spot between the end of the cell and the apex: secondaries semihyaline white, broadly bordered with black; the veins all black.

Expanse 1 inch.

Hab. Bolivia (*Garlepp, Mus. Druce*).

Astyochia ithra, sp. n.

Male.—Head, antennæ, thorax, tegulæ, abdomen, and legs black. Primaries black, slightly hyaline at the base; on the underside the apex is grey: secondaries white, very broadly bordered with black.

Expanse $1\frac{1}{10}$ inch.

Hab. Bolivia (*Garlepp, Mus. Druce*).

XLV.—*Foraminifera from the "Cambridge Greensand."*

By FREDERICK CHAPMAN, A.L.S., F.R.M.S.

PART II. *

Subfamily *NODOSARIINÆ* (continued).

FRONDICULARIA, DeFrance [1824].

Frondicularia inversa, Reuss.

Frondicularia inversa, Reuss, 1845, Verstein. böhm. Kreidef. pt. i. p. 31, pl. viii. figs. 15–19, pl. xiii. fig. 42; Chapman, 1894, Journ. R. Micr. Soc. pp. 155, 156, pl. iii. fig. 8.

A well-known species in the Gault and Chalk. At Folkestone it was found only in zone x.

A few fragments from Swaffham.

Frondicularia lanceola, Reuss.

Frondicularia lanceola, Reuss, 1860, Sitzungs. d. k. Ak. Wiss. Wien, vol. xl. p. 198, pl. v. fig. 1; Chapman, 1894, Journ. R. Micr. Soc. p. 157, pl. iii. fig. 15.

Two specimens, one of which is fragmentary, were found at Swaffham.

Frondicularia Ungerii, Reuss.

Frondicularia Ungerii, Reuss, 1862, Sitzungs. d. k. Ak. Wiss. Wien, vol. xli. p. 54, pl. iv. figs. 11 a, b; Chapman, 1894, Journ. R. Micr. Soc. p. 157, pl. iii. fig. 16.

Two specimens from Swaffham.

* For Part I. see this Magazine for January 1899, pp. 48–66.

Fronicularia Parkeri, Reuss.

Fronicularia Parkeri, Reuss, 1862, Sitzungsab. d. k. Ak. Wiss. Wien, vol. xlv. p. 91, pl. xii. fig. 7; Chapman, 1894, Journ. R. Micr. Soc. p. 157, pl. iii. fig. 17.

Four good specimens of this species were found at Swaffham, one of which bears upon its lateral surface the initial chambers of *Vitriuebbina Sollasi*.

Fronicularia guestphalica, Reuss.

Fronicularia guestphalica, Reuss, 1860, Sitzungsab. d. k. Ak. Wiss. Wien, vol. xl. p. 195, pl. vi. fig. 2; Chapman, 1894, Journ. R. Micr. Soc. p. 158, pl. iv. fig. 2.

Two specimens from Swaffham.

Fronicularia striga, sp. n. (Fig. 1.)

Lateral outline of test subovate, acuminate; the oral end more produced; complanate, with the surface nearly even, but relieved by two strong riblets running vertically down the middle of the test and covering the oral terminations of

Fig. 1.

Fronicularia striga, sp. n. $\times 15$.

each chamber. The margins of the chambers not marked by very strong shell-thickening as in some species having the same general outline. Edge of the test slightly grooved. The shell-surface under a high power appears finely granulated or rippled. Length of type specimen 1.9 millim.; breadth 1.4 millim.; thickness of edge .133 millim.

This species appears to be quite distinct from any previously figured. In outline it somewhat resembles *F. perovata*, Chapman*, but is not so regularly ovate, and the sutural margins of the chambers are not incurved towards the aboral

* Journ. R. Micr. Soc. 1894, pp. 158, 159, pl. iv. figs. 5 a, b.

end. *F. Cordai*, Reuss *, is near to *F. striga* in its general outline, but it bears no double riblet on the shell-surface. These vertical costulæ are comparable with the same structures forming a marked feature in *F. Fritschii*, Perner †. The latter species, however, belongs to the group with much elongated tests, and I have never met with any intermediate and broader specimens of *F. Fritschii* than those figured in the paper dealing with the *Fronidulariæ* from the Gault of Folkestone under the name of *F. pinnæformis* (= *F. Fritschii*, Perner ‡).

The specimens recorded by G. R. Vine from the Cambridge Greensand as "*Fronidularia*, var. with two parallel longitudinal ribs," may either belong to this present species or to *F. Fritschii*.

Three specimens of *F. striga* with fairly constant characters, but all slightly broken, were found in the Cambridge Greensand of Swaffham.

Fronidularia Archiaciana, d'Orbigny.

