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VIII.—Notes on the Ammonites of the Cretaceous rocks of the District of Athabasca, with descriptions of four new species.

By J. F. WHITEAVES.

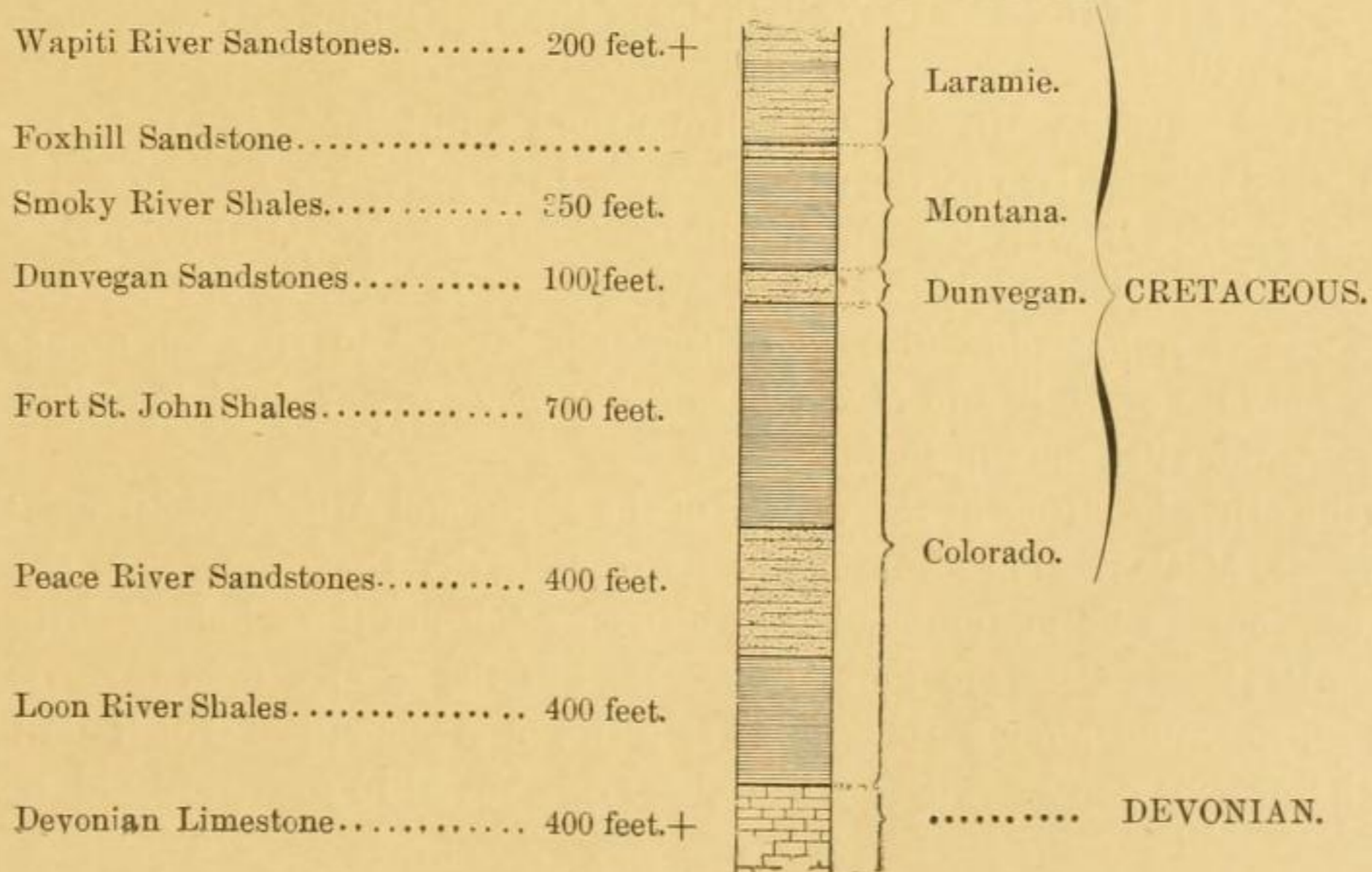
(Read June 1st, 1892.)

The Cretaceous rocks of part of the District of Athabasca were carefully examined by Dr. R. Bell in 1882, and described by him in the Report of Progress of the Geological Survey of Canada for 1882-3-4, published in 1885. A few well preserved but for the most part very imperfect fossils were collected by Dr. Bell on this occasion at the Drowned (or Boiler) and Burnt Rapids of the Athabasca, and a provisional list of these fossils is given on page 14 C. C. of his Report.

In continuance of these investigations, Mr. R. G. McConnell devoted the whole of the summer seasons of 1889 and 1890 to making as complete an examination as practicable of the Cretaceous rocks of the district in question, and contributed descriptions of the general results of his observations to the "Summary Reports" of the Survey for those years. He succeeded in making large and important collections of the fossils of these rocks at Lesser Slave Lake and on the Peace River and its tributaries in 1889, and on the Athabasca River and its tributaries in 1890, but these fossils have not yet been reported upon.

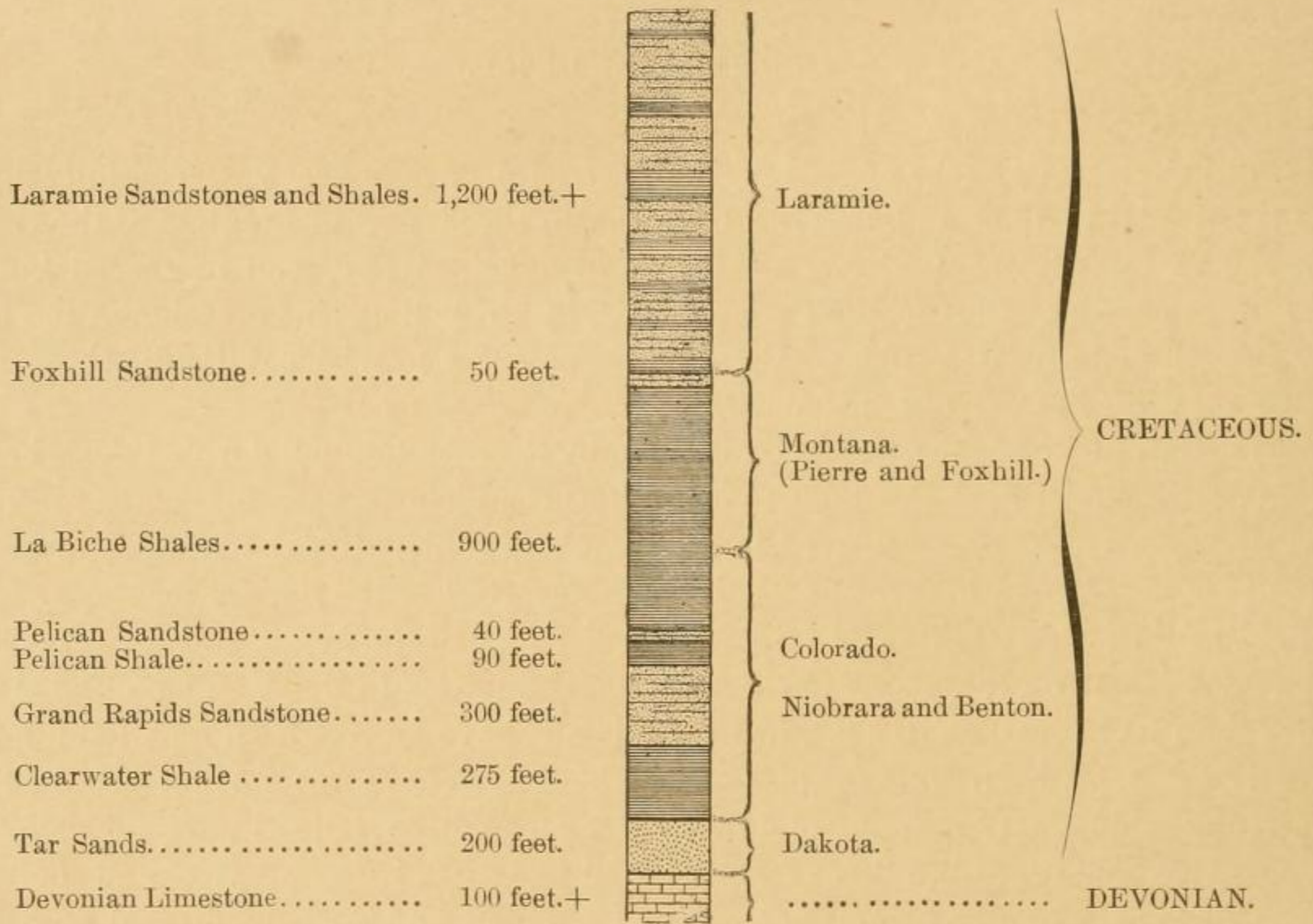
It has long been known that the Cretaceous rocks of the Athabasca District rest unconformably on limestones of Devonian age, and the following sections of the beds exposed on the Peace and Smoky Rivers and on the Athabasca River and Lesser Slave Lake, have been kindly furnished by Mr. McConnell and are here printed by permission of the Director of the Survey.

