

## NEW SPECIES OF PLIOCENE MOLLUSCA FROM EASTERN OREGON

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### ABSTRACT

A Pliocene fresh-water fauna is described from eastern Oregon. It is especially interesting in connection with Dall's "Balkan Fauna." One genus (*Platytafhius*), represented by two species, was heretofore known only from Lake Titicaca, in the Andes. In all, thirteen species are included, of which eight are new and are figured.

Most of the species described herein were obtained from a rather coarse, somewhat crumbly sandstone, several feet thick, consisting mostly of quartz grains with many small fragments of basalt, in the bottom of a ravine said to be known locally as Sand Hollow, about 16 miles southwest of Vale, Malheur County, Oregon, near Double Mountain. Pliocene beds containing fossil plant and animal remains occur in the region, and though the relation of the deposit in question to the surrounding formation has not been definitely ascertained, there seems very little doubt that they are of the same age. There is no reason apparent for supposing the deposit to be pre-Pliocene, and Pleistocene age is almost certainly precluded by the presence of one genus (*Payettia*) which has never been found living anywhere; another genus or subgenus (*Platytafhius*) which has been found only in Lake Titicaca, in the South American Andes, so far as we have ascertained; and the fact that nearly all of the

species are apparently extinct. This fauna is especially interesting in connection with Dall's "Balkan Fauna," described from the Snake River Valley, Idaho.<sup>1</sup>

The deposit is probably of fluvial origin. Early writers on western geology considered nearly all fresh-water deposits of the Rocky Mountain region lacustrine, but now it is known that most of them are fluvial. The presence of *Anodonta* is interesting. White, in 1883,<sup>2</sup> stated that lacustrine waters form a more congenial habitat for *Anodonta* than do fluvial waters, and that no *Anodonta* had been found in any of the

<sup>1</sup> Dall, W. H., Discovery of a Balkan fresh-water fauna in the Idaho formation of Snake River Valley, Idaho: *U. S. Geol. Survey, Prof. Paper* 132-G., pp. 109-115, 1924. Since this manuscript was sent to the printer, we received from Professor H. M. Tucker a small collection obtained at Oreana, Owyhee County, Idaho, including *Sphaerium malheurensis*, *Payettia malheurensis*, and *Platytafhius malheurensis* of this fauna, associated with *Goniobasis taylori*, *Lithoglyphus antiquus*, *Orygoceras tuba*, and *O. idahoense* of Dall's Balkan fauna.

<sup>2</sup> White, A review of the nonmarine fossil Mollusca of North America: *U. S. Geol. Survey, 3rd Ann. Rept.*, (for 1881-1882), p. 429.

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great fresh-water deposits of western North America which he then considered lacustrine. However, *Anodonta* is often found living in small, sluggish streams and in small ponds such as occur in the valleys of rivers. Since White's publication several species of the genus have been described from Tertiary deposits of the Pacific states, and I have found *A. californiensis* Lea in a Pleistocene deposit in Grand Coulee, Washington. The post-Cretaceous history of western nonmarine Mollusca has been recently discussed<sup>3</sup> and needs not be repeated here.

The genus *Goniobasis*, represented abundantly by living species in the eastern United States and by a number of living species in western Oregon, western Washington and California, and by Eocene species in the Rocky Mountain region, is not found living in Idaho and eastern Oregon. In the Balkan fauna Dall transferred *Melania taylori* Gabb to *Goniobasis* and described a variety *calkinsi*. Though probably they are not *Melania*, it is doubtful whether they are *Goniobasis*. Perhaps it would have been as well to leave them in *Pachychilus*, where Hannibal placed them.<sup>4</sup>

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DESCRIPTION OF SPECIES

MARGARITIFERA MARGARITIFERA (Linnaeus)

Two specimens of this circumpolar species were found in the Pliocene deposit 16 miles southwest of Vale, Oregon. Also we have this species, Pliocene or Pleistocene, obtained by Prof. Orma J. Smith, from 20 miles southwest of Caldwell, and east of Given's Hot Springs, Owyhee County, Idaho. Probably this material is all the living western color form, *M. m. falcata* (Gould), but as the interior cannot be seen and the color of the nacre would doubtless have faded, there is no way of ascertaining whether it was purple.

ANODONTA MALHEURENSIS  
Henderson and Rodeck, n. sp.