Fronidularia Archiaciana, d'Orbigny, 1840, Mém. Soc. géol. France, vol. iv. p. 20, pl. i. figs. 34-36; Reuss, 1845, Verstein. böhm. Kreidef. pt. i. p. 31, pl. xiii. fig. 29; Chapman, 1894, Journ. R. Micr. Soc. p. 155, pl. iii. fig. 6.

A broken specimen was found at Swaffham which bears vertical striæ on its lateral surfaces similar to those found in the Gault of Folkestone and the Chalk of Bohemia.

FLABELLINA, d'Orbigny [1826].

Flabellina didyma (Berthelin).

Fronidularia didyma, Berthelin, 1880, Mém. Soc. géol. France, sér. 3, vol. i. no. 5, p. 61, pl. ii. figs. 18 a, b.

Flabellina didyma (Berthelin), Chapman, 1894, Journ. R. Micr. Soc. p. 159, pl. iv. fig. 7.

One specimen from Swaffham.

RHABDOGONIUM, Reuss [1860].

Rhabdogonium excavatum, Reuss.

Rhabdogonium excavatum, Reuss, 1862, Sitzungsab. d. k. Ak. Wiss. Wien, vol. xlv. p. 91, pl. xii. fig. 8; Chapman, 1894, Journ. R. Micr. Soc. p. 160, pl. iv. figs. 9 a, b.

* Verstein. böhm. Kreidef. 1845, pt. i. p. 31, pl. viii. figs. 26-28, pl. xiii. fig. 41.

† "Foraminifery Českého Cenomanu" (Pal. Bohemiæ, no. 1), 1892, p. 58, pl. vii. figs. 1 a-d.

‡ Journ. R. Micr. Soc. 1894, p. 156, pl. iii. figs. 9-11.

In the Gault this species appears to be confined to the uppermost zones. It is somewhat frequent at Swaffham.

Rhabdogonium excavatum, Reuss, var. *exilis*, nov.

(Fig. 2.)

This variety is distinguished from the typical *R. excavatum* by the elongate form and extreme tenuity of its test. The primordial segment is separated from the rest of the shell by

Fig. 2.

Rhabdogonium excavatum, Reuss, var. *exilis*, nov. $\times 30$.

a, lateral view; *b*, oral aspect.

a conspicuous constriction. Length .9 millim.; breadth at the widest part of the oral extremity .3 millim.

The figured specimen was obtained from the Cambridge Greensand of Swaffham.

MARGINULINA, d'Orbigny [1826].

Marginulina glabra, d'Orbigny.

Marginulina glabra, d'Orbigny, 1826, Ann. Sci. Nat. vol. vii. p. 259, no. 6; Modèle, no. 55; Chapman, 1894, Journ. R. Micr. Soc. p. 160, pl. iv. figs. 11 *a*, *b*.

Two specimens from the Greensand of Swaffham.

Marginulina hamulus, Chapman.

Marginulina hamulus, Chapman, 1894, Journ. R. Micr. Soc. p. 161, pl. iv. figs. 13 *a*, *b*.

Two specimens, in both of which the test does not so rapidly increase in size as the specimens figured from the Folkestone Gault, were found at Swaffham.

Marginulina linearis, Reuss.

Marginulina linearis, Reuss, 1862, Sitzungsab. d. k. Ak. Wiss. Wien, vol. xlv. p. 60, pl. v. fig. 15; Chapman, 1894, Journ. R. Micr. Soc. p. 161, pl. iv. fig. 14.

Rare at Swaffham.

Marginulina soluta, Reuss.

Marginulina soluta, Reuss, 1860, Sitzungsab. d. k. Ak. Wiss. Wien, vol. xl. p. 206, pl. vii. fig. 4.

This species is easily recognized by the bulb-like initial segment and the prominent tubular oral termination. This form has not been met with up to the present in the Folkestone Gault. It was found by Reuss in the Chalk of Westphalia.

Four specimens from the Greensand of Swaffham.

Marginulina æquivoca, Reuss.

Marginulina æquivoca, Reuss, 1862, Sitzungsab. d. k. Ak. Wiss. Wien, vol. xlv. p. 60, pl. v. fig. 17; Chapman, 1894, Journ. R. Micr. Soc. p. 162, pl. iv. fig. 20.

Three specimens, one of which has a greatly prolonged tubular aperture, were found at Swaffham.

Marginulina striatocostata, Reuss.

Marginulina striatocostata, Reuss, 1862, Sitzungsab. d. k. Ak. Wiss. Wien, vol. xlv. p. 62, pl. vi. fig. 2; Chapman, 1894, Journ. R. Micr. Soc. p. 163, pl. iv. fig. 21.

Two specimens were found at Swaffham.

