NEW GASTROPODS AND TRILOBITES CRITICAL IN THE CORRELATION OF LOWER ORDOVICIAN ROCKS.[1]

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ABSTRACT. In order to make them available for general use new names are here applied to two genera of gastropods and a genus of trilobites found in the Lower Ordovician Ellenburger rocks of central Texas and critical in their correlation. In this connection it is necessary also to describe three new species.

The gastropod *Barnesella* is found 130 to 180 feet above the base of the Honeycut formation and is of wide occurrence in upper Lower Ordovician strata from Newfoundland to Colorado.

To a large gastropod long wrongly known as *Roubidouxia*, from its characteristic occurrence in beds of Roubidoux age at many localities, the new name *Rhombella* is given.

The trilobite, *Paraplethopeltis*, characterizes the upper 90 to 100 feet of the Tanyard formation, and relates it to the upper Gasconade strata of Missouri and the upper Chepultepec beds of the southern Appalachian region.

INTRODUCTORY REMARK AND ACKNOWLEDGMENTS.

A CONTEMPLATED monographic study of the Lower Ordovician faunas of central Texas being a diminishing prospect, the writers feel obligated to present descriptions of three previously unnamed genera critical in the correlation of the rocks that contain them.

The typescript for this descriptive note had the advantage of critical review by Dr. J. Brookes Knight of the U. S. National Museum, and members of the manuscript review board of the U. S. Geological Survey.

SYSTEMATIC DESCRIPTIONS.

Genus *Barnesella* Bridge and Cloud, n. gen.

Genotype: *Barnesella lecanospiroides* Bridge and Cloud, n. sp.

Description: Shell of medium size, discoidal, hyperstrophic dextral, with a flat or very slightly convex base and a broadly umbilicate upper surface; consisting of 4 to 5 gradually expanding whorls. An average specimen ranges between 20

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and 40 millimeters in diameter. Within the broad superior umbilicus all whorls are visible.

Whorl-profile rounded triangular, with a sharp notch-keel at the upper margin and a gently rounded to nearly flat base. Outer wall of whorl evenly and gently to moderately convex. Umbilical wall of whorl of similar or greater convexity than that of outer wall; evenly convex or with a depression just inside of the keel, below which it swells out to give a gently sigmoid profile. Profile of outer wall ordinarily steeper than, or of approximately the same steepness as, umbilical wall; rarely the umbilical wall is of slightly greater steepness than the outer wall.

Ornamentation seemingly of growth-lines only. The trace of the growth-lines is not clear in specimens at hand, but they seem to run evenly round the under surface of the whorl and sweep backward at the superior keel to define a sharp notch, which apparently does not generate a selenizone.

Stratigraphic and geographic range: Species of *Barnesella* are known from Lower Ordovician strata of post-Roubidoux age in Newfoundland, the Champlain Valley of Vermont, the southern Appalachian region, Oklahoma, Texas, and Colorado.

Discussion: *Barnesella* has its closest resemblances in *Maclurites*, a genus more typical of the Middle Ordovician, and *Lecanospira*, a genus of which representatives have so far been found only in rocks of Roubidoux age. Morphologically it seems intermediate between these two genera, but it may be questioned if a shell with the unusual apertural characteristics of *Lecanospira* (Pl. 1, Figs. 10, 13) could have given rise to a shell with the simple macluritoid aperture to be inferred from the visible growth-lines of *Barnesella*.

From *Maclurites*, to which species of *Barnesella* have previously been assigned, *Barnesella* differs in having a broad and relatively shallow superior umbilicus in which parts of all whorls are exposed, in the fact that the outer wall of the whorl is steeper than or of approximately equal steepness to the inner wall, and in its much more gradually expanding whorls. *Maclurites* has a relatively narrow and deep superior umbilicus in which commonly only the outer whorl is exposed, or the outer and part of that adjacent to it; the umbilical wall is steeper than the outer wall, and the whorls expand rapidly.

