

BIOSTRATIGRAPHY AND PALEOECOLOGY OF LOWER PALEOZOIC, UPPER CRETACEOUS, AND LOWER TERTIARY ROCKS IN U. S. GEOLOGICAL SURVEY NEW MADRID TEST HOLES 1 AND 1-X, SOUTHEASTERN MISSOURI

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ABSTRACT

The paleontology and biostratigraphy of Tertiary, Cretaceous, and Paleozoic rocks in the upper Mississippi embayment are incompletely known because marine fossils are only locally present in these rocks. This study concerns material from two U. S. Geological Survey test holes in New Madrid County, southeastern Missouri.

Test hole 1 sampled lower Tertiary strata to a depth of 146 ft; these strata were found to be late Eocene in age on the basis of sporomorphs. Test hole 1-X, 29 ft northwest of hole 1, provided cuttings and cores from lower Tertiary, Upper Cretaceous, and lower Paleozoic rocks to a total depth of 2,316 ft below the Kelly bushing (at an altitude of 288 ft). Sporomorphs show that the base of the Jackson Formation (Jacksonian Stage, upper Eocene) is probably at a depth of about 350 ft in test hole 1-X. Lithologic units of the Claibornian Stage (middle Eocene) here consist of the Cockfield? and Cook Mountain Formations and Memphis Sand, in descending order. The Claibornian in hole 1-X could not be subdivided using sporomorphs from cuttings, but sporomorphs show that the top of the Sabinian Stage (top of the lower Eocene) is at about 1,055 ft; lithologically, the top of the Wilcox Group (top of the Flour Island Formation) is at 1,048 ft. The top of the lower Sabinian (top of the Paleocene) is within the Flour Island Formation at about 1,105 ft. The top of the underlying Fort Pillow Sand is at 1,186 ft. Lithologically, the interval from 1,339 to 1,377 ft may belong to the Old Breastworks Formation; dinoflagellates from cuttings indicate that this interval is likely to be late Midwayan in age and to correlate with the Naheola Formation of the eastern Gulf Coast. The Porters Creek Clay extends from a probable top at 1,377 ft to 1,696 ft, and the base of the underlying Clayton Formation is at 1,704.5 ft. Calcareous nannofossils, dinoflagellates, foraminifers, mollusks, ostracodes, and sporomorphs were examined from the continuously cored Porters Creek and Clayton of hole 1-X. On the basis of these fossils, the upper half of the Porters Creek correlates with the upper part of the same formation or perhaps partly with slightly younger rocks in the eastern Gulf Coast; the lowermost Porters Creek of the test hole seems to correlate with the upper part of the Clayton Formation of the eastern Gulf Coast and with the Kincaid Formation of Texas; and the thin Clayton of the test hole probably correlates with the lower part of the thick Clayton of the eastern Gulf Coast. Sporomorphs from McNairy Sand (Upper Cretaceous) cores from hole 1-X indicate an age of Maestrichtian and perhaps latest Campanian. Lower Paleozoic dolostone from 2,023 ft to total depth at 2,316 ft is barren of identifiable fossils, except for a probable fragment of the fish *Anatolepis*; the dolostone is probably Late Cambrian in age.

The McNairy Sand of New Madrid hole 1-X seems to have formed mainly in nonmarine to marginal marine environments; the Clayton and lower Porters Creek represent an early Paleocene marine transgression followed by a regression lasting through the end of Porters Creek time and perhaps into Naheola (late Midwayan) time; the Sabinian, Claibornian, and Jacksonian strata of test holes 1-X and 1 were deposited mainly or nearly entirely in nonmarine environments.

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