PEACE RIVER AND SMOKY RIVER SECTION.



Part of the Dunvegan Sandstones of the Peace and Smoky River Section consists of a fresh-water or brackish water deposit, corresponding to the Belly River Series of other parts of the North-west Territories of Canada and perhaps to the Bear River "Laramie" of Wyoming. It contains a *Corbula*, which the writer is unable to distinguish from *C. pyriformis*, Meek, *Corbicula Durkeii*, Meek, a species of *Goniobasis*, etc.

ATHABASCA RIVER AND LESSER SLAVE RIVER AND LAKE SECTION.



In this section, the "Foxhill Sandstone" and the upper 700 feet (or thereabout) of the "La Biche Shales" are the representative of the Pierre-Foxhill or Montana Formation, and the lower 200 feet of the "La Biche" Shales of the upper part of the Niobrara-Benton or Colorado Formation.

The fossils obtained by Mr. McConnell from the Foxhill Sandstone and upper portion of the La Biche Shales at two of the exposures on Lesser Slave Lake and at three on the Athabasca River are all well known and characteristic species of the Pierre-Foxhill or Montana Formation. Those which are recognizable are *Pleria Nebrascana*, Evans and Shumard, *Protocardia borealis*, nobis, *Tancredia Americana*, Meek and Hayden, *Cinulia concinna* and *Lunatia concinna* of Hall and Meek, *Baculites compressus*, Say, and *B. ovatus*, Say, but there are no Ammonites among them.

At all the other localities in the valleys of the Peace and Athabasca Rivers, the fossils collected by Mr. McConnell are from lower horizons in the Cretaceous than the "Pierre-Foxhills" or Montana Formation, and the greater part, if not the whole of them, are from the Niobrara-Benton or Colorado Formation. Most of the species from these lower beds are new to science, and among them is a fine series of Ammonites, which will form the subject of the present paper. These will be here considered in zoological order, in accord-

ance with the classification of the Ammonoidea in the second volume of Zittel's "Handbuch der Palæontologie."

Family HAPLOCERATIDÆ, Zittel.

DESMOCERAS AFFINE. (Sp. nov.)

Plate VIII., and Pl. XI., figs. 1 and 1 a.

Shell discoidal, sides strongly compressed, periphery very narrowly rounded, umbilicus so narrow that little more than the inner faces of the inner volutions are exposed, its margin rounded and consequently ill-defined: aperture elongated in the dorso-ventral direction, narrowly subelliptical in outline, but deeply emarginate posteriorly by the encroachment of the preceding volution.

Surface, of septate specimens from two or two and a half to a little over four inches in their maximum diameter, marked by very numerous and closely disposed, fine and flexuous raised lines, which radiate obliquely outward and forward from the umbilical margin to and across the periphery, also with distant periodic arrests of growth, each of which consists of a narrow groove bounded anteriorly by a swelling rim. Upon the chamber of habitation of adult or nearly adult specimens the surface markings consist of distant, narrow and not very prominent or feebly developed, simple radiating ribs, with broad but shallowly concave intervals between them.

Sutures of the septa essentially similar to those of *Desmoceras Beudanti*, the *Ammonites Beudanti* of Brongniart, as described and figured by d'Orbigny, Pictet and Campiche, Stoliczka, and other palæontologists.

Peace River Sandstones on the Peace River,—twenty-two and five miles below the Battle River, also twenty-five miles above that river,—and twenty-five miles below Cadotte's River, R. G. McConnell, 1889: one or two good specimens from each of these localities. Loon River Shales on the Loon River (a tributary of the Peace), opposite Buffalo Head Hills (four specimens), at the lower end of these hills (three specimens), and thirty miles above its mouth (two specimens); R. G. McConnell, 1889. Loon River Shales on the Red River¹ (another tributary of the Peace), at the Second Rapids, R. G. McConnell: six specimens.

Clearwater Shale of the Athabasca River, at the Boiler Rapids, R. G. McConnell, 1890: a badly preserved portion of the outer volution of a rather large specimen.

Altogether, twenty-four specimens were collected, the largest of which is about ten inches in its maximum diameter. These are remarkably similar to *Desmoceras Beudanti*, in their sutural lines, sculpture and general shape, but they are invariably more closely coiled and consequently more narrowly umbilicated. According to Stoliczka, scarcely one-third of the inner whorls are exposed in the umbilicus of *D. Beudanti*, but in that of the present species little more than their inner faces are exposed. Pictet and Stoliczka represent the umbilicus of *D. Beudanti* as truncated on its inner face, with a rectangular

¹ As there are two Red Rivers in the District of Athabasca it may be well to state that the one here referred to takes its rise in the Birch Mountains, and flowing westward, empties into the Peace, about five miles below Vermilion Falls.

margin, and in this respect *D. affine* more closely resembles the very closely allied *D. Parandieri*, d'Orbigny, as described and figured by Pictet. This angularity of the umbilical margin, however, does not seem to be a constant character, as in some specimens of *D. Beudanti* from the Earlier Cretaceous of the Queen Charlotte Islands the umbilical margin is angular and in others rounded. In Europe *D. Beudanti* is characteristic of the Gault Formation, and in the Queen Charlotte Islands of deposits apparently older than the Dakota Sandstone, whereas, in the valleys of the Peace and Athabasca *D. affine* occurs in beds that are probably the equivalents of the Niobrara-Benton of the Upper Missouri Section, and of the Lower or Grey Chalk of the English geologists, the Turonien of d'Orbigny, and therefore a little newer than the Dakota.