In superficial respects the genus here named more closely resembles *Lecanospira* than *Maclurites*. The sharp keel, flat base, and wide superior umbilicus (Pl. 1, Figs. 4-5) are immediately suggestive of *Lecanospira*; but the umbilicus of *Lecanospira* is relatively broader and shallower than that of *Barnesella*, and the umbilical slope of the whorl of *Lecanospira* is flat or slightly concave, so that the superior notch-keel of the inner whorls makes a prominent revolving keel within the umbilicus (Pl. 1, Fig. 10). The convexity of the inner whorl-face of *Barnesella* is such that the umbilical slope is fairly even, although all whorls are exposed within the umbilicus, and the keel is continuously visible within it. The umbilical impression, in this case the impression of the upper surface, is especially distinctive of the two genera. That of *Lecanospira* consists of a prominent keel revolving in a depressed cone and set off by a narrow, sharp, and relatively deep revolving trough, the impression of the true notch-keel of the shell (Pl. 1, Figs. 11-12). The umbilical impression of *Barnesella* is in the form of a low, sharp keel revolving in a more elevated cone and in some instances, at least, separated by a broad revolving trough which may be sigmoid in vertical outline in reflection of the revolving depression just inside of and below the notch-keel of some species (Pl. 1, Figs. 2-3). The outer whorl-wall of *Lecanospira* is invariably steeper than the umbilical wall and commonly almost vertical, or pitching but slightly inward toward the superior keel. The number of whorls in *Lecanospira* seems to range from 5 to 8, as compared to 4 or 5 in *Barnesella*; with the rate of expansion tending to be slightly greater in the earlier whorls of *Barnesella* than in *Lecanospira*, but nearly equivalent in the last whorl of both.

The growth lines of *Barnesella* appear to run directly across the lower surface with slight posterior convexity, as in *Maclurites*. This contrasts with *Lecanospira*, where the growth lines swing far forward at the rounded peripheral margin of the whorl base to define a prominent apertural lip. The aperture of *Barnesella* and *Maclurites* would appear to be rather evenly rounded. Whereas the base of *Lecanospira* is commonly slightly concave, that of *Barnesella* and *Maclurites* is typically flat or slightly convex. Both *Lecanospira* and *Maclurites* tend to have the basal interior portion of the whorl

profile moderately or rather deeply impressed, whereas the whorl profile of *Barnesella* is only slightly or scarcely at all impressed.

Species included under *Barnesella* are the genotype, *B. lecanospiroides*, "*Maclurea*" *affinis* Billings, and probably certain other species of small so-called *Maclurites* found in high Lower Ordovician strata and commonly referred to "*Maclurea affinis.*" Text Fig. 1 shows the association of a zone of *Barnesella* with zones of the lithistid sponge *Archaeoscyphia*, and the gastropod operculum *Ceratopea* at an easily accessible locality near Chappel, Texas.

The genus is named, in token of special esteem, for Dr. Virgil E. Barnes, collaborator with its describers on problems of Texas stratigraphy.

Barnesella lecanospiroides Bridge and Cloud, n. sp.
(Pl. 1, Figs 1-8).

Description: Shell seemingly of average size for the genus. Outer wall of whorl evenly rounded, nearly vertical, but pitching slightly inward toward the superior notch-keel. Umbilical wall sigmoid in vertical profile, with a shallow revolving depression just inside of and below the notch-keel. Base of shell essentially flat; base of whorl-profile slightly convex. Other features as described for the genus.

Greatest diameter of holotype (a steinkern) 29 mm., maximum whorl-height 9.5 mm. A small paratype steinkern has a diameter of 14.2 mm. and a maximum whorl-height of 5.5 mm.

Discussion: *B. lecanospiroides* was at first thought to be conspecific with *B. affinis* (Billings), but it is now recognized that the similarities are not greater than those of congenerity. *B. affinis*—as shown by Billings' illustration (1865, p. 238, Figs. 224a and b) and by probably conspecific specimens from Fort Cassin, Vermont; Bellefonte, Pennsylvania; and the Arbuckle Mountains of Oklahoma—has a more generally rounded whorl-profile with rather evenly rounded slopes of approximately equivalent steepness on both sides of the superior notch-keel, without a revolving depression inside of and below the notch-keel, and with a more rounded basal whorl face.

Material: The holotype and paratypes, all chert steinkerns, are from locality TF-244.[4] This is along a pasture road about 2.8 miles airline S. 62° E. from the crossroads at Chappel, and 2.4 miles due north from the J. F. Barnes ranch headquarters, southeastern San Saba County, Texas. Associated

