37. DESCRIPTIONS of some NEW SPECIES of CARBONIFEROUS GASTEROPODA. By Miss DONALD, of Stanwix. (Read June 19, 1889.)

(Communicated by J. G. GOODCHILD, Esq., F.G.S., of the Geological Survey.)

[PLATE XX.]

WITH one exception the Gasteropoda described in this paper have been collected by Mr. John Young, Hunterian Museum, Glasgow. The specimens are all very minute and are well preserved, their creamy colour giving them the appearance of shells of a much more recent date than the Carboniferous period. With the best of materials, however, the affinities of the Palæozoic Gasteropoda are always more or less difficult to determine. In this instance though the sculpture of the surface is wonderfully well preserved, none of the apertures are entire, and the minute size of the shells renders it difficult in many instances to discern the lines of growth.

Out of the five Scottish shells three are undoubtedly *Murchisonia*, one in particular having the band indicating the sinus in the outer lip very clearly defined.

With regard to the other two shells, I know of no genus to which they may be referred, unless it be *Orthonema*, Meek and Worthen*. The more elongated shell bears some resemblance to species of the genus *Aclisina*, de Koninck †, from which it differs, however, in the form of the mouth and the flattened, closely coiled whorls.

Before proceeding to discuss the general characteristics of the shells, it may be well to give the original description of the genus *Orthonema* :—

“Shell elongate, many-whorled; volutions ornamented with revolving carinæ crossed by nearly straight lines of growth; body-whorl short, not produced below; aperture angular above, slightly effuse below; peristome incomplete; lip simple, nearly straight; axis imperforate. The shell upon which we propose to found this genus has much the appearance of a *Murchisonia*, but differs in being entirely destitute of a spiral band or a sinus in the lip, as in that genus and *Pleurotomaria*, the lines of growth being distinctly seen crossing the carinæ and the spaces between, without making the slightest curve.”

In the form of the spire and in ornamentation both the shells agree with the above description, the lines of growth also come straight down over the keels. With regard to the mouth, it is angular above and slightly effuse below, the peristome is incomplete; the pillar-lip, however, seems somewhat more developed than is repre-

* Proc. Acad. Nat. Sci. Phil. 1861, p. 146.

† Faune du Calc. Carb. de la Belgique, 1881, vol. vi. pt. 3, p. 86.

sented in the figure of the type species *Orthonema Salteri* *. Great stress cannot be laid on this difference, as the mouth is not well drawn, and it may not have been sufficiently well preserved to admit of more careful delineation.

Both the Scottish shells are very minute, but they do not differ more in size from the type than do some species of *Murchisonia* from one another, and they are about the same size as *Orthonema subcæniatum*, Geinitz †, one of the smallest species I have seen described. Some of the Spanish species also seem to be very small, for Barrois ‡ says that the specimens he has collected of *Orthonema Choffati* vary in length from 2 millim. to 20 millim., while the length of *C. Delgado* ranges from 3 centim. to 8 or 9 millim.

ORTHONEMA PYGMÆUM, sp. nov. (Pl. XX. figs. 1, 2.)

Shell very minute, turreted, composed of from seven to nine angular whorls. Each whorl is ornamented with four keels, and on the body-whorl there is an additional fine keel below. The second keel from the top is generally the strongest, but sometimes that next below is equally strong, the uppermost and the lowest are the slightest. The mouth is a little longer than wide, and slightly effuse below; the pillar-lip is thickened and arched forwards. There is no evidence of a sinus in the outer lip; the lines of growth come directly down the whorls, merely being deflected by the keels. The base is rounded.

Length from 2 to 2½ millim.; width of the body-whorl about 1 millim.

This shell bears a strong resemblance to *Orthonema subcæniatum*, Geinitz §, but differs from it in possessing stronger keels, which divide the whorls into unequal spaces; and also the whorls are not so rounded as in that species.

Locality. Glencart, Dalry, Ayrshire.

Formation. Upper Limestone series, which represents the middle beds of the Yoredale rocks.

? ORTHONEMA YOUNGIANUM, sp. nov. (Pl. XX. figs. 3, 4.)