Marginulina Jonesi, Reuss.

Marginulina Jonesi, Reuss, 1862, Sitzungsab. d. k. Ak. Wiss. Wien, vol. xlv. p. 61, pl. v. fig. 19; Chapman, 1894, Journ. R. Micr. Soc. p. 163, pl. iv. fig. 24.

One specimen from Swaffham.

VAGINULINA, d'Orbigny [1826].

Vaginulina recta, Reuss.

Vaginulina recta, Reuss, 1862, Sitzungsab. d. k. Ak. Wiss. Wien, vol. xlv. p. 48, pl. iii. figs. 14, 15; Chapman, 1894, Journ. R. Micr. Soc. p. 422, pl. viii. figs. 1 a, b.

This species is fairly common at Swaffham.

Vaginulina recta, Reuss, var. *tenuistriata*, Chapman.

Vaginulina recta, Reuss, var. *tenuistriata*, Chapman, 1894, Journ. R. Micr. Soc. pp. 422, 423, pl. viii. fig. 2.

This variety is common at Swaffham.

Vaginulina truncata, Reuss.

Vaginulina truncata, Reuss, 1862, Sitzungsab. d. k. Ak. Wiss. Wien, vol. xlv. p. 47, pl. iii. fig. 9; Chapman, 1894, Journ. R. Micr. Soc. pp. 423, 424, pl. viii. figs. 5 a, b, 6.

It is difficult to define the limits of the type form of this species, for it passes so insensibly into the robust variety with the redundant shell-growth. Variations of *V. truncata*, in which the later segments are Frondicularian, are met with in the Cambridge Greensand, similar to those which were found in the Gault of Folkestone*.

V. truncata is very common at Swaffham.

Vaginulina truncata, Reuss, var. *robusta*,
Berthelin & Chapman.

Vaginulina truncata, Reuss, "var. très robuste," Berthelin, 1880, Mém. Soc. géol. France, sér. 3, vol. i. no. 5, p. 40, pl. ii. figs. 4 a, b.

Vaginulina truncata, Reuss, var. *robusta*, Chapman, 1894, Journ. R. Micr. Soc. pp. 424, 425, pl. viii. figs. 7 a, b.

This variety is equally abundant with the type form at Swaffham.

Vaginulina truncata, var. *eurynota*, Reuss.

Vaginulina eurynota, Reuss, 1862, Sitzungsab. d. k. Ak. Wiss. Wien, vol. xlv. p. 90, pl. xii. fig. 9; Burrows, Sherborn, and Bailey, 1890, Journ. R. Micr. Soc. p. 559, pl. x. fig. 9.

In the Gault series this curved form of *Vaginulina* was found to graduate into what may be regarded as the type form—*V. truncata*—and was included under that name in the descriptive papers on the Folkestone Foraminifera. An extremely good specimen of this variation was found in the Cambridge Greensand of Swaffham, and is here regarded as a variety of *V. truncata*.

Vaginulina arguta, Reuss.

Vaginulina arguta, Reuss, 1860, Sitzungsab. d. k. Ak. Wiss. Wien, vol. xl. p. 202, pl. viii. fig. 4; Chapman, 1894, Journ. R. Micr. Soc. p. 425, pl. viii. figs. 9 a, b.

One specimen from Swaffham.

Vaginulina striolata, Reuss.

Vaginulina striolata, Reuss, 1862, Sitzungsab. d. k. Ak. Wiss. Wien, vol. xlv. p. 46, pl. iii. fig. 7; Chapman, 1894, Journ. R. Micr. Soc. pp. 425, 426, pl. viii. fig. 10.

This species was represented in the series from the Upper

* Cf. Journ. R. Micr. Soc. 1898, p. 14, pl. ii. fig. 13

Gault at Folkestone by a single specimen, and it is also unique in the collection from the Cambridge Greensand of Swaffham.

Vaginulina comitina, Berthelin.

Vaginulina comitina, Berthelin, 1880, Mém. Soc. géol. France, sér. 3, vol. i. no. 5, p. 38, pl. i. figs. 21 *a-d*; Chapman, 1894, Journ. R. Micr. Soc. p. 426, pl. viii. fig. 11.

This species has previously been described from the Gault of France and England, and it has also occurred in the Chalk detritus of Charing, Kent. It is rare at Swaffham.

Vaginulina Biochei, Berthelin.

Vaginulina Biochei, Berthelin, 1880, Mém. Soc. géol. France, sér. 3, vol. i. no. 5, p. 42, pl. ii. figs. 9 *a, b*; Chapman, 1894, Journ. R. Micr. Soc. p. 427, pl. viii. figs. 14 *a, b*.

