoid of a Chelonian: and two others; portions of Chelonian bones.

Locality.—Cliffs of S. African coast, near the Umtafuna and Umzambani Rivers.

Inferences drawn from a Study of the Species.

The total number of species of *Mollusca* in this Collection are 35, viz.:—

Cephalopoda	5	35 species.
Gasteropoda	11	
Lamellibranchiata	19	

Of these, 30 are hitherto undescribed forms, and related or having a close affinity with Cretaceous species; the only apparent exceptions being that of the *Voluta*, a genus characteristic of the Tertiaries of our own country (but as Professor Forbes states in his Report on the Indian fossils, to which this collection bears a considerable resemblance, "having representatives, and those not peculiar forms, as low down as the Upper Greensand in Europe, and occurring also in Cretaceous strata in North America"); and the *Teredo*, which is undistinguishable from the London Clay species.

There is but one species, however, which can be positively identified with English fossils, and that is *Pecten quinquecostatus*, one of the most characteristic of cretaceous species.

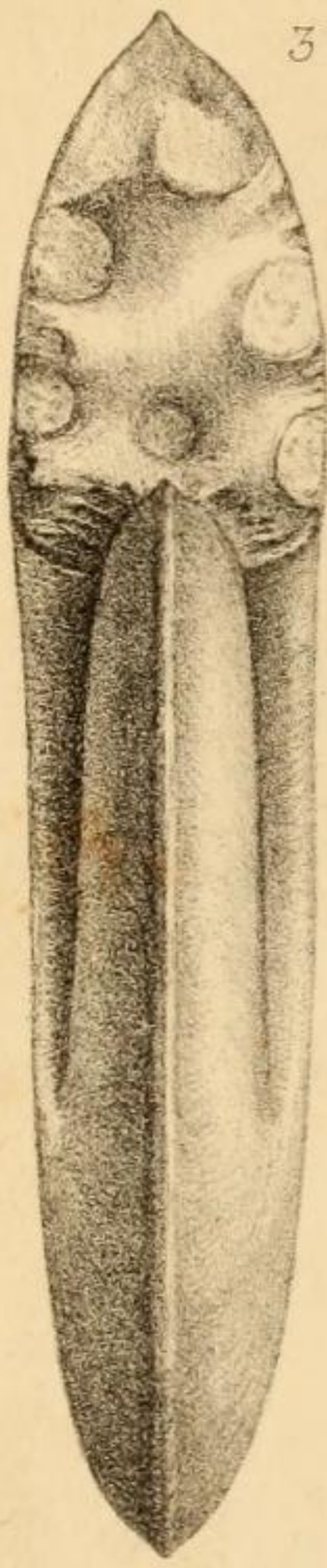
Of the *Gasteropoda*, the *Scalaria* is closely related to a cretaceous species found in the Gault of Folkestone and Greensand of Blackdown; one of the species of *Turritella* is also allied to a cretaceous form from France; another, but very imperfect specimen, appears to be identical with *Turritella Renauxiana*, described by D'Orbigny from the *Craie Chloritée*.

The genera of Bivalves in this collection are all known in cretaceous or older strata; the peculiar forms of *Arca*, *Trigonia*, *Corbula*, *Poromya*, *Lucina*, *Astarte*, *Nucula*, *Inoceramus*, and *Pecten* being also characteristically cretaceous.