The genus *Desmoceras* was constituted by Zittel in 1884 for the reception of a large group of Cretaceous Ammonites which Neumayr had previously referred to *Haploceras*. Besides the two which are described and illustrated in the present paper, six species of *Desmoceras* from the Cretaceous rocks of Canada have been previously enumerated or described by the writer, under the generic name *Ammonites*, *Haploceras*, or *Placenticerus*, in the three parts of the first volume of "Mesozoic Fossils" or in the second part of the first volume of "Contributions to Canadian Palæontology," published by the Geological Survey of Canada. The following is a synopsis of the amended nomenclature of these species :—

A. From the Earlier Cretaceous of the Queen Charlotte Islands.

- Desmoceras* *Perezianum*. (=Ammonites *Perezianus*, nobis, non d'Orbigny).
 " *Breweri*. (=Ammonites *Breweri*, Gabb).
 " *Beudanti*. (=Ammonites *Beudanti*, Brongniart).
 " *planulatum*. (=Ammonites *planulatus*, Sowerby).

B. From the Later Cretaceous of Vancouver and adjacent islands.

- Desmoceras* *Gardeni*. (=Ammonites *Gardeni*, Bailey).
 " *Newberryanum*. (=Ammonites *Newberryanus*, Meek).

Ammonites Billingsii of Meek,¹ from the Cretaceous rocks of the neighbourhood of Bear River in the Mackenzie River district, is probably also a *Desmoceras*, but, as the largest known specimen is only five-eighths of an inch in its maximum diameter, its generic and specific affinities are uncertain.

Ammonites Laperousianus, nobis,² from the Earlier Cretaceous of the Queen Charlotte Islands, which has the distant periodic arrests of growth usually characteristic of *Desmoceras*, seems nevertheless to belong to the genus *Silesites* of Uhlig.

Haploceras Cumshewaense, nobis,³ from the same formation and locality as *A. Laperousianus*, has also periodic arrests of growth like those of *Desmoceras*, but it most probably belongs to that section of the genus *Olcostephanus* of which the *Ammonites virgatus* of von Buch is the type, and for which Pavlow has recently proposed the subgeneric name *Virgatites*.⁴

¹ In Hind's Rep. Assinib. and Saskatch. Expl. Exped., p. 184, pl. ii., figs. 4, 5 and 6.

² Geol. Surv. Canada, Mesoz. Fossils, vol. I., p. 39, pl. iii., fig. 3.

³ Ibid., p. 208, pl. xxiv, fig. 1.

⁴ Bull. Soc. Imp. Nat. Moscou, Année 1891 (1892), p. 471.

DESMOCERAS AFFINE, var. GLABRUM.

Plate IX.

Placenticeras glabrum, Whiteaves. 1889. Contr. to Canad. Palæont., vol. I., p. 172, pl. xxiv., figs. 1, 1a and 1b.

Shell essentially similar to the typical form of the species in general shape and in the ramifications of its sutural lines, but differing therefrom in the total absence of distant arrests of growth in the septate portion.

It is only proper to add that most of the specimens of this variety are abnormally compressed, and it is perhaps to this circumstance alone that the absence of the usual distant periodic constrictions or arrests of growth is due. Pictet, in his description of the very closely related *Ammonites Beudanti*,¹ says, in effect, in a passage formerly overlooked by the writer, that the most compressed specimens do not show any of these arrests of growth, and that they are always most marked in the most inflated individuals. He has, he says, numerous examples of *A. Beudanti* with these growth arrests (sillons), which show that this character has no specific value. Some have only one constriction, some two or three, and others more. They never have any when very young, and their earlier volutions are perfectly smooth. All have perfectly similar sutural lines.

The specimen upon which the description and figures of *Placenticeras glabrum* were based is a small but unusually perfect and well preserved cast of the interior of the shell, collected by Mr. W. Ogilvie in 1885 from the Loon River Shales on the Peace River a few miles below Fort Vermilion. It is ninety-six millimetres, or about three inches and three-quarters, in its maximum diameter, smooth and the whole of the ramifications of the lobes and saddles of its crowded sutural lines are exquisitely shown. The sutural lines are so complicated that it was not thought necessary to draw the whole of them, so that in this respect the original figure is not an exact representation of the specimen, which was referred to the genus *Placenticeras* on account of its supposed resemblance to the *Ammonites Cleon* and *A. nisus* of d'Orbigny, which Zittel places in that genus.

Three larger but in every other respect precisely similar casts, the largest of which is seven inches and three-quarters in its maximum diameter, were collected by Mr. McConnell in 1889, from the Loon River Shales on the Loon River, opposite the Buffalo Head Hills, a locality about forty miles to the southward of that at which the type of the species was obtained by Mr. Ogilvie.

A few specimens with most of the test preserved were collected by Mr. McConnell in 1889, from the Peace River Sandstones on the Peace River at exposures twenty and twenty-five miles below Cadotte's River, also, from the Loon River Shales on the Loon River thirty miles above its mouth. The largest of these specimens, which is represented, three-fourths of the natural size, on Plate IX., is a little over nine inches in its maximum diameter. The surface markings, as shown in this specimen, consist of numerous and flexuous radiating striæ, and of several short and very irregular faint spiral grooves or strigations, but there is no evidence of any distant periodic arrests of growth. The outer lip seems to have been considerably produced on the peripheral or ventral region.

¹ Paléont. Suisse, Foss. Terr. Crét. env. Sainte-Croix, pp. 278-79.

A study of the whole of these specimens has convinced the writer that they should be referred to the genus *Desmoceras* rather than to *Placenticas*, and that they represent a variety of *D. affine* in which the periodic arrests of growth in the septate portion of the shell are either obliterated by lateral pressure or not developed. As the specific name *glabrum* can scarcely be retained for the type of the species, whose surface is by no means smooth, it may perhaps be used without impropriety for the less strongly ornamented variety now under consideration.

At first sight, the comparatively smooth specimens of this variety, such as that represented on Plate IX., are so dissimilar in aspect to the typical form of the species, as illustrated on Plate VIII., that they might well be regarded as specifically distinct from it. Some specimens, however, are intermediate in their characters. Thus, in an imperfect shell of this species, from the Loon River Shales of the Loon River, part of the outer volution of which has been broken off in such a way as to expose a large portion of the last volution but one, the inner of the two volutions has the character of the var. *glabrum*, i. e., the absence of periodic growth arrests, while upon the outer one very distinct traces of the distant and feebly developed transverse ribs characteristic of the typical form of the species are preserved.

DESMOCERAS ATHABASCENSE. (Sp. nov.)

Plate X.

Shell very large, discoidal, compressed at the sides and narrowly rounded at the periphery: volutions so closely coiled and so strongly embracing that the whole of the inner ones are covered by the outer one, the umbilicus consisting of a very narrow central depression or pit, on each side: chamber of habitation occupying between two-thirds and three-fourths of the outer volution: aperture much higher than broad, almost elliptical in outline but deeply emarginate by the encroachment of the preceding volution.

Surface of the only specimen collected, which is not very well preserved, nearly smooth and marked only with two or three distinct, broad but shallow and extremely obscure radiating grooves or faint constrictions, on the outer portion of the chamber of habitation. Sutures of the septa too imperfectly preserved to be described with any precision.

Maximum diameter of the specimen, fifteen inches and a half: greatest breadth of the same (at the aperture) five inches.

Athabasca River, four miles below the mouth of the Pelican, in the lower 200 feet of the La Biche Shales, associated with *Acanthoceras Woolgari*,—R. G. McConnell, 1890: a nearly perfect cast of the interior of the adult shell, with most of the nacreous or inner layer of the test preserved upon the chamber of habitation.