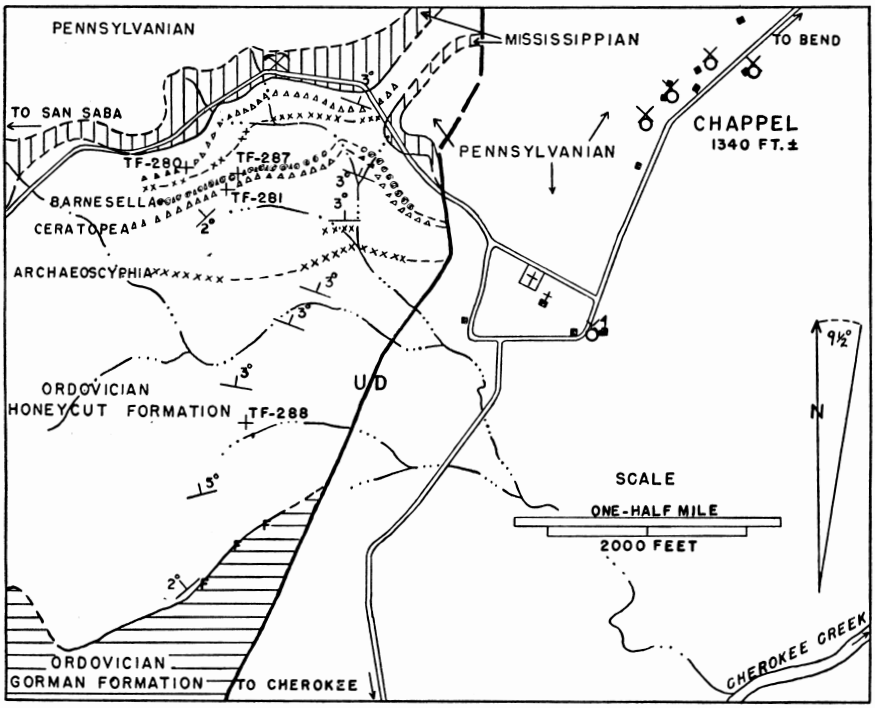

Figure 1. Geologic sketch-map showing occurrence of *Barnesella* near Chappel, southeastern San Saba County, Texas. (Geology by P. E. Cloud, Jr., 1944. Base from U. S. Dept. Agriculture aerial photograph BRH-3-72, flown in 1939 by Kargl Aerial Surveys.)

+ indicates numbered fossil locality, *e.g.*, TF-281.
F indicates fossils recorded but not collected.
× over ○ indicates windmill at center of ○.
Quarry symbol marks a borrowing area.

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[4] Numbers preceded by TF- are field-locality numbers given by Cloud to collections of fossils from Texas made for the U. S. Geological Survey and housed at the U. S. National Museum. Numbers preceded by B- refer to collections from localities registered by Bridge (*e.g.* B-66a). Other numbers indicate localities of the Texas Bureau of Economic Geology, which uses a system in which each of the 254 counties of the State is numerically designated, with other parts of the number referring to location within the county (*e.g.* 16T-2-42C). All figured specimens will be deposited in the collections of the U. S. National Museum.

fossils at this locality are *Archaeoscyphia annulata* Cullison, *Ophileta*, *Raphistomina*, *Ceratopea*, "*Euconia*," *Eotomaria?*, *Orospira*, *Plethospira*, *Hormotoma*, *Moreauoceras milleri* Cullison, and *Mcqueenoceras*. Unfortunately structural conditions in the vicinity of locality TF-244 are such that its stratigraphic position in the Honeycut formation cannot be given on the basis of reasonable direct estimate, but the associated fossils show it to be within the lower third of the formation.

The position of specimens of *Barnesella lecanospiroides* from locality TF-287, however, can be fairly estimated as about 170 to 180 feet above the base of the Honeycut formation. This locality is so accessible, and the associations of *Barnesella* are so well shown here, that a geologic sketch-map of the vicinity is given in Figure 1. On this sketch-map the small triangles mark zones of *Ceratopea*, and the x's mark zones of *Archaeoscyphia*. In the same bed with *Barnesella lecanospiroides* at locality TF-287 are found *Archaeoscyphia*, *Ceratopea capuliformis robusta* Oder, an unguiform new species of *Ceratopea*, *Raphistomina*, *Ophileta*, cephalopods, *Jeffersonia producta* Cullison, *J. granosa* Cullison, and *Eopteria*. A few feet stratigraphically above locality TF-287 are abundant specimens of a new species of *Ceratopea* with a strongly incurved apex (TF-280), and a few feet below is a bed marked by *C. capuliformis robusta* (TF-281).

At several other localities in central Texas (notably TF-255, near the Gorman Falls section) *Barnesella lecanospiroides* occurs at similar or somewhat lower stratigraphic levels.

Genus *Rhombella* Bridge and Cloud, n. gen.

Genotype, and only present named species: *Roubidouxia umbilicata* Ulrich and Bridge (*in* Dake and Bridge, 1932).

