that they were first laid down as calcium carbonate, rather than as the calcium-magnesium carbonate of which they are now composed. The conversion to dolostone most likely occurred progressively as new layers of sediments were added to the Banks. In relation to this, we should keep in mind that the animals and plants which produce such a large proportion of the sediments do not have the ability to secrete dolomite. In fact, most of the animals and plants which produce skeletal components of limestones have only a very low proportion of magnesium in their shells or other hard parts. Thus most of the magnesium for dolomitization must be brought into the sediment mass by water, from elsewhere.[15]

During the past 15 years sedimentary geologists have located and extensively studied numerous seashore areas where dolomitized sediments are being formed.[16] One such area, the Trucial Coast of the Persian Gulf, has already been described in Chapter 5. Another is on the western shores of Andros Island in the Bahamas. Still other sites where present-day dolomite formation is taking place are southern Australia, the Netherlands Antilles, and the Florida Keys.[17]

There is strong evidence that some dolomite has been slowly forming by direct precipitation from natural waters, in certain specialized environments. However, this is an even slower process than the sediment formation we have described for the Bahamas, and of course could not form fossils or fecal pellets.[18]

Goodell and Garman cite several types of evidence to show that the conversion of the Bahama Bank sediments to dolostone occurred at shallow depths, though not in the exact manner in which the supratidal dolomites are formed today.[19] At least 3 basic facts are evident: (1) The dolostone was formed from carbonate sediments similar to those being formed today on the Banks. (2) The fossilized and cemented sediments in the dolostone layers are in natural proportions, without any appreciable admixture of non-carbonate materials. (3) The process of conversion of the sediments to calcium-magnesium carbonate (dolomite) was dependent upon (at least slowly) circulating water for the necessary magnesium ions.[20]

The last point is one to which we have briefly referred in previous sections, where dolostone was mentioned, but it is so fundamental and universal that overstressing it would be difficult to do. A large supply of magnesium ions must be carried, in solution, to every sediment grain which is to be converted to dolomite. Even if the water is circulating as rapidly as possible through the sediment mass, there is no really rapid delivery of ions to the sites of dolomitization. This is true even if the relatively small magnesium content of natural sea water has been supplemented by evaporitic conditions or by volcanic-hydrothermal sources such as those mentioned in Chapter 4. As the water passes through the sediment mass the supply of magnesium ions is constantly depleted in the multitude of small channels through which the water is moving. In each such channel the grains nearest the source of water supply