This fine species, which, so far as known, occurs at a horizon at least 500 feet higher up in the Cretaceous than *D. affine*, appears to differ from that shell in its much larger size, narrower umbilicus and somewhat different sculpture. Thus, the largest known specimen of *D. affine*, in which nearly the whole of the chamber of habitation is preserved, is about ten inches in its greatest diameter, whereas the maximum diameter of the type and only known specimen of *D. Athabascense* is fifteen inches and a half. In *D. affine* a

small portion of each of the inner whorls is exposed in the umbilicus, but in *D. Athabascense* the inner whorls are completely covered by the overlapping of the outer volution. The exterior of the septate portion of the shell of the typical form of *D. affine*, also, is marked with varix-like periodic arrests of growth, and the outer surface of the body chamber of both it and its var. *glabrum* by low, distant and feebly developed ribs, whereas the outer volution of *D. Athabascense* is apparently smooth posteriorly, and marked only with from two to three broad, faint and almost obsolete transverse constrictions on the outer portion of the body chamber.

Family STEPHANOCERATIDÆ (Neumayr) Zittel.

HOPLITES MCCONNELLI. (Sp. nov.)

Plate XI., figs. 2, 2 a-b.

Shell small, discoidal, sides compressed, periphery narrowly rounded: umbilicus occupying more than one-fourth and less than one-third of the total diameter, and exposing about one-third of each of the inner volutions, but with its margin rounded and ill-defined: aperture elongated, higher than broad, subelliptical in outline, but shallowly emarginated posteriorly by the encroachment of the preceding volution.

Surface marked by feebly developed, simple and flexuous radiating ribs, which become almost obsolete on the periphery, with finer striæ between them. By the use of a lens, also, several minute spiral striæ can be detected on the sides of the outer volution.

Sutural line consisting of three lateral saddles and two lateral lobes on each side of the siphonal saddle and lobe, besides two or three minute saddles and lobes on the inner face of the umbilicus. Siphonal saddle very short and incised only at the summit: first lateral saddle much larger than the second, its summit divided very unequally into two short primary branches, which are subdivided, the outer and larger one into three still shorter and incised secondary branchlets, and the inner and smaller one into two: second lateral saddle larger than the third, its summit also divided unequally and somewhat similarly, but with the larger of its primary branches on the inner side: third lateral saddle divided unequally at the summit, with the larger of its two lobate branches on the outer side. Siphonal lobe a little shorter than the first lateral lobe, symmetrical and bearing three incised and spur-like processes on each side: first lateral lobe trifurcate above and divided into three branchlets, which are slightly expanded and deeply incised at their summits: second lateral saddle small, its summit expanded and perhaps better described as unequally bifurcate than as trifurcate.

Maximum diameter of the largest specimen collected, the one figured, nearly forty millimetres, or a little over an inch and a half.

Clearwater Shales of the Athabasca River, at the Burnt Rapids, R. G. McConnell, 1890: two small septate specimens, with most of the test well preserved.

This small Ammonite appears to belong to the group Flexuosi of von Buch, as limited by Pictet in the first volume of the *Paléontologie Suisse*, and to be most closely related to the *Ammonites Castellanensis* of d'Orbigny. It is probably a rather aberrant member of that section of the genus *Hoplites* which Zittel designates as the group of *Ammonites cryptoceras*, d'Orbigny.

Three species of *Hoplites* are now known to occur in the Cretaceous rocks of Canada, and each of these belongs to a different section of the genus. Two of them are described for the first time in the present paper, and the third is *Hoplites Vancouverensis*, the *Ammonites Vancouverensis* of Meek, from the Later Cretaceous of Vancouver Island, which was at one time (1876) doubtfully referred by Meek to his own genus *Placenticerus*.

HOPLITES CANADENSIS. (Sp. nov.)

Plate XI., figs. 3, 3 a, 4 and 5.

Shell discoidal, compressed at the sides and flattened on the periphery, the outer volution being almost rectangular in transverse section: umbilicus occupying not much more than one-fourth of the total diameter and exposing only a small portion of each of the inner volutions, but with a rounded and very indefinite margin: aperture subquad-rangular, with the dorso-ventral diameter a little greater than the lateral, and distinctly but rather shallowly emarginate posteriorly by the encroachment of the preceding volution.

Surface marked with prominent, narrow and rather distant, radiating ribs, which bifurcate at the umbilical margin, with a shorter and simple rib occasionally intercalated between two of the larger ones. All the ribs pass continuously over the periphery, and the intervals between them are rather broad and slightly concave.

Sutural line consisting of three principal lateral saddles and two lateral lobes on each side of the siphonal saddle and lobe, besides a few small accessory lobes and saddles in the umbilical cavity. Siphonal saddle very short, its summit minutely trilobed, with the central lobule the shortest: first, second and third lateral saddles nearly equal in height, but dissimilar and unequal in breadth, the first and third being broader than the second, and all three narrowly and deeply lobed and incised rather than branched. Siphonal lobe not much shorter than the first lateral lobe, the former symmetrical and bearing four nearly simple divergent spurs or offsets on each side, though the margins of the two upper and longer pairs of spurs are distinctly incised: first lateral lobe not much higher than the siphonal lobe, but unsymmetrical, its summit being unequally but not very deeply bipartite: second lateral lobe much narrower and shorter than the first, with its margin simply incised, but neither lobed nor branched.

Clearwater Shales of the Athabasca River, at the Burnt Rapids, Dr. R. Bell, 1882, and Mr. R. G. McConnell, 1890, where one imperfect and not very well preserved specimen was obtained by each of these geologists. Peace River Sandstones on the Peace River, at exposures five, six, ten and twenty miles below Cadotte's River, R. G. McConnell, 1889: a few well preserved and nearly perfect specimens from each of these localities. Loon River Shales on the Loon River, opposite Buffalo Head Hills, also ten and thirty miles above its mouth, where a few rather badly preserved specimens were collected by Mr. McConnell in 1889.

All the specimens are little more than casts of the interior of the shell, but many of these are almost or quite covered with the more or less exfoliated inner or nacreous layer of the test. The largest specimen (figs. 3 and 3 a), from the Peace River ten miles below Cadotte's River, in which most of the sutures are thus covered, is about two inches and

three-quarters in its maximum diameter. A piece of argillaceous limestone collected by Mr. McConnell on the Loon River is an aggregation of numerous small septate individuals of this species, which average from about an inch to an inch and a quarter in their greatest diameter.

A single valve of a bivalved *Aptychus*, which may have belonged to this species, lies closely appressed to one side of the outer volution and close to the aperture of the large specimen from the Peace River, represented by figs. 3 and 3 a. This valve, which is thirty-one millimetres in its maximum dorso-ventral diameter and twenty-nine in its greatest breadth, is broadly subovate in outline, but subtruncate posteriorly. The median fold is narrow but well defined and separated from the rest of the valve by a linear groove which diverges slightly from the suture. The sculpture appears to consist of faint and almost obsolete distant concentric plications, with a few obscure radiating striæ, nearly parallel with and close to the furrow which bounds the median fold.

This strongly ribbed Ammonite belongs to the group *Angulati* of d'Orbigny, and to that section of the genus *Hoplites* which Zittel calls the group of *Ammonites Deshayesii*. Its closest affinities appear to be with that species, especially in the sutural line, and to the *A. Feraudianus* of d'Orbigny,¹ but it differs from the former in its much squarer outer volution and straighter and bifurcating costæ, and from the latter in its much narrower umbilicus.

ACANTHOCERAS WOOLGARI, Mantell. (Sp.)

Ammonites Woolgari, Mantell. 1822. Geol. Sussex, p. 197, pl. xxi., figs. 16-22, and pl. xxii., fig. 7.

“ “ Sowerby. 1828. Min. Conch., pl. 587, fig. 1.

“ “ Sharpe. 1853. Foss. Moll. Chalk, p. 27, pl. xi., figs. 1 and 2.