This rare form was originally described from the French Gault, and it has also been found in the Gault of Folkestone. One specimen from the Cambridge Greensand at Swaffham.

CRISTELLARIA, Lamarck [1816].

Cristellaria linearis, Reuss.

Cristellaria linearis, Reuss, 1862, Sitzungsab. d. k. Ak. Wiss. Wien, vol. xvi. p. 66, pl. xii. figs. 1 *a, b*; Chapman, 1894, Journ. R. Micr. Soc. pp. 645, 646, pl. ix. figs. 1 *a, b*.

Very rare at Swaffham.

Cristellaria parallela, Reuss.

Cristellaria parallela, Reuss, 1862, Sitzungsab. d. k. Ak. Wiss. Wien, vol. xvi. p. 67, pl. vii. figs. 1, 2; Chapman, 1894, Journ. R. Micr. Soc. p. 647, pl. ix. figs. 5 *a, b*.

This occurrence extends the range of the species upward, being formerly known from Neocomian, Aptian, and Albian beds, and only as high as zone v. at Folkestone.

Very rare at Swaffham.

Cristellaria cymboides, d'Orbigny.

Cristellaria cymboides, d'Orbigny, 1846, Foram. Foss. Vienne, p. 85, pl. iii. figs. 30, 31; Burrows, Sherborn, and Bailey, 1890, Journ. R. Micr. Soc. p. 560, pl. xi. fig. 6; Chapman, 1894, *ibid.* p. 647, pl. ix. figs. 6 *a, b*.

One specimen from Swaffham.

Cristellaria crepidula (Fichtel & Moll).

Nautilus crepidula, Fichtel & Moll, 1798, Test. Micr. p. 107, pl. xix. figs. *g-i*.

Cristellaria crepidula (Fichtel & Moll), d'Orbigny, 1839, Foram. Cuba, p. 64, pl. viii. figs. 17, 18; Chapman, 1894, Journ. R. Micr. Soc. p. 648, pl. ix. figs. 8 *a, b*.

One specimen from Swaffham.

Cristellaria gladius (Philippi).

Marginulina gladius, Philippi, 1843, Beitr. z. Kenntniss d. Tertiärf. nordwest. Deutschl. p. 40, pl. i. fig. 37.

Cristellaria gladius (Philippi), Hantken, 1875, Mittheil. a. d. Jahrb. k. ungar. geol. Anstalt, p. 51, pl. v. fig. 12; Chapman, 1894, Journ. R. Micr. Soc. p. 649, pl. ix. figs. 11 *a, b*.

Two very typical specimens from Swaffham.

Cristellaria Bronni (Römer).

Planularia Bronni, Römer, 1841, Verstein. d. nordd. Kreidegeb. p. 97, pl. xv. fig. 14.

Cristellaria Bronni (Römer), Reuss, 1862, Sitzungsab. d. k. Ak. Wiss. Wien, vol. xlv. p. 70, pl. vii. figs. 13 *a, b*; Chapman, 1894, Journ. R. Micr. Soc. pp. 649, 650, pl. ix. figs. 12 *a, b*, 13 *a, b*.

One slightly damaged specimen from Swaffham.

Cristellaria sulcifera, Reuss.

Cristellaria sulcifera, Reuss, 1862, Sitzungsab. d. k. Ak. Wiss. Wien, vol. xlv. pp. 74, 93, pl. viii. figs. 8 *a, b*; Chapman, 1894, Journ. R. Micr. Soc. pp. 650, 651, pl. x. figs. 2 *a, b*.

Rare at Swaffham.

Cristellaria triangularis, d'Orbigny.

Cristellaria triangularis, d'Orbigny, 1840, Mém. Soc. géol. France, sér. 1, vol. iv. p. 27, pl. ii. figs. 21, 22; Chapman, 1894, Journ. R. Micr. Soc. p. 651, pl. x. figs. 3 *a, b*.

One characteristic specimen from Swaffham.

Cristellaria trunculata, Berthelin.

Cristellaria trunculata (pars), Berthelin, 1880, Mém. Soc. géol. France, sér. 3, vol. i. no. 5, p. 53, pl. iii. figs. 27 *a, b*; Chapman, 1894, Journ. R. Micr. Soc. p. 651, pl. x. figs. 4 *a, b*.

Rare at Swaffham.

Cristellaria oligostegia, Reuss.

Cristellaria oligostegia, Reuss, 1860, Sitzungsab. d. k. Ak. Wiss. Wien, vol. xl. p. 213, pl. viii. fig. 8; Chapman, 1894, Journ. R. Micr. Soc. pp. 651, 652, pl. x. figs. 5 *a*, *b*.

This species is somewhat rare at Swaffham.

Cristellaria scitula, Berthelin.

