

evidently a record of the biological growth which was going on during the part of each year when the salinity of the water was lower. This was apparently a period of abundant growth of the smaller (microscopic) forms of plants and animals which ordinarily grow in the sea--just as occurred in the formation of the laminated anhydrite which is over the Rainbow reefs discussed in the previous chapter. It is possible that the growth was mainly that of floating organisms which settled to the bottom to form the organic layer each year. On the other hand, the organic layer could have been formed by microscopic size algae growing on the bottom, covering over the previously deposited layer of mineral.¹³

Dean's research included measuring the percentage of organic matter in the evaporitic couplets, by an oxidation process. He made this measurement on several hundred sections from the well cores. The percentage of organic matter in most couplets ranged from 0.1% to 0.6%.¹⁴ This is a very significant amount, representing an abundant growth of microorganisms in the water each year. The layer of organic matter is usually found either just beneath, or mixed with, the calcium carbonate; both being beneath the layer of anhydrite of the couplet. This is the relationship which would be expected. The usual, expected order would be, first the dying of the microscopic organisms, due to rising salt concentration and (probably) rising temperature as the seasonal temperature increased. Next, or simultaneously with the death and settling of the microorganisms would be the precipitation of the calcium carbonate. Finally, when the water reached a salt concentration of five to six times that of ordinary sea water, the anhydrite could precipitate on top of the calcite and organic deposit which had been formed a few weeks or months before. This is the usual order found in the couplets.¹⁵

So, here in the Delaware basin we see a body of sediments which was laid down year after year in an orderly manner, constantly subject to definite natural controls. Evidently a major change in the concentration of the sea water took place 200,000 times, with the concentration coming back each time to at least very near the same value. This is somewhat comparable to the forming of rings in a tree trunk, in which case the laying down of the cellulose-lignin layers of which the rings are composed is under the definite control of natural laws. The laminated anhydrite series of the Delaware basin is, in the realm of precipitation, what tree rings are in the biological realm. It is true that we are not able to determine with absolute certainty that only one couplet of the laminated anhydrite was formed each year. But since the laws of precipitation of these same minerals are observed in operation today, and since the mineral content of the sea water was low enough for the growth of organisms during each cycle, we can be certain that no large number of couplets could have been formed in any one year.

Thus we can say that the microlayered anhydrite deposits which filled the Delaware basin are not only extensive and widespread, but are meaningful in their minute structure. They show the regularity of the periodic changes of environment which fostered the