

SOME FOSSILS FROM THE LOWER AUBREY AND UPPER RED WALL
LIMESTONES IN THE VICINITY OF FORT APACHE, ARIZONA.

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The Fort Apache region, Arizona, is the home of the White Mountain Apache Indians. The region, as described in the November number of the *American Geologist* for 1903, is included between the parallels $33^{\circ} 15'$ and $34^{\circ} 15'$, and the meridians $109^{\circ} 30'$ and 111° . In this region, practically all the geological ages are represented from the Archæan to recent. The Carboniferous Age, to which the fossils belong, is represented by the Aubrey and Red Wall groups of rocks. Each of these groups is separated geologically and stratigraphically into two divisions; the Aubrey into the Upper and Lower Aubrey, and the Red Wall into the Upper and Lower Red Wall. The fossils were collected from the Upper Red Wall and Lower Aubrey divisions. Those from each division were collected separately, and their exact position will be given in the description.

FUSULINA FISCHER (1837).

FUSULINA SECALICA.

Plate, Figs. 1 a, b.

White's description (in part): Shell varying from terete to subglobose, assuming all intermediate fusiform shapes, generally somewhat obtusely pointed, usually having the appearance of being slightly twisted at the ends; septal furrows moderately distinct, extending in more or less direct lines longitudinally, but are a little deflected just at the ends; centrifugal apertures about twice as high as the thickness of the cell-wall covering them, more than twice as broad as high, and of nearly uniform size throughout the whole coil.

The locular or external aperture is seldom clearly shown upon the fossils. It was apparently linear the full length of the shell until closed by a new longitudinal septum at each side, leaving only a new centrifugal aperture at the middle, in line with the others. Volutions from five to eight; septa from twenty to thirty in outer volution; septa nearly straight at their outer or external edges, but laterally undulating at their inner edges, where they join the outer surface of the next volution within,

as may be seen in specimens that have had a part of their outer volution removed by weathering.

Dimensions very variable.

Position and Locality.—Strata of the Upper Red Wall, north bank of White River, twelve miles southwest of Fort Apache, Arizona. A few specimens of this species were also seen at several other places in the Fort Apache region as follows: At the crossing of the government trail on Carrixo Creek, on west bank of Cibucu Creek, one mile north of U. S. Indian farmer's residence, and on the east edge of the bluff one half mile northwest of agent's residence at White River, Arizona.

CAMPHOPHYLLUM.

[Milne-Edwards and Haime, Brit. Foss. Corals, Pl. LXVIII (1850).]

CAMPHOPHYLLUM TORQUUM.

Plate, Figs. 2 a, b, c.

Simple, usually large, conical to subcylindrical corallum, which in the case of specimens under three inches in length is usually bent or geniculated, but in larger specimens is nearly straight. Epitheca thin, with small encircling wrinkles and strong undulations of growth. Calice not seen. Septa very numerous, strictly radial in arrangement, extending about two-thirds the distance from the exterior toward the center, stout and usually straight within the outer vesicular zone, but becoming attenuated and somewhat curved or a little flexuous in crossing the vesicular area, where they alternate with an equal number of very short, thin ones. Visceral chamber filled with numerous imperfectly developed tabulæ, which pass nearly horizontally across the cavity with a more or less upward arching. Vesicular dissepiments highly developed in the periferal portion, forming numerous obliquely ascending small vesicles. Entire length unknown.

Range and Distribution.—Red Wall Group, Fort Apache, White River, Salt River, Carrixo Creek at the crossing of the government trail, and on Cibicu Creek, one mile north of the U. S. Indian farmer's residence, Arizona.

ACERVULARIA Schweigg.

ACERVULARIA DAVIDSONI Milne—Edwards and Haime.