Ammonites percarinatus, Hall & Meek. 1854. Mem. Am. Ac. Arts & Sci., Boston, vol. V., (n. s.), p. 396, pl. iv., fig. 2 (young).

Ammonites Woolgari, Meek & Hayden. 1861. Proc. Ac. Nat. Sc. Philad., p. 421.

Prionocyclus (Prionotropis) Woolgari, Meek. 1876. Rep. U. S. Geol. Surv. Terr., vol. IX., p. 455, pl. vi., fig. 2, and pl. vii., figs. 1, a-h.

Acanthoceras Woolgari, Zittel. 1882-85. Handbuch der Palæontologie, vol. II, p. 477.

A few characteristic specimens of this well known English species were collected by Mr. McConnell, in 1880, on the Athabasca River, at exposures ten miles above and three and four miles below the mouth of the Pelican River, in the lower 200 feet of the La Biche Shales, associated with *Desmoceras Athabascense*. The largest of these specimens is a nearly perfect cast of the interior of the shell, about fifteen inches and a half in its greatest diameter, in which nearly the whole of the chamber of habitation is preserved, as well as the septate portion. This specimen represents the adult state of the species as described by Sharpe (op. cit., p. 27), in which the periphery is totally devoid of any keel or keels, and the transverse ribs also are absent, the ornamentation consisting of two rows of very prominent, large, conical and pointed tubercles, on each side of the outer volution, one around the umbilical margin, and the other on the outer margin of the broadly flattened

¹ "Paléont. Franc., Terr. Cret.," vol. I., p. 324, pl. lxxvi., figs. 4 and 5.

periphery. The sutural lines, which are well preserved in two of the specimens collected by Mr. McConnell, are essentially similar to those of the Dakota specimens figured by Meek.

Mantell and Sowerby, who both figure the same specimen of *Ammonites Woolgari*, say that it is peculiar to the Lower Chalk near Lewes, Sussex, but Sharpe states that it occurs also in the Middle Chalk of that county. In his "Report on the Invertebrate Cretaceous and Tertiary Fossils of the Upper Missouri Country" (page 457) Mr. Meek makes the following remarks as to the localities and geological horizon at which *A. Woolgari* (which he regards as the type of the subgenus *Prionotropis* of his genus *Prionocyclus*) had then been found in North America. "Our figured specimens are from the south-east base of the Black Hills, Dakota, where it occurs in the Fort Benton group of the Upper Missouri Cretaceous series. The specimens described by Prof. Hall and the writer under the name *Ammonites percarinatus* came from the same horizon on the Missouri, five miles below the mouth of Vermilion River. It also occurs at this horizon in north-eastern Nebraska; and I am informed by Dr. White that he has found loose specimens of it in the Drift of north-western Iowa. Dr. Newberry likewise brought specimens of it from New Mexico, and Dr. Palmer found it eight miles north of Fort Lyon, Colorado. I am not aware that it has been found *in situ* at any other horizon than that above stated, in this country."

Mr. Meek also states that North American examples of *A. Woolgari* attain to "a medium size," the largest specimen seen by him, "with part of the non-septate portion wanting" is seven inches in its greatest diameter. Specimens from the Athabasca district vary very considerably in their dimensions, for in two of the most perfect specimens collected by Mr. McConnell, both of which have most of the body chamber preserved, the larger, as already stated, is fifteen inches and a half in its maximum diameter, and the smaller only seven.

The only other Ammonite from the Cretaceous rocks of Canada that can be referred to the genus *Acanthoceras* with a reasonable degree of certainty, is the *Ammonites Stolizkanus* of Gabb, a spinose variety of which was collected by Mr. James Richardson in 1872, from the Earlier Cretaceous of Skidegate Inlet, in the Queen Charlotte Islands.¹ It is most probable, however, that the fossil from the Cretaceous rocks of Fort St. John, on the Peace River, which was described on page 239, Section IV., of the second volume of the Transactions of this Society, as *Buchiceras cornutum*, but whose sutural line is unknown, is also an *Acanthoceras* not very distantly allied to *A. Woolgari*.

OTTAWA, October 10, 1892.

¹ See Geol. Surv. Canada, Mesoz. Foss., vol. I., p. 24, pl. iii., fig. 3, and pl. iv., fig. 1, also woodcut, fig. 2, on p. 24.

EXPLANATION OF PLATES.

PLATE VIII.

DESMOCERAS AFFINE. (Page 113.)

Side view of one of the most perfect specimens of the typical form of this species, three-fourths the natural size.

PLATE IX.

DESMOCERAS AFFINE, Var. GLABRUM. (Page 115.)

Side view of the largest known specimen of this variety, also three-fourths the natural size. In this drawing the fine radiating striæ are represented somewhat diagrammatically.

PLATE X.

DESMOCERAS ATHABASCENSE. (Page 116.)

Fig. 1.—Side view of the type and only known specimen of this species, one-half the natural size.

“ 1a.—Front view of the same, to show the characters of the periphery and aperture, in outline only and reduced to one-tenth the natural size.

PLATE XI.

DESMOCERAS AFFINE. (Page 113.)

Fig. 1.—Side view of a half grown specimen of this species, to show the periodic arrests of growth. Natural size.

“ 1a.—Front view of the same, in outline only, also of the natural size.

HOPLITES McCONNELLI. (Page 117.)

Fig. 2.—Side view of the largest known specimen, of the natural size.

“ 2a.—Front view of the same, in outline only, also natural size.

“ 2b.—Sutural line of one side of the same, of the natural size.

HOPLITES CANADENSIS. (Page 118.)

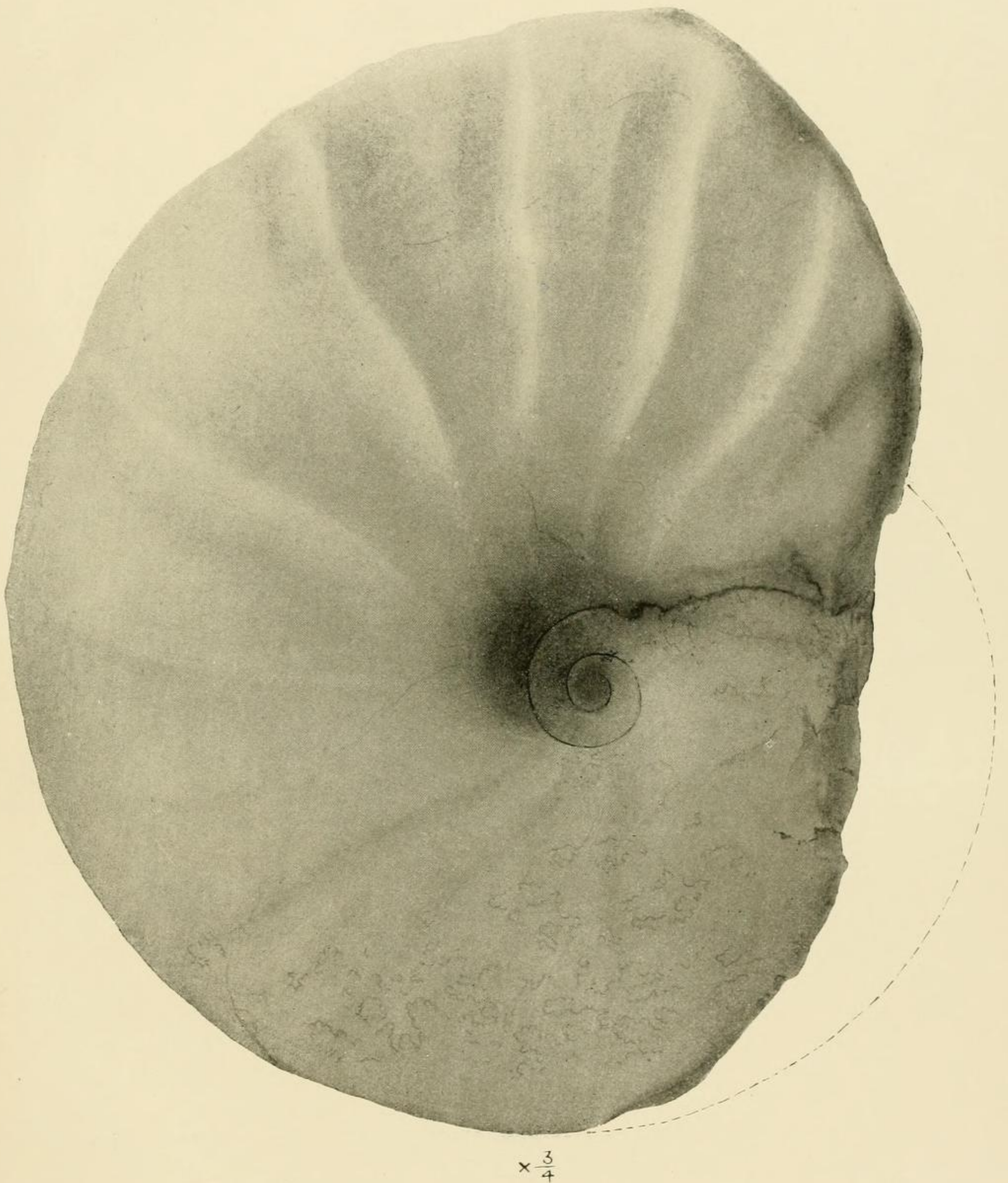
Fig. 3.—Side view of the largest specimen collected, of the natural size.

