

Lower Mississippian Hampton Formation at LeGrand, Iowa, USA

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COLOURFUL CRINOIDS

Colonies and colours provide the fascination of LeGrand, Iowa, crinoids. The invertebrate palaeontology halls of most U.S. museums display a slab of buff-coloured dolomite covered with crinoid crowns. The slab may be up to 2 m across with small, perfectly preserved crowns and a tangle of stems forming an eye-catching display (Figs. 142, 143). Most of these museum display pieces are from the original large crinoid colony discovered during the preceding century. Crinoids occur in extensive, thin lenticular beds representing the original distribution of living crinoid colonies.

The buff-coloured dolomite provides an attractive background for these crinoids, but their aesthetic appeal nearly hides the most remarkable aspect of this fauna: the crinoids themselves are preferentially coloured. Preservation of this fauna was so good that certain species retain distinctive coloration. The earth tones that shade these fossils undoubtedly do not reflect living coloration, but the species-specific nature of this remarkable preservation does suggest some type of primary vital effect. However, in contrast to situation with other crinoids (see Chapter 4), the chemistry of the pigments responsible for the coloration has not yet been examined.

STRATIGRAPHY OF THE LEGRAND CRINOIDS

LeGrand crinoids are from the Maynes Creek Member of the Hampton Formation in north-central Iowa (Mississippian, approximately 355 million years old). The Maynes Creek is composed of approximately 20 m of fossiliferous buff- to brown-coloured dolomite interbedded with chert. These rocks were deposited in a fairly shallow-water epicontinental setting (Laudon 1931). The member immediately beneath the Maynes Creek Member is an oolitic unit. The Hampton Formation is Kinderhookian (Tournaisian 2) in age (Anderson 1969). Hampton crinoids occur in the centre of lenticular beds.

CRINOID COLONIES RECOVERED THROUGH QUARRYING

James Hall was the first to collect crinoids at LeGrand, Iowa, in 1858. However, nearly another quarter century passed before serious collections were made at LeGrand (see Laudon & Beane 1937), and the first LeGrand specimens were not described until 1890.