[Pal. Fo: s. des Terr. Pal. P. 418, Pl. 9, Figs. 4-4 b (18—).]*

Coral composite, astræiform and massive, composed of unequally sized, usually five or six-sided corallites, having both an outer and an interior, slightly undulated or zigzag wall. The outer wall is thin; the inner wall is rarely well defined; the surface sinks, at first gradually and then abruptly, to form the cup, the diameter of which is about one-fifth of an inch. The bottom of the true calice is flat to slightly elevated. The septæ are radially arranged, and are stout and finely denticulate, there being about seven denticulations in the space of one line. They are usually about forty-two in number, and for the most part, extend into the true calice. The tabulæ are abundant in the central area; the dissepiments abundant in the periferal zone. The diameter of the larger corallites is about one-half inch.

This species is most nearly allied to *A. Profunda* Hall, from which it is distinguished by the larger size of the corallites, the greater constancy in the size of the calices, the less number and less conspicuous denticulation of the septa, and in the zigzag undulations of the outer walls.

Range and Distribution.—Devonion formation, on the government trail, four miles east of Canyon Creek, Arizona; on the John Dazen trail, three-fourths mile southeast of the cliff houses, near Oak Creek, and along the rim of the Tonto basin, Arizona; at the falls of the Ohio and at Sandusky, Ohio, etc.

CERIOCRINUS?

Plate, Fig. 3.

The specimens referred to this genus are a few detached plates and are insufficient to fully identify even the genus.

Position and Locality.—Upper Red Wall, north bank of White River Canyon, twelve miles southwest of Fort Apache, Gila County, Arizona.

ARCHLEOCIDARIS McCoy.

ARCHLEOCIDARIS.

Plate, Fig. 7.

The specimens here called *Archæocidaris* are some fragments. They are too imperfect for identification of the species; but, though much worn, are sufficient to identify the genus.

* For a figure of the fossil here described the reader is referred to plate XXX of the November number of the American Geologist for 1903.

Position and Locality.—Upper Red Wall, north side of White River Canyon, twelve miles southwest of Fort Apache, Arizona.

FENESTELLA?

Plate, Fig. 4.

Bryozoa; reverse side, branches ridged, long and generally straight; dissepiments from one-fourth to one-half the size of the branches; surface covered with a porous calcareous covering.

Position and Locality.—Upper Red Wall, near Fort Apache, Arizona.

PUGNAX HALL (1893).

PUGNAX UTA.

Plate, Figs. 8 a, b.

Meek's description: Shell small, more or less variable in form, often subtrigonal, generally wider than long, more or less gibbous; front truncated, or sometimes sinuous in outline; anterior lateral margins rounded in outline; posterior lateral margins convex or nearly straight and converging toward the beak at an angle of from 90° to 120°. Dorsal valve more convex than the other, greatest convexity near the middle or between it and the front, which has a broad, rather deep, marginal sinus for the reception of the corresponding projection of the front of the other valve; mesial fold somewhat flattened, but slightly prominent, and rarely traceable back of the middle of the valve; generally composed of three but sometimes four—rarely more—plications; side rounding down rapidly on each side of the mesial fold, and each occupied by about three or four plications; beak curving strongly beneath that of the other valve; interior with a faint linear mesial ridge, on each side of which is a raised curved line enclosing an ovate space, occupied by the abductor muscular impressions. Ventral valve distinctly less convex than the other, with a broad, shallow, short sinus, occupied by about two or three plications; anterior lateral margins on each side of sinus, with from two to four plications; beak moderately prominent, and more or less arched, rather pointed; foramen small."

Position and Locality.—Upper Red Wall, north bank of White River, twelve miles southwest of Fort Apache, Arizona.

AMBROCELIA Hall (1860).

AMBROCELIA PLANOCONVEXA Shumard.

Plate, Figs. 9 a, b, c.

White's description*: "Shell very small; breadth varying from a little more to a little less than the length; hinge-line of considerable length, but always shorter than the full width of the shell in front of it; lateral and front borders regularly and continuously rounded.

The dorsal valve would be almost circular but for its truncation by the hinge-line; nearly flat, but slightly convex at the umbo, and sometimes slightly concave at the front; beak minute, not prominent; area very narrow.