Plate 37, figures 1a, b

Shell of medium size, much compressed, flat-sided, suboblong, the diagonal posterior swing of the postero-dorsal and the antero-ventral margins giving it a strong tendency toward a rhombic outline; dorsal and ventral margins nearly,

but not quite, straight and parallel; beaks raised but little above the hinge-line; umbones not inflated, sculptured by numerous small, sharp, concentric riblets, which are rather straight below but turn upward somewhat abruptly before and behind; growth lines minute, paralleling a few low, rounded, irregular, concentric undulations; anterior end rather evenly and somewhat narrowly rounded to a little below the middle, thence rounding by a broader curve into the ventral margin; posterior end diagonally truncated nearly to the ventral margin, into which it swings by an abrupt, narrow curve. Unlike the living forms of the region, *A. californiensis* Lea, *A. nuttalliana* Lea, *A. wahlamettensis* Lea and *A. oregonensis* Lea, *A. malheurensis* exhibits no posterior angle or wing. The hinge has not been directly observed, but natural casts show no evidence of dentition.

Type, No. 18041a, in the Univ. of Colo. Museum, length 47 mm., height 29 mm., diameter 12 mm. Paratype, No.

<sup>3</sup> Henderson, Junius, Molluscan provinces in the western United States: *Univ. of Colorado Studies*, vol. 18, pp. 177-186, 1931.

<sup>4</sup> Hannibal, *Proc. Mal. Soc. London*, vol. 10, pp. 182, 201, 1912.

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18041b, length 51 mm., height 30 mm., diameter 12 mm. Largest specimen found, mostly exfoliated, length 71 mm., height 37 mm., diameter 15 mm.

Pliocene, 16 miles southwest of Vale, Malheur County, Oregon.

SPHAERIUM MALHEURENSE  
Henderson and Rodeck, n. sp.

Plate 37, figures 2a-c

Shell large, inflated, moderately thin in proportion to its size, almost equilateral, subrotund, nearly equally rounded at both ends, but posteriorly slightly narrower and more prolonged just below the middle; ventral margin broadly, evenly rounded; hinge line arcuate; umbones swollen and elevated far above the hinge line; beaks turned forward so as to meet the hinge line a little in advance of the middle; umbones sculptured by many sharp, regular, concentric ridges (remarkably prominent in some of the paratypes), which pass into a few low, rounded undulations between the umbones and the ventral margin, these not showing on the interior of the valves.

Type, a well-preserved right valve, No. 18042a, in Univ. of Colo. Museum, length 24 mm., height 20.5 mm., height from ventral margin to hinge 17 mm., convexity of valve 8 mm. (convexity of both valves in place would be 16 mm.). Paratypes, imperfect valves, No. 18042, in Univ. of Colo. Museum. Pliocene, 16 miles southwest of Vale, Oregon.

The large size suggests *Corbicula* or *Cyrena*, but the thin shell and hinge characters clearly place it in *Sphaerium*. The pallial line has not been detected.

Compared with *S. idahoense* Meek,<sup>5</sup> *S.*

<sup>5</sup> The original locality of *S. idahoense* and some associated fossils was given as Fossil Hill, Kaw-soh Mountains, Nevada, and in the "same formation at Castle Creek, Idaho," Meek, Rept. King's U. S. Geol. Explor. of 40th Parallel, vol. 4, pp. 183-184, pl. 16, fig. 1, 1877. Dall says that Meek's "locality was later included in the State of Idaho," and Castle Creek is the locality in which Dall's Balkan fauna was obtained (Dall, U. S. Geol. Survey, Prof. Paper 132-G, p. 110, 1924) which apparently came "from the same beds

*malheurense* is more nearly equilateral, less disposed toward a triangular outline, and has more inflated and elevated umbones. Some casts of *idahoense* "show a few distinct, broad, irregular, concentric undulations that were doubtless more strongly defined on the exterior of the valves," but the external undulations of *malheurense* do not show on the interior of the valves, hence would not show on casts.

The large Quaternary *Sphaerium pilsbryanum* Sterki (Nautilus, vol. 22, p. 141, 1909), from Bear Lake, Utah-Idaho, is quite distinct. It is considerably smaller, less inflated, more inclined toward a triangular outline, the posterior margin is obliquely truncated, the postero-ventral margin is subangulate, and the umbones are not elevated as far above the hinge.

