ART. IX.—*Rate of Growth of Corals.* From a letter to Professor J. D. DANA, by Professor JOSEPH LECONTE, dated University of California, May 1, 1875.

I OBSERVE in your work on Corals and Coral Reefs, while discussing the rate of coral growth, you mention an interesting observation of Weinland on the corals about Hayti, bearing on this subject. This recalls to my mind a very similar observation on a much larger scale, made by myself during the winter of 1851, while assisting Professor Agassiz in his examination of the Florida reefs. Knowing your interest in the subject, I send you an account of it.

Professor Agassiz and his party were at Fort Jefferson, Tortugas. Dr. Wm. L. Jones and myself had gone to examine a little island about 8 or 10 miles to the northwest. On returning to Fort Jefferson in a small boat, when about half way between the two islands and in the still shoal water on the inside of the line of reefs, to our great surprise the boat suddenly grounded on the close-set prongs of an extensive grove of madrepores (*Madrepora cervicornis?*). On examining closely the trees of this grove, we found: 1. That the prongs were far more thickly set than is usual in this species; 2. that all the prongs not only of the same tree, but of all the trees of the whole grove, grow up to nearly the same level, which at the time examined was very near the surface; 3. that all the prongs at that level were dead for a distance of one to three inches from the point. The lower limit of death seemed to be a *perfectly horizontal plane*. The dead points rose above it to various distances not exceeding three inches. We rowed around the margin of this grove for a considerable distance and found everywhere the same phenomena. I satisfied myself that the whole grove, for hundreds of acres in extent, had been clipped in a similar manner.

On subsequent inquiry at Key West, I learned that the mean level of the ocean, owing probably to the prevalence of certain winds, was higher during one portion of the year than during the other. It became evident, therefore, that during the high water the living points of the madrepores grow upward until the descending water level exposes and kills them down to a

certain level. With the rise of the mean level again, new points start upward, to be again clipped at the same level by the descending water. The levelness, the thick setting, and the deadness of the points are all thus completely accounted for. It is precisely the phenomena of a clipped hedge.

I have long been accustomed to estimate from these facts the rate of madreporo growth. I have recently looked up the data necessary to do so more accurately.

The following table, taken from the Coast Survey Report for 1853, p. 76, gives the mean sea level for the different months of the year.

	Feet.	Dif.		Feet.	Dif.
Jan.	5.10	0	July	.78	.68
Feb.	.15	5	Aug.	.63	.53
March	.26	.16	Sept.	.93	.83
April	.26	.16	Oct.	.90	.80
May	.32	.22	Nov.	.73	.63
June	.60	.50	Dec.	.31	.21

From the differences I have roughly plotted a curve representing the annual variation of mean level.

It is seen that the mean level at Key West is lowest in January and highest in September, the difference being 0.83 feet or about ten inches. Now starting with the lowest mean level in

January, *l l*, it is evident that living points *a a a* near that surface would grow upward and continue to grow all the time the water was rising from *l l* to *l' l'*, i. e., from middle of January to the middle of September, and also while it was falling to three inches above *l l*, i. e., until about the beginning of December. At this level

the growing points would be nipped. It is evident, therefore, that the three inches were grown in 10 to 10½ months, which would make about 3½ inches per annum.

This table is taken from Key West; my observations were at the Tortugas. There may be differences in the amount and the curve of variation in different places. But this would make but little difference in the result. I believe we may say with confidence that the annual growth of madreporