DIMORPHOCERAS DISCREPANS (T. Brown¹).

In one nodule is exhibited about one-half of the lateral area and a portion of the periphery of the septate part of a *Goniatite*, 3 mm. in diameter, that seems to be referable to this species. The test is not preserved, but the septa are well shown.

ORTHOCERAS, sp. 1.

In the same nodule as the example of *Dimorphoceras discrepans* there is a fragment of a slender, slowly-tapering *Orthoceras*, 8 mm. long and about 2 mm. in diameter. Rather more than the uppermost 2 mm. form part of the body-chamber; the rest is entirely septate and exhibits fifteen chambers, so that these may be described as very shallow, about five occupying the space of 2 mm. The septa are slightly oblique; the cross-section is elliptical; the siphuncle appears to be nearly marginal and situated at the extremity of the long axis. The test is thin and polished. *Orthoceras asciculare*, T. Brown,² is described as having the siphuncle near the side, but, judging from the figure, that species has deeper chambers than the present specimen.

ORTHOCERAS, sp. 2.

Another nodule contains a fragment of a slender *Orthoceras*, about 6 mm. long. The specimen is only partially exposed, the greatest width being only 1.5 mm., but it seems to belong to a more rapidly tapering shell than sp. 1. Although nearly covered with the test, it appears to be entirely septate, the chambers being a little deeper than in sp. 1, eight chambers occupying about 5 mm. The test is thin, polished, and has very feeble annulations, which apparently correspond to the septa, whilst the surface between the annulations is covered with exceedingly fine transverse lines.

III.—SEDGWICK MUSEUM NOTES.

NEW FOSSILS FROM THE HAVERFORDWEST DISTRICT. IV.

By F. R. COWPER REED, M.A., F.G.S.

(PLATE XXIII.)

THE following species of Brachiopoda were recorded by Messrs. Marr & Roberts³ from the Ordovician beds of the Haverfordwest district:—

LLANDEILO LIMESTONE.

Leptana [*Plectambonites*] *sericea*, Sow.
Orthis striatula, CONR.

DICRANOGRAPTUS SHALES.

Orthis argentea, His.
Siphonotreta micula, McCoy.
and "other horny brachiopods."

¹ T. Brown, *Fossil Conchology*, 1849, p. 28, pl. xxi, figs. 8, 8a, and 15 (*Goniatites discrepans*). See also Foord & Crick, *Cat. Foss. Ceph. British Museum*, pt. 3, 1897, p. 222 (*Dimorphoceras discrepans*).

² T. Brown, *Trans. Manchester Geol. Soc.*, vol. i, 1841, p. 220, pl. vii, fig. 39;
and T. Brown, *Foss. Conch.*, 1849, p. 249, pl. xxix*, fig. 29.

³ Marr & Roberts: *Q.J.G.S.*, vol. xli (1885), pp. 476-491.

ROBESTON WATHEN LIMESTONE.

- Orthis elegantula*, His.
 „ *Actoniae*, Sow.
 „ *calligramma*, Dalm.
Leptæna [*Plectambonites*] *transversalis*, Wahl.
Strophomena [*Leptæna*] *rhomboidalis*, Wilck.

TRINUCLEUS SETICORNIS BEDS.

(a) SHOESHOCK LIMESTONE.

- Orthis elegantula*, Dalm.
 „ *testudinaria*, Dalm.
 „ *calligramma*, Dalm.
Leptæna [*Plectambonites*] *quinquecostata*, McCoy.
 „ „ *sericea*, Sow.
 „ [*Christiania*] *tenuicincta*, McCoy.
Strophomena [*Leptæna*] *rhomboidalis*, Wilck.

(b) REDHILL BEDS.

- Lingula* sp.
Leptæna [*Plectambonites*] *sericea*, Sow.
 „ [*Christiania*] *tenuicincta*, McCoy.
Strophomena [*Leptæna*] *rhomboidalis*, Wilck.
Orthis elegantula, Dalm.
 „ *calligramma*, Dalm.

(c) SLADE BEDS.

- Lingula* sp.
Strophomena [*Leptæna*] *rhomboidalis*, Wilck.
 „ *corrugatella*, Dav.
Leptæna [*Plectambonites*] *sericea*, Sow.
Orthis bifurcata, Schloth.
 „ *elegantula*, Dalm.
 „ *testudinaria*, Dalm.
 „ *calligramma*, Dalm.
 „ *porcata*, McCoy (?).

We are able to make the following additions to the foregoing list by means of the large series of Brachiopods collected by Mr. V. M. Turnbull, though the specific determination of many specimens (probably including some new species) must await the acquisition of better material.

I. LLANDEILO LIMESTONE.

- Trematis multistriata*, sp. nov. Lampeter Velfrey.
Strophomena sp. Lampeter Velfrey.

II. DICRANOGRAPTUS BEDS.

- (*Orthis argentea* zone.)
Acrotreta Nicholsoni, Dav.
Orbiculoides perrugata, McCoy.

III. ROBESON WATHEN LIMESTONE.

- Plectambonites sericea*, Sow.

IV. TRINUCLEUS SETICORNIS BEDS.

(a) SHOESHOCK LIMESTONE.

- Crania Turnbulli*, sp. nov.
Orthis Actoniae, Sow.
Triplecia insularis, Schloth.
Plectambonites scissa, Salt.

(b) REDHILL BEDS.

- Orthis* aff. *Bouchardi*, Dav.
Plectambonites scissa, Salt.
 „ *papillosa*, sp. nov.
Strophomena antiquata, Sow., var.

(c) SLADE BEDS.

- Lingula brevis*, Portl. (?).
Lingula, two sp. indet.
Crania Grayi, Dav., var.
Orbiculoidea perrugata, McCoy.
 „ (*Pholidops*?) *oblongata*, Portl.
Orthis vespertilio, Sow.
 „ *Sowerbyana*, Dav.
 „ *crispa*, McCoy.
 „ *Actonia*, Sow.
 „ *porcata*, McCoy, var. nov. *sladensis*.
 „ *testudinaria*, Dalm., var.
 „ (several indet. sp.).
Triplecia insularis, Schloth.
Strophomena antiquata, Sow., var. *scabrosa*, Dav.
 „ *expansa*, Sow.
 „ *mediocostalis*, sp. nov.
 „ sp.
Plectambonites papillosa, sp. nov.
Atrypa imbricata, Sow.
Meristella cf. *crassa*, Sow.
Hyattella pentagonalis, Reed (?).
Zygospira Hicksi, sp. nov.

TREMATIS MULTISTRIATA, sp. nov. (Pl. XXIII, Figs. 1, 1a.)

DESCRIPTION.—Shell nearly orbicular, a little wider than long. Brachial valve gently convex, most so towards beak, which is marginal and slightly projects over posterior margin. Surface of valve covered with fine, raised, thread-like lines radiating from the beak, and increasing in number towards margin by interpolation of secondary and tertiary shorter lines at half, or a quarter, or less than a quarter the length of the primary lines. All lines of equal strength and at equal distances, the interspaces being about twice the width of the lines. The median lines are straight, but towards the cardinal region the lines curve gently backwards. Interspaces between radiating lines occupied by small transversely rectangular or subquadrate pits, a single row lying along each interspace, and separated by small low transverse bars. The radial threads number on margin about 200. A few low concentric growth ridges are present on the surface.

DIMENSIONS.

Length	...	...	...	...	...	16.5 mm.
Width	...	...	...	...	...	18.5 mm.

LOCALITY.—Quarry near Church, Lampeter Velfrey.

HORIZON.—Lower Llandeilo Limestone.

REMARKS.—This beautifully ornamented shell is closely allied to *Trematis siluriana*, Dav.,¹ but the radial lines are rather more numerous and closer together, the interpolation of secondary and tertiary lines less regular, the pits less conspicuous, and the beak more marginal. The shell is well preserved in our specimen, but unluckily we know nothing of the internal characters nor of the opposite valve. *T. ottawaensis*, Billings,² from the Trenton Limestone, appears to be a nearly allied form, but, apart from the

¹ Davidson: Mon. Brit. Foss. Brach., vol. iii, p. 71, pl. vi, figs. 8, 8a, 8b.

² Billings: Pal. Foss. Canada, vol. i (1862), p. 53, fig. 58.

presence of the pits, the shape of the shell, position of beak, and radial ornamentation resemble *Schizocrania filosa*, Hall.¹ However, the generic position of our specimen does not admit of a doubt. It appears to be specifically distinct from any so far described, none of the other British species, except *T. siluriana*, being closely allied, and the name *multistriata* is therefore proposed for it.

CRANIA TURNBULLI, sp. nov. (Pl. XXIII, Figs. 2, 2a.)

DESCRIPTION.—Shell subquadrate, wider anteriorly, upper valve strongly elevated, convex, subpyramidal; apex situated nearer anterior than posterior margin; posterior slope somewhat flattened; anterior slope short, steep. Cast of interior of upper valve showing pair of anterior adductor muscle-scars situated a little behind apex, nearly in middle of shell, less than their own diameter apart, deep, subcircular, each partly divided internally into two subequal portions by a triangular projection from outer anterior side. Pair of shallow oval posterior adductor impressions, submarginal, posterior, situated about twice their diameter apart at end of broad, slightly diverging shallow grooves running back from anterior adductors. Surface of valve ornamented with very numerous fine, closely-set, subparallel, thread-like, raised lines of equal strength, radiating from umbo and running at right angles to the four sides, with many shorter similar lines of equal strength but of various lengths intercalated. To the four angles of the shell only a few of the radial lines run the whole way from the umbo, the majority curving round on each side to meet the adjacent sides at right angles. A few weak concentric growth-lines present.

DIMENSIONS.

Width at anterior end, 17 mm.	...	...	Length, 12.5 mm.
Width at posterior end, 13 mm.	...	...	Height, 5.0 mm.

LOCALITY.—Sholeshook Railway Cutting.

HORIZON.—Sholeshook Limestone.

REMARKS.—Only the impression of the exterior of the shell and the cast of the interior of the same valve, both in a somewhat imperfect state, but belonging to the same individual, are known to me. They present characters which differentiate them from other described species. The nearest allied appears to be *Cr. Crofti*, Dav.,² but this shell has an anterior depression on the surface, the posterior adductors are placed nearer together, there is an internal ridge on the posterior face of the shell, and the external ornamentation is rather coarser. *Cr. divaricata*, McCoy,³ is quite distinct.

CRANIA GRAYI, Dav., var. (Pl. XXIII, Fig. 3.)

There is one small specimen of a *Crania* which is almost indistinguishable from *C. Grayi*, Dav.⁴ It consists of an upper

¹ Hall & Clarke: Palæont. New York, vol. viii, Brach., pt. 1, 1892, p. 143, pl. iv g, figs. 22-30.

² Davidson: Mon. Brit. Foss. Brach., vol. v, Suppl. Silur., p. 215, pl. xvii, figs. 54-56.

³ Ibid., vol. iii, p. 78, pl. viii, figs. 7-12.

⁴ Davidson: Mon. Brit. Foss. Brach., vol. iii, p. 82, pl. viii, figs. 22-24.

valve of a subcircular, conical shape, with a non-central elevated umbo situated at about one-third the diameter from the posterior edge. The surface is ornamented with about fifty strong radiating ribs, equidistant, of equal strength, and projecting a little beyond the margin of the shell, with 2-3 much finer shorter ones between.

DIMENSIONS.

Diameter	...	...	...	...	...	4.0 mm.
Height	...	...	...	...	...	1.5 mm.

LOCALITY.—Roadside near St. Martin's Cemetery, Haverfordwest.

HORIZON.—Slade Beds.

REMARKS.—*C. Grayi* is, according to Davidson, only found in the Wenlock Limestone. The American Ordovician species *C. Lalia*, Hall,¹ from the Utica and Lorraine groups appears to be allied to the Slade species.

ORTHIS (PLESIOMYS) PORCATA, McCoy, var. nov. *sladensis*.
(Pl. XXIII, Figs. 4-7.)

This species was recorded with a query by Messrs. Marr & Roberts from the Slade Beds. Many fine specimens of a variety of it are included in Mr. Turnbull's collection. The variety is distinct, particularly with regard to its internal characters, and may have to be regarded as specifically different to the typical *O. porcata*.

DESCRIPTION.—Shell biconvex, semi-elliptical, wider than long, broadest at about half its length; hinge-line straight, less than greatest width of shell; cardinal extremities obtusely angular, sides and front rounded. Pedicle valve moderately convex, less so than brachial valve; no medial depression; beak moderate, slightly incurved, not prominent, but rising a little above hinge-line; hinge-area triangular, not very wide, inclined. Brachial valve slightly more convex than opposite valve; beak rather smaller, slightly incurved; area triangular, nearly vertical, of approximately the same size. Interior of pedicle valve with small, elongated-suboval, muscular area, definitely circumscribed, acutely indented in front, about one-fifth the length of the valve; teeth large. Brachial valve with oval cardinal process; low rounded median ridge running forwards for about one-fourth the length of the valve between deep, narrow, elongated muscular scars; crura stout. Surface of valves covered with numerous subequal fine rounded ribs, slightly curved on lateral portions of shell, increasing by bifurcation at about one-fourth their length, and frequently again nearer margin, to about 150-160 round margin. A few strong concentric growth ridges generally present, and a fine concentric striation.

DIMENSIONS.

				I.		II.
Length	...	...	...	22.5 mm.	...	25.0 mm.
Width at hinge-line	...	...	...	22.0 mm.	...	27.0 mm.
Maximum width	...	...	...	28.5 mm.	...	36.0 mm.

LOCALITY.—Roadside near St. Martin's Cemetery, Haverfordwest.

HORIZON.—Slade Beds.

¹ Hall & Clarke: Palæont. New York, vol. viii, Brach., pt. 1, 1892, pl. iv n, fig. 1.

REMARKS.—In typical examples of *O. porcata*,¹ as well as in the type-specimen, the pedicle valve is flattened, and only convex about the beak and on the lateral portions; there is also a moderate depression down the middle of the valve, and the muscular area is remarkably square. In none of these points does our variety agree with it. The ornamentation of the surface varies much in the species, but ours is not in complete agreement with any figured, though not much stress need be laid on this fact. This new variety may be named *sladensis*.

ORTHIS aff. BOUCHARDI, Dav. (Pl. XXIII, Figs. 8, 9.)

DESCRIPTION.—Shell subquadrate, rounded, a little wider than long, plano-convex; hinge-line straight, a little less than the greatest width. Pedicle valve convex, slightly keeled, rounded; beak high, incurved; hinge-area triangular, large, vertical or steeply inclined. Brachial valve flattened, with deep, broad median sinus of nearly uniform width, deeply sinuating anterior margin; small inconspicuous beak; narrow hinge-area. Interior of pedicle valve with small teeth, and faint muscular impressions. Interior of brachial valve with bilobed cardinal process; stout strong crura; two pairs of adductor impressions, distinct, rather wide apart, with low rounded ridge between them, anterior pair elongated oval, twice as long as posterior pair, which are subcircular. Surface of valves ornamented with about 30 to 40 subangular ribs, mostly simple, but some bifurcating, and with a shorter one intercalated between each pair; usually finely imbricated concentrically.

DIMENSIONS.

Length	...	...	...	...	...	6.0 mm.
Width at hinge	...	...	...	...	...	7.0 mm.

LOCALITIES AND HORIZONS.—Redhill Beds, Prendergast Place; Slade Beds, near St. Martin's Cemetery, Haverfordwest.

REMARKS.—This small species appears to be allied to or perhaps a variety of the Wenlock species *O. Bouchardi*, Dav.,² but the ribs in the latter are fewer and the imbrications coarser.

STROPHOMENA (?) MEDIOCASTALIS, sp. nov. (Pl. XXIII, Figs. 10, 10a, 11.)

DESCRIPTION.—Shell transversely semi-elliptical, about $1\frac{1}{2}$ times to twice as wide as long; cardinal angles acute, more or less alate; hinge-line straight, at greatest width of shell; lateral and anterior margins rounded; concavo-convex, more or less flattened; valves close together. Pedicle valve gently convex, slightly bent down near anterior and lateral margins, flattened towards hinge-line; beak small, acute, not prominent nor rising above hinge-line; hinge-area narrow, triangular, steeply inclined. Brachial valve flattened or slightly concave; beak small, not prominent; hinge-area very narrow.

Interior of pedicle valve with pair of small, divergent, triangular diductor impressions extending about one-fourth the length of the

¹ Davidson: op. cit., p. 250, pl. xxxi, figs. 12–20; pl. xlvii, fig. 4.

² Davidson: op. cit., vol. iii, p. 209, pl. xxvi, figs. 16–23.

valve; teeth small, slender, divergent. Brachial valve with small bifid cardinal process, each arm transversely grooved; dental sockets narrow, diverging at more than right angles; low, short, rounded ridge between faint adductor scars.

Surface of valves ornamented with one conspicuous, single, strong but slender median rib, with 16–20 fine, straight, primary, radiating, raised, thread-like lines on each side, and between each pair 3–5 finer striæ or lines. A few concentric wrinklins occasionally present near cardinal angles. Shell strongly punctate.

DIMENSIONS.

	I.		II.		III.		IV.
Length ...	10.0	...	10.5	...	8.0	...	14.0 mm.
Width ...	19.5	...	15.0	...	12.0	...	16.5 mm.

LOCALITY.—Quarry at Upper Slade.

HORIZON.—Slade Beds.

REMARKS.—The presence of the median rib and character of the surface-ornamentation distinguish this form from *S. compressa*, Sow., from the Llandovery Beds, to which in general shape, contour, and internal features it is closely allied. The variety of *S. compressa* termed *llandeiloensis* by Davidson,¹ from the Llandeilo Flags, has the same points of difference, and in addition possesses larger diductor scars in the pedicle valve. The Llandovery shell appears to belong to the genus *Stropheodonta*, according to Hall & Clarke, judging from the hinge, but the transverse crenulations are not clearly visible in our Slade shell. One of our specimens, probably a young individual, as it is of small size, has much produced lateral wings, but in the majority of examples the cardinal angles are only slightly produced, though always acutely pointed.

STROPHOMENA ANTIQUATA, Sow., var. (Pl. XXIII, Fig. 12.)

The peculiar lobed variety of *S. antiquata*, figured by Davidson² from the Wenlock of Dudley, occurs in the Redhill Beds of Prendergast Place, Haverfordwest. In this form the pedicle valve has a broad, deep, rounded sinus down the middle, with an elevated rounded lobe on each side passing gradually into the somewhat flattened ears. The shell is markedly transverse, being nearly twice as wide as long; the hinge-line is at the greatest width of the shell, and the cardinal angles are almost rectangular, or form an angle of about 75°. The diductor muscles in the pedicle valve form a subquadrate or subpentagonal impression about one-third the length of the valve. The Redhill specimens, being in the condition of internal casts, do not show the ornamentation of the surface, but a few concentric wrinkles are traceable in one specimen near the lateral angles. It seems to me a matter of doubt whether this form is not specifically separable from *S. antiquata*, var. *scabrosa*, which also occurs in the Ordovician of the Haverfordwest district. The shape of the shell is utterly different, and the ornamentation as seen in the typical Wenlock examples is completely distinct.

¹ Davidson: Mon. Silur. Foss. Brach., vol. iii, p. 316, pl. xlv, figs. 11–14.

² Davidson: op. cit., p. 299, pl. xlv, fig. 3.

The dimensions of two Redhill specimens are the following:—

	I.	II.
Length	7.0	8.5 mm.
Width	13.0	16.0 mm.

PLECTAMBONITES PAPILLOSA, sp. nov. (Pl. XXIII, Figs. 13, 13a, 14, 15.)

DESCRIPTION.—Shell small, transverse, broadly semicircular, twice as wide as long; widest at hinge-line; concavo-convex to plano-convex; cardinal angles sharp and angular, but not produced. Pedicle valve weakly convex, flattened laterally; hinge-line straight; beak small, inconspicuous, not rising above hinge-line; hinge-area narrow, inclined, with triangular delthyrium below beak. Brachial valve slightly concave or nearly flat, flattened laterally; beak very small; hinge-area very narrow, linear. Interior of pedicle valve with small, short, divergent, divaricator scars, extending about one-fourth or one-fifth the length of the shell; teeth short, small, diverging, supported by short dental plates. Brachial valve with short crural plates and cardinal process (characters obscure). Interior of both valves very coarsely papillose, the papillæ large, more or less elongated, and radially but irregularly arranged. Surface of valves ornamented with regular, straight, fine radii of equal size, increasing in number by intercalation of secondary rather finer ribs, about two-thirds to three-fourths the length of the primary, to about 60–80 ribs round the margin.

DIMENSIONS (average).

Length	3.0 mm.
Width	6.0 mm.

LOCALITY.—Quarry at Upper Slade.

HORIZON.—Slade Beds.

REMARKS.—This pretty little species occurs in fair abundance at Upper Slade. It is certainly distinct from *P. sericea*, as its internal characters prove. *P. tenuissime-striata* (McCoy) has much finer and less conspicuous striæ on the surface, and the coarse papillæ on the interior seem to be absent. The undetermined species figured by Davidson¹ from Llandeilo appears to bear a considerable resemblance. '*Leptæna*' Grayæ, Dav.,² and '*Lept.*' *llandeiloensis*, Dav.,³ have somewhat similar ornamentation, but ours has not a lobed shell like the former, and the interior of the latter is quite distinct. The two valves are frequently attached and open, as is often the case with *P. plicatella*, Ulrich,⁴ an allied form from the Utica group of America. There is no trace of cardinal spines in any of our specimens, but the general characters of the shell recall *Chonetes*.

ATRYPA IMBRICATA, Sow. (Pl. XXIII, Fig. 16.)

This species is stated by Davidson⁵ to range up from the Bala to

¹ Davidson: op. cit., vol. iii, p. 330, pl. xlix, fig. 22.

² Id., Suppl., vol. v, p. 171, pl. xii, figs. 23–25.

³ Ibid., p. 171, pl. xii, figs. 26–29.

⁴ Hall & Clarke: Palæont. New York, vol. viii, Brach., pt. 1, 1892, pl. xv A, figs. 34, 35.

⁵ Op. cit., vol. iii, p. 135, pl. xv, figs. 3–8.

the Wenlock Limestone; and our specimens, which come from the Slade Beds near St. Martin's Cemetery, Haverfordwest, show the typical characters. It has been found in the Chair of Kildare Limestone, but apparently has not previously been recorded from the Bala of South Wales. It seems to be in both cases a rare species.

ZYGOSPIRA *HICKSI*, sp. nov. (Pl. XXIII, Figs. 17–19.)

DESCRIPTION.—Shell subcircular or ovoid, subglobose, biconvex. Pedicle valve larger than brachial, strongly convex, occasionally with faint traces of median fold; beak incurved. Brachial valve less convex; beak small, overlapped by that of pedicle valve; weak median depression sometimes present on surface of valve. Interior of pedicle valve with stout, short teeth widely separated; small transverse ridge from tooth to tooth; elongated, subparallel, muscular impressions extending nearly half the length of valve and broadening slightly anteriorly, with low ridge between them; no dental lamellæ. Interior of brachial valve with hinge-plate, broad, stout, and cleft in middle into two triangular portions; low median rounded ridge dividing paired impressions of adductors. Surface of valves ornamented with 25–30 simple, straight, rounded, radiating ribs of equal size, without bifurcation or intercalation of shorter ribs; regular, fine, concentric striae present.

DIMENSIONS.

Length	...	...	...	...	10 mm.
Width	...	...	...	...	9.75–10 mm.

LOCALITIES.—Cuckoo Grove Lane, Haverfordwest; Upper Slade.

HORIZON.—Slade Beds.

REMARKS.—This interesting shell appears to belong to the genus *Zygospira* (or perhaps its subgenus *Catazyga*), for though we are ignorant of much of its internal structure, and have not seen its brachial spires, yet in its shape, ornamentation, and internal characters, so far as they are known to us, it closely resembles members of this genus. *Zygospira* is known in the British Lower Palæozoic by the form referred by Davidson to *Atrypa* (?) *Headi*, var. *anglica*.¹ There does not seem to be any very marked line of separation between *Zygospira* and *Catazyga*, which Schuchert employs as a generic name; Hall,² for instance, considers *Z. anticostiensis* to be intermediate between them. The smaller specimens of this Slade shell in our collection are of a more elongated and ovoid shape, but otherwise appear to be identical with the larger subcircular form. *Z. Headi*, var. *anglica*, differs from our species in having more numerous (forty or more) ribs which are also finer, and in having the muscle-scars in the pedicle valve slightly different; and on the whole it seems to belong to another species.

HYATTELLA *PENTAGONALIS*, Reed (?). (Plate XXIII, Fig. 20.)