Many thousands of crinoids have been collected, up

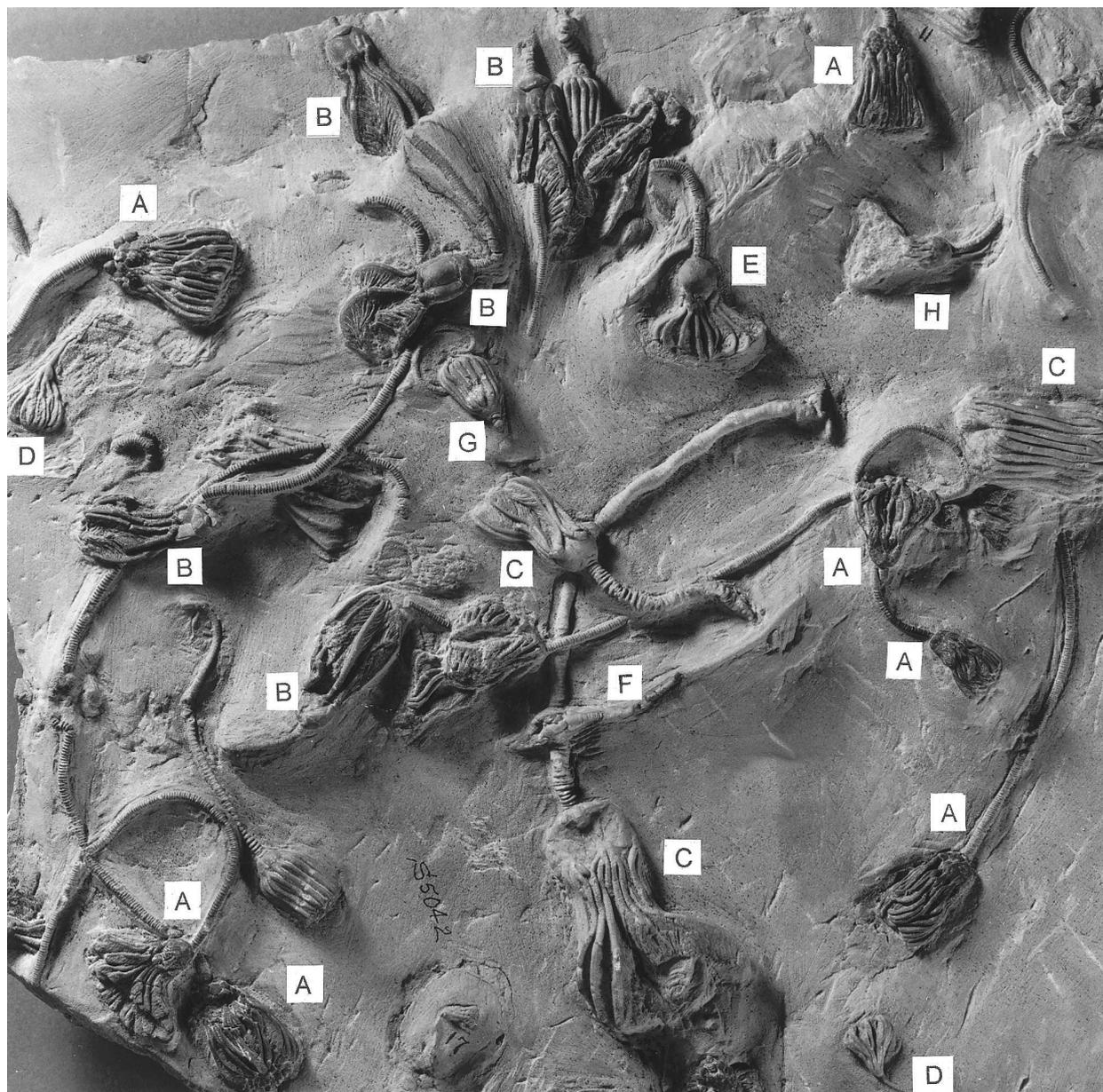


Fig. 142. Bedding surface with numerous LeGrand crinoids. (A) *Rhodocrinites kirbyi*; (B) *Stimplecrinus inomatus*; (C) *Platycrinites symmetricus*; (D) *Aphelecrinus elegantulus*; (E) *Orophocrinus conicus*; (F) *Orophocrinus fusiformis*; (G) *Abatocrinus macbridei*; (H) *Cribanocrinus watersianus*. (Reprinted by permission of the National Museum of Natural History, Washington, D.C.) $\times 0.6$.

to now all from a relatively narrow stratigraphic zone. Crinoid colonies were entombed in a relatively soft, fine-grained dolomite. The initial colony was collected between 1874 and 1890 during a time when quarrying was done by hand. Quarrymen recognized the value of these unusually fossiliferous rocks and took care to preserve them.

B. H. Beane of LeGrand renewed the collection of these crinoids in 1931 with the discovery of a small

colony of *Rhodocrinites kirbyi*, which had more than 200 specimens in 1 m². In 1934, Beane discovered another colony. Quarry operations blasted into the margin of the colony (Laudon & Beane 1937) and pieces were strewn throughout the rubble of the blast. The bulk of the new colony remained in place and was exposed for 6 m along the quarry face. With patience, much work and the close co-operation of the quarry operators, Beane excavated the remainder of this colony through 1937. This



Fig. 143. LeGrand bedding surface with the more common crinoids. (A) *Rhodocrinites kirbyi*; (B) *Stimplecrinus inornatus*. (Reprinted by permission of the National Museum of Natural History, Washington, D.C.)

final colony yielded several thousand of the best crinoid specimens recovered from this site. Beane collaborated with Lowell R. Laudon to publish a monograph on the LeGrand crinoid fauna in 1937.

THE CRINOIDS OF LEGRAND

Presently, 41 species assigned to 25 genera are known from the LeGrand crinoid beds. In addition, blastoids,

asteroids and echinoids also belong to this fauna. Advanced cladids are the most diverse group, but the camerates, diplobathrids and monobathrids are the dominant faunal elements. The most common crinoid in this fauna is the diplobathrid camerate *Rhodocrinites kirbyi* (Figs. 55, 142, 143). Other common crinoids include the monobathrids *Aorocrinus immaturus*, *Stimplecrinus inornatus* and *Platycrinites symmetricus* (Figs. 142, 143) and the flexible *Taxocrinus intermedius*. Although relatively uncommon, pinnulate cladids are reasonably diverse in this fauna (11 species) and provide an early

glimpse of these forms, which dominated crinoid faunas by the Late Mississippian.

Species-specific coloration discussed by Laudon and Beane (1937) includes the following: *Rhodocrinites kirbyi*, very dark colour; *R. nanus*, very light colour for genus; *R. nanus glyptoformis* and *Cribanocrinus watersianus*, midway between *R. kirbyi* and *R. nanus*; *Strimplecrinus inornatus* and *Dichocrinus hammondi*, dark colour; and *D. delicatus*, white. Other coloration distinctions not mentioned by Laudon and Beane (1937) are also present among LeGrand species.

The LeGrand fauna has received little modern study. However, its remarkable preservation provides insight into crinoid palaeoecology. LeGrand crinoids lived in dense colonies, some monospecific and others very diverse (Fig. 142). Colony size varied greatly, from small circumscribed patches 1 m in diameter to colonies with a diameter approaching 10 m. These colonies also appear to have been established in depressions on the sea floor, which is in apparent conflict with living stalked

crinoids that prefer exposed areas where currents are locally enhanced.

Blastoids lived among crinoids in the larger colonies. Although most LeGrand crinoids are rather small, interspecific differences in both filtration fan density and stem length are apparent, suggesting that these crinoids partitioned food resources in the same way as geologically younger crinoids (Ausich 1980) (see Chapter 18). Finally, the larger colonies must have been established for a relatively long time because juveniles and adults are preserved together.

IMPORTANT COLLECTIONS IN THE UNITED STATES

Beloit College, Beloit, Wisconsin (the Beane Collection)

Field Museum of Natural History, Chicago, Illinois

National Museum of Natural History, Smithsonian Institution, Washington, D.C.