

and all three of the orders of corals we have described grew in the same zone. (A detailed explanation of why an ecological zoning process could not have produced the isolation of these and other fossil types in the great inland systems of rock on the continents is given in Wonderly (1987, p. 60-70)).

Thick, Localized Buildups of Limestone

There are a great number of in situ, organic banks of limestone buried in the rock systems of the earth (Reading, et al., 1986, p. 327-338). Some of these are true coral reefs containing many well-preserved fossil corals. Lack of space will prevent our giving any detailed description of these reefs and other organic banks in this article, but research-report descriptions of some in Canada are cited below.

The average and maximum growth rates of modern coral reefs and related organic banks are fairly well known, and it seems to be necessary to assume that the ancient ones grew at similar rates. At least the growth rate principles given above, in the section, "Some Special Characteristics of the World's Limestones," should prevent our postulating enormously faster rates. One of the most thorough investigations of coral reef growth rates was made by A. G. Mayor and his associates during the years 1917 to 1920 (Mayor, 1924, p. 51-72). They found the fastest upward growth rate of reefs in the tropical Pacific to be approximately 8 mm per year (8 m per 1,000 years).⁵ This accumulation rate is several times faster than that of any known accumulation by non-coral, lime-secreting organisms. For example, in the shallow water of the Great Bahama Bank, off the southeast coast of the U. S. A.-- an area of normal semi-tropical growth--the rate is only approximately 30 cm per 1,000 years (Goodell and Garman, 1969, p. 527-528).

In the northwest part of Alberta, Canada, there are several oil fields where major oil production from ancient, Devonian coral reefs is being obtained. These buried reefs have been studied in great detail by petroleum geologists. Research teams used large numbers of high-quality drilling cores taken from each of several of the atoll-type reefs, and seismic surveys which accurately determine the size and shape of each atoll. Many species of reef-building corals from these atolls have been classified, and significant numbers of the specimens were found in growth position. The thickness (height above the base) of some of the atolls and other reefs is as much as 800 feet (240 m), and the shapes of some of them are strikingly similar to living atolls now found in the Pacific Ocean. These atolls of Alberta belong to the Keg River Formation of the Devonian System. (Langton and Chin, 1968, p. 1930-1943; Hriskevich, 1970, p. 2261-2264; Barss, 1970, p. 34-35.)