The muscular impressions of *H. pentagonalis*³ are unknown, but

¹ Davidson: op. cit., vol. iii, pl. xxii, figs. 1–8; suppl., vol. v, p. 127.

² Hall & Clarke: Palæont. New York, vol. viii, Brach., pt. 2, pp. 154–159.

³ Reed: Quart. Journ. Geol. Soc., vol. liii (1897), pp. 75–77.

G.M. Woodward del et lith.

West, Newman imp.

Ordovician Brachiopoda, from Haverfordwest.

there is an internal cast of the pedicle valve of a shell which in shape and other characters resembles this species, and possesses muscular characters like those of the genus, especially like those of the type-species *H. congesta*, Conr.¹ The pedicle cavity, the sub-parallel, short dental lamellæ, and a subrhomboidal sharply bounded muscular scar, angularly notched behind, and comprising the two diductors enclosing the narrow contiguous adductors, are clearly seen. The specimen is imperfect, but must have measured about 12 mm. long by 10 mm. wide.

LOCALITY.—Bank Saeson, Whitland.

HORIZON.—Slade Beds.

MERISTELLA cf. CRASSA, Sow.

Several imperfect internal casts and external impressions of a species of *Meristella* occur in the Slade Beds near St. Martin's Cemetery, Haverfordwest. In external form and internal features they agree closely with *M. crassa* (Sow.)²; in the pedicle valve we find the dental lamellæ pursuing the same course, and the muscular area and diverging lateral vascular impressions are precisely similar; in the brachial valve the cleft hinge-plate and median longitudinal septum are developed in the same manner. The external shape of the shell and smooth character also agree. *M. crassa* occurs in the Lower Llandovery, and this Slade form may prove to be a separate species or a variety.

EXPLANATION OF PLATE XXIII.

- FIG. 1.—*Trematis multistriata*, sp. nov. Brachial valve. Lower Llandeilo Limestone: Lampeter Velfrey. $\times 1\frac{1}{2}$.
 ,, 1a.—Ditto. Portion of surface of same specimen. $\times 15$.
 ,, 2.—*Crania Turnbulli*, sp. nov. Cast of interior of upper valve. Sholehook Limestone: Sholehook railway cutting. $\times 1\frac{1}{2}$.
 ,, 2a.—Ditto. Impression of part of surface of shell of same specimen, showing ornamentation. $\times 4$.
 ,, 3.—*Crania Grayi*, Dav., var. Slade Beds: near St. Martin's Cemetery, Haverfordwest.
 ,, 4.—*Orthis (Plesionys) porcata*, McCoy, var. nov. *sladensis*. Cast of interior of brachial valve. Slade Beds: near St. Martin's Cemetery, Haverfordwest. $\times 1\frac{1}{2}$.
 ,, 5.—Ditto. Ditto. Same horizon and locality. $\times 1\frac{1}{2}$.
 ,, 6.—Ditto. Cast of portion of interior of pedicle valve. Same horizon and locality. $\times 1\frac{1}{2}$.
 ,, 7.—Ditto. Impression of part of surface of shell, showing ribbing. Same horizon and locality. $\times 2$.
 ,, 8.—*Orthis* aff. *Bouchardi*, Dav. Cast of interior of brachial valve. Redhill Beds: Prendergast Place. $\times 3$.
 ,, 9.—Ditto. Impression of part of surface, showing ribs. Redhill Beds: roadside near St. Martin's Cemetery. $\times 5$.
 ,, 10.—*Strophomena* (?) *mediocostalis*, sp. nov. Cast of interior of pedicle valve. Slade Beds: Upper Slade. $\times 2$.
 ,, 10a.—Ditto. Impression of exterior of same valve and specimen. $\times 2$.
 ,, 11.—Ditto. Cast of interior of anterior part of brachial valve. Same horizon and locality. $\times 2\frac{1}{2}$.
 ,, 12.—*Strophomena antiquata*, Sow., var. Cast of interior of pedicle valve. Redhill Beds: Prendergast Place. $\times 1\frac{1}{2}$.

¹ Hall & Clarke: Palæont. New York, vol. viii, Brach., pt. 2, 1894, p. 61, pl. xl, figs. 23-28.

² Davidson: op. cit., vol. iii, p. 117, pl. xiii, figs. 1-3.

