

average only one-half the length and breadth of the latter, and the outer, organic reef rim of each is higher and more pronounced on the northeast side. This greater development of the strongly cemented rim on the northeast side indicates that the prevailing wind direction was from the northeast at that time.¹⁶ (Reefs develop most on the side toward the wind, as the wind keeps bringing waves with fresh supplies of oxygenated water and food.)

The Death and Burial of the Reefs

After a long period of flourishing growth, "hard times" came, and most of the reef organisms could no longer grow. The usual unrestricted flow of food-and-oxygen-laden water which is so vital for reef growth gradually became less and less. The layers of evaporite minerals with which most of the reefs are covered give testimony to the condition of stagnation and increased salinity of the water. The fact that the larger reefs became heavily dolomitized (changed to dolostone), as their burial progressed, is further evidence of the slow change to more saline (salty) water. The dolomitization which is observed in the well cores of these reefs is of the type expected in an intertidal and supratidal (just above the tide) environment. This type of environment brings about the death of reefs, and if there are increased evaporative conditions, the increase in magnesium content of the water provides the magnesium ions to slowly convert the reef material to dolostone.¹⁷

It is possible that the briny water was considerably deeper at some times than others, but in either case the reefs were dying and being fossilized right in the broad marine basin which had fostered their growth.¹⁸ This change was undoubtedly brought about either by an altering of the sea level, or by a rising of the floors of the inlet channels through which water was supplied to the basin from the ocean. In fact, the sedimentary record which has been left in the basin tells us clearly that there were numerous changes of this type (or of both types), which left an elaborate series of evaporitic sediments in the basin around the reefs, and over the tops of the same.

There is much evidence that there were, in this basin, long periods of time when the evaporating water was deep; whereas during other periods it was shallow, as we have just described. Evaporite mineral layers can be deposited in deep water if the basin is stagnant, with extensive evaporation occurring from the surface. However, an absolute requirement for deposits of the type found here is that there be time and proper conditions for the concentrated brines to be produced by the evaporation. This requires many years for each foot of evaporative sediment formed.

The evidence for the shallow-water condition during a part of the reef's history consists not only of the shallow-water types of mineral deposits mentioned above, but also of the remaining marks of weathering processes. Bebout found these remaining effects in the reef limestone and dolostone at numerous levels on the sides of