Description: Shell large, depressed trochiform, widely phaneromphalus. Pleural angle 90 to 105 degrees. Whorls five to six, abruptly expanding, rhomboidal in cross-section, the upper and lower surfaces essentially flat and approximately parallel. Profile of outer whorl-slope gently sigmoid, convex above, concave below; umbilical slope slightly convex, merging into base with a less definite keel than is present at the junctures of other surfaces. Umbilicus deep and funnel-shaped, exposing part of all whorls. Peripheral band well defined, completely exposed in the spire and rising sharply from the suture.

Aperture rhomboidal, inner lip entire, outer lip with a deep unsymmetrical notch, the apex of which lies on the peripheral band.

Surface markings consist of fine concentric growth-lines. These curve slightly forward from the suture to about the middle of the shoulder of the whorl and then swing sharply backward to the peripheral band, crossing it a considerable distance behind their point of origin. After crossing the band they bend abruptly forward along the base of the band until they are about opposite the point of origin. They then curve gently forward to the middle of the base and then gently backward, the curve reversing as the umbilicus is entered.

Stratigraphic and geographic range: Lower Ordovician—Roubidoux formation of Missouri, Gorman formation of Texas, Longview limestone of the southern Appalachian region, and equivalent strata north at least as far as southern Quebec.

Discussion: The rhomboidal cross-section of the flat-based whorl (Pl. 1, Fig. 14), the upward deflected peripheral band, and the depressed conical shape (indicated by the large pleural angle) of the abruptly expanding spire are the distinctive features of the shells of this genus.

The shells, however, are rarely preserved entire, and commonly occur as fragmentary fillings or steinkerns which may not show the deflected peripheral notch-keel. Such specimens may be confused with *Euconia*, if the writers are correct in assigning to that genus specimens of which an example is illustrated by figure 23 of Plate 2. The whorl cross-section of these shells is very like that of *Rhombella*, and, except that the notch-keel of *Euconia* appears not to be deflected upward, the two would be inseparable on the basis of the adult lower whorl alone. Judged from these shells, however, and from Knight's description (1941, p. 117-118) and Billings' original illustrations (1865, p. 226, Fig. 210a-b), *Euconia* is a relatively highly conical shell, with an acute pleural angle of 65° to 75°. Moreover, the specimen of *Euconia* illustrated by Figure 23 of Plate 2 in the present report shows parts of eight gradually expanding whorls, and probably had at least nine such whorls. In contrast *Rhombella* had only five (or possibly six) abruptly expanding whorls disposed in a much more depressed cone with a pleural angle of 90° to 105°. Ordinarily at least two whorls are necessary to make a sure

DESCRIPTION OF PLATES.

Plate 1.—*Barnesella*, *Lecanospira*, and *Rhombella*.

Figures

1–8. *Barnesella lecanospiroides* Bridge and Cloud, n. gen., n. sp.

1, 4-5. Lateral (xl) and apical (xl, x2) views of a paratype showing the cross-section of the whorl, the sharp notch-keel and the broad superior umbilicus.

2-3. Oblique basal views (xl) of two incomplete paratypes showing the features of the umbilical impression. Note the irregularities of growth in the upper right-hand corner of figure 3, indicating the basal outline of the aperture.

6-7. Ventral views (xl, x2) of a small paratype showing flat base.

8. Basal view (xl) of the holotype.

All specimens are chert steinkerns and impressions from the lower Honeycut formation at locality TF-244, southeastern San Saba County, Texas (described in text).

9. *Barnesella* cf. *B. affinis* (Billings) .....

Basal view (x2) of a small silicified specimen from locality OF-15; about 1,000 feet above the base of the Kindblade formation (Lower Ordovician), NW.¼, NW.¼, sec. 19, T.2S., R.2E., in a draw 1,200 to 1,300 feet west of highway U. S. 77, Carter County, Oklahoma.

10. *Lecanospira* sp. .....

Apical view (x2) of a small and excellently preserved specimen showing the broad superior umbilicus with its prominent revolving notch-keel. Irregular discoloration of the specimen and the fact that it is broken at the side of the high-light may give the illusion of an elevated spire. From locality 16T-2-31B, about 30 feet below top of Gorman formation, 7.45 miles No. 58° E. from juncture of highways at Johnson City, Blanco County, Texas.

11–13. *Lecanospira sanctisabae* (Roemer) .....

11-12. External impressions (xl) of the hyperstrophic spire showing the characteristic features of the umbilical impression. Specimens on a single slab from locality TF-293. About 400 feet above base of Gorman formation, 1 mile north of White's Crossing and about 10 miles southwest of Mason, Mason County, Texas.

