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HACKBERRY SEEDS FROM THE PLEISTOCENE LOESS OF NORTHERN CHINA¹

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The occurrence of seeds of *Celtis* in the Pleistocene loess of western Chihli Province, China, is of particular interest in view of their presence in deposits of the same age in southern California and in the Great Plains of North America. The record of this material from the loess of northern China has especial significance since it furnishes the only known evidence regarding the plant life of this region during the Pleistocene. The seeds were collected by Professor George B. Barbour of Yenching University in 1924, and were given to the writer for study the year following. They are here described as a new species, named in honor of their collector.

Celtis barbouri, new species

DESCRIPTION.—Nutlets spheroidal, the outer portion, representing the fleshy layer, shrunken to form reticulate ridges of which the more conspicuous are longitudinal; slightly flattened at the base where an inconspicuous attachment scar can be seen in many specimens, and produced into a short stout point at the distal end; diameter 3.5 to 4.5 mm., averaging 4 mm.; thickness of the shrunken fleshy layer 0.3 mm.; interior hollow in all specimens examined.

These seeds closely resemble the specimens described by the writer from the White River beds of South Dakota under the name *Celtis hatcheri*.² They average smaller in size, and the surface markings are less well defined than is the case in the American material. In view of these differences, and more especially of the fact that living species of the genus are given distinct names in North America and in eastern Asia, it has seemed desirable to consider the specimens from Chihli as representing a distinct species.

LOCALITY.—Gully south of Kuo Ts'un, 5 miles south of Hsuan-hua-fu, and nearly 25 miles southeast of Kalgan, Chihli Province.

COLLECTION.—Univ. Calif. Coll. Pal. Bot., Type No. 154.

In discussing the *Celtis* material from the Tertiary of North America the writer has considered the ecological significance of the occurrence of

¹Publication of the Asiatic Expeditions of The American Museum of Natural History, Contribution No. 73

²Chaney R. W., 1925, Carnegie Inst. Publ. 349, No. 3 pp. 54-56

hackberry seeds.¹ Their presence in rocks which contain no other fossil plant material, together with the habit of present-day species of *Celtis*, is indicative of semiarid conditions. In both the later Tertiary and the Pleistocene deposits of the Great Plains, the only known fossil plants represent seeds and stems and are of rare occurrence.

In the asphalt deposits at Rancho La Brea, California, which contain an abundant and varied mammalian fauna of Pleistocene age, a single seed of *Celtis* has recently been noted.² The floral assemblage at this locality is dominated by juniper, live-oak (*Quercus agrifolia*), and other species now found living in regions of comparatively low rainfall. In such a situation, *Celtis* might be expected to have occurred during the Pleistocene, as it does today, occupying the borders of intermittent streams in the grasslands.

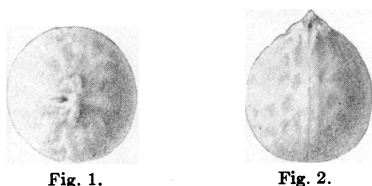


Fig. 1.

Fig. 2.

Figure 1. Seed of *Celtis barbouri* viewed from the distal end. X 4.

Figure 2. Seed of *Celtis barbouri* viewed from the side. X 4.

A similar habitat may be postulated in northern Chihli during the Pleistocene, involving a climate which is in accord with the generally accepted idea for loess accumulation, and which is not greatly unlike that found in the region today. The common living trees noted in this region by the writer are *Ulmus pumila* L. and *Populus* (probably *P. tomentosa* Carriere), both of which occupy valleys. *Ulmus pumila* ranges northward for several hundred miles across the grasslands of Inner Mongolia. *Celtis bungeana* Hems. is also recorded in northern Chihli.³ With the present annual rainfall of about 15 inches, the water table is doubtless too low to permit the forming of leaf impressions; and the seeds of *Celtis* alone, because of their larger size and thicker pericarp than those of *Ulmus* and *Populus*, are suited to remain in the sedimentary record. It is therefore suggested that conditions not unlike those of today have characterized northern Chihli as far back as Pleistocene time, and that these seeds of *Celtis* represented the only element of a rather sparse flora which was structurally suited to leave a record in the loess.

¹Op. Cit.

²Frost, 1927, Univ. Calif. Publ. in Botany, Vol. 13, No. 21.

³Sargent, 1916-1917, Plantæ Wilsonianæ, III, 270.