Shell small, very elongated, conical, composed of from eleven to fourteen whorls. The whorls are closely set, and the outline of the spire is somewhat convex. Each whorl is ornamented with three or four keels, generally with four, the spaces between them vary in width; in some specimens the two middle keels are the strongest, in others only the lower of the two. The mouth is rounded and slightly effuse below, the lip is turned back on the pillar, which is arched forward. The base is somewhat flattened and smooth. The lines

* Geol. Surv. Illinois, 1866, vol. ii. pl. xxxi. fig. 14.

† Dr. H. B. Geinitz, 1866. Carbonformation und Dyas in Nebraska, p. 12, pl. i. fig. 18.

‡ Recherches sur les Terrains Anciens des Asturies et de la Galice, 1883, pp. 352-354, pl. xvii. figs. 21, 23.

§ *Murchisonia subcæniata*. H. B. Geinitz, 1866, Carbonformation und Dyas in Nebraska, p. 12, pl. i. fig. 18. *Orthonema subcæniata*, Hayden, Final Report on Nebraska (1871), p. 228.

of growth are not very distinct except on the base; they appear to come straight down the whorls, being merely deflected by the keels.

Length of small specimen of twelve whorls 4 millim., width of body-whorl $1\frac{1}{4}$ millim. A larger specimen has only four whorls preserved, it is 3 millim. in length, and the body-whorl is $1\frac{1}{2}$ millim. in width.

This shell bears some resemblance to species of *Murchisonia*, but the absence of a sinus in the outer lip excludes it from that genus; from species of *Aclisina* it may be distinguished by the form of the mouth and the flattened, closely set, whorls. I feel somewhat doubtful about referring it to the genus *Orthonema*, as it is more elongated and the whorls are less angular than in any species of that genus I have seen figured; I, however, know of no other genus to species of which it bears a closer resemblance, and it may therefore be well to place it with *Orthonema* for the present.

Locality. Glencart, Dalry.

Formation. Upper Limestone series.

It is, I think, unnecessary to repeat a description of the genus *Murchisonia* here, as it was pretty fully given in a previous paper *, in which also I mentioned that J. W. Salter had separated from the typical *Murchisonia* a group of shells distinguished by certain characteristics under the name *Hormotoma* †, and that Whitfield had formed a distinct genus of others under the name of *Lophospira* ‡. Since then D. P. Ehlert has grouped some species of *Murchisonia* in two more sections, called *Goniostropha* and *Cælocaulus* §.

To the former of these alone I need refer in this paper.

In the section *Goniostropha* Ehlert collects all those species which are turriculated, elongated, having angular whorls of which the sinual band, nearly always limited by two prominent keels, occupies the summit; sometimes there are additional spiral keels. He says that the spire has no umbilicus, and at the same time he refers to this section *Murchisonia kendalensis*, McCoy, which has an umbilicus. Much weight, however, cannot be attached to the presence or absence of an umbilicus, as it is known to exist in some members and not in others of the same species.

Of the species I am about to describe, one, *M. subtilistriata*, may undoubtedly be referred to this section; and another, *M. turriculata*, De Kon., may at any rate be placed here provisionally, as it agrees in general characteristics, with the exception of the sinus being most probably situated immediately below the angle. With regard to the remaining species *M. compacta*, its characteristics are such as to entitle it to a place in a separate section.

* "Notes upon some Carboniferous Species of *Murchisonia* in our Public Museums," Quart. Journ. Geol. Soc. Nov. 1887, p. 620.

† Geol. Surv. Canada, dec. i. p. 18.

‡ Bull. Amer. Mus. Nat. Hist. vol. i. no. 8. 1886, p. 311.

§ Bull. de la Soc. d'Etudes Scientifiques d'Angers, 1887, pp. 13, 29.

Section GONIOSTROPHA, Ehlert, 1888.

MURCHISONIA (GONIOSTROPHA) TURRICULATA, De Kon. (Pl. XX.
fig. 5.)

Murchisonia turriculata, De Koninck, 1883, 'Faune du Calcaire Carb. de la Belgique,' p. 19, pl. xxxiv. figs. 11, 12, 13.

Murchisonia angulata, var., De Koninck, 1843, 'Descr. des Anim. Foss. du Terr. Carb. de la Belgique,' p. 412, pl. xl. fig. 8.