Ventral valve capacious, especially its posterior portion, which extends much behind the hinge-line, and ends in a prominent strongly incurving pointed beak; area very narrow, high, concave, mesial sinus absent, but in its place there is usually a slight flattening at the front and sometimes an indistinctly impressed line is to be seen extending from beak to front.

Surface apparently smooth, but under a lens it is seen to be finely granular, the apparent granules being the bases of minute striæ; a few concentric lines of growth are observable upon both valves."

Position and Locality.—Strata of the Upper Red Wall, north bank of White River Canyon, twelve miles southwest of Fort Apache, Arizona.

RETICULARIA McCoy (1844).

RETICULARIA PERPLEXA.

Plate, Figs. 10 a, b.

Shell ordinary size, nearly circular in outline; breadth a little more and convexity a little less than the length; hinge-line shorter than the full width of the shell in front of it; lateral and front borders regularly and continuously rounded; cardinal area distinct, arched, and moderately high.

Ventral valve convex, extending much behind the hinge-line in a prominent, strongly incurved beak; area small; mesial sinus absent, but in its place there is a slight flattening at the front and three indistinctly impressed lines are to be seen extending from front to beak. This flattening gives to the shell a slight sinuosity.

*White, U. S. Geog. Surv. W. of the 100th meridian, Vol. IV, P. 135, Pl. 3, Figs. 10 a, b, c

Dorsal valve circular in outline except where truncated by the hinge-line; regularly convex; beak less prominent than that of the other valve, extending beyond the hinge-line; area very narrow.

Surface marked by very numerous almost indistinct radiating costae and by somewhat strong concentric markings.

Position and Locality.—Upper Red Wall Group, north bank of White River Canyon, twelve miles southwest of Fort Apache, Arizona.

DIELUSMA King (1859).

DIELUSMA BOUVIDINES (Morton).

Plate, Fig. 11.

White's description (in part)*: Shell ovate or elongate-ovate in outline; sides behind the middle laterally compressed. Ventral valve strongly arcuate from front to beak, the curvature being greatest behind the middle, rather more capacious than the other valve; beak prominent, incurved; foramen moderately, not squarely, truncating the beak, but opening obliquely backward, mesial sinus broad, and more or less distinct at the anterior part of the valve, but becoming obsolete at or behind the middle. Dorsal valve generally almost straight along the median line from front margin to a little behind the middle, from which part it gently curves to the beak; gently and somewhat uniformly convex from side to side, without a mesial fold.

Surface nearly smooth; shell structure finely punctate.

Position and Locality.—Upper Red Wall Group, Fort Apache, Arizona.

SEMINULA McCoy (1844).

SEMINULA ARGENTIA Shepard.

Plate, Figs. 12 a, b, c, e.

Shell varying considerable in outline, generally subovate; seldom as wide as long, usually moderately gibbous, but sometimes old shells are much inflated. Ventral valve generally a little more capacious than the dorsal; beak rather prominent, incurved; mesial sinus usually not very deep, and becoming obsolete about the middle.

*U. S. Geog. Surv. W. of the 100th meridian, Vol. IV, P. 144, Pl. XI, Figs. 10 a, b, c.

Dorsal valve somewhat uniformly convex, but most prominently so near the umbo; beak small, slightly prominent, mesial fold entirely wanting as a rule. Surface marked by faint traces of radiating striae and by occasional imbricating lines of growth.

Range and Distribution.—Upper Red Wall group and Lower Aubrey; Carrizo Creek, at the confluence of White and Black rivers, and on either side of White River in Maricopa County, and at Fort Apache and at Jemez, New Mexico, White River, Arizona, etc. Common throughout the upper carboniferous of America and in England and India in the sub-carboniferous also. Its range also extends into the Permian.

MYALINA de Konnick, 1844.

MYALINA?

Plate, Fig. 13.

The specimen here figured in outline is too badly crushed to warrant a description, but is obviously a member of the genus Myalina.

Position and Locality.—Upper strata of the Upper Red Wall, south side of White River Canyon, one mile west of Fort Apache, Arizona.

EUOMPHALUS Sowbery (1815).

