

that are not in the main river. In that fork of the Obey River containing mollusca are still three of the riverine species, one of which retains the original characteristics save in the matter of size. Three species are present that were absent in lower waters. The pleurocerid fauna of the small tributaries is reduced to relatively small species of two genera. The relationship of all the species, one with another, is probably closer than may be presumed from the exo-skeletons alone. In any case, we have here a compact series of intimate adaptations to differing environments.

MOLLUSKS OF A KANSAS PLEISTOCENE DEPOSIT

BY CALVIN GOODRICH

In the summer of 1939, Mr. Claude M. Hibbard of the Museum of Paleontology, University of Kansas, carried on excavations in a deposit of Pleistocene times of Meade County, Kansas. The county is in the southwestern part of the state and borders on Oklahoma. It is about eighty miles east of the Colorado line. The drainage is through the Cimarron and Arkansas rivers to the Mississippi. The molluscan material, which I have examined, is in two zones, one of them fifteen feet below the top of the exposure, the other fifty feet below. Upon a chart with which Mr. Hibbard has kindly provided me the upper bed is described as "stream deposited sand with invertebrate and vert. fossils; fine sandy laminated clay, gray to bluish." The lower one is marked "Soil zone? Dark gray to dark slate color, sandy with few gastropods."

The shells of the upper zone are:

Gastrocopta armifera abbreviata (Sterki)

procera (Gould)

Hawaiiia minuscula (Binney)

Pupoides inornatus Vanatta

marginatus (Say)

Pupilla muscorum (Linnaeus)

Vertigo modesta (Say)

ovata (Say)

Vallonia costata (Müller)

Succinea grosvernori Lea

Gyraulus parvus (Say)
Helisoma lentum (Say)
Lymnaea bulimoides cockerelli Pilsbry and Ferriss
 caperata Say
 palustris (Müller)
 stagnalis subsp.?
Musculium partumeium (Say)
Pisidium abditum Haldeman
 noveboracense Prime
Valvata tricarinata (Say)

H. lentum has been put down as that species on the basis of identity with specimens at hand that have been so named. The shells would probably be called *H. trivolvis* if they occurred east of the Mississippi. All that remains of *L. stagnalis* are three or four whorls of as many spires. Whatever the fragments are, they belong to the *stagnalis* complex. Junius Henderson has reported subspecies *appressa* as occurring at Gunnison, Colorado, and that is the locality for known living colonies which is nearest to the Meade County site. The occurrence here might seem to argue colder all-round-the-year waters in Pleistocene southwestern Kansas than in these days. *V. tricarinata* is still farther away from the present frontier of its range. The western edge of distribution is given by Mr. Frank C. Baker now as Iowa. The shells, fairly plentiful in the Hibbard collection, would, I think, be pronounced typical although the carinae are noticeably more developed than in shells from Delaware River, the type stream, with which they have been compared. The rest of the findings corresponds with the fauna of today so far as it is known.

In the bottom exposure were taken:

Gastrocopta armifera abbreviata (Sterki)
 procera (Gould)
Hawaiiia minuscula (Binney)
Pupoides marginatus (Say)
Succinea grosvernori Lea
Gyraulus parvus (Say)
Lymnaea palustris (Müller)
Pisidium noveboracense Prime

These eight species, it will be observed, occur also in the zone thirty-five feet above. Unless the two beds were laid down with

something of the rapidity marking the formation of aeolian deposits in the "Dust Bowl" in recent years—which is highly improbable—we have another illustration of the fact that in a given area, under the conditions we call natural, the molluscan fauna is persistent, tenacious, changing little.

In Meade County material sent to him by Mr. Hibbard, Mr. F. C. Baker recovered new species of *Vertigo*, *Strobilops*, *Carychium* and *Menetus*, of which only one genus is represented in the 1939 collecting. That deposit is recognized as Pliocene. (See Nautilus, 51, 1938, pp. 126–31.) Mr. Baker reported at the same time on Pleistocene mollusca of Brown County, Nebraska. Shells of these beds more nearly resemble the Meade County specimens I have dealt with above than the latter do those of the Meade County Pliocene.

Associated with the mollusks, Mr. Hibbard found bones of salamanders, frogs, toads, small fish, birds, shrews and squirrels.

I am indebted to Dr. Phil Marsh for the identification of the land shells.

A NEW TELLIN OF THE SUBGENUS ANGULUS, A NEW LAMELLARIA AND A NEW SUBSPECIES OF CRASSISPIRA, FROM SOUTHWEST FLORIDA

BY LOUISE M. PERRY

TELLINA RUBRICATA, new species.¹

Length 8; width 4.1 mm. Its color is pale pink with rays and extremely minute pencillings of deeper pink, the tint becoming paler toward the margin with the widest and most deeply colored ray over the posterior rostration. The valves are sculptured with fine, closely placed, equidistant, concentric threads, continuous over rostrum to the posterior border, with some intercalation of threads at the umbonal ridge; the interspaces are a little wider and somewhat irregular and the growth lines more evident near the margin. Immediately posterior to the umbos the border is slightly concave, the posterior extremity is narrow and bluntly rounded; the ventral margin curves gently to the rounded anterior extremity and the anterior border rises in a straight line

¹ Lat., *rubricatus*, marked with red.



Goodrich, Calvin. 1940. "Mollusks of a Kansas Pleistocene deposit." *The Nautilus* 53, 77–79.

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