A fragment of a shell, consisting of four whorls, seems to agree in all essential particulars with one described and figured by De Koninck as *Murchisonia turriculata*. If entire it would be elongated and composed of numerous angular whorls. The specimens described by De Koninck have from sixteen to eighteen whorls. There is a prominent keel about the centre of each whorl, and below it there are two finer keels placed at about equal distances from it and from each other; on the lowest whorl preserved there is evidence of a still finer keel appearing above the suture. De Koninck does not mention the presence of this lower keel on his specimens, but there are more numerous keels on the shell previously described by him as *Murchisonia angulata*, var., which has since been identified by him with *M. turriculata*. And in other instances the number of keels on different individuals of the same species is observed to vary. The presence or absence of a keel cannot therefore be considered of much importance when shells agree in other particulars. On the upper part of the whorl there is a much finer keel, placed somewhat nearer to the suture than to the central keel. De Koninck says this keel is in the middle of the upper part of the whorl in the specimen figured by him; it, however, seems to vary in position on different individuals in the Brussels Museum, being higher on some and lower on others. The surface of the whorls is almost flat both above and below the principal keel. The lines of growth are indistinct, so that no evidence of the position of the sinus can be obtained from this specimen. De Koninck says it is situated between the strongest keel and that next below. The mouth is not preserved. De Koninck describes that of the Belgian specimens as round. My specimen is crushed, so the spiral angle cannot be accurately ascertained.

I believe this is the first record of this species being found in Britain.

Length of fragment of four whorls $10\frac{1}{2}$ millim., width of lower whorl one way $6\frac{1}{2}$ millim.; in the opposite direction 4 millim.

Locality. Abbey Foss, Askrigg, Yorkshire.

Formation. Shales at the base of the Yoredale rocks.

MURCHISONIA (GONIOSTROPHA) TURRICULATA, var. SCOTICA. (Pl. XX.
fig. 6.)

A fragment of a shell of which about six gradually increasing whorls are preserved seems to agree with that last described except in its much smaller size. This difference in size is so great as quite to constitute a variety, if not a distinct species. The position and

number of the keels is the same, with the exception of the strongest keel being situated a little higher on the whorl than in the typical *M. turriculata*; the additional fine keel is visible on the three lower whorls. The sutures are rather more prominent than in *M. turriculata*, De Koninck, and also than in my larger specimen. The lines of growth are well preserved on the lowest whorl; they curve back to the strongest keel, are invisible between it and the keel next below, and then curve forward again. The sinus is probably situated between the strongest keel and that next below, but the apex and the base of the shell are broken.

Length of fragment consisting of six whorls $5\frac{1}{4}$ millim., width of lowest whorl $2\frac{1}{2}$ millim.; it is slightly broken, therefore this measurement is somewhat less than it would be were the whorl entire.

Locality. Dalry.

Formation. Upper Limestone Series.

MURCHISONIA (GONIOTROPHA) SUBTILISTRIATA, sp. nov. (Pl. XX. figs. 7, 8.)

Shell small, very elongated, consisting of numerous whorls. Each whorl has a strong angle a little below the middle, and on this angle there is a prominent keel. About midway between this keel and the suture there is another keel; between these keels there are two strong threads, and below the lower keel there are one or two strong threads between it and the suture. There is also a very faint line about midway between the angle and the upper suture. The lower part of the whorl is almost flat and slopes rapidly down to the suture, which is deep. The upper part of the whorl is slightly convex-concave in adult specimens, but in young ones it is more convex, the concavity above the angle being hardly discernible. The lines of growth are not well preserved on any of the specimens; on the penultimate whorl of the largest specimen there are traces of lines of growth curving forward below the strongest keel. This keel probably represents the sinus in the outer lip. The base of all the specimens I have seen is broken, therefore the form of the mouth is unknown.

There are three specimens of this shell in the collection of Mr. Young, Hunterian Museum, Glasgow, and I have a fragment which was given me by him. The largest specimen (Pl. XX. fig. 7) consists of eleven and a half whorls; both the apex and base are broken. Its length is $8\frac{1}{2}$ millim., width of body-whorl $3\frac{1}{2}$ millim. Length of fragment (Pl. XX. fig. 8), consisting of three whorls, $3\frac{1}{4}$ millim.