PISIDIUM species undetermined

A number of detached valves of *Pisidium* occur in the deposit 16 miles southwest of Vale, Oregon, but probably no description of them would be recognizable if the same form should be found elsewhere in a different state of preservation, so it seems useless to designate them by a name.

FLUMINICOLA MALHEURENSIS  
Henderson and Rodeck, n. sp.

Plate 37, figures 8a, b

Shell of medium size for this genus, smooth, helicoid, imperforate, somewhat similar to *F. fusca* (Haldeman), but spire decidedly shorter; whorls four and one-half to five, rounded, closely coiled, the

that yielded the Pliocene or Pleistocene vertebrate fauna referred to by Merriam" [Merriam, Bull. Univ. Calif. Dept. Geol., vol. 10, p. 432, 1917]. Dr. John B. Reeside, of the U. S. Geol. Survey has recently called our attention to several statements in the early reports which, taken together, indicate that the locality is south of the Montezuma (called Trinity in many modern maps) Range, in Ts. 23, 24, Rs. 27, 28, southwest of Humboldt Lake and west of Carson Sink, Nevada, a long way from Idaho.

last not descending to the aperture and so the periphery; aperture suboval, ends joined by a narrow line, consists of fine concentric ridges. This species is readily distinguished from *Sphaerium* by its apparently near spherical form, shorter spire, and its genus, it varies in size. Type, No. 18042b, in Univ. of Colo. Museum, altitude 10,000 ft.

Pliocene, about 16 miles southwest of Vale, Malheur County, Oregon. Casts probably from the same locality, 20 miles south of Vale.

VORTICIFEX

Three small specimens, 16 miles southwest of Vale, Oregon, very doubtfully referable to *Vorticifex*, perhaps the variety that form short spires. The spire is depressed, of the body width.

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In the deposit 16 miles southwest of Vale, Oregon, fragments of a gastropod have not been detected. Above, they look like *Vorticifex stevensi*. The base of the spire may be referred to *Vorticifex* because of their irregular shape.

PAYETTIA

Henderson and Rodeck, n. sp.

Plate 37, figures 10a, b

Fifteen specimens, 16 miles southwest of Vale, Oregon, referred to this genus. In all specimens the lateral margin is produced, in *P. dalli*, for example, more nearly parallel to the lateral, produced

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last not descending much toward the aperture and sometimes flattened above the periphery; suture well impressed; aperture subovate; peristome simple, its ends joined by a heavy callus; sculpture consists of fine growth lines only. This species is readily distinguished from its apparently nearest relative by its much shorter spire, though, as is usual in the genus, it varies somewhat in this respect. Type, No. 18044a, in Univ. of Colo Museum, altitude 8.5 mm., diameter 7.5 mm.

Pliocene, about 16 miles southwest of Vale, Malheur County, Oregon. We have casts probably of the same species, from 20 miles southwest of Vale, Oregon.

VORTICIFEX TRYONI Meek?

Three small specimens from the deposit 16 miles southwest of Vale, Oregon, are very doubtfully referred to *V. tryoni*, perhaps the variety *concava* Meek (if that form should be recognized), as the spire is depressed slightly below the top of the body whorl.

VORTICIFEX? sp.

In the deposit 16 miles southwest of Vale, Oregon, imperfect, badly crushed fragments of a very thin-shelled species of gastropod are common, but have not been determined, even generically. Above, they look much like a flat *Carinifex*. The base is somewhat like that of *Vorticifex stearnsii* White. They cannot be referred plausibly to any genus because of their imperfection.

PAYETTIA (?) MALHEURENSIS

Henderson and Rodeck, n. sp.

Plate 37, figures 5a-d

Fifteen specimens from the deposit 16 miles southwest of Vale, Oregon, are referred to this genus with some uncertainty. In all but one specimen the left lateral margins are much straighter than in *P. dalli*, forming a narrower shell with more nearly parallel sides. The vertex is lateral, proceeding from the left posterior

portion of the shell, and shows a volution of about one turn toward the right posterior. The beak is not produced as in *dalli* but is closely appressed to the shell. There is no more than a trace of a posterior septum within, such as is found in *P. dalli*, and which is elaborated in *Lalia*. These not well preserved and perhaps juvenile fossils are all small, 7 mm. or less in length, as compared with the dimensions of 16 by 10 mm. as given by White for *P. dalli*. The exterior of the shells shows the concentric undulations very much less conspicuous than in *dalli*. Type, No. 18045a, Univ. of Colo. Museum, length 7.5 mm., width 4.5 mm., altitude 3.25 mm. Pliocene, 16 miles southwest of Vale, Oregon.

