

degrees of hardness shows that these beds of sediment which accumulated during the earlier epochs of the Tertiary Period have existed practically undisturbed for the long periods necessary for cementation of the ooze particles, to form the hard layers. Also, the fact that there are alternating layers, with contrasting degrees of hardness, strongly suggests that there were periods of time when the oceanic environment varied from what it was at other times.<sup>34</sup>

The rates at which the sediments originally accumulated undoubtedly differed somewhat from the present rate of near 20 millimeters per 1,000 years, and likely fluctuated appreciably at certain times. Nevertheless, the principle of the stability of the natural laws of biological growth, which we explained in Chapter 3 and in the earlier part of this Chapter 9, prevents anyone from speculating that the formation rate of these sediments was vastly greater than at present. Also, the texture, arrangement, and very fine-grained nature of the deposit prevents our postulating that the sediments were brought in from elsewhere. (The team of scientists on board the drilling vessel were alert to watch for evidences of the action of ancient turbidity currents and other swift currents, but found practically none at the sites we have been considering.)<sup>35</sup>

Before terminating the discussion of drillings made during the seventh cruise, we should briefly note a few facts about Site 63, which can be contrasted somewhat with the two sites we have just discussed (numbers 62 and 64). By glancing at the map (Figure 30) one can see that Site 63 lies between the other two, and that it is in a basin, rather than on a ridge or plateau. Thus we are not surprised to find that the water depth at Site 63 is 14,700 feet, a depth too great to allow deposition of any appreciable amount of carbonate sediments. One would therefore expect to find the sedimentary column at this site to be considerably different from that of the other two--and so it is. This column was approximately 1,800 feet in thickness. The upper 65 feet was found to be made up mainly of layers of various types of pelagic clay, with some siliceous microfossils. (Both the clay and the microfossils have particle sizes which allow only very slow settling in the ocean waters.) At the surface of the sea floor here the carbonate content is only 4%. Deeper, the carbonate content rises to high percentages, undoubtedly indicating that during the earlier parts of its history the basin floor was higher, with less water depth covering it than at present. However, the composition of the chalk ooze, chalk, and limestone layers which appear in the deeper parts of the column at Site 63 is very significantly different from that of the columns at Sites 62 and 64. For example, the amounts and vertical distribution of certain minerals, and of various kinds of fossilized animal skeletons (especially the Radiolaria) vary greatly from one site to another--even though the sites are relatively close to each other. The total thickness of sediment which was able to accumulate at Site 63 was much less than at Site 64.<sup>36</sup> So, we must recognize that each of these three sites received its sediment covering independently of the others, without appreciable exchange or transport of sediment particles.<sup>37</sup> (This is another of the many facts which prohibit any hypothesis that the sediments