Locality. Glencart, Dalry.

Formation. Upper Limestone Series.

Section STEGOCÆLIA.

Whorls angular, keeled; sinus wide, situated on the posterior part of the whorl above the angle, umbilicated when young; inner lip reflected on the columella and forming a callosity round the base of the pillar, covering the umbilicus in adult specimens.

MURCHISONIA (STEGOCCELIA) COMPACTA, sp. nov. (Pl. XX. figs. 9-13.)

Shell small, short and conical, composed of from six to nine whorls. The whorls are almost convex, being but slightly angular. A little above the centre of each whorl there is a strong keel, below which there is another almost equally strong, and just above the suture there is a third and slighter keel; the space between the two uppermost is the greatest. Below the suture there are two very fine keels placed close together, occupying about half of the upper surface of the whorl and leaving a wide space between them and the strongest keel. This space seems to have been formed by the successive filling up of the sinus in the outer lip, as indicated by the lines of growth, which are strongly arched and so fine that they are only to be observed on well-preserved specimens. On the rest of the shell the lines of growth are much stronger and may be distinctly seen curving back over the two uppermost keels and curving forward again below the strongest keel. Base of the shell rounded. Mouth rather longer than wide, slightly channelled below; outer lip reflected over the pillar; the inner lip is a thin shelly layer spread on the columella; it thickens at the base of the pillar and covers the umbilicus in adult specimens, in young ones the umbilicus is open.

Length of a medium-sized specimen about 4 millim., width of body-whorl 2 millim. A fragment of a larger specimen measures $2\frac{3}{4}$ millim. across the body-whorl, height of its body-whorl $2\frac{1}{2}$ millim.

This shell is shorter than is the case in most of the *Murchisoniæ*. Its ornamentation resembles that of *M. quadricarinata*, McCoy, but it may easily be distinguished from that shell by its greater spiral angle and smaller number of whorls. It appears to be identical with some shells in the Brussels Museum from Visé marked *M. spirata*, Goldf.* I have, however, seen the type of this species in the Bonn Museum, and it is a totally different shell, being more elongated, and the ornamentation is quite distinct.

Locality. Glencart, Dalry.

Formation. Upper Limestone Series.

There is a single specimen of this species in the Jermyn Street Museum, marked No. TK, 1618. It is well preserved and consists of six whorls, the apex is, however, broken; if entire there would probably be two or three more whorls. One of the fine keels on the upper part of the whorl is wanting in this specimen. This may perhaps arise from the substance in which the shell is preserved being too coarse to retain it.

Length 3 millim., width of body-whorl $1\frac{1}{2}$ millim.

Locality. Cawledge Burn, $\frac{3}{8}$ of a mile N. of Cawledge Park, S. of Alnwick.

Formation. About the same horizon as the Yoredale rocks †.

* Petr. Germ. vol. iii. p. 26, pl. 172. fig. 6, a, b.

† I am greatly indebted to Mr. John Young, Hunterian Museum, Glasgow, for his kindness in giving me every facility, whilst writing this paper, for studying his fine collection of Carboniferous Gasteropoda and also for the gift of many specimens.

EXPLANATION OF PLATE XX.

- Figs. 1, 2. *Orthonema pygmæum*, sp. n., Glencart, Dalry: 1, front view, $\times 12$;
2, back, $\times 15$.
3, 4. *Orthonema* (?) *Youngianum*, sp. n., Glencart, Dalry. $\times 12$.
5. *Murchisonia* (*Goniostropha*) *turriculata*, De Kon., Abbey Foss, Ask-
rigg. $\times 3$.
6. — (—) —, var. *scotica*, Dalry. $\times 8$.
7, 8. — (—) *subtilistriata*, sp. n., Glencart, Dalry: 7, adult, $\times 6$;
8, fragment of young shell, $\times 8$.
9-13. — (*Stegocalia*) *compacta*, sp. n., Glencart, Dalry: 9, back view,
 $\times 12$; 10, apex, $\times 10$; 11, mouth, enlarged, showing reflected
inner lip, outer lip broken; 12, young shell showing open umbi-
licus, $\times 10$; 13, $\times 12$.