With the exception of the internal septum these specimens fit into the genus *Lalia*. *Amphigyra*, with a septum at all stages of growth, and *Gundlachia*, with a septum in the second stage, are close, but the present specimens seem to be excluded from them. It seems best to include the species tentatively in the genus *Payettia*, from the same region, although it may be found to represent a new genus.

Specimens of *P. dalli* in the University of Colorado Museum, obtained 2½ miles southeast of Hammett, Idaho, received from C. Francis Miller, measure 14 mm. in length. An internal view of one of them is presented (Pl. 37, fig. 7) to show the *Crepidula*-like deck posteriorly. These specimens were associated with *Gonobasis taylori* (Gabb), *Lithoglyphus antiquus* (C. Bl.), *L. campbelli* Dall, and *Sphaerium idahoense* Meek.

LYMNAEA species undetermined

Plate 37, figure 10

Two rather large specimens of *Lymnaea*, much too imperfect for satisfactory identification or description, were found at the locality 16 miles southwest of Vale. They resemble somewhat *L. meckii* Evans and Shumard, from the White River group, but probably belong to an undescribed species.

MENETUS PLANULATOIDES  
Henderson and Rodeck, n. sp.

Plate 37, figures 4a-c

Shell small, flat above, rounded below, somewhat similar to *M. planulatus* (Cooper),<sup>6</sup> a living species of Oregon and Washington, but the umbilicus is very small. Apex slightly sunken. The carina or angle at the edge of the upper flat surface is well marked, from which the shell rounds evenly to the base, then near the middle of the base rounds abruptly into the umbilicus. The widest part of the shell is at or near the angle. Growth lines scarcely visible. Shell shows some tendency toward developing one or more spiral ridges on the base, as in some specimens of *planulatus*. Width 3.25 mm., height 1.5 mm. Type, No. 18050a, Univ. of Colo. Museum.

Pliocene, 16 miles southwest of Vale, Oregon.

<sup>6</sup> For discussion of *M. planulatus* see Henderson, Junius, Nonmarine Mollusca of Oregon and Washington: *Univ. of Colo. Studies*, vol. 17, pp. 140-141, 1929.

PLATYTAPHIUS Pilsbry and Vanatta

This name was proposed (Pilsbry and Vanatta, *Proc. Acad. Nat. Sci. Phila.* vol. 76, p. 51, 1924) as a section of *Planorbis* to accommodate *Planorbis heteropleurus* Pilsbry and Vanatta (*Proc. Acad. Nat. Sci. Phila.*, for 1896, p. 562), a living species of Lake Titicaca, in South America. It is so distinct that it might be better to consider it a genus.

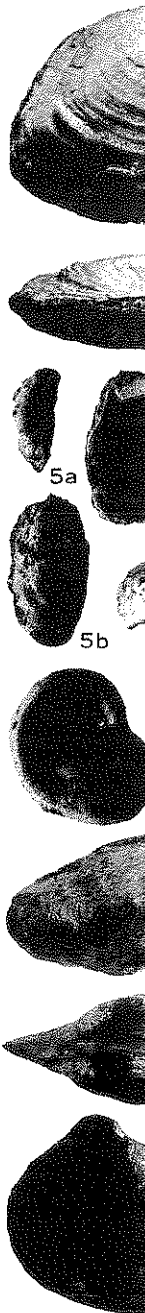
PLATYTAPHIUS MALHEURENSIS  
Henderson and Rodeck, n. sp.