13. Basal view (xl) of two silicified specimens on a slab of limestone, the upper specimen shows the basal outline of the aperture, with its anteriorly flaring peripheral lip. Locality 16T-2-42C, about 86 feet below top of Gorman formation in a measured section at Honeycut Bend of Pedernales River, about 4.5 miles east of Johnson City, Blanco County, Texas.

14–15. *Rhombella umbilicata* (Ulrich and Bridge) .....

14. Whorl cross-section (xl) of a chert steinkern from same locality as specimens illustrated by figures 24-26 on Plate 2.

15. Rubber replica (xl) made from holotype impression (which also shows part of steinkern). Chert of the Roubidoux formation, McCabe Ozark County, Missouri. U. S. Geological Survey Collection No. 272-W-1 (E. O. Ulrich).


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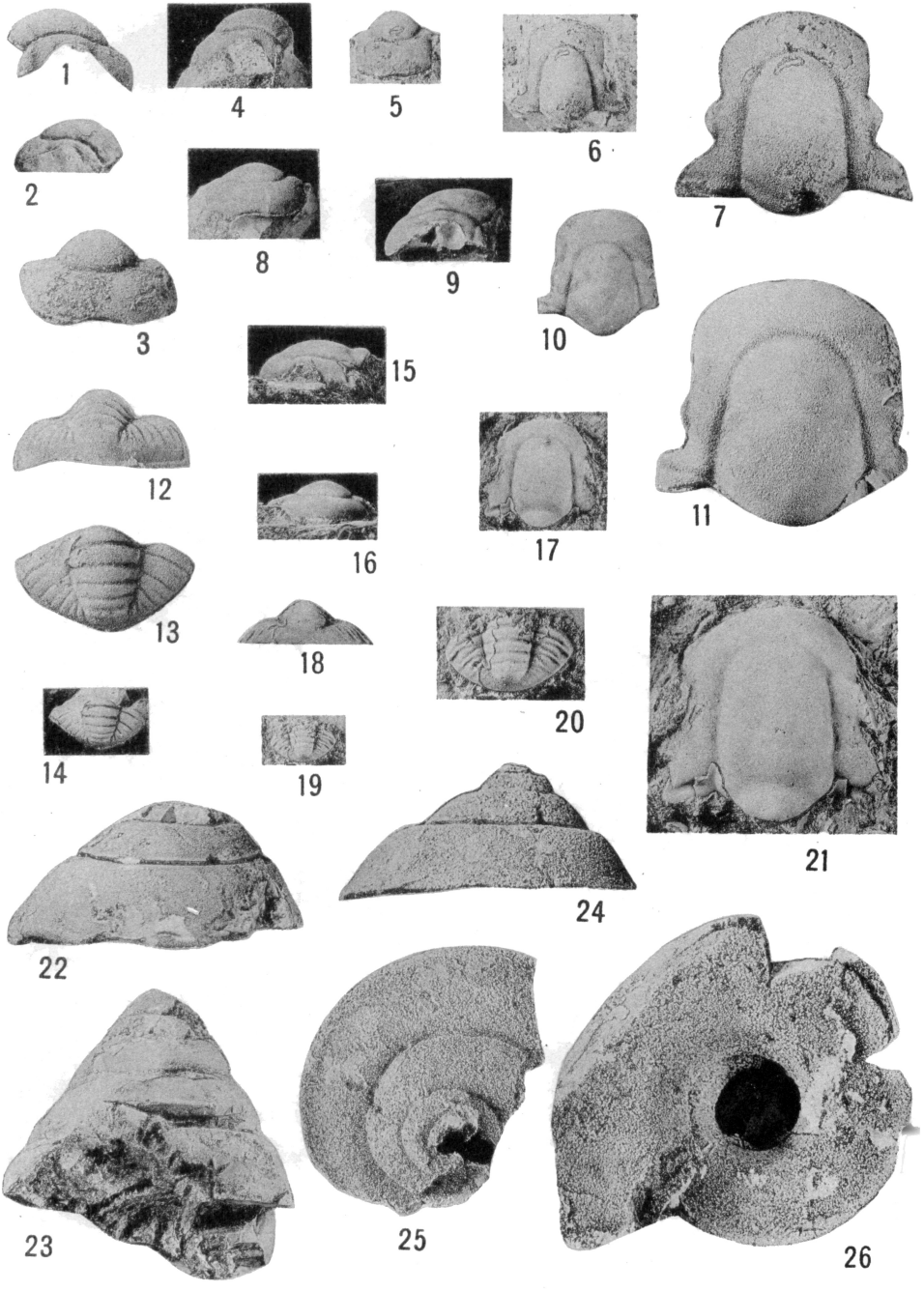
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Plate 2.—*Rhombella, Euconia, Paraplethopeltis,* and *Plethopeltis.*

Figures

1-7, 12-14, *Paraplethopeltis obesa*[5] Bridge and Cloud, n. gen. n. sp.