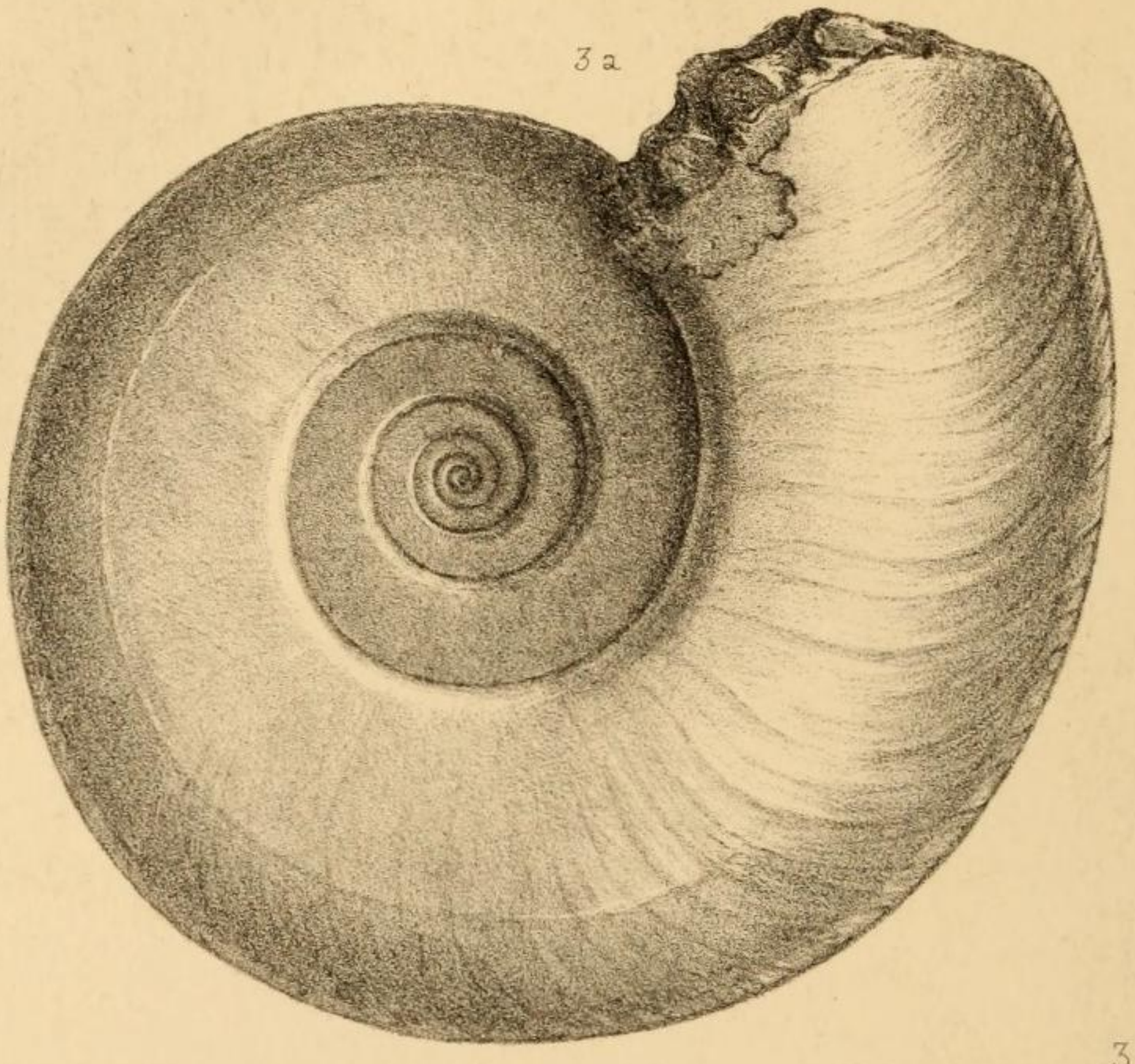
There is but one species of Echinoderm; and this is a characteristic cretaceous form of the genus *Hemiaster*.

There appears, therefore, from the evidence adduced, no difficulty in believing that the beds from which these fossils were obtained, are "cretaceous," and probably palæontologically equivalent to the Upper Greensand of this country and *Craie Chloritée* of France.