Cristellaria scitula, Berthelin, 1880, Mém. Soc. géol. France, sér. 3, vol. i. no. 5, p. 53, pl. iii. figs. 3 *a-c*; Chapman, 1894, Journ. R. Micr. Soc. p. 652, pl. x. figs. 7 *a*, *b*.

Very rare at Swaffham.

Cristellaria complanata, Reuss.

Cristellaria complanata, Reuss, 1845, Verstein. böhm. Kreidef. pt. i. p. 33, pl. xiii. fig. 54; Chapman, 1894, Journ. R. Micr. Soc. pp. 653, 654, pl. x. figs. 12 *a*, *b*.

One very fine example from the Cambridge Greensand of Swaffham.

Cristellaria turgidula, Reuss.

Cristellaria turgidula, Reuss, 1862, Sitzungsab. d. k. Ak. Wiss. Wien, vol. xvi. p. 73, pl. viii. figs. 4 *a*, *b*; Chapman, 1896, Journ. R. Micr. Soc. pp. 1, 2, pl. i. figs. 1 *a*, *b*.

Very rare at Swaffham.

This record extends the range of the form upward, it having been noticed previously in the various divisions of the Albian stage.

Cristellaria circumcidanea, Berthelin.

Cristellaria circumcidanea, Berthelin, 1880, Mém. Soc. géol. France, sér. 3, vol. i. no. 5, p. 52, pl. iii. figs. 1 *a*, *b*; Chapman, 1896, Journ. R. Micr. Soc. pp. 2, 3, pl. i. figs. 2 *a*, *b*.

This species is common at Swaffham.

Cristellaria convergens, Bornemann.

Cristellaria convergens, Bornemann, 1855, Zeitschr. d. deutsch. geol. Gesellsch. vol. vii. p. 327, pl. xiii. figs. 16, 17; Chapman, 1896, Journ. R. Micr. Soc. p. 4, pl. i. figs. 6 *a*, *b*.

One specimen from Swaffham.

Cristellaria gibba, d'Orbigny.

Cristellaria gibba, d'Orbigny, 1826, Ann. Sci. Nat. vol. vii. p. 292, no. 17; Chapman, 1896, Journ. R. Micr. Soc. pp. 4, 5, pl. i. figs. 7 *a*, *b*.

This species is common at Swaffham.

Cristellaria rotulata (Lam.).

Lenticulites rotulata, Lamarck, 1804, Annales du Muséum, vol. v. p. 188, no. 3; Tableau Encycl. et Méth. pl. cccclxvi. fig. 5.

Cristellaria rotulata (Lam.), d'Orbigny, 1840, Mém. Soc. géol. France, sér. 1, vol. iv. p. 26, pl. ii. figs. 15-18; Chapman, 1896, Journ. R. Micr. Soc. pp. 5, 6, pl. i. figs. 8 a, b.

This species was recorded by G. R. Vine from Cambridge. It is common at Swaffham.

Cristellaria rotulata (Lam.), var. *macrodiscus*, Reuss.

Cristellaria macrodisca, Reuss, 1862, Sitzungsab. d. k. Ak. Wiss. Wien, vol. xlv. p. 78, pl. ix. figs. 5 a, b.

Cristellaria rotulata (Lam.), var. *macrodiscus*, Reuss, Chapman, 1896, Journ. R. Micr. Soc. pp. 6, 7, pl. i. figs. 9 a, b.

This variety is frequent at Swaffham.

Cristellaria gaultina, Berthelin.

Cristellaria gaultina, Berthelin, 1880, Mém. Soc. géol. France, sér. 3, vol. i. no. 5, p. 49, pl. iii. figs. 15-19; Chapman, 1896, Journ. R. Micr. Soc. pp. 7, 8, pl. i. figs. 10 a, b, 11.

This species ranges throughout the Gault, besides occurring at several horizons above the Cenomanian. In the Cambridge Greensand of Swaffham and elsewhere *C. gaultina* is excessively common and attains to a great size, some specimens being 3 millim. across the disk.

Cristellaria sternalis, Berthelin.

Cristellaria sternalis, Berthelin, 1880, Mém. Soc. géol. France, sér. 3, vol. i. no. 5, p. 54, pl. iii. figs. 2 a, b; Chapman, 1896, Journ. R. Micr. Soc. p. 8, pl. ii. figs. 1 a, b.

This species does not attain to so large a size in the Cambridge Greensand as in the Gault. It is frequent at Swaffham.

Cristellaria diademata, Berthelin.

Cristellaria diademata, Berthelin, 1880, Mém. Soc. géol. France, sér. 3, vol. i. no. 5, p. 51, pl. iii. figs. 4, 5, 12, & 13; Chapman, 1896, Journ. R. Micr. Soc. p. 8, pl. ii. figs. 2 a, b.

