saline-resistant microorganisms could survive, leaving their shells behind in the marl ooze.[55]

With respect to the fossils contained within the evaporite series penetrated in these drillings, we must note first that the layers of anhydrite, gypsum, and halite are barren of animal-type fossils (except for a few which lodged in dessication cracks which formed after the layers of salts had hardened). However, many of the cores of hard anhydrite which were brought up contained almost unmistakable stromatolite-type bulges in the laminations.[56] (See Chapter 8 for an explanation of the nature of stromatolites.) All stromatolites are formed by the growth of one or more types of algae. Since present-day stromatolite growth is regularly observed on saline flats of the Trucial Coast and elsewhere, we thus have further strong evidence that the water was of very shallow depth during the deposition of the anhydrite in the Mediterranean floor. (The algal cells of course have to have light; so, they can grow and form the stromatolites only at shallow depths where the sunlight can penetrate.)[57]

Thus, the presence of the evaporitic series of deposits deep in the Mediterranean floor provides a number of kinds of very strong evidence that this sea was a shallow evaporative basin for a long period of time prior to the deposition of the oceanic oozes which are above the evaporite beds.[58] The exact length of this period of evaporative deposition is difficult to determine, but the following facts and principles can help us gain some idea of the minimum length of time.

The process of depositing anhydrite and gypsum from sea water is necessarily slow, because of the small amount of calcium sulfate in the water. (Both anhydrite and gypsum are composed of calcium sulfate, except that gypsum molecules contain added water.) In Chapters 5 and 6 we referred to the fact that the amount of water which evaporates from an ocean or lagoon surface annually in even the most arid and hot parts of the world rarely exceeds 5 meters (16 feet) depth, and that this amount of normal sea water contains only enough calcium sulfate to deposit a 2.2 millimeter layer of anhydrite. When we apply this deposition rate to the 23 meters (75 feet) of anhydrite drilled at Site 124 we arrive at 10,400 years as the absolute minimum time for depositing this portion of the stratigraphic column at Site 124. Since the column at this site also contained several hundred feet of other slowly deposited sediments, it is obvious that the 10,400 years mentioned here is only a small fraction of the total deposition time for the anhydrite and the sediments above it.

At this point we should also recognize the fact that the evaporite deposits of the Mediterranean (such as the anhydrite just noted) are not the lower-most sedimentary strata of this sea floor. During Cruise 13 the crew of the Deep Sea Drilling Project was unable to drill beyond the evaporite layers, due to the difficulty of penetrating the hardened anhydrite with the drill bits they had at that time. However, some of the additional drillings made in