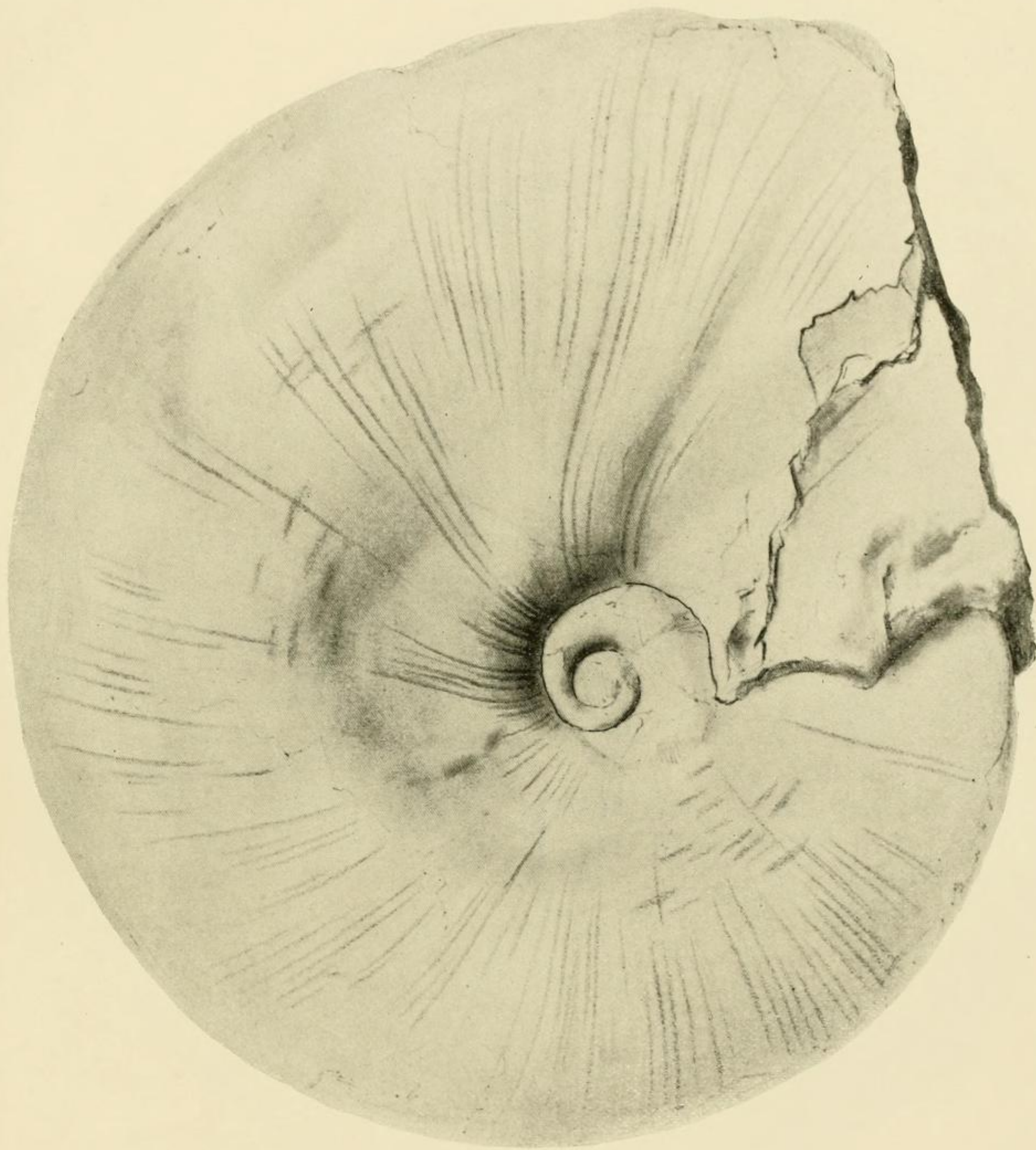
“ 3a.—Front view of the same, in outline only and of the natural size.

“ 4.—Sutural line of one side of a smaller specimen of this species, of the natural size.