3b

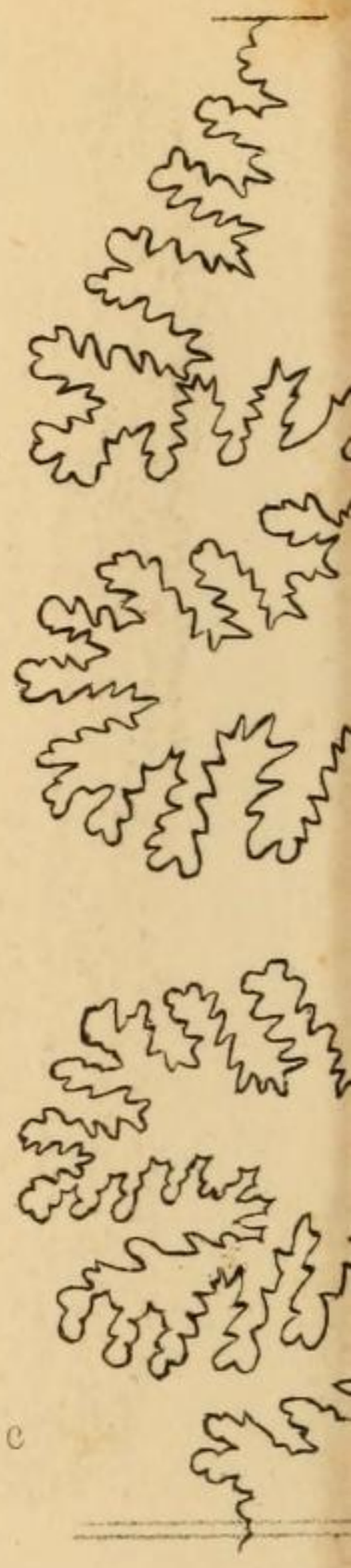


3a

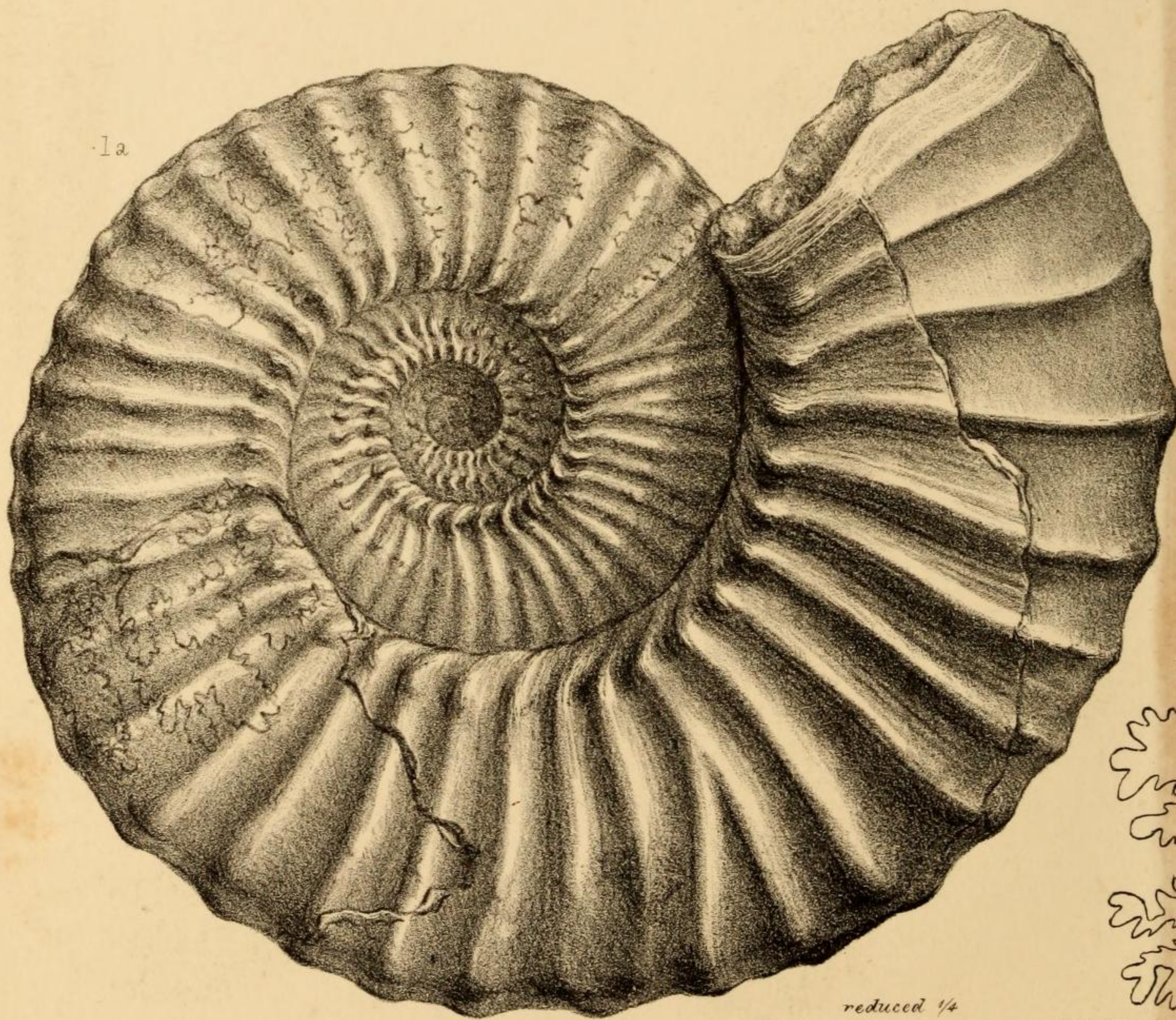


nat. size

3c



1a



reduced 1/4

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CRETACEOUS FOSS

2b

2a

reduced 1/4

2c

5a

1b

5c

5b

4c

4b

4a

1c

nat. size

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S OF SOUTH AFRICA.

3b

3a

nat. size

3c

2b

2a

reduced 1/4

2c

5a

1b

5c

5b

1a

4c

4b

4a

reduced 1/4

1c

nat. size

W.H.Baily del. et lith.

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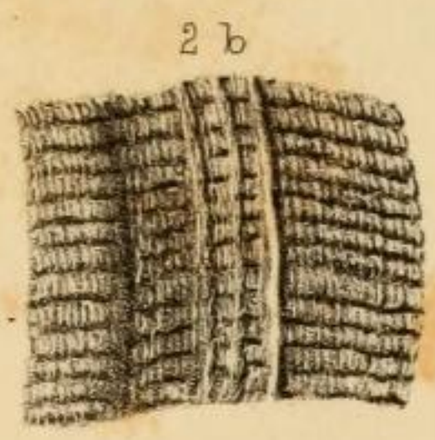
CRETACEOUS FOSSILS OF SOUTH AFRICA.