1-2. Lateral views (xl) of two paratype cranidia from locality TF-149. Boulders of Tanyard age in terrace gravel about 8.69 miles airline S. 44° E. from intersection of highways at San Saba, San Saba County, Texas.

3. Anterior view (x2) of small paratype cranidium from locality B-66A. Upper beds of Tanyard formation, 1.5 miles by speedometer west from the ranch headquarters of Mack Yates, Sr., southeastern San Saba County, Texas.

4-7. Lateral (xl), anterior (xl), and dorsal (xl, x2) views of holotype cranidium from locality TF-111. Upper part of Tanyard formation, about 8.47 miles airline S. 40° E. from intersection of highways at San Saba, San Saba County, Texas.

12-14. Posterior (x2) and dorsal (x2, xl)) views of paratype pygidium from locality TF-286. Within 50 feet of top of Tanyard formation, about 2,500 feet southeast from main dwelling at the J. F. Barnes ranch headquarters, southeastern San Saba County, Texas.

8–11. *Paraplethopeltis depressa* Bridge and Cloud, n. gen., n. sp. .....

Anterior (xl), lateral (xl), and dorsal (xl, x2) views of holotype cranidium from locality TF-37. Upper beds of Tanyard formation, about 7.13 miles airline S. 2° E. from intersection of highways at San Saba, San Saba County, Texas.

15–21. *Plethopeltis saratogensis* (Walcott) .....

15-17, 21. Lateral (xl), anterior (xl), and dorsal (xl, x2) views of the largely exfoliated holotype cranidium, introduced for comparison with *Paraplethopeltis.* Hoyt limestone member of Theresa dolomite, 4 miles west of Saratoga Springs, Saratoga County, New York. U. S. National Museum No. 58558 (= 23863 of Walcott. *See* Resser, 1942, p. 41).

18-20. Posterior (x2) and dorsal (xl, x2) views of paratype pygidium. Same locality and stratigraphic level as above.

22, 24–26. *Rhombella umbilicata* Ulrich and Bridge .....

22. Lateral view (xl) of an incomplete chert steinkern from locality TF-121. Base of Gorman formation, 5.84 miles airline S.1°E. from intersection of highways at San Saba, San Saba County, Texas.

24–26. Lateral and apical views (xl) of an incomplete chert steinkern, and basal view (xl) of a similar specimen from locality TF-179, basal beds of Gorman formation, 5.84 miles airline S.1° E. from intersection of highways at San Saba, San Saba County, Texas.

23. *Euconia* aff. *E. etna* (Billings) .....

Lateral view (xl) of a specimen from locality 205T-1-17A. Approximately 218 feet above base of Honeycut formation in measured section north of Gorman Falls, San Saba County, Texas.

[5] All specimens illustrated are chert impressions of under surface of test.

distinction between *Rhombella* and *Euconia*, allowing observation of pleural angle and rate of expansion.

It was originally the intention of Dr. E. O. Ulrich and Bridge that the name *Roubidouxia* apply to the genus here described as *Rhombella*. *Roubidouxia* was validated as a generic name, however, by Butts (1926, p. 96), and as he mentions only the species *Roubidouxia depressa* Butts in connection with the validation there is no choice but to consider that species the genotype of monotypy. In a later paper Ulrich and Bridge (*in* Dake and Bridge, 1932, p. 741) described "*Roubidouxia*" *umbilicata* and designated it the genotype of *Roubidouxia* in accordance with their original intention. By the International Rules of Zoological Nomenclature, however, "*Roubidouxia*" *umbilicata* Ulrich and Bridge cannot supplant *Roubidouxia depressa* Butts in its clearly indicated status as a genotype of *Roubidouxia*. Moreover, study of the holotype of Butts' species reveals that it is not congeneric with the species *umbilicata* of Ulrich and Bridge, and that a new genus must be erected for the reception of the latter. The name here proposed for this genus is *Rhombella*, referring to the characteristically rhomboidal whorl-section of the genus.