EUOMPHALUS PERNODOSUS Meek and Worthen.

Plate, Figs. 14 a, b, c, e

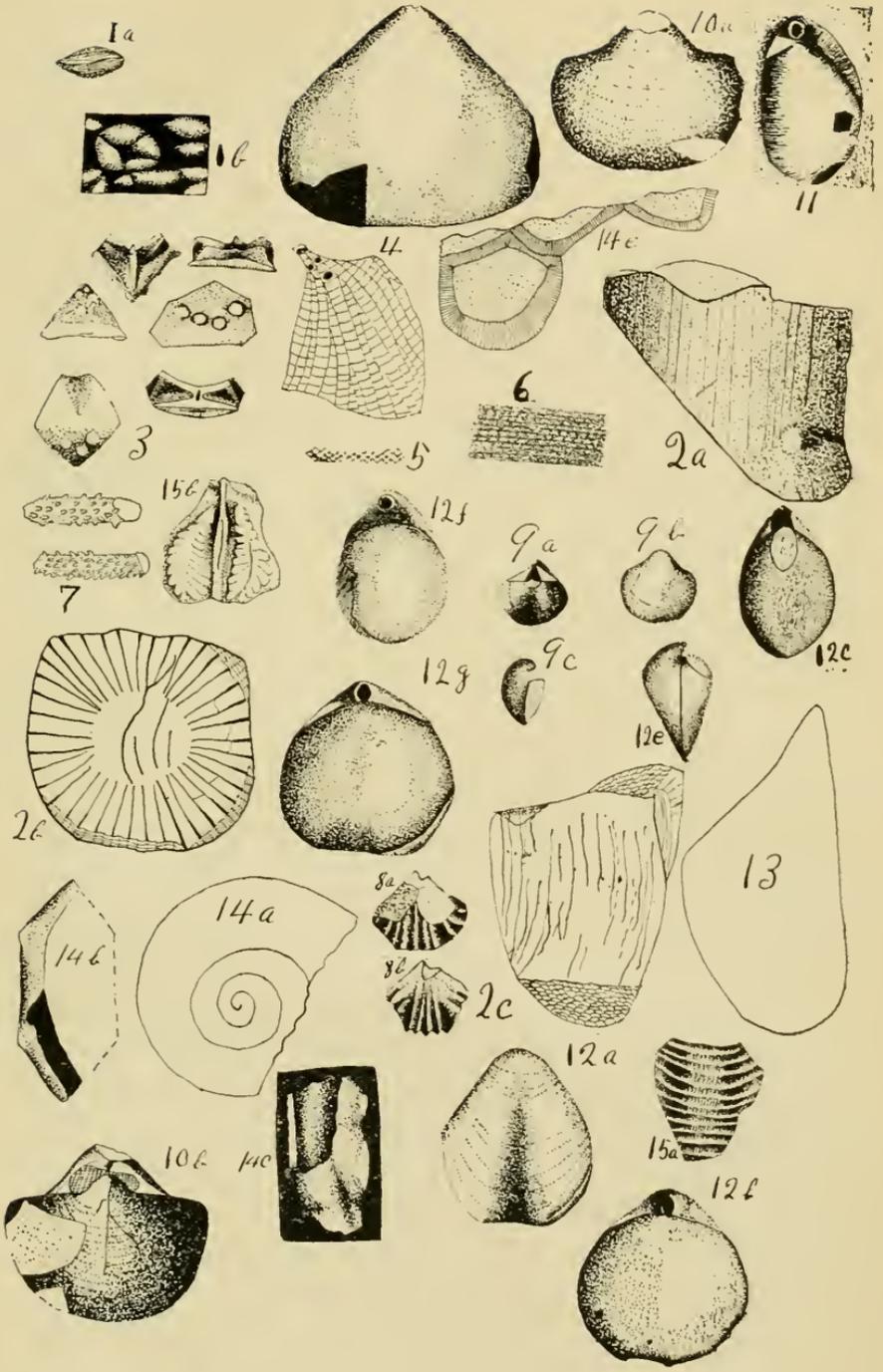
White's description* (in part): "Shell rather above medium size when full grown, nearly discoidal, the spire being only very slightly elevated, and the inner portion of it being quite flat, or evenly depressed. Test thick, volutions five or six, the upper side flattened and sloping gently inward to the distinct suture, outer side flattened, convex, under side rounding; the angles formed by the upper and outer sides constitute a distinct carina which is rugose or corrugated upon the outer volution; upon the under side of the volutions there is a row of moderately large, rounded nodes, separated by spaces of about their own width, those of the last half of the outer volution being obsolete;" umbilicus not seen.

