

Fossils of the Louisville Limestone

By Alan Goldstein

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The Louisville Limestone was named by August Foerste in 1897. It is a high carbonate to dolomitic limestone of Middle Silurian (Niagaran = Wenlockian) age. Locally it attains a thickness of 58 feet.

In the Louisville area the formation is bounded by the Waldron Shale below and the Jeffersonville Limestone above. In Indiana, the upper Louisville Limestone is called the Wabash Formation. There is a unconformity between the top of the Louisville and basal Jeffersonville Limestone that represents a gap between 425 million and 390 million years ago (~35 million year hiatus).

The type locality of the Louisville Limestone is at Shank's Quarry at I-64 and Grinstead Drive. This quarry operated in the early 20th century and is long-abandoned. The limestone has a thickness of 55 feet, 8 inches at this location.

This formation consists of a series of ledges or zones which are shot-through with fossils. Generally, the bottom one-third is fairly fossiliferous (especially corals and echinoderms), the middle is fossil poor, and the top third is very fossiliferous. Unfortunately, the uppermost ledges disappear toward the north and east. The residual soil above the limestone is classic red terra rosa. It is frequently rich with silicified corals. In my personal collection, 95 percent come from the residuum.

Fossils can be collected as far north as Scott Co., Indiana, and as far south as Bullitt Co., Kentucky. It is restricted to the eastern half of Jefferson Co. and the western third of Oldham Co. The outcrops run roughly parallel with the axis of the Cincinnati Arch, which trends NE – SW in Kentucky.

Where to collect...

Wherever the Louisville Limestone outcrops, fossils are likely to be found. The best fossils (mostly likely to be display quality) are found in the soil. It is not unusual to find fossils from the Devonian Jeffersonville Limestone mixed and differentiating them is not easy for the novice collector. For scientific purposes (e.g. where thin-sections are needed), it is best to collect the fossils directly from the limestone.

Most corals are fairly indistinct embedded in the rock. The silicified (quartz-replaced) fossils often show much more detail. They are colored red, like the soil. It is not advisable to bleach out this color (typically with *Iron Out*-type products) because a featureless white fossil will remain. It is not unusual to find silicified fossils with quartz crystals from a sparkly druse to several millimeters long inside.

As a rule, corals and stromatoporoids (a type of sponge) should be collected from the residuum. Gastropods, brachiopods, trilobites, etc. are best collected from the limestone.

Old quarries, road cuts, freshly dug development sites, and outcrops along streams provide plenty of locations to seek out fossils. Most localities are on private property so get permission!

The fossils...

Corals were the predominate form of life found in the Louisville Seas. The marine waters were fairly shallow (<100 feet / 30 m deep). Later the alteration of the rock by dolomitization recrystallized the limestone making fossils more obscure. This is especially true in southern Jefferson and northern Bullitt Counties. The Louisville Limestone, with one minor exception, is non-oolitic.

Some corals are found upside down, indicating shallow water. Most were probably inverted by storm-induced turbulence. The largest coral head I have collected is about eight inches (16 cm) thick, 14 inches (35 cm) wide and 40 inches (1 m) in circumference! Collected in situ, it was found upside down, the conical base worn smooth by foot traffic on a path.

When the Crescent Springs condominiums were being developed (near Grinstead Dr.), the quarry floor, about 15 feet (4.5 m) above the Waldron Shale, was observed along a bedding plane over a substantial area (where tennis courts are found today) revealing small, low mounds separated by an approximate radius of 10 feet (3 m). These mounds were various species of *Arachnophyllum*, *Astrocerium* and *Thecia* colonial corals as well as unidentified stromatoporoid sponges. They were all in growth position.

Stromatoporoids are very common, consisting of a simple mound structure ranging from a few inches / cm to over 12 inches (30 cm) wide. Some varieties observed in cross-section in rock walls may attain dimensions on the order of 3 to 10 feet (1 – 3 m) across, but they are usually no thicker than two inches (5 cm). I have never found more than large fragments in the residual soil. Stromatoporoids may occasionally be found “smothering” pentamerid brachiopods and gastropods. One specimen I collected is an *Arachnophyllum* colonial rugosa coral covered by a stromatoporoid, in turn covered by an *Astrocerium* tabulate coral covered by another stromatoporoid with a *Halysites* “chain” coral on top! Such combinations, while unusual, are not very rare.

Corals are, without question, the most common fossils in the Louisville Limestone. R. S. Bassler (G.S.A. Memoir 44 *Faunal Lists and Descriptions of Paleozoic Corals*) describes 34 genera of colonial and horn corals totaling some 112 species. E. C. Stumm (1965) lists a more accurate number of 67 species. Even with this number, it rates as one of the diverse Silurian coral deposits in the United States! It is over-shadowed by the Jeffersonville Limestone containing more than three times as many species.

Brachiopods are not as common as corals, though there is a zone of *Pentamerus oblongatus cylindricus* in the lower Louisville Limestone where they occur in great numbers. The upper Louisville is noted for a zone of less abundant *Rhipidium* (a pentamerid). Atrypid brachiopods like *Atrypa* and *Gotatrypa* are common throughout. There are other brachiopod genera like *Dalmanella* or *Camarotoechia*, but they are much less common.

Crinoids are scattered throughout, but not particularly common. Even columns require a close search. The lower Louisville is echinoderm rich. In southern Indiana the greenish glauconitic limestone contains locally abundant rhombiferan cystoids *Caryocrinites*. Individual hexagonal plates (with a star-like pattern) are more commonly found. I have found crinoid holdfasts on corals and stromatoporoids. The *Eucalyptocrinites*-type superficially resemble mangrove roots. Others look like a tree stump.

Gastropods and pelecypods (bivalves) are not particularly common, but again, can be found with a careful search. Some species attain sizes of two to three inches (5 – 6 cm) across. These are very, very rare in the soil residuum. Cephalopods are exceedingly rare. The most unusual specimen I observed was a coiled nautiloid about six inches (15 cm) wide in a multi-ton boulder in a quarry. (It was not collected.)

Trilobites are rare. There is a trilobite zone in the uppermost Louisville Limestone (e.g. on I-64 near Cannons Lane), but they consist of mostly fragments. The Waldron Shale and Laurel Formation (below the Louisville) contain more trilobites.

Other less observed fossils includes sponges such as *Astraeospongia* or *Hindia*, various microscopic foraminifera and bryozoans. Fenestrate bryozoans which have a net or lace-like skeletal structure are widespread. Trace fossils are widespread but given scant attention. Graptolites are very rare.

Common Fossils* (By Genera)

* Note: Common is relative, aside from corals and brachiopods, everything else is not truly common, but are the most prevalent genera of those fossil types.

Sponges

Astraeospongia

Hindia

Stromatoporoids (genera unknown)

Colonial Corals

Alveolites

Arachnophyllum (*Strombodes* in older texts)

Astrocerium

Coenites (*Cladopora* in older texts)

Favosites

Halysites
Heliolites
Plasma
Propora (*Lyella* in older texts)
Thecia

Horn Corals

Dokophyllum (*Ketophyllum* in older texts)
Entelophyllum (colonial, but typical found as individual pieces)
Lamprophyllum (*Blothrophyllum* in older texts)
Streptelasma
Tryplasma

Echinoderms

Caryocrinites
Eucalyptocrinites
Lyriocrinus

Brachiopods

Atrypa
Camarotoechia
Dalmanella
Gotatrypa
Pentamerus
Rhipidium

Gastropod

Platyceras (*Platystoma*)

Trilobite

Glyptambon (*Dalmanites* in older texts)