One fine specimen from the Greensand of Swaffham.

Subfamily *POLYMORPHININÆ*.*POLYMORPHINA*, d'Orbigny [1826].

Polymorphina lactea (Walker & Jacob), var. *acuplacentæ*,
Jones & Chapman.

Polymorphina lactea (W. & J.), "Fistulose form," Chapman, 1896,
Journ. R. Mic. Soc. p. 9, pl. ii. fig. 4.

Polymorphina spp., var. *acuplacentæ*, Jones & Chapman, 1896, Journ.
Linn. Soc., Zoology, vol. xxv. p. 502, figs. 6-9.

The apical outgrowths of this specimen particularly resemble those seen in fig. 8, p. 502 of Jones and Chapman's summary of the fistulose *Polymorphinæ* (*tom. suprâ cit.*).

One specimen from Swaffham.

Polymorphina gibba, d'Orbigny, var. *acuplacentæ*,
Jones & Chapman.

Polymorphina gibba, d'Orbigny, "Fistulose form," Chapman, 1896,
Journ. R. Mic. Soc. p. 10, pl. ii. fig. 6.

Polymorphina gibba, d'Orbigny, var. *acuplacentæ*, Jones & Chapman,
1896, Journ. Linn. Soc., Zoology, vol. xxv. p. 502, figs. 6, 7.

The specimens, of which there are two in this series from the Cambridge Greensand of Swaffham, are perhaps more nearly comparable with fig. 6, p. 502 of Jones and Chapman's summary than with the Gault specimen.

Polymorphina gutta, d'Orbigny, var. *diffusa*,
Jones & Chapman.

Polymorphina gutta, d'Orbigny, "Fistulose form," Chapman, 1896,
Journ. R. Mic. Soc. pp. 10, 11, pl. ii. fig. 8.

Polymorphina spp., var. *diffusa*, Jones & Chapman, 1896, Journ. Linn.
Soc., Zoology, vol. xxv. p. 505, figs. 26-29.

Four specimens, all more or less resembling those from the Folkestone Gault, were found at Swaffham.

Polymorphina fusiformis, Römer.

Polymorphina (*Globulina*) *fusiformis*, Römer, 1838, Neues Jahrb. für
Min. p. 386, pl. iii. fig. 37.

Polymorphina fusiformis, Römer, Chapman, 1896, Journ. R. Mic. Soc.
p. 11, pl. ii. fig. 9.

Three specimens belonging to the type species were found at Swaffham.

Polymorphina fusiformis, Römer, var. *horrida*, Reuss.

Polymorphina horrida, Wright, 1875, Rep. & Proc. Belf. Nat. Field-Club for 1873-74, Appendix, 1875, p. 85, pl. iii. fig. 14.

Polymorphina fusiformis, Römer, "Fistulose form," Chapman, 1896, Journ. R. Micr. Soc. pp. 11, 12, pl. ii. fig. 10.

Polymorphina fusiformis, Römer, var. *horrida*, Reuss, Jones & Chapman, 1896, Journ. Linn. Soc., Zoology, vol. xxv. p. 503, fig. 14.

The solitary specimen found at Swaffham more nearly resembles the Chalk specimen found by Mr. Wright than that figured from the Gault series. The original specimen of von Reuss * belongs to the species *P. gutta*.

Polymorphina fusiformis, Römer, var. *acuplacentia*,
Jones & Chapman.

The variety here under consideration has apparently never hitherto been found associated with the type species *P. fusiformis*. The nearest figured form of outgrowth which the specimens from the Cambridge Greensand resemble is that of fig. 9, p. 502 of the summary of the fistulose *Polymorphinæ* (*op. cit.*), although in that specimen the outgrowths are much more produced.

Three specimens of *P. fusiformis*, var. *acuplacentia*, were found at Swaffham.

Polymorphina sororia, Reuss, var. *cuspidata*, Brady.

Polymorphina sororia, Reuss, var. *cuspidata*, Brady, 1884, Chall. Rep. vol. ix. p. 563, pl. lxxi. figs. 17-19, pl. lxxii. fig. 4; Chapman, 1896, Journ. R. Micr. Soc. p. 13, pl. ii. fig. 13.

This variety has been recorded from the Aptian of Guildford, the Gault of Folkestone, and the Red Chalk of Speeton. Only one specimen was found at Swaffham.

Polymorphina communis, d'Orbigny.

Polymorphina (Guttulina) communis, d'Orbigny, 1826, Ann. Sci. Nat. vol. vii. p. 266, pl. xii. figs. 1-4; Modèle, no. 62.