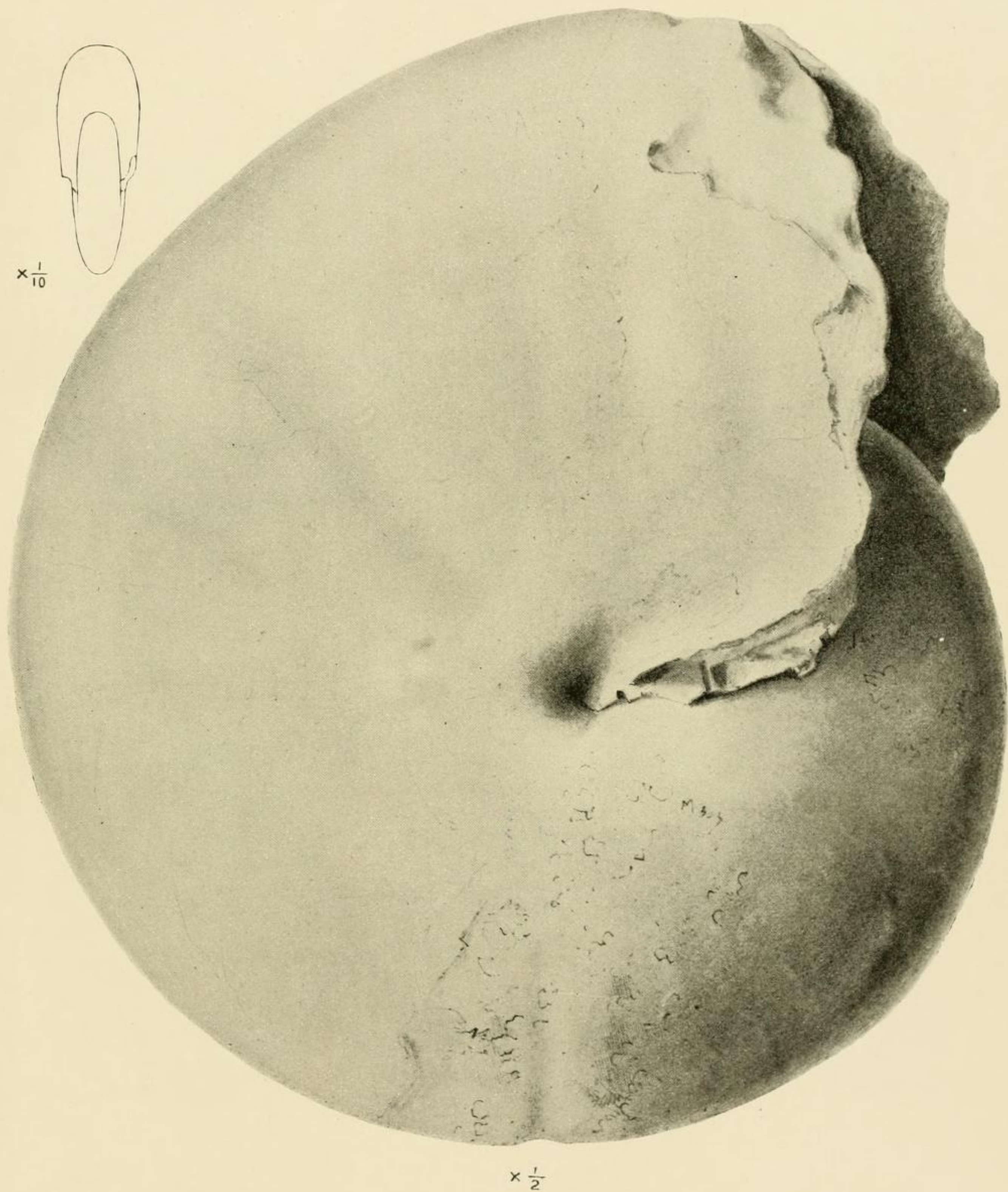
“ 5.—Single valve of an *Aptychus* found in the same piece of stone as the original of figs. 3 and 3a, and probably referable to the same species. Natural size.

