

A UNIQUE TAPHONOMIC PROFILE FOR LOWER CARBONIFEROUS CRINOIDS OF WESTERN CANADA AND POSSIBLE RECENT ANALOGS
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During diving studies of comatulid crinoids at Lizard Island, Great Barrier Reef, detached but intact crinoid arms and arm groups were sometimes encountered on the substratum. These arms are thought to originate through autotomy or breakage during attacks of predatory fish that remove the calyx and visceral mass but leave the arms intact. Detached arms remain in a vital condition for several days but soon lose pinnules and fragment as decay ensues.

Occurrence of intact, isolated arms and arm groups in the Banff Formation of western Alberta requires a catastrophic disturbance (not necessarily predation) followed closely, if not coincidentally, with burial. The loose arms are preserved mostly as short, straight, distal arm segments (1-2 cm long) or sometimes as long, curved arm segments (2-4.5 cm). The arm groups range from complete arm rays to partial arm rays. If originally present, pinnules are still articulated to the arms and cover plates are preserved on most pinnules. Biserial arms with pinnules, uniserial arms and uniserial arms with pinnules occur in a 2:1 ratio to crinoids having that type of arm structure whereas cuneiform arms with pinnules have a 3:1 ratio of preserved loose arms and arm groups to calyces. Loose, single arms and arm groups account for 33% and 11%, respectively, of the identifiable crinoid remains for the western, deep-water Banff Formation crinoid fauna. Overall, this fauna shows an equitable range from complete articulated crinoid crowns with attached stems to loose isolated plates. The preservation of this fauna has both a time-averaged, accumulation component as well as an instantaneous storm deposited component as represented by both completely articulated crinoids and the high abundance (44%) of loose arms and arm groups. The comparatively anomalous abundance of loose arms and arm groups probably originated through breakage or autotomy coincident with the burial event.

In comparison, the Gilmore City crinoid fauna of Iowa represents an obrution deposit with over 75% of the crinoid specimens preserved as complete articulated crowns with attached stems whereas the eastern Banff Formation crinoid fauna is preserved as a shallow-water, time-averaged accumulation of mainly isolated crinoid calyx plates (54%) and partial calyces (20%). However, both of these faunas have few preserved loose arms or arm groups (<4% for either fauna).