Polymorphina communis, d'Orb., Chapman, 1896, Journ. R. Micr. Soc. pp. 13, 14, pl. ii. fig. 15.

One specimen from Swaffham.

* "*Globulina horrida*," Reuss, 1845, Verstein. böhm. Kreidef. pt. ii. p. 110, pl. xliii. fig. 14.

Subfamily *RAMULININÆ*.*RAMULINA*, Rupert Jones [1875].*Ramulina globulifera*, Brady.

Ramulina globulifera, Brady, 1879, Quart. Journ. Micr. Sci. vol. xix. n. s. p. 58, pl. viii figs. 32, 33; Chapman, 1896, Journ. R. Micr. Soc. pp. 582, 583, pl. xii. figs. 3-6.

Numerous double and single segments of this species were found at Swaffham.

Ramulina aculeata, Wright.

Ramulina aculeata, Wright, 1886, Proc. Belf. Nat. Field-Club, 1885-86, Appendix ix. 1886, p. 331, pl. xxvii. fig. 11.

Lagena tuberculata, Perner, 1892, Česká Ak. Císare Františka Josefa, Prague (Palæont. Bohemiæ, no. 1), p. 56, pl. v. figs. 19 a, b.

Ramulina aculeata, Wright, Chapman, 1896, Journ. R. Micr. Soc. pp. 583, 584, pl. xii. figs. 7-9.

This species is well known in nearly all washings from the Cretaceous beds, and has occurred in the Cenomanian of Bohemia. It is abundantly represented in the Cambridge Greensand of Swaffham by slender stoloniferous fragments and bulbous and bifurcated portions.

VITRIWEBBINA, Chapman [1892].*Vitriwebbina lævis* (Sollas).

Webbina lævis, Sollas, 1877, Geol. Mag. dec. ii. vol. iv. pp. 103, 104, pl. vi. figs. 1-3.

Vitriwebbina lævis (Sollas), Chapman, 1892, Geol. Mag. dec. iii. vol. viii. p. 53, pl. ii. fig. 4; id. 1896, Ann. & Mag. Nat. Hist. vol. xviii. p. 332, fig. 3; id. Journ. R. Micr. Soc. pp. 585, 586, pl. xii. fig. 12.

Vitriwebbina lævis (Sollas), Bagg, 1898, Bull. U.S. Geol. Survey, no. 88, p. 36, pl. ii. figs. 4 a, b.

This form was originally described from the Cambridge Greensand under the generic name *Webbina* as recorded by Sollas and Vine. It has since been found in the Middle Marl of New Jersey, in the Gault of Folkestone, and in the lowest beds of the Chalk strata.

One specimen of *Vitriwebbina lævis* attached to a glauconitic fragment was found in the washings from Swaffham.

Vitriwebbina Sollasi, Chapman.

Vitriwebbina Sollasi, Chapman, 1892, Geol. Mag. dec. iii. vol. viii. p. 53, pl. ii. figs. 1-3.

Vitriwebbina Sollasi, Chapman, Bagg, 1898, Bull. U.S. Geol. Survey, no. 88, pp. 35, 36, pl. ii. figs. 5 a, b.

This species was first recorded from the Gault. It has since been found in the Middle Marl of New Jersey and in the lowest beds of the Chalk.

Vitriwebbina tuberculata (Sollas). (Fig. 3.)

Webbina tuberculata, Sollas, 1877, Geol. Mag. dec. ii. vol. iv. p. 104, pl. vi. figs. 4-7 & 9.

Trochammina irregularis (d'Orbigny), Perner, Česká Ak. Císare Františka Josefa, Prague (Palæont. Bohemiæ, no. 1), p. 53, pl. ix. figs. 1-6.

Vitriwebbina tuberculata (Sollas), Chapman, 1896, Ann. & Mag. Nat. Hist. vol. xviii. p. 332, fig. 4; id. 1896, Journ. R. Micr. Soc. pp. 586, 587, pl. xiii. fig. 3.

By far the finest specimen of this form I have met with is here figured from the Cambridge Greensand of Swaffham (fig. 3). It is remarkable for having no less than ten

Fig. 3.

Vitriwebbina tuberculata (Sollas). $\times 15$.
p=primordial segment.

segments, and by its completeness throws considerable light on one of the methods of its growth. *Vitriwebbina* is more usually found as a series of chambers of gradually increasing size; but the specimen before us gives an instance of a deviation from this general habit. The primordial segment in this specimen immediately gives rise to a double series of chambers of about equal dimensions extended laterally on either side of the commencement. This specimen is attached to a brown (?) fish-bone fragment.

Originally described from the Cambridge Greensand, this species has since been found in the Gault of Merstham and Folkestone and in the Cenomanian and Chalk of Bohemia. Six specimens of *Vitriwebbina tuberculata* occur in this present series from the Cambridge Greensand of Swaffham.