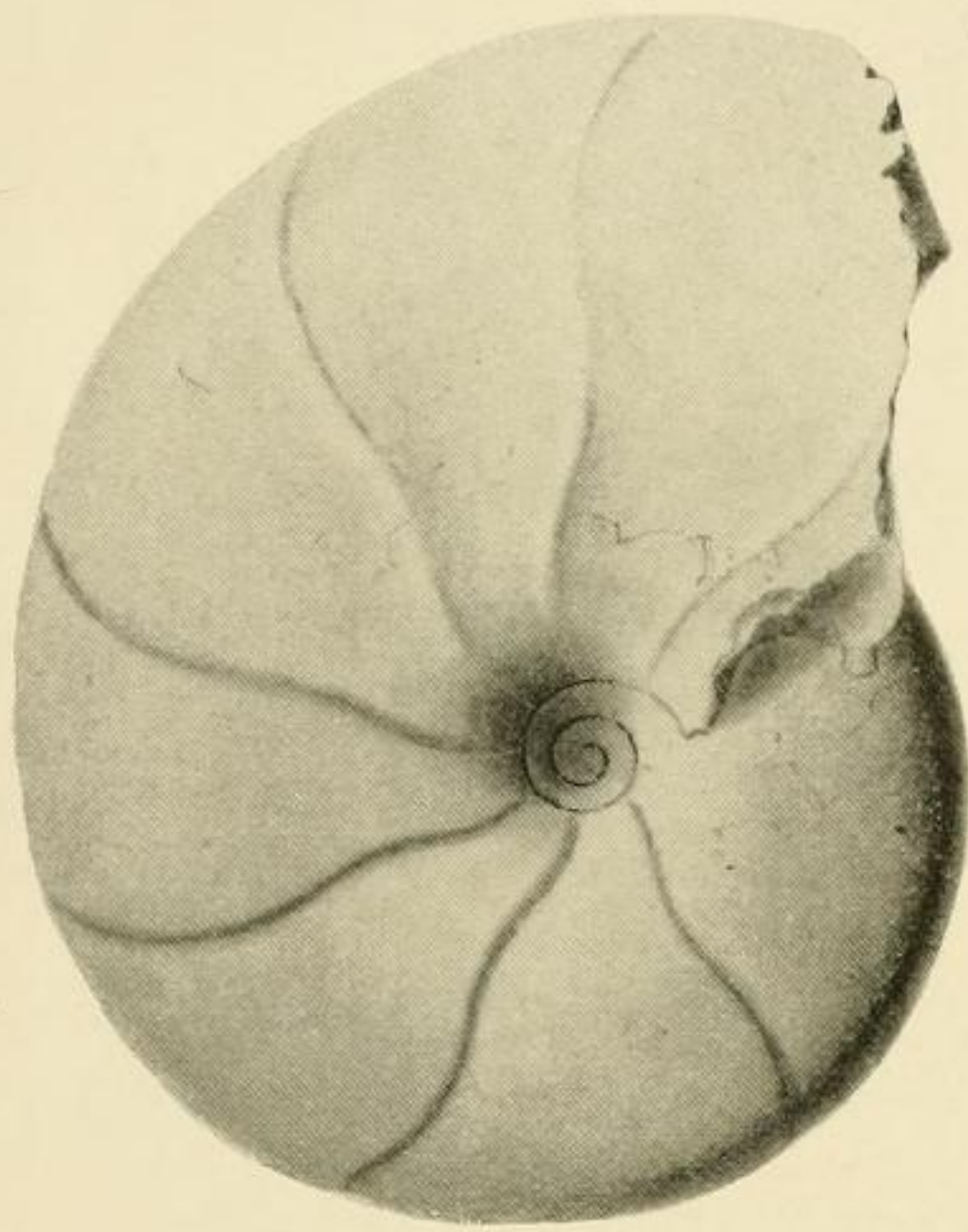




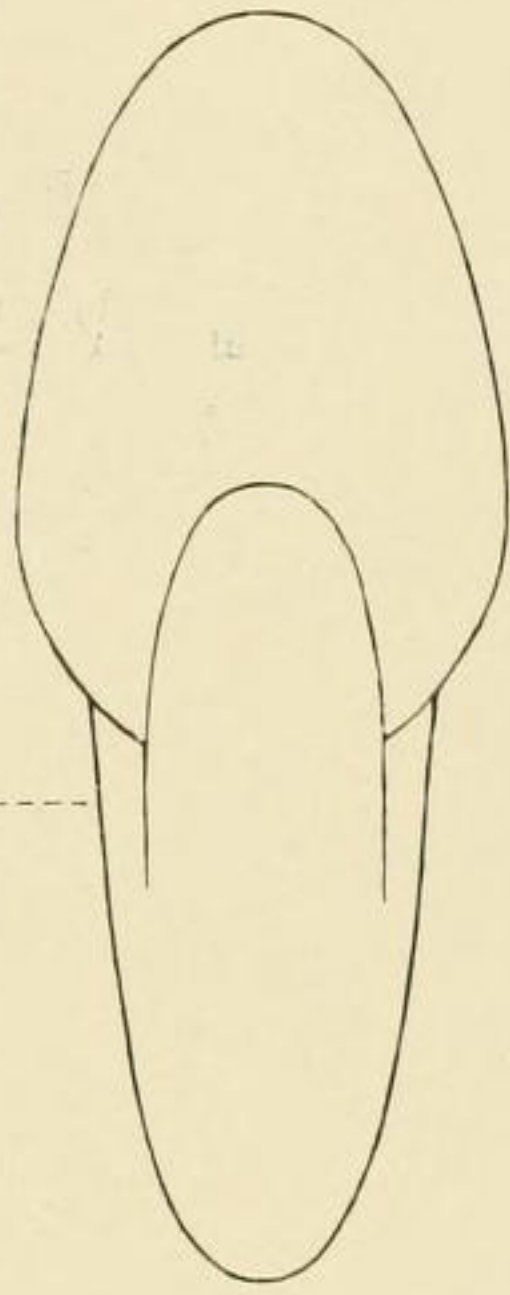


$\times \frac{3}{4}$

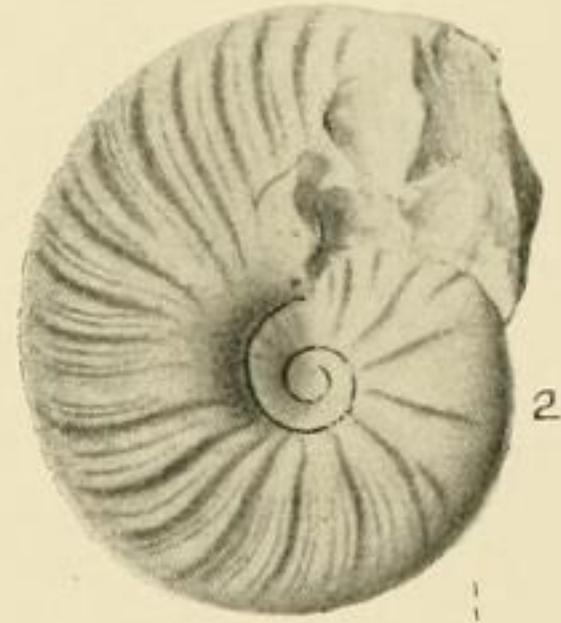




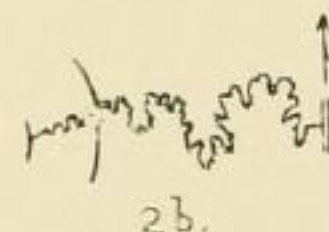
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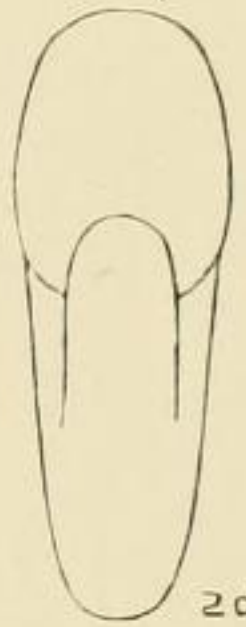
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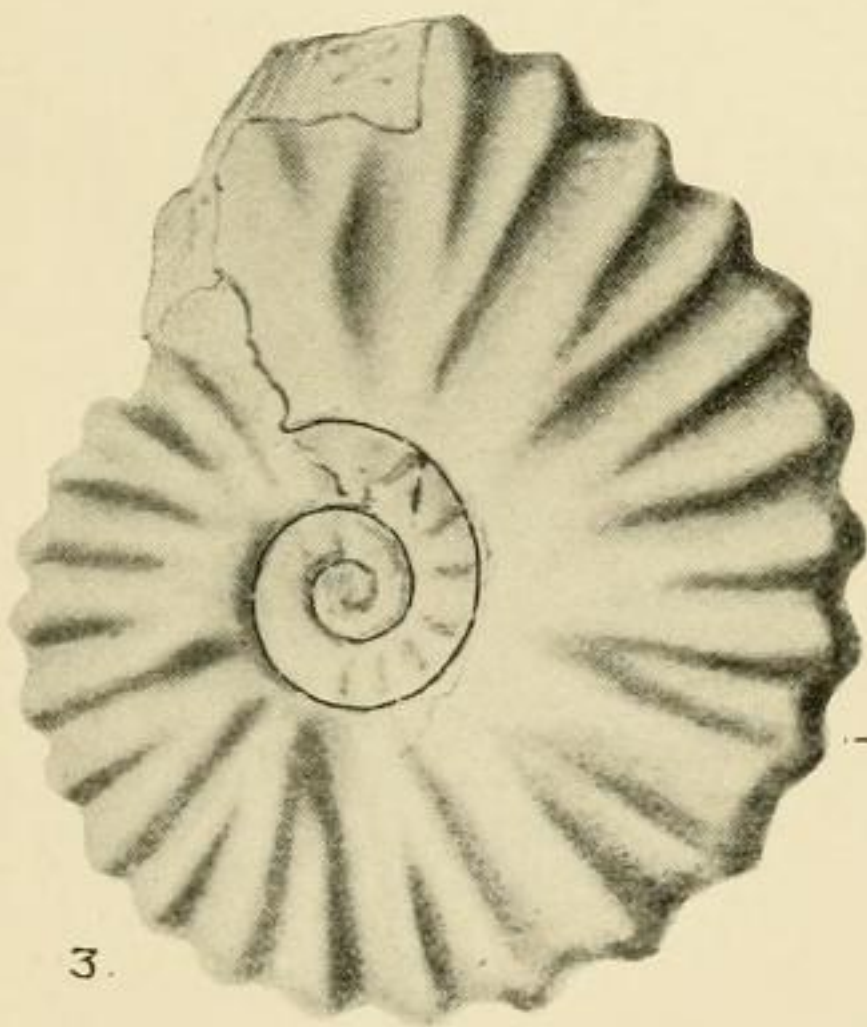
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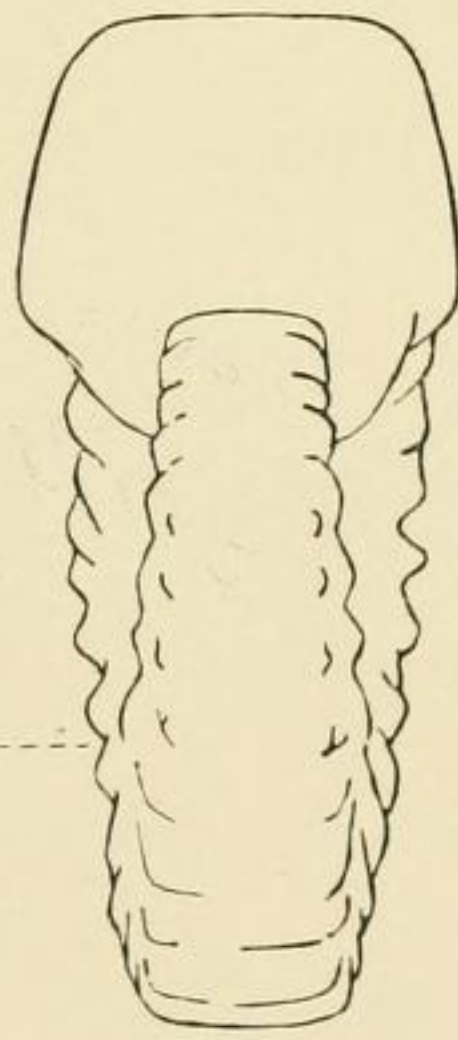
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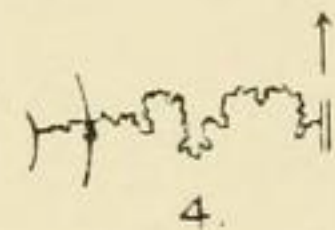
2a.



3.



3a.



4.



5.



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