

AGE DETERMINATIONS FOR LATE CRETACEOUS DINOSAUR SITES IN THE NEW JERSEY COASTAL PLAIN

GALLAGHER*, William B.; and PARRIS, David C., New Jersey State Museum, CN-530, Trenton, NJ 08625, U.S.A.

During the nineteenth century a number of vertebrate fossils were described by Leidy, Cope, and Marsh from the marl pits in New Jersey's Atlantic coastal plain region. Among these were some of the earliest dinosaur discoveries in North America. Because the stratigraphic context of the nineteenth century specimens was occasionally not precisely determined, we have embarked on a program of attempting to obtain ages for some of the historically important dinosaur sites in the Upper Cretaceous marl beds of New Jersey. Several methods have been employed.

Since most dinosaur specimens from the Atlantic coastal plain Upper Cretaceous deposits are found mixed in with marine fossils, possibilities for long-range correlation with well-dated deposits of the Western Interior Seaway exist. Ammonites provide the best means of correlating the New Jersey Upper Cretaceous beds with Cretaceous marine deposits elsewhere. One specimen from the Navesink Formation at the Inversand Pit in Sewell, NJ has been identified as Discoscaphites conradi. The upper part of the Navesink has produced a number of dinosaur specimens, including the type specimens of Hadrosaurus minor and Dryptosaurus aquilunguis. D. conradi is known from the upper part of the Maastrichtian Fox Hills Formation, and since the dinosaur specimens occur at the very top of the Navesink it is likely that they are younger than the upper Fox Hills.

Another approach that can be used for deposits containing marine shell material is $^{87}\text{Sr}/^{86}\text{Sr}$ isotopic age estimation. In conjunction with Rutgers University, we are conducting analyses of shell material from the type locality of Hadrosaurus foulkii as well as shell samples from the Navesink Formation. Preliminary results of stable Sr isotopic ratios yield a middle Campanian age for H. foulkii and other specimens found in the Woodbury Formation of New Jersey.

The application of radiometric dating techniques to the New Jersey Upper Cretaceous deposits has not been very successful. There is reason to doubt some of the previous K/Ar dates, which are probably systematically off by several million years. Under a grant from the Inversand Company, we attempted to date sediments from the upper Navesink Formation and the lower Hornerstown Formation at the Inversand Pit using Rb/Sr age determination. The Maastrichtian Navesink Formation was dated at 56 Ma and the Hornerstown overlying it at 58 Ma, obviously unsatisfactory dates. It is concluded that this type of dating is not applicable to glauconitic marls, perhaps because they are geochemically open systems.