Roubidouxia itself appears to be a raphistomoid shell of some sort, and the name is possibly a synonym of *Raphistomina* Ulrich and Scofield, 1897.

Rhombella umbilicata (Ulrich and Bridge).

(Pl. 1, Figs. 14-15; Pl. 2, Figs. 22, 24-26).

Roubidouxia umbilicata Ulrich and Bridge, 1932, (*in* Dake and Bridge, 1932, p. 741, Pl. 12, Figs. 11-12).

Description: Shell large, conical, consisting of five (or perhaps in some instances six) abruptly expanding whorls. The width of the body whorl (suture to periphery) is a little less than twice the corresponding width of the preceding whorl. Pleural angle 90 to 105 degrees. Whorls rhomboidal in cross-section, the upper and lower surfaces approximately flat and parallel; the outer slope from suture to peripheral band gently sigmoid in profile, convex above, concave below. Base flat or slightly concave. Umbilicus about half the diameter of the final volution, open, deeply conical, exposing part of all the whorls. In this species the whorls overlap in such a manner

as to produce an almost smooth umbilical slope. Surface markings and aperture as given in the generic description.

Average specimens are from 45 to 60 millimeters in diameter and from 25 to 40 millimeters in height. A very large but fragmentary specimen from Rose Hill, Virginia, has an estimated diameter of 70 millimeters.

Occurrence: Holotype from U. S. Geological Survey locality No. 272-W-1, from the Roubidoux formation near McCabe, Ozark County, Missouri. Paratypes from the Roubidoux formation, near Eminence, Shannon County, Missouri, and at Bessville, Bollinger County, Missouri, and from the Nittany dolomite, two miles north of the town of Spruce Creek, Tyrone quadrangle, Pennsylvania.

Many additional specimens of this broadly delimited species have been obtained from the Gorman formation at various localities in central Texas; from the Roubidoux formation at many localities in Missouri; from the Longview limestone at many localities in Alabama; from the Nittany dolomite at various localities in Tennessee, Virginia, and Pennsylvania, and from rocks of Nittany age included in the "Calciferous" at Beauharnois, Quebec.

Discussion: It is probable that critical study of large collections of well-preserved specimens would permit the delimitation of other species within the present broadly drawn limits of *R. umbilicata* Ulrich and Bridge. Such discrimination would be a worthy objective of future faunal studies. The wide geographic distribution and restricted vertical range of the shells assigned to this species, together with their distinctive form and large size, make it one of the most useful index fossils in the Lower Ordovician, however, even as now recognized.

Genus *Paraplethopeltis* Bridge and Cloud, n. gen.

Genotype: *Paraplethopeltis obesa* Bridge and Cloud, n. sp.

Description: Cephalon opisthoparian, of medium size as trilobites go. Excluding posterolateral limbs, cranidium is subrectangular in outline, longer than wide, strongly to moderately convex both longitudinally and transversely, with straplike or narrow wedge-shaped posterolateral limbs behind the inconspicuous palpebral lobes. Preglabellar field about one-

third the length of the entire cephalon, and half the length of the glabella according to airline measurements; evenly convex transversely and longitudinally. Circumglabellar furrows well developed, entire. Occipital furrow clearly visible, but shallow and not prominent; occipital ring only slightly wider at the center than at the sides and not prolonged into a median spine. Posterior marginal furrow about equal in prominence to occipital furrow. Glabella probably smooth and without furrows, strongly to moderately convex transversely and longitudinally; subquadrate in outline, but tapering slightly forward and with broadly rounded anterolateral corners. Associated free cheeks are evenly convex, unevenly club-shaped with inner edge notched and a short genal spine. It is not established that these are the free cheeks of *Paraplethopeltis.*

Pygidium small and transversely flabelliform, with six transverse segments in the prominent central axis and lateral slopes with four or five pleural segments. Lateral and posterior margins abruptly deflected.

Stratigraphic and geographic range: Lower Ordovician—upper 90 to 100 feet of Tanyard formation in central Texas, upper Gasconade dolomite of Missouri, upper Chepultepec dolomite of the southern Appalachian region.