*U. S. Geog. Surv. W. of the 100th meridian, Vol. IV, P. 158, Pl. 12, Figs. 2 a, b, c.

PLATE EXPLANATION.

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- Fig. 1. *Fusulina secalica*.....
 1 a. A specimen showing the septal furrows and the centrifugal aperture.
 1 b. Some weathered specimens.
- Fig. 2. *Camphophylum torquum*.....
 2 a. Longitudinal view of a portion of a coral.
 2 b. Cross section.
 2 c. A longitudinal section showing tabulæ.
- Fig. 3. Some crinoid plates.....
- Fig. 4. *Fenestella* ?
- Fig. 5. ? *Rhombopera* ?
- Fig. 6. *Hemetrypa* ?
- Fig. 7. *Archæocidaris* spines.....
- Fig. 8. *Pugnax uta*
- 8 a. Ventral valve.
 8 b. Dorsal valve.
- Fig. 9. *Ambocælia planoconvexa*
- 9 a. Dorsal view.
 9 b. Ventral view.
 9 c. Side view.
- Fig. 10. *Reticularia perplexa*
- 10 a. Ventral valve.
 10 b. Dorsal valve.
- Fig. 11. *Dielasma bovidines*, dorsal view.....
- Fig. 12. *Seminula argentia*
- 12 a. Ventral valve showing sinus.
 12 b, f and g. Dorsal views.
 12 c. Dorsal view of a young specimen.
 12 e. Side view.
 12 m. An old specimen.
- Fig. 13. *Myalina* ? Outline only.....
- Fig. 14 a, b, c, e. Fragments of an *Euomphalus pernodosus*.....
- Fig. 15. *Productus punctatus*
- 15 a. A portion of the dorsal valve.
 15 b. Inside of dorsal valve, showing muscular impressions.

12 m



Position and Locality.—In limestone strata at top of the lower Aubrey group, Aubrey Cliff, one mile northeast of White River, and at the crossing of the government trail on Carrizo Creek, Arizona.

CALAMARIE.

CALAMITES.

CALAMITES CANNÆFORMIS.

Long, slender, tapering reed-like stem, jointed and having a large pith. Its exterior surface is finely striated, but the striae are not continuous, but are interrupted at the joints by a "break." The striae on each side of said "joint break" correspond to each other. Each stria has a small pinhead-like projection on it near its upper extremity. The bark which was left in the cast is about 1-132 of an inch in thickness. It seemed to be fibrous. The striae impressions and the grooves between the striae which were filled with the bark tissue show very distinctly, the latter being ridges on the inside of the bark, the former depressions. The leaves were strap-like (?) the stem is flattened and in its longer diameter, three feet above the ground it exceeded five inches. At its lower end the joints grow rapidly smaller and shorter, so that this end is conical, but so curved as to represent a dog's tearing tooth. From these lower tapering joints came out the small roots which nourished this peculiar tree and which were still found imbedded in the clayey stratum by the writer. The top of the stem was not found but it most likely was cone-like.

Habitat.—West of Cibicu Creek and one mile north of the Phoenix-Fort Apache trail, Arizona. The specimen above described was found imbedded in a shaley white sandstone, underlaid with a thin stratum of clay, into which the lower part of the above-mentioned tree extended. The location is on the east side of the mesa to the west of the aforementioned Cibicu Creek, and about 42 feet below its summit.*

*The specimen here described was sent to the university at Albuquerque, N. M., and is now in the collection there.