2a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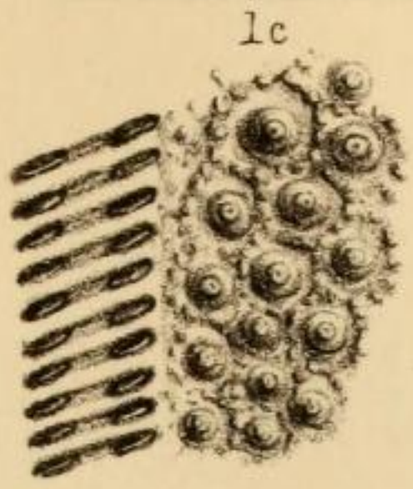
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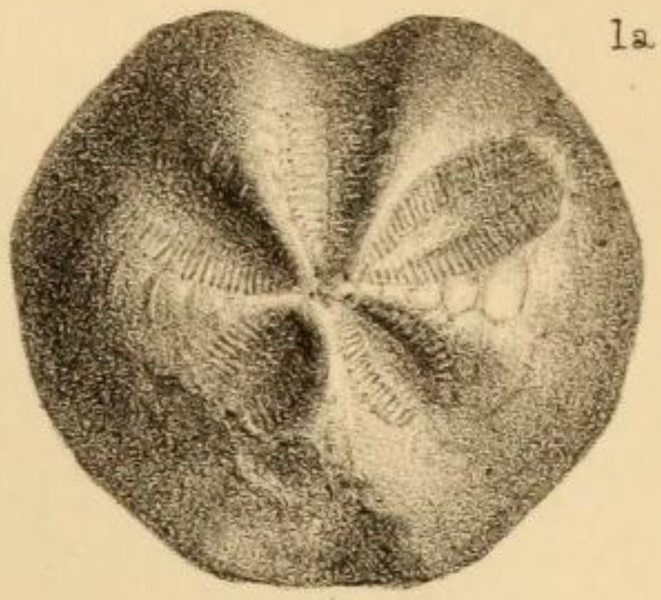
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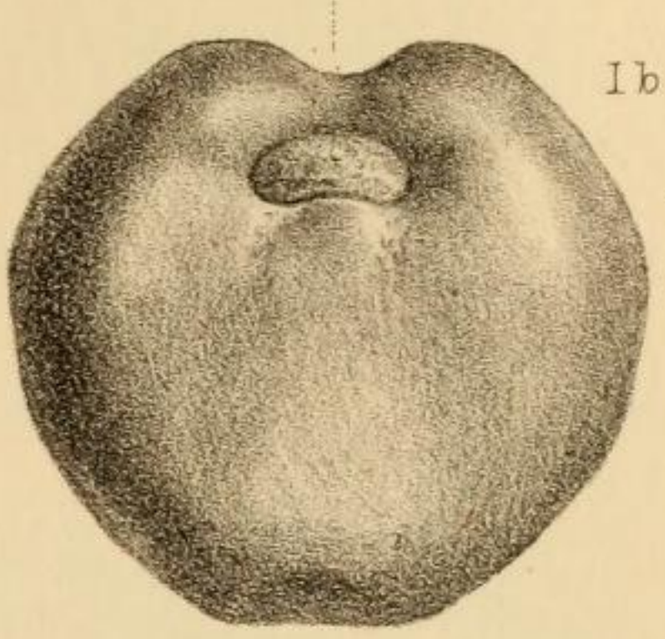
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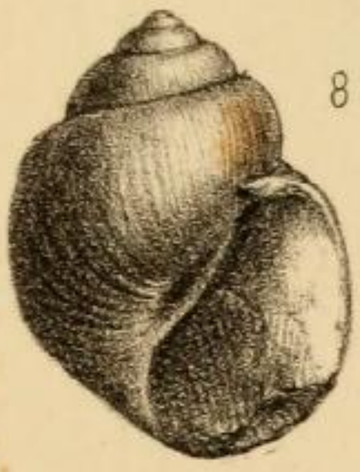
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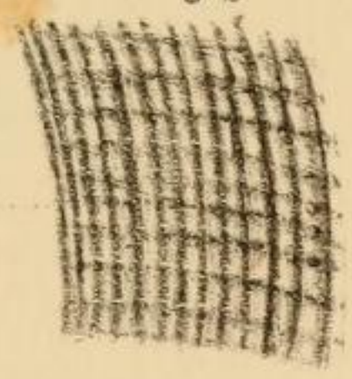
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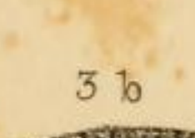
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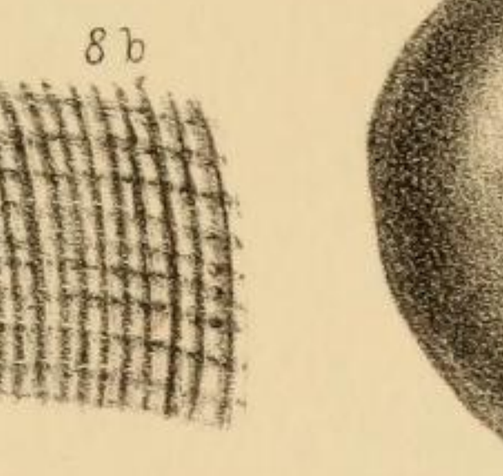
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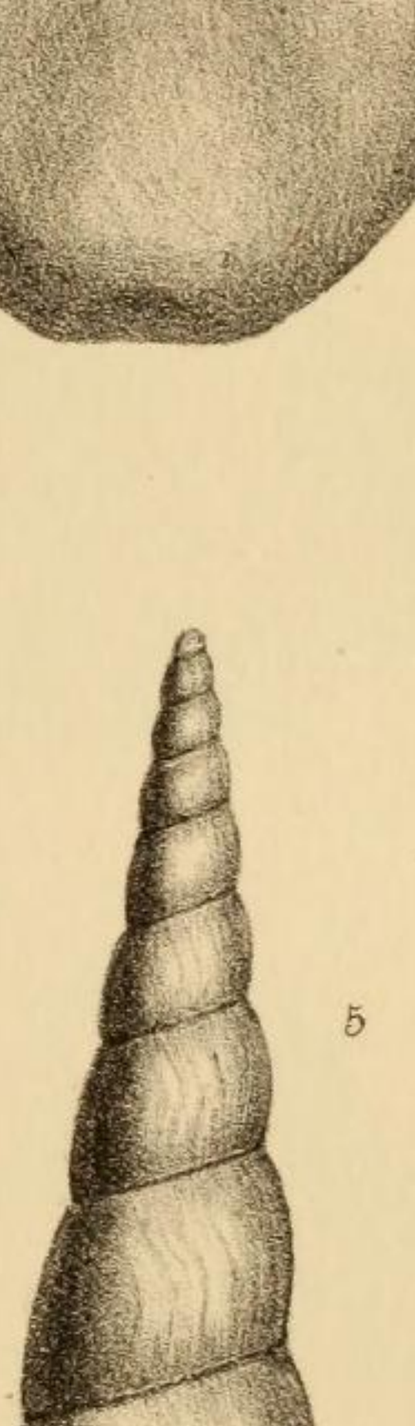
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7b