Discussion: The pygidium of *Paraplethopeltis* is very like that of *Plethopeltis* except that it is less convex and has less abrupt lateral slopes. However, there are a number of apparently consistent differences in proportion in the cranidial region of the two genera. The airline length of the preglabellar field of *Paraplethopeltis* averages about one-third that of the entire cephalon and one-half that of the glabella, in contrast to a proportion of one-fourth to one-fifth for the cephalon and one-third to one-fourth for the glabella in *Plethopeltis.* The posterolateral limbs of *Paraplethopeltis* are straplike or narrowly wedge-shaped, with the inner length about half the breadth, whereas those of *Plethopeltis* are broadly wedge-shaped with the inner length as great as or greater than the breadth. The occipital furrow and ring are less well defined in *Paraplethopeltis* than in *Plethopeltis*, and the median portion of the occipital ring is not so long in the former as in *Plethopeltis. Paraplethopeltis* is not known in any instance to develop even a blunt spine, as does *Plethopeltis saratogensis* (Walcott), the genotype of *Plethopeltis.* The palpebral lobe

of *Plethopeltis* lies anterior to the midlength of the cranidium, but in the genus here proposed it is situated posterior to the midlength. The glabella is less quadrate in outline in the two known species of *Paraplethopeltis* than in some species of *Plethopeltis* and tapers more. In no known instance is the glabella of *Paraplethopeltis* notched opposite the palpebral lobes.

Paraplethopeltis obesa Bridge and Cloud, n. sp.
(Pl. 2, Figs. 1-7, 12-14).

Description: Cranidium subrectangular in outline, exclusive of posterolateral limbs, with airline length exceeding width; strongly convex longitudinally and transversely. Glabella smooth and well defined, strongly convex, with marginal furrows converging anteriorly at an angle of 10 to 16 degrees (16 degrees in the holotype). Preglabellar field evenly and moderately convex, strongly deflected toward the anterior margin in the general curvature of the cephalon. Palpebral lobes small, slightly elevated, located slightly posterior to the midlength of the cephalon.

Pygidium about equal in breadth and convexity to cranidium but only about half as long. Characteristics as described for genus.

	Length of pre-glabellar field	Length of cranidium	Breadth of cephalon at palpebral lobes	Approximate height of cranidium	Length of glabella	Breadth of glabella at midlength	Approximate height of glabella	Glabellar angle
Holotype (TF-111)	mm.	mm.	mm.	mm.	mm.	mm.	mm.	
airline	5.6	14.4	12.3	7.5	10.8	7.3	5.0	..
along curvature	5.8	20.5	14.0	..	13.5	9.0	..	16°
Figd. paratype (TF-111)								
airline	5.2	15.6	13.0	7	11.6	7.3	4.5	
along curvature	5.3	19.3	15.5	..	14.0	9.1	..	
Figd. paratype B-66A)								
airline	4.6	12.4	11.2	5.5	9.4	6.0	3.7	
along curvature	4.9	16.9	13.5	..	12.0	7.0	..	
nmature unfigd. ıratype (TF-111)								
airline	2.7	7.4	6.3	4.0	5.5	3.6	2.5	

A pygidium from locality TF--286 measures 11.9 mm. wide and 8.3 mm. long.

Occurrence: Description based on holotype cranidium and two paratype cranidia from locality TF-111, three paratype cranidia from locality TF-149, a paratype pygidium and cranidium from B-66A, and a pygidium from TF-286. These specimens were selected as representative of the species from a larger number scattered through the collections of the U. S. Geological Survey and the Texas Bureau of Economic Geology, and were prepared for special study. Most are impressions of the under surface of the test, preserved in chert. A few, from locality TF-93 and 93a occur in limestone.

Paraplethopeltis depressa Bridge and Cloud, n. sp.
(Pl. 2, Figs. 8-11).

Description: Cranidium subquadrate in outline, exclusive of postero-lateral limbs, with airline length slightly exceeding width, moderately convex in both longitudinal and lateral profiles. Marginal furrows of smooth, well-defined glabella converging anteriorly at an angle of 20 to 25 degrees (23° in the holotype). Other features as in *P. obesa*, from which species *P. depressa* differs in the lesser convexity and greater relative breadth of its cephalon, and in its less convex and more tapering glabella.

	Length of pre-glabellar field	Length of cranidium	Breadth of cephalon at palpebral lobes	Approximate height of cranidium	Length of glabella	Breadth of glabella at midlength	Approximate height of glabella	Glabellar angle
Holotype (TF-37)	mm.	mm.	mm.	mm.	mm.	mm.	mm.	
airline	5.6	17.3	15.6	7.5	13.0	9.6	4.0	
along curvature	5.8	21.0	16.5	..	15.2	10.5	..	23°

Occurrence: Holotype cranidium and paratype pygidium from locality TF-37. Other specimens from TF-37 and other localities scattered through the collections of the U. S. Geological Survey and the Texas Bureau of Economic Geology. Most are impressions of under surface, preserved in chert.

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