

ORDOVICIAN-SILURIAN MASS EXTINCTION AND RECOVERY: CORAL FAUNAS IN THE EAST-CENTRAL UNITED STATES

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Three successive coral faunas that are involved in the Ordovician-Silurian mass extinction and recovery occur in latest Ordovician (Richmondian-Gamachian) to earliest Silurian (early Llandovery; Rhuddanian) strata of the east-central United States. The Richmondian fauna comprises typical cratonic North American Late Ordovician corals. In the Cincinnati Arch region, these belong to the Richmond Province and include massive stauriids (e.g., *Favistina*), sarcinulids (e.g., *Foerstephyllum*, *Calapoecia*), and common tetradiids. In the upper Mississippi Valley region, corals belong to the Red River-Stony Mountain Province and include the streptelasmatid *Salvadorea*. The disappearance of typical Ordovician-type coral faunas from the interior of eastern North America was related to habitat loss resulting from progradation of the Queenston delta and regression of the epeiric sea during a major glacio-eustatic drop in the late Richmondian.

The succeeding fauna of Gamachian to early Rhuddanian age represents the Edgewood Province. The solitary rugosan *Streptelasma* is dominant; colonial rugosans are rare and are all fasciculate. The principal tabulates are *Paleofavosites*, *Propora*, and *Halysites*; sarcinulids are absent. Rare tetradiids (*Rhabdotetradium*) are among the youngest representatives worldwide of an important Ordovician order. The Edgewood fauna includes first occurrences of typical Silurian taxa: the earliest North American halysitine (*Halysites*), the oldest definite plasmoporida (*Plasmopora*), and the earliest known pycnostylid (*Pycnostylus*). The striking difference between Richmondian and Edgewood faunas in the east-central United States reflects, at least in part, a hiatus between Richmondian and Gamachian deposition. Corals were introduced to the Edgewood Province from the continental margin, or were derived from forms previously restricted to the continental margin. This occurred during minor transgressions from the south, as sea level fluctuated during a regressive phase corresponding to the Gamachian glacial maximum. Immigration was evidently related to shifts of suitable habitat areas during a time of depressed temperatures. Edgewood corals dispersed farther northward during the early phase of the major latest Gamachian to Early Llandovery transgression associated with deglaciation.

Corals are uncommon in late Rhuddanian strata immediately above those containing the Edgewood fauna. This Silurian fauna includes the solitary rugosans *Rhegmaphyllum*, *Dinophyllum*, *Dalmanophyllum*, and *Cyathactis?*, which were not derived from Edgewood taxa. Colonial rugosans are absent. The tabulates belong to *Paleofavosites*, *Propora*, and *Halysites*, the dominant colonial genera in the Edgewood fauna. At least some of the species were likely derived from Edgewood forms; others may have been introduced from elsewhere, or perhaps were derived from species in other areas. A slight stratigraphic overlap of several Edgewood and Silurian species is known at one locality, but the faunal change is otherwise abrupt. The changeover from Edgewood to Silurian faunas took place as water depth and temperature were generally increasing during the Rhuddanian. However, corals of the Silurian fauna appear above intraformational channels in one area and above unconformities or formational boundaries elsewhere, suggesting that the change occurred during an intervening regressive event. It is inferred that as areas in the east-central United States became inhospitable, geographic ranges of Edgewood corals were reduced. Most species became extinct; some colonial corals apparently underwent rapid evolution, probably in small populations. The descendants dispersed and new immigrants arrived as suitable habitat areas expanded when the Early Llandovery transgression resumed. A few Edgewood colonial species survived for a short time, evidently in local refugia. Unlike the colonial corals, all solitary forms known from the Silurian assemblage were immigrants. Corals of the Silurian assemblage probably favored somewhat deeper water than those of the Edgewood Assemblage.