- FIG. 13.—*Plectambonites papillosa*, sp. nov. Exterior of pedicle valve. Slade Beds: Upper Slade. $\times 3$.
 „ 13a.—Ditto. Cast of interior of same valve and specimen. $\times 3$.
 „ 14.—Ditto. Pedicle valve, showing portion as cast. Same horizon and locality. $\times 3$.
 „ 15.—Ditto. The two valves in natural juxtaposition. Same horizon and locality. $\times 3$.
 „ 16.—*Atrypa imbricata*, Sow. Pedicle valve. Slade Beds: Cuckoo Grove Lane, Haverfordwest. $\times 1\frac{1}{2}$.
 „ 17.—*Zygospira Hicksi*, sp. nov. Cast of interior of brachial valve. Slade Beds: Cuckoo Grove Lane, Haverfordwest. $\times 2$.
 „ 18.—Ditto. Cast of interior of brachial valve, showing hinge, etc. Same horizon and locality. $\times 2$.
 „ 19.—Ditto. Cast of interior of umbonal portion of pedicle valve, showing teeth, etc. Same horizon and locality. $\times 2$.
 „ 20.—*Hyattella pentagonalis*, Reed (?). Cast of interior of pedicle valve. Slade Beds: Bank Saeson, Whitland. $\times 1\frac{1}{2}$.

IV.—THE RECENT GEOLOGICAL HISTORY OF THE BALTIC. PART III: THE WESTERN PART OF THE SEA, THE SOUND, AND THE BELTS.

By Sir H. H. HOWORTH, F.R.S., F.G.S.

(Concluded from the September Number, p. 413.)

PROCEEDING westward, the fauna again increases in richness. The molluscan fauna of the Gulf of Kiel has been elaborately described by Meyer and Möbius in their well-known work entitled “Fauna der Kieler Bucht.” They thus enumerate the shells found there:—

OPISTHBRANCHIA.

<i>Pontolimax capitatus.</i>	<i>Polycera ocellata.</i>
<i>Elysia viridis.</i>	<i>P. quadrilineata.</i>
<i>Embletonia Mariae.</i>	<i>Ancula cristata.</i>
<i>E. pallida.</i>	<i>Doris pilosa.</i>
<i>Eolis alba.</i>	<i>D. proxima.</i>
<i>Æ. Drummondii.</i>	<i>D. muricata.</i>
<i>Æ. papillosa.</i>	<i>Philine aperta.</i>
<i>Æ. exigua.</i>	<i>Acera bullata.</i>
<i>Æ. rufobranchialis.</i>	<i>Cylichna truncata.</i>
<i>Dendronotus arborescens.</i>	<i>Amphisphya hyalina.</i>

PROSOBRANCHIA.

<i>Chiton marginatus.</i>	* <i>Hydrobia ulva.</i>
<i>Tectura testudinalis.</i>	† <i>Velutina haliotoidea.</i>
* <i>Litorina litorea.</i>	* <i>Cerithium reticulatum.</i>
<i>L. obtusata.</i>	† <i>Triforis perversa.</i>
* <i>L. rudis.</i>	<i>Buccinum undatum.</i>
<i>Lacuna divaricata.</i>	* <i>Nassa reticulata.</i>
<i>L. pallidula.</i>	<i>Fusus antiquus.</i>
* <i>Rissoa inconspicua.</i>	† <i>Pleurotoma turricula.</i>
* <i>R. octona.</i>	<i>Odostomia rissoides.</i>
<i>R. striata.</i>	

LAMELLIBRANCHIA.

* <i>Mytilus edulis.</i>	<i>Cyprina islandica.</i>
<i>Modiolaria discors.</i> ¹	* <i>Astarte borealis.</i>
<i>M. nigra.</i>	† <i>A. sulcata.</i>
<i>M. marmorata.</i>	<i>A. compressa.</i>
* <i>Montacuta bidentata.</i>	* <i>Tellina balthica.</i>
* <i>Cardium edule.</i>	† <i>Tellina tenuis.</i>
* <i>C. fasciatum.</i>	* <i>Scrobicularia piperata.</i>

¹ In the previous part of this paper, at p. 412, lines 3 and 23 from top, for *Modiolaria* read *Modiolarca*.—H. H. H.