Plate 37, figures 9a-c

Shell rather small, solid, depressed broadly convex above, apex slightly sunken, broadly concave below, the concavity passing into a small funnel-like umbilicus in the middle. Whorls three and one-half or four, the last proportionately very large, embracing nearly all of the earlier whorls, marked only by minute growth lines. The last whorl is narrowly rounded, not angled or carinated above as it is in *P. heteropleurus*, thence it rounds broadly to the periphery,

EXPLANATION OF PLATE 37

- FIGS. 1a, b—*Anodonta malheurensis* Henderson and Rodeck, n. sp., type, slightly enlarged.  
2a-c—*Sphaerium malheurense* Henderson and Rodeck, n. sp., type, slightly enlarged. (p. 265)  
3a-c—*Carinifex* (?) *malheurensis* Henderson and Rodeck, n. sp., 3a, type, slightly enlarged. (p. 266)  
4a-c—*Menetus planulatoides* Henderson and Rodeck, n. sp., 4b, type, about  $\times 3$ . (p. 268)  
5a-d—*Payettia* (?) *malheurensis* Henderson and Rodeck, n. sp., 5d, type, about  $\times 3$ . (p. 268)  
6a-c—*Platytafhius milleri* Henderson and Rodeck, n. sp., 6a, type, slightly less than  $\times 3$ . (p. 267)  
7—*Payettia dalli* (White), somewhat less than  $\times 3$ . (p. 268)  
8a, b—*Fluminicola malheurensis* Henderson and Rodeck, n. sp., 8a, type, about  $\times 3\frac{1}{2}$ . (p. 266)  
9a-c—*Platytafhius malheurensis* Henderson and Rodeck, n. sp., 9a, type, somewhat less than  $\times 3$ . (p. 268)  
10—*Lymnaea* sp. undet., slightly enlarged. (p. 267)  
11-13—*Exputens lajasensis* Clark, n. gen., n. sp., Holotype, Univ. Calif. No. 32391. (p. 270)  
14-18—*Exputens lajasensis* Clark, n. sp., 14, Paratype, Univ. Calif. No. 32393. 15, Paratype, Univ. Calif. No. 32392. 16, Paratype, Univ. Calif. No. 32389. 17, 18, Paratype, Univ. Calif. No. 32390. (p. 270)  
19-24—*Exputens alexi* Clark, n. sp. 19-21, Holotype, Univ. Calif. No. 32386. 22, Paratype, Univ. Calif. No. 32384. 23, Paratype, Univ. Calif. No. 32385. 24, Paratype, Univ. Calif. No. 32387. (p. 271)

