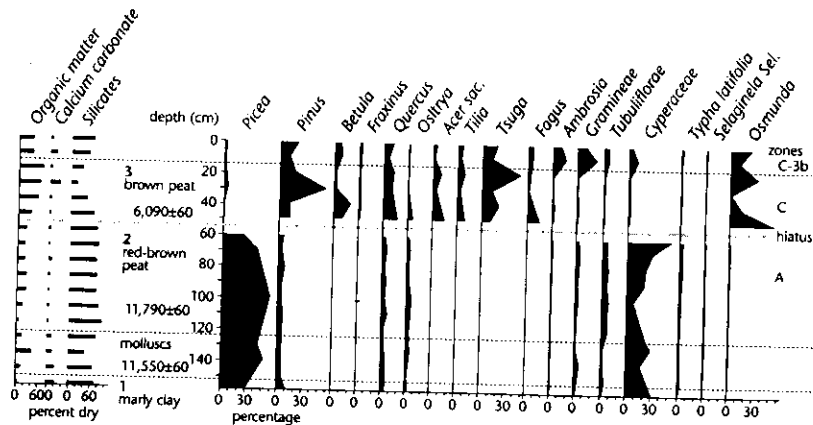


## Beaver (*Castor canadensis*) and Mastodon (*Mammuth americanum*) in a Late-Pleistocene Upland Spruce Forest, Western New York State

Richard S. Laub and John H. McAndrews

The Doerfel site lies 6.5 km north of Springville, New York (Springville 7½' Quadrangle, 42° 33' 41" N, 78° 42' 51" W), elevation 517 m ASL. It is a small basin (ca. 20–30 m diameter), one of several along the crest of a ridge. The site is on Valley Heads Moraine, which dates ca. 13,000 yr B.P. (Miller 1973:81), but the oldest organic matter is <12,000 yr B.P.), indicating delayed basin formation. The coincidence of gravel with an abundance of logs just above the basal marly clay (Unit 1) suggests the melting of a buried ice block that persisted for ca. 1,000 years, accompanied by the collapse of an overlying stand of trees (see Florin & Wright 1969). This may explain the inverted radiocarbon dates for the top and bottom of Unit 2.

The basal unit is marly clay, nearly devoid of macro-organics and dominated by spruce (*Picea*) pollen (Figure 1). Numerous conifer logs lie at its upper



**Figure 1.** Pollen diagram from the Doerfel mastodon site; only the main pollen and spore types are shown. The percentage sum is 200 upland plants including Cyperaceae but excluding aquatic pollen grains and spores. Four contemporaneous late-Pleistocene pollen sites lie within 40 km of Doerfel: Belmont Bog (Spear & Miller 1976), Nichols Brook (Fritz et al. 1987), and Houghton and Protection bogs (Miller 1973). Geochemical analysis was done by loss-on-ignition.

contact with Unit 2, red-brown "peat." This "peat" (<20 percent organic matter) contains Pleistocene spruce pollen Zone A (Miller 1973). A white spruce (*P. glauca*) cone in the top quarter of the unit was AMS dated to 11,790 ± 60 yr

Richard S. Laub, Geology Division, Buffalo Museum of Science, 1020 Humboldt Parkway, Buffalo, NY 14211.

John H. McAndrews, Royal Ontario Museum, 100 Queen's Park, Toronto, ON M5S 2C6.

B.P. (CAMS-39330, while a cone from its basal contact yielded a date of 11,550 ± 60 yr B.P. (CAMS-43074). Wetland microfossils include cattail (*Typha latifolia*) pollen and spike moss (*Selaginella selaginoides*) spores. Gastropods are common in the lower portion of this unit in deeper areas. Also present are twig fragments similar in appearance to those from a nearby site, which were interpreted as mastodon gastrointestinal contents (Laub et al. 1994).

The uppermost unit (3) is a dark-brown peat up to 50 cm thick. It contains pollen of *Tsuga* and *Fagus*, which identify Holocene Zone C, and *Fraxinus* logs. Peat from the lower half of this unit dated to 6,090 ± 60 yr B.P. (Beta-118010). The absence of a pine (*Pinus*) pollen zone (Zone B) at its base indicates a hiatus of over 4,000 years between the Holocene and Pleistocene beginning sometime before 10,100 yr B.P.

Scattered bones of a mature female mastodon lie at the interface between the marly clay and the red-brown "peat." They were dated to 11,460 ± 60 yr B.P. (CAMS-54734). One bone, nearest the center of the basin, lies 21 cm above this interface, probably reflecting partial in-filling of the basin before the bones were deposited. No cultural artifacts were recognized.

Several logs in the lower half of Unit 2 (Pleistocene) featured conical ends bearing gnaw-marks that match the incisors of beaver. One such log of ash (*Fraxinus*) yielded a date of 11,390 ± 100 yr B.P. (Beta-122837). Several logs, including the dated one, had been chewed at both ends, precluding the likelihood that they were old, partially buried logs gnawed by Holocene beavers. To our knowledge, this is the first report of *Castor* in the New York Pleistocene.

Probable beaver-dug canals are prominent in the grey marl/red-brown "peat" interface toward the basin margin, indicating water depth here of only a few centimeters. The presence of cattail and the absence of water lilies in the late-Pleistocene Unit 2 suggests that the pond was seasonal and therefore an undependable water supply. This may explain the beaver canals. Evidence of contemporaneous drought occurs nearby at the lowland Hiscock Site (Laub and Haynes 1998).

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