Family **Globigerinidæ**.

GLOBIGERINA, d'Orbigny [1826].

Globigerina cretacea, d'Orbigny.

Globigerina cretacea, d'Orbigny, 1840, Mém. Soc. géol. France, vol. iv. p. 34, pl. iii. figs. 12-14; Chapman, 1896, Journ. R. Micr. Soc. pp. 588, 589, pl. xiii. figs. 5, 6.

This species was formerly recorded by Vine from the Cambridge Greensand. It is very common at Swaffham.

Globigerina æquilateralis, Brady.

Globigerina æquilateralis, Brady, 1879, Quart. Journ. Micr. Sci. vol. xix. n. s. p. 7; id. 1884, Chall. Rep. vol. ix. p. 605, pl. lxxx. figs. 18-21; Chapman, 1896, Journ. R. Micr. Soc. p. 589, pl. xiii. fig. 7.

Rare at Swaffham.

Family **Rotaliidæ**.

Subfamily **ROTALINÆ**.

ANOMALINA, d'Orbigny [1826].

Anomalina complanata, Reuss.

Anomalina complanata, Reuss, 1851, Haidinger's Naturw. Abhandl. vol. iv. (1) p. 36, pl. iii. fig. 3; Chapman, 1898, Journ. R. Micr. Soc. pp. 3, 4, pl. i. figs. 4 a-c.

Very rare at Swaffham.

Anomalina ammonoides (Reuss).

Rosalina ammonoides, Reuss, 1845, Verstein. böhm. Kreidef. pt. i. p. 36, pl. xiii. fig. 66, pl. viii. fig. 53.

Anomalina ammonoides (Reuss), Brady, 1884, Chall. Rep. vol. ix. p. 672, pl. xciv. figs. 2, 3; Chapman, 1898, Journ. R. Micr. Soc. pp. 4, 5, pl. i. figs. 5 a-c.

This species has been previously recorded from the Cambridge Greensand by G. R. Vine. It is very abundant at Swaffham.

Anomalina rudis (Reuss).

Rosalina rudis, Reuss, 1862, Sitzungsab. d. k. Ak. Wiss. Wien, vol. xlvi. p. 87, pl. xi. figs. 7 a-c.

Anomalina rudis (Reuss), Berthelin, 1880, Mém. Soc. géol. France, sér. 3, vol. i. no. 5, p. 68, pl. iv. figs. 15 a-c; Chapman, 1898, Journ. R. Micr. Soc. p. 5, pl. i. figs. 6 a-c.

Occasional at Swaffham.

ROTALIA, Lamarck [1804].

Rotalia Soldanii (d'Orbigny), var. *nitida*, Reuss.*Rotalina nitida*, Reuss, 1844, Geogn. Skizze Böhmen, vol. ii. pt. 1, p. 214.*Placentula nitida* (Reuss), Berthelin, 1880, Mém. Soc. géol. France, sér. 3, vol. i. no. 5, p. 69, pl. iv. figs. 11 a-c.*Rotalia Soldanii* (d'Orb.), var. *nitida*, Reuss, Chapman, 1898, Journ. R. Micr. Soc. pp. 9, 10, pl. ii. figs. 2 a-c.

Very common at Swaffham.

The types of the foregoing 138 species and vars. of the Foraminifera described or referred to in these papers, and also the figured Ostracoda, are now placed in the Woodwardian Museum at Cambridge.

XLVI.—*British Isopoda Chelifera*. By the Rev. Canon
A. M. NORMAN, M.A., D.C.L., LL.D., F.R.S.

OUR knowledge of the group of Isopoda entitled by Sars "Chelifera," and containing the two families Apseudidæ and Tanaidæ, has been greatly extended of late years. With respect to our own fauna no doubt many small species still await discovery in our seas, and it is remarkable that as yet no member of the genus *Typhlotanais* has been met with, although nine belong to the Norwegian fauna. Now, however, when these minute forms have been so fully illustrated by the publication of the classical work of Sars, some of the species will probably be soon added to our fauna. Bate and Westwood recorded seven British Isopoda Chelifera; the number in this paper is twenty-three. The following works have either been published since Bate and Westwood, and have reference to species which are here enumerated, or, if of earlier date, are necessitated by synonymy which is here specially noticed; but many authors who are only once mentioned are referred to in the text and not inserted in the following list.

Selected List of Publications on Isopoda.

- (1) BATE and WESTWOOD.—'History of British Sessile-eyed Crustacea,' vol. ii. 1863-9.
- (2) BARROIS (T.H.).—'Note préliminaire sur la Faune carcinologique des Açores.' Lille, 1888.