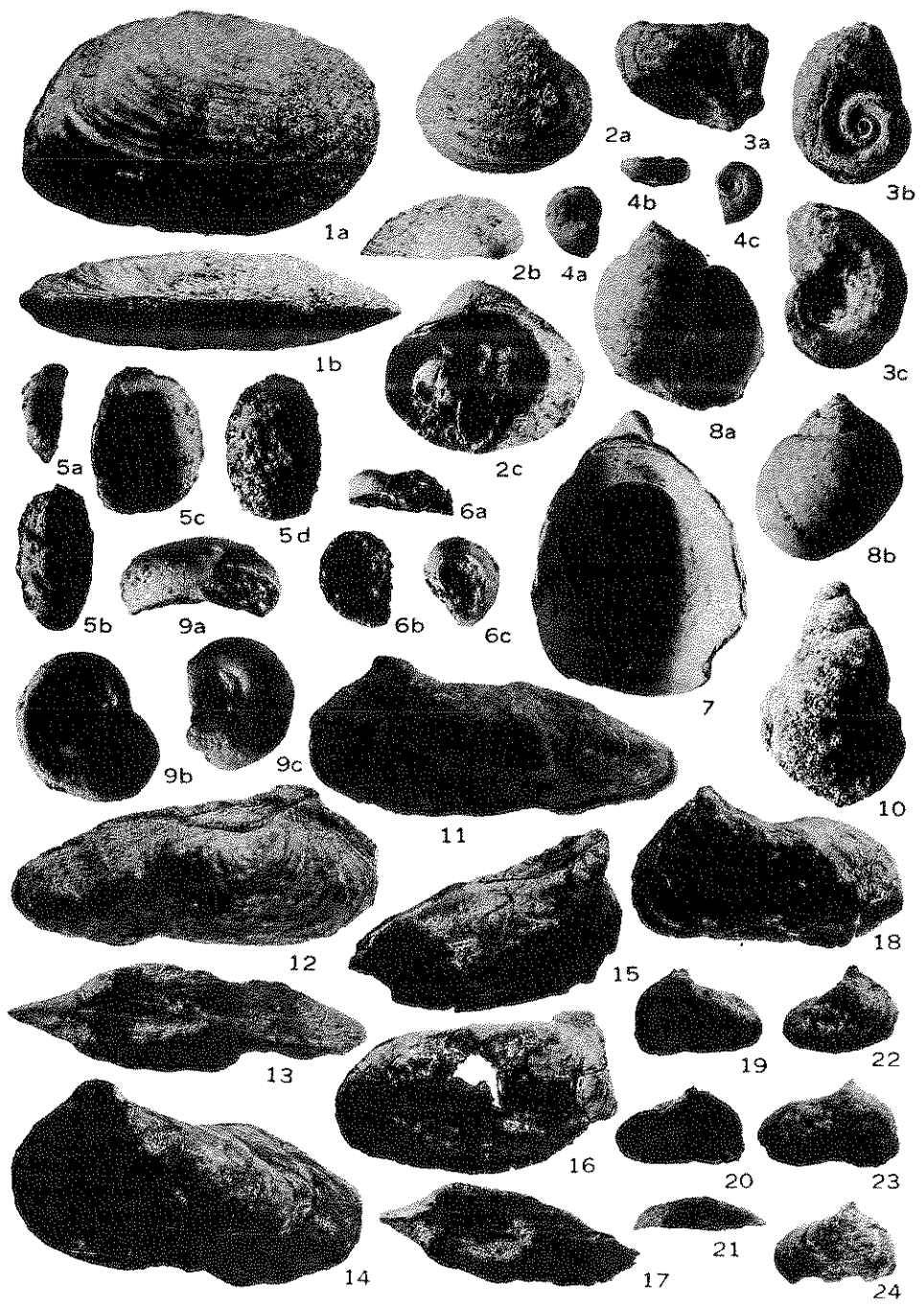




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Henderson and Rodeck, Pliocene Mollusca  
 Clark, Eocene Lamellibranchiata

which is narrowly rounded to the sharply carinated, latero-basal margin, so that the widest part of the shell is somewhat above the carina, with a rather marked depression just above the carina making it stand out as a minute but distinct ridge when examined with a lens. The whorls are flattened below, the carina forming a sharp edge, the flattened surface being so tilted as to produce the concave basal outline of the shell. Aperture very oblique, proportionately rather large. Greatest width 8.5 mm., greatest height 4.5 mm. Type, No. 18049a, paratypes No. 18049b, in Univ. of Colo. Museum.

Pliocene, 16 miles southwest of Vale, Oregon.

PLATYTAPHIUS MILLERI

Henderson and Rodeck, n. sp.

Plate 37, figures 6a-c

Shell smaller than *P. malheurenensis*, sharply carinate above as well as on the latero-basal margin, the upper carina sharper and more marginal than in *heteropleurus*, margining a rather flat or very broadly funnel-shaped depression. Base and umbilicus similar to *malheurenensis*. Type No. 18051a, Univ. of Colo. Museum. Width 5.25 mm., height 2.5 mm.

Pliocene, 16 miles southwest of Vale, Oregon.

The following, from a locality a few miles from that of the foregoing species, has been received from Mr. C. Francis Miller.

CARINIFEX (?) MALHEURENSIS

Henderson and Rodeck, n. sp.

Plate 37, figures 3a-c

Seven imperfect casts appear to be distinct from all described species. The spire is nearly flat, the shoulder rounded, the umbilical crater broad, defined by a high, sharp ridge, as is usual in this genus. It is more like *C. ponsonbyi* Smith than any other species, but is wider in proportion to its height and consequently the umbilical crater is wider. In *C. ponsonbyi* usually the spire is slightly elevated above the top of the last whorl, but this is not true of these casts. The absence of a shoulder carina should not prevent its assignment to this genus, as casts of some specimens of *C. ponsonbyi* and other species would exhibit but a very obtuse angulation there. The sharply-bounded, crater-like pit seems to be unmistakably that of *Carinifex*. Type, No. 18052a, in the Univ. of Colo. Museum, altitude 13.5 mm., width 19.15 mm., greatest width of umbilical pit 13.5 mm.

Pliocene, Cow Hollow, 6 miles north west of Double Mountain, 20 miles southwest of Vale, Malheur County, Oregon.