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A LIST OF SHELLS COLLECTED IN ARIZONA, NEW
MEXICO, TEXAS AND OKLAHOMA
BY DR. E. C. CASE.

BY BRYANT WALKER

During several of his recent palæontological explorations in the western states, Dr. E. C. Case of the Department of Geology, University of Michigan, very kindly took the trouble to collect samples of drift from many of the localities visited by him. The net result is a valuable and interesting contribution to our knowledge of the distribution of the species belonging to the arid lands of the west, and especially so because very many of the localities have never been visited by conchologists and are not likely to be on account of the local conditions.

The writer is indebted to Dr. V. Sterki and Dr. George H. Clapp for the identification of all of the land species, except

the Succineas, and to Dr. Sterki for the determination of the Sphæriidæ. The fresh-water species, with the exception of the Sphæriidæ, and the Succineas were identified by the writer.

1. Fort Defiance, Arizona. "Post-pleistocene," Case.

Zonitoides arborea (Say).

Zonitoides singleyana Pils.

Succinea avara Say.

Lymnæa proxima Lea.

Lymnæa humilis rustica Lea? Two specimens in very poor condition seem to be this.

Planorbis Deflectus Say.

Planorbis parvus Say.

2. Fort Defiance, Arizona. "Drift," Case.

Identified by Clapp.

Zonitoides minuscula (Binn.).

Zonitoides singleyana Pils.

Vallonia cyclophorella Ancey.

Pupoides marginata (Say).

Pupoides hordacea (Gabb).

Bifidaria hordeacella Pils.

Bifidaria procera (Gld.).

2. Canones Creek, east of Mt. Pedernal, Rio Arribo Co., N. M.

Identified by Sterki.

Pupoides hordacea (Gabb).

Pupilla blandi (Mse.).

Bifidaria pilsbryana St.

Vallonia gracilicosta Reinh.

Vallonia cyclophorella Ancey.

Vallonia perspectiva St.

Helicodiscus parallelus (Say).

Zonitoides singlyana Pils. *Z. læviuscula* St. teste Sterki.
Euconulus fulvus (Dr.).

4. Coyote Creek, near Rio Puerco, Rio Arribo Co., N. M.
Identified by Sterki.

Pupoides hordacea (Gabb).
Pupilla blandi (Mse.).
Bifidaria pilsbryana St.
Bifidaria hordeacella Pils.
Vallonia graciliocosta Reinh.
Vallonia cyclophorella Ancey.
Punctum pygmaeum (Dr.).
Helicodiscus parallelus (Say).
Zonitoides arborea (Say).
Zonitoides minuscula (Binn.)
Cochlicopa lubrica (Müll.).

5. Arroya Augua and Rio Puerco, (near together), Rio Arribo Co., N. M.

Identified by Sterki.

Pupoides hordacea (Gabb).
Bifidaria pilsbryana St.
Bifidaria hordeacella Pils.
Pupilla blandi (Mse.).
Vallonia cyclophorella Ancey.
Zonitoides singlyana Pils. *Z. læviuscula* St. teste Sterki.

6. Outlet of El Cobra Canyon, five miles north of Albuquerque, N. M.

Identified, except the *Succinea*, by Sterki.

Pupoides hordacea (Gabb).
Pupilla blandi (Mse.).
Bifidaria hordeacella Pils.
Vallonia cyclophorella Ancey.
Succinea avara Say.

7. Cuervo River, San Miguel Co., N. M.

Land species identified by Clapp.

Zonitoides minuscula (Binn.).

Zonitoides singleyana Pils.

Helicodiscus parallelus (Say).

Vallonia costata (Müll.).

Pupoides marginata (Say).

Pupilla sonorana (St.).

Bifidaria hordeacella Pils.

Bifidaria cristata P. & V.

Bifidaria procera (Gld.).

Bifidaria holzingeri St.

Planorbis lentus Say var.?

Segmentina obstructa (Mor.)? A few very young examples are probably this species.

Planorbis parvus, Say.

Physa sp.? A single, immature example, too young to be sure about, but different from young *forsheyi* of the same size.

8. Fourteen miles northeast of Tucumcari, N. M.

Identified, except the *Succinea*, by Clapp.

Zonitoides minuscula (Binn.).

Zonitoides singleyana Pils.

Helicodiscus parallelus (Say).

Vallonia costata (Müll.).

Pupoides marginata (Say).

Pupoides hordacea (Gabb).

Pupilla sonorana (St.).

