FOSSIL HACKBERRY SEEDS FROM THE LOESS AT NATCHEZ, MISSISSIPPI

WILLIAM MILLER, III
and
LAURA ST. C. LEITCH
TULANE UNIVERSITY

The loess deposits in the vicinity of Natchez, Mississippi, have received much attention from geologists over the years, and are well known to paleontologists as the source of an abundant and varied terrestrial snail fauna (Shimek, 1902; Vestal, 1942; Russell, 1955; Snowden and Priddy, 1968; Kolb, 1976). With the exception of the casts and molds of roots, well-preserved plant remains from the southern loess are essentially unknown. The purpose of our note is to describe a rare occurrence of fossil seeds from loess deposits near Natchez, and to comment on the mode of preservation of the seeds.

During the summer of 1982, the best collecting locality for fossil land snails in the Natchez area was at the western edge of property on which the Natchez Ramada Inn motel is presently located, on the southern periphery of town. The site is 0.4 km south of the southeast footing of the Natchez-Vidalia Bridge, and 50 m west of the motel building (see Natchez, Mississippi-Louisiana 7.5′ quadrangle map, 1963). The locality consists of spoil derived locally from the loess and used to control the headward erosion of a large gully that cuts into the river bluff just west of the motel. We are sure that the fill used here is loess owing to its silty texture, buff coloration, and the presence of many pulmonate gastropod shells; we are not sure, however, of the exact stratigraphic position within the loess from which the fill was derived. In addition to fossil snail shells, this locality yielded a single calcareous siltstone nodule containing around 200 small, chalky seeds (Pl. 1, figs. 1,2).

The seeds are approximately 6 mm in diameter and divided into two equal hemispherical shells. The commissural margins of each shell are delimited to straight, continuous, raised ridges that girdle the shells and form a double equatorial band around the seeds. Shell surfaces feature an intricate pattern of reticulated ridges, with the ridges having three relatively stronger grades of relief (Pl. 1, fig. 3). The strongest grade of relief is about equal to that of the commissural ridges. Each hemispherical shell consists of a white outer wall, 0.5 mm thick, which surrounds a light-gray inner lamina about 0.05 mm thick (Pl. 1, fig. 4). Both layers have been replaced with subhedral calcite crystals that are best exposed along the freshly broken edges of shells (Pl. 1, fig. 5). Some of the fossil seeds contain microscopic, light-brown, acicular to irregularly shaped bodies of calcite attached to the inner laminae. Based upon size, shape, and surface sculpture, the seeds closely resemble hackberry (*Celtis* sp.) seeds (see Martin and Barkley, 1961, p. 145 and Plates 699, 700).

The seeds are embedded in a pale yellowish-brown (10 YR 6/2), clayey siltstone nodule that has been cemented with calcite and contains numerous, small rootlet channelways (Pl. 1, fig. 2). Fresh loess exposures in the Natchez and Vicksburg areas that were studied by Snowden and Priddy (1968), and later by Kolb (1976), contained similar calcareous nodules associated with paleosols. These ancient soil horizons are located both between major loess sheets and within these units. It appears that during both short and protracted pauses in the deposition of the wind-blown silt deposits of the lower Mississippi Valley, soils mantled the newly deposited loess blankets. Trees, bushes, and grasses colonizing loess-covered uplands adjacent to the river valley contributed organic material to these thin soil covers, and were buried along with the soils by each of the subsequent pulses of eolian deposition. These paleosols probably represent poorly developed, slightly alkaline soil horizons (see Daniels *et al.*, 1960; Snowden and Priddy, 1968, p. 109-117), in which plant material occasionally could be replaced with calcite. The calcite was ultimately derived from windblown calcareous rock flour (which originally made up a small percentage of the silt deflated from the adjacent Mississippi Valley floor) and from pedochemical recycling of $CaCO_3$ from snail shells within the loessial blankets. These nodules and paleosols may therefore prove to be productive targets for collecting additional examples of plant fossil remains in the southern loess.

We would like to thank Ms. Deborah Sellers for presenting the nodule containing the fossil seeds. Ms. Lisa Metelman skillfully prepared the micrographs using the Department of Geology scanning electron microscope at Tulane University.

LITERATURE CITED

DANIELS, R. B., R. L. HAMDY, and G. H. SIMONSON, 1960, Dark-colored bands in the thick loess of western Iowa: Jour. Geology, v. 68, p. 450-458.