7a


6a


6b

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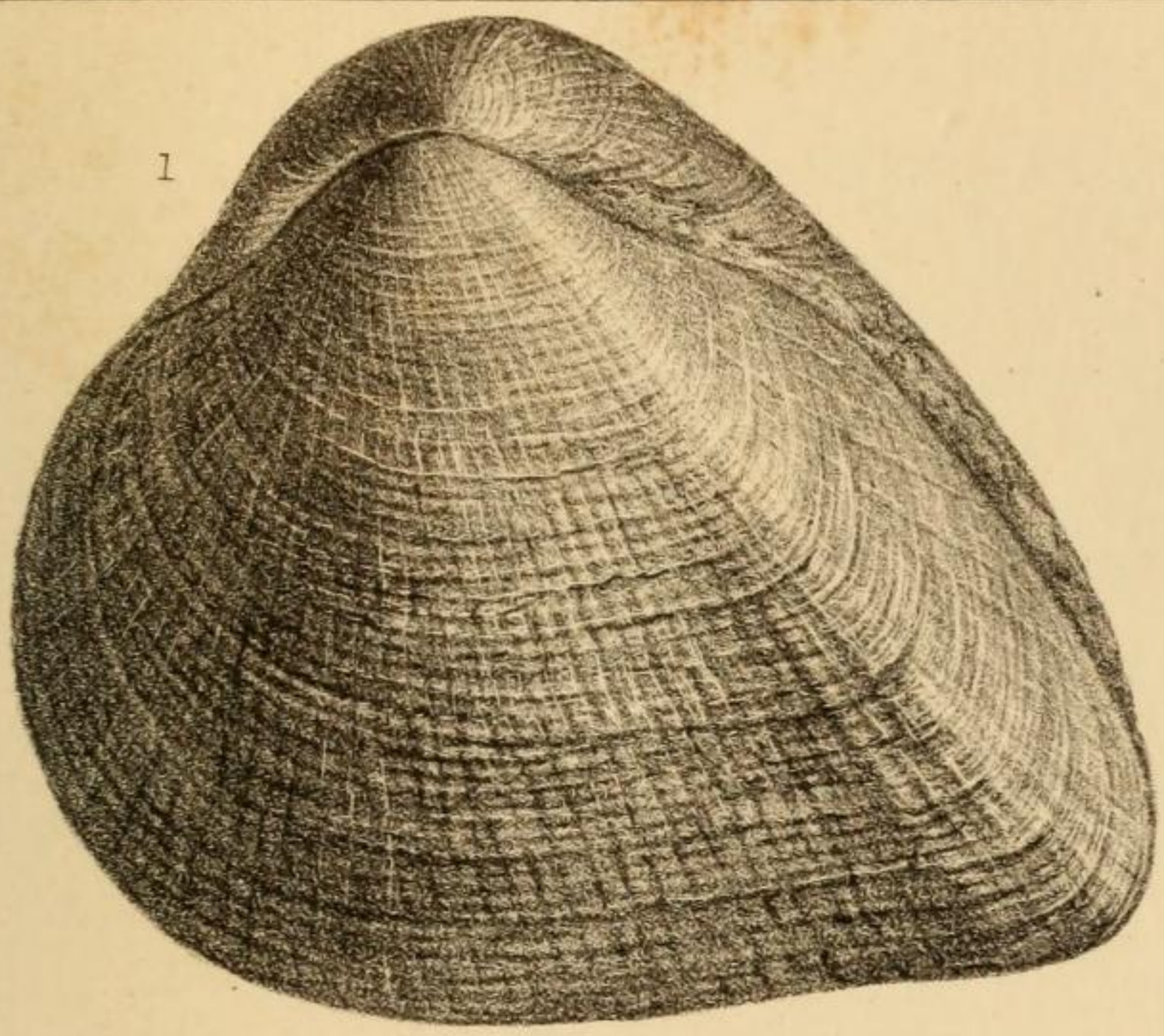