Bifidaria hordeacella Pils.

Bifidaria procera (Gld.).

Bifidaria cristata P. & V.

Succinea grosvenori Lea? Very young.

9. Red or Canadian Canyon, east of Wagon Mound, Mora Co., N. M.

Identified by Clapp.

Zonitoides minuscula (Binn.).

Zonitoides singleyana Pils.

Vitrea indentata (Say).

Vallonia costata (Müll.).

Vallonia sp.?

Helicodiscus parallelus (Say).

Pupilla sonorana (St.).

Bifidaria armifera (Say).

Bifidaria cristata P. & V.

Bifidaria procera (Gld.).

Bifidaria hordeacella Pils.

Bifidaria holzingeri St.

10. Turkey Creek, near Wagon Mound, Mora Co., N. M.

Identified by Clapp.

Zonitoides minuscula (Binn.).

Helicodiscus parallelus (Say).

Vallonia gracilicosta Reinh.

Pupilla sonorana (St.).

Bifidaria procera (Gld.).

Vertigo ovata Say.

Lymnaea humilis rustica Lea.

Physa forsheyi Lea.

Planorbis lentus Say var.?

Planorbis parvus Say.

Pisidium sp.? "One, (fresh), somewhat like *P. ashmuni* St., but larger and probably immature at that."

Pisidium sp.? "Two valves and two juveniles, near *compressum*, but more rounded, less oblique; more like *fallax*, but probably distinct" (Sterki).

11. Staked Plain, Crosbyton, Texas.

Planorbis lentus Say var.?

12. Double Mountain, Aspermount, Texas.

Identified by Clapp.

Bulinulus alternatus (Say) var.

13. Double Mountain Fork of the Brazos, eight miles southeast of Aspermount, Texas.

Land species identified by Clapp.

Polygyra texasiana (Mor.).

Zonitoides minuscula (Binn.).

Zonitoides singleyana Pils.

Zonitoides nummus Van.

Helicodiscus parallelus (Say).

Vallonia costata (Müll.).

Pupoides marginata (Say).

Bifidaria cristata P. & V.

Bifidaria hordeacella Pils.

Bifidaria procera (Gld.).

Physa forsheyi Lea.

Planorbis parvus Say.

Segmentina obstructa (Mor.)? Very young.

14. Red River, Burkeburnett, Texas.

Identified by Clapp.

Zonitoides minuscula (Binn.).

Zonitoides singleyana Pils.

Zonitoides nummus Van.

Vitrea indentata (Say).

Pupoides marginata (Say).

Strobilops labyrinthica texasiana P. & F.

Bifidaria contracta (Say).

Bifidaria cristata P. & V.

Bifidaria hordeacella Pils.

15. North Fork of the Little Wichita River, south of Dundee,
Texas.

Land species, except *Succinea*, identified by Clapp.

Polygyra texasiana (Moric.).

Zonitoides minuscula (Binn.).

Zonitoides singleyana Pils.

Zonitoides nummus Van.

Punctum pygmæum (Dr.).

Vallonia costata (Müll.).

Pupoides marginata (Say).

Bifidaria procera (Gld.).

Bifidaria tappaniana (C. B. Ads.).

Bifidaria cristata P. & V.

Bifidaria hordeacella Pils.

Succinea grosvernori Lea.

Lymnæa bulimoides techella Hald.

Physa forsheyi Lea.

Planorbis lentus Say var.?

Segmentina obstructa (Mor).

16. Red River or Prairie Dog Fork, Silvertown-Clarendon
Road, Texas.

Identified by Clapp.

Zonitoides minuscula (Binn.).

Zonitoides singleyana Pils.

Pupoides marginata (Say).

Bifidaria cristata P. & V.

Bifidaria hordeacella Pils.

17. Piedroso Creek, north of Amarillo, Texas. "Loess"?
Case.

Succinea grosvernori Lea.

Lymnæa caperata Say? A single, badly broken specimen may be this species.

Physa gyrina Say.

Physa forshleyi Lea? A single, decollate, very much distorted specimen may be this species.

Planorbis lentus Say var.?

Sphærium aureum Pme.

Sphærium sp.? "One valve, more like *striatinum*, but?"

Sphærium sp.? "One valve distinct."

Sphærium sp.? "This deposit must have other good things, but it does not appear to be "æolian loess." (Sterki).

18. Orland, Oklahoma,

Identified by Clapp.

Bifidaria cristata P. & V.

Bifidaria procera (Gld.).

19. Beaver Creek, Riverside, Beaver Co., Oklahoma.

Identified by Clapp.

Zonitoides nummus Van.

Pupoides marginata (Say).

Bifidaria cristata P. & V.

Bifidaria procera (Gld.).

20. Cimmaron River, Ripley, Oklahoma.

Identified by Clapp.

Polygyra texasiana (Moric.).

Polygyra monodon alicia Pils.

Zonitoides minuscula (Binn.).

Zonitoides singlyana Pils.

Vitrea indentata (Say).

Euconulus sp.?
Helicodiscus parallelus (Say).
Punctum pygmaeum (Dr.).
Strobilops sp.?
Pupoides marginata (Say).
Bifidaria armifera (Say).
Bifidaria contracta (Say).
Bifidaria cristata P. & V.
Bifidaria hordeacella Pil.
Bifidaria pentodon (Say).
Bifidaria procera (Gld.).

21. Red Rock Creek, near Billings, Noble Co., Oklahoma.

Land species identified by Clapp; *Musculium* by Sterki.

Zonitoides minuscula (Binn.).
Zonitoidesingleyana Pils.
Zonitoides nummus Van.
Euconulus sp.?
Vallonia costata (Müll.).
Helicodiscus parallelus (Say).
Pupoides marginata (Say).
Bifidaria armifera (Say).
Bifidaria contracta (Say).
Bifidaria holzingeri St.
Bifidaria pentodon (Say).
Bifidaria procera (Gld.)
Bifidaria tappaniana (C. B. Ads.).
Planorbis lentus Say var.?
Musculium sp.? "Two, nepionic and very young at
that, probably *transversum*." (Sterki).

22. Creek, fifteen miles east of Chicasha, Oklahoma.

Land species identified by Clapp.

Zonitoides arborea (Say)?

Zonitoides minuscula (Binn.).
Zonitoides nummus Van.
Vitrea indentata (Say).
Helicodiscus parallelus (Say).
Pupoides marginata (Say).
Bifidaria armifera (Say).
Bifidaria contracta (Say).
Bifidaria cristata P. & V.
Bifidaria pentodon (Say).
Bifidaria procera (Gld.).
Bifidaria tappaniana (C. B. Ads.).
Physa forsheyi Lea.

23. Blue Creek Canyon, Wichita Mountains, Oklahoma.

Land species identified by Clapp; *Pisidium* by Sterki.

Polygyra texasiana (Moric.).
Zonitoides minuscula (Binn.).
Zonitoides singleyana Pils.
Zonitoides nummus Van.
Eucomulus trochulus Reinh.?
Helicodiscus parallelus (Say).
Pupoides marginata (Say).
Bifidaria contracta (Say).
Bifidaria hordeacella Pils.
Bifidaria procera (Gld.).
Bifidaria tappaniana (C. B. Ads.).
Physa forsheyi Lea
Pisidium sp.? "One example, probably not full grown,
 appears to be *friersoni* St." (Sterki).

24. Santa Fe Lake, one and one-half miles south of Tecumseh, Oklahoma.

Land species identified by Clapp.

Zonitoides minuscula (Binn.).

Zonitoides nummus Van.

Vitrea indentata (Say).

Strobilops labyrinthica texasiana Pils.

Bifidaria contracta (Say).

Bifidaria cristata P. & V.

Bifidaria hordeacella Pils.

Bifidaria pentodon (Say).

Bifidaria tappaniana (C. B. Ads.).

Vertigo decora (Gld.).

Physa forsheyi Lea.

Planorbis lentus Say var.? Nearly all of the larger *Planorbis* collected by Dr. Case have the strongly sculptured inner whorls with raised revolving lines, giving a tresselated effect, which appears to be characteristic of the southern form that has been received both as *lentus* and *tumidus*. This sculpture is usually very strongly developed for about the first three or four whorls, after which the spiral lines become obsolete. The longitudinal sculpture is more persistent, but varies greatly at maturity. There is also great variation in shape accordingly as the shell is compactly or loosely coiled. This form, which is widely distributed through the western states from South Dakota to Texas, is quite different from typical *tumidus*. It seldom attains the size of what Crosse and Fischer regard as typical *lentus* from New Orleans, but, as stated, agrees better with that in its sculpture than with the typical northern *trivolvus*, to which it is often referred.

25. Sand flats on the east bank of the Cimmaron River, west in a straight line from Alva, Oklahoma.

Succinea groszvernori Lea.