KOLB, C. R., 1976, Physical properties and engineering characteristics of Mississippi loess, *in* C. R. KOLB *et al.*, Classic Tertiary and Quaternary Localities and Historic Highlights of the Jackson-Vicksburg-Natchez Area, Guidebook, New Orleans Geol. Soc., p. B1-B23.

MARTIN, A. C., and W. D. BARKLEY, 1961, Seed Identification Manual: Univ. California Press, Berkeley, 221 p.

RUSSELL, R. J., 1955, Notes on loess in Mississippi and along U.S. 61 below Vicksburg, *in* R. J. RUSSELL (ed.), Guides to Southeastern Geology, Guidebook, Geol. Soc. Amer., p. 301-307.

SHIMEK, B., 1902, The loess of Natchez, Miss.: Amer. Geologist, v. 30, p. 279-299.

SNOWDEN, J. O., and R. R. PRIDDY, 1968, Loess investigations in Mississippi: Mississippi Geol. Econ. Topogr. Survey, Bull. 111, 267 p.

VESTAL, F. E., 1942, Adams County mineral resources: Mississippi Geol. Survey, Bull. 47, 200 p.

October 31, 1984

PLATE 1

Figures

1. Calcareous siltstone nodule containing fossil hackberry (*Celtis* sp.) seeds. (Bar scale represents 5 cm)
2. Freshly broken edge of siltstone nodule showing fossil seeds concentrated in thin layer. Noterootlet channelways (small dark holes). (Same scale as in fig. 1)
3. External view of individual seed. (Bar scale represents 1mm)
4. Internal view of seed shell showing the continuous outer wall (indicated by black arrows) and the discontinuous inner lamina (white arrows). (Bar scale represents 1 mm)
5. Close-up view of broken surface of shell wall showing subhedral calcite crystals. (Bar scale represents 10 microns)

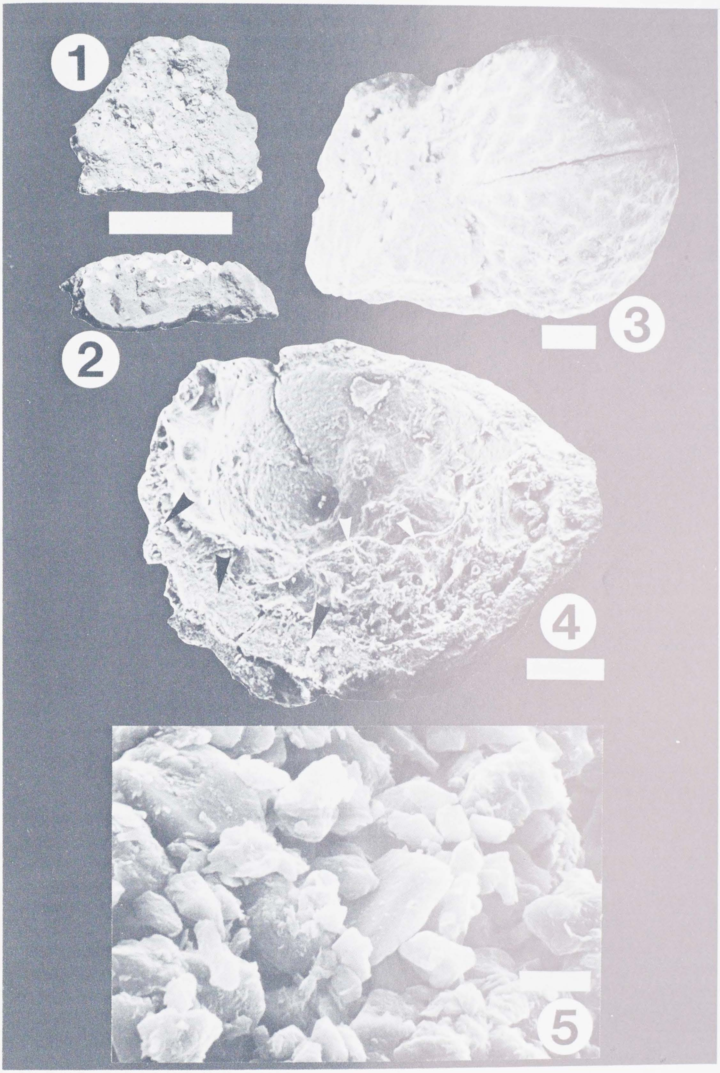

PLATE 1