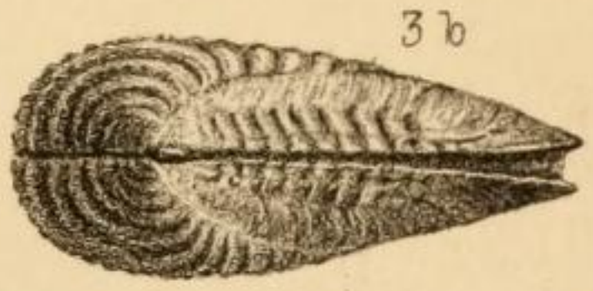

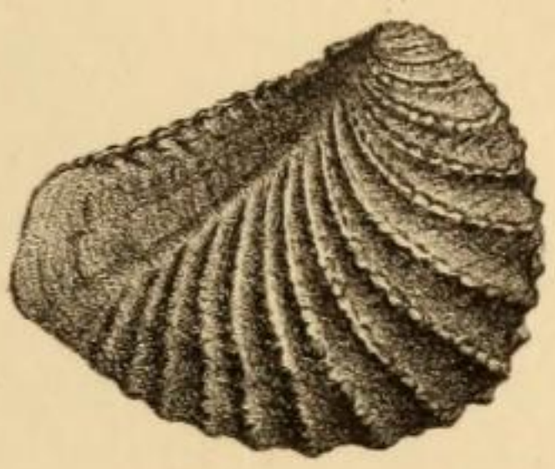

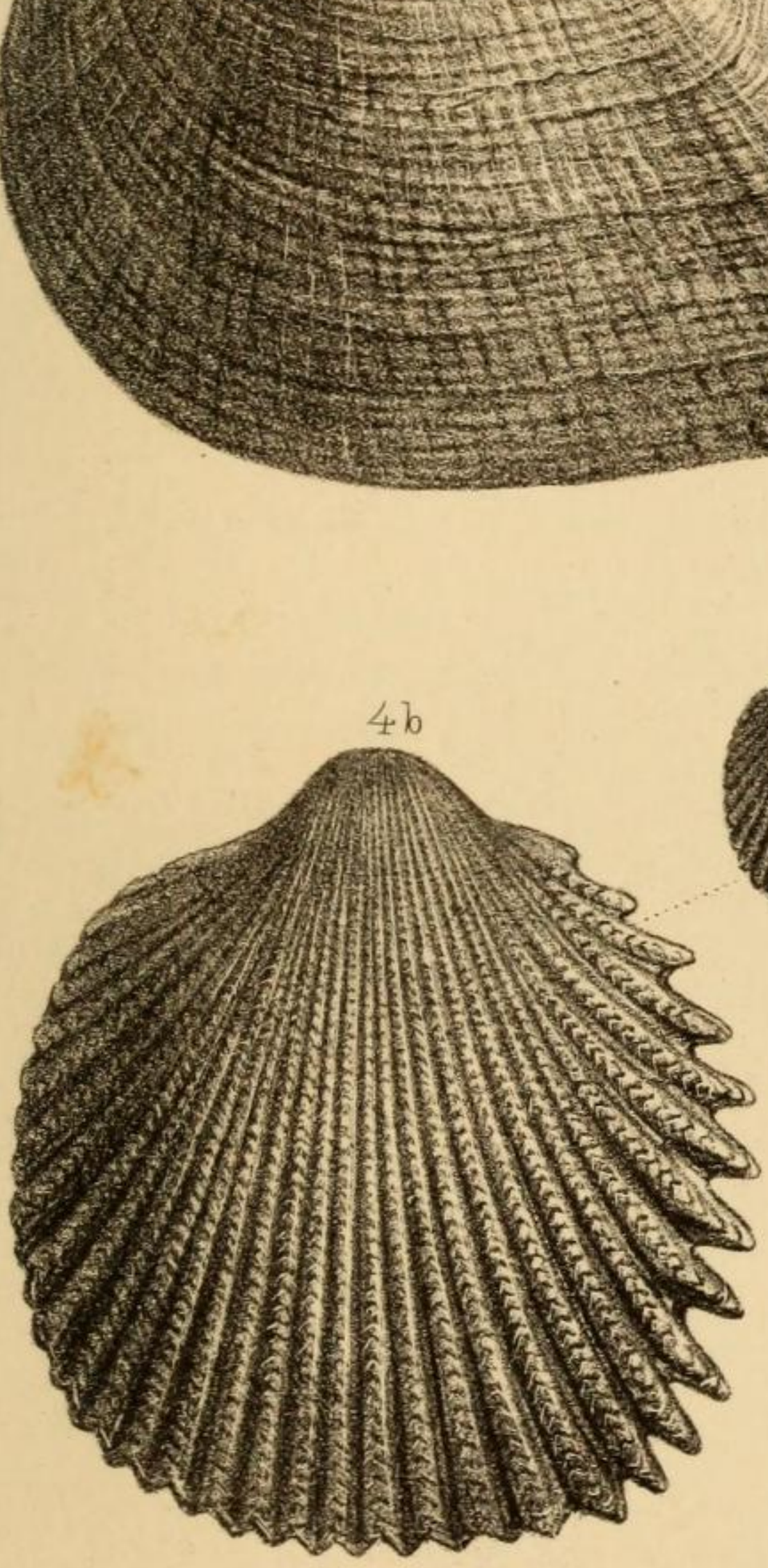

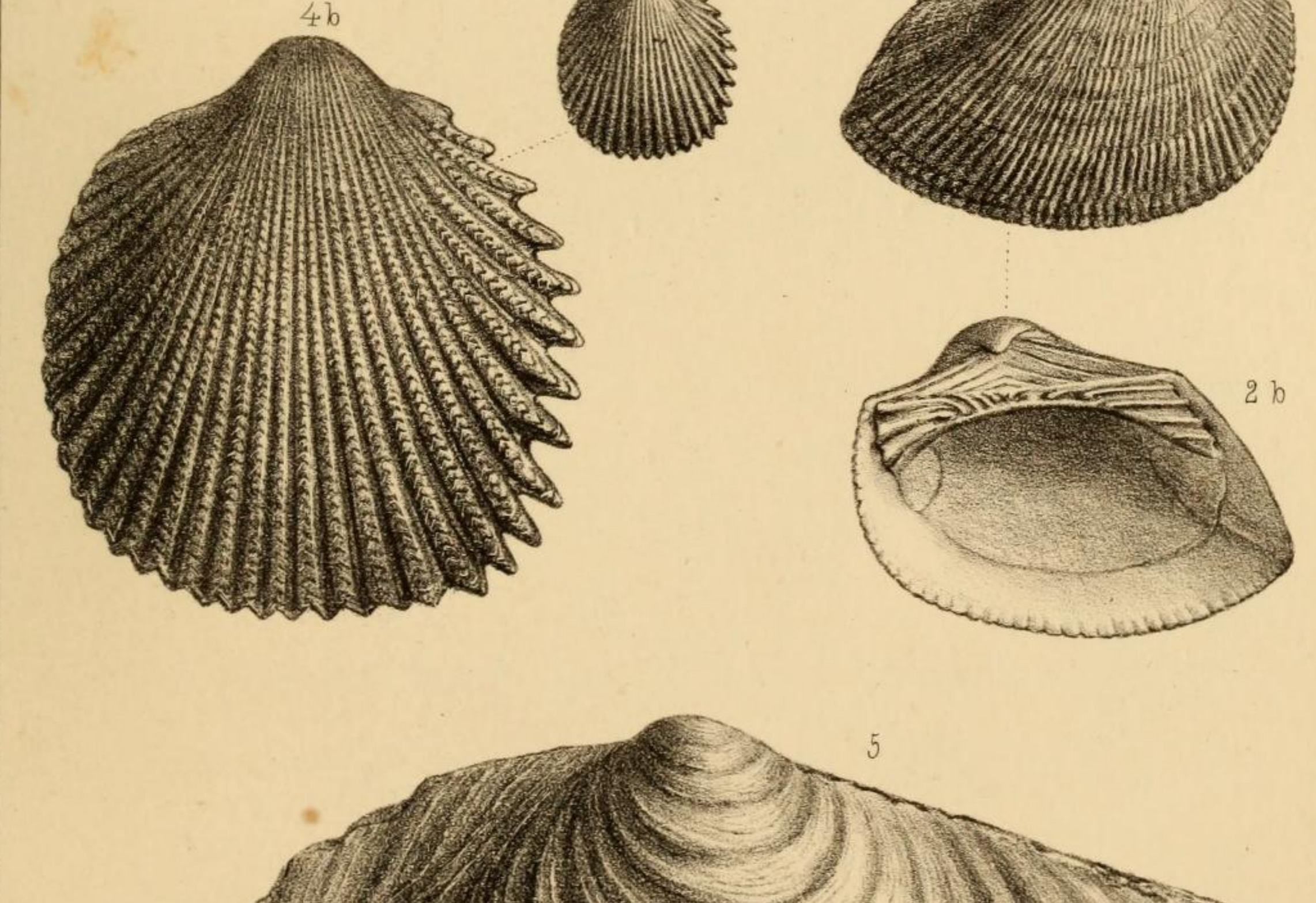

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CRETACEOUS FOSSILS OF SOUTH AFRICA.

EXPLANATION OF PLATES XI., XII., XIII.

Plate XI.

Fig. 1. Ammonites Soutonii: *a*, front view of whorls; *b*, back view reduced to one-fourth of natural size; *c*, septal suture, half-natural size.
Fig. 2. Ammonites Stangeri: *a*, front view of whorls; *b*, back view, reduced to one-fourth of natural size; *c*, septal suture, natural size.
Fig. 3. Ammonites Gardeni: *a*, front view of inner whorls; *b*, back view, natural size; *c*, septal suture, enlarged 2 diameters.
Fig. 4. Ammonites Umbulazi: *a*, front view of whorls; *b*, back view, natural size; *c*, septal suture, enlarged 3 diameters.
Fig. 5. Baculites sulcatus: *a*, front view; *b*, section of one of the chambers; *c*, back view of another specimen with deeper sulcations.

Plate XII.

Fig. 1. Hemiaster Forbesii: *a*, upper surface; *b*, under surface; *c*, portion of upper surface with ambulacra, perforated tubercles, and encircling granules, magnified.
Fig. 2. Scalaria ornata: *a*, natural size; *b*, portion of surface, magnified.
Fig. 3. Solarium pulchellum: *a*, side view, natural size; *b*, upper view of whorls enlarged 5 diameters.
Fig. 4. Voluta rigida; natural size.
Fig. 5. Chemnitzia Sutherlandii; natural size.
Fig. 6. Turritella Meadii: *a*, natural size; *b*, enlarged 3 diameters.
Fig. 7. Turritella Bonei: *a*, natural size; *b*, portion of surface magnified.
Fig. 8. Natica multistriata: *a*, natural size; *b*, portion of the surface magnified.

Plate XIII.

Fig. 1. Arca Umzambaniensis; natural size.
Fig. 2. Arca Natalensis: *a*, outer view of single valve; *b*, inner view of the same; natural size.
Fig. 3. Trigonia elegans: *a*, front view; *b*, hinge view; natural size.
Fig. 4. Cardium denticulatum: *a*, natural size; *b*, enlarged 3 diameters.
Fig. 5. Inoceramus expansus: hinge portion of shell, reduced one-third.

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5. *Notes on the* Geology *of* Natal, South Africa.

By Dr. P. C. Sutherland.

[In Letters* to Sir R. I. Murchison, V.P.G.S.]

The sea-coast of Natal, to a distance of twenty to thirty miles inland, appears to be composed of beds of sandstone and shale alternating with trap-rock, the former containing thin layers of woody coal and very faint vegetable impressions. These beds of trap and sedimentary matter are not individually of great extent. Six of each sometimes occur in a linear space of a quarter of a mile.

The best specimens of the coal yet found are only slightly bituminous; and much is of very inferior character. The thickness of the seams varies from a mere film up to about $2\frac{1}{2}$ to 3 feet. Where the best coal exists, three seams crop out in a space of 20 feet; the aggregate thickness of which is upwards of 4 feet. From the manner in which they run into each other, thin out, again thicken,

* Dated D'Urban, March 13, 1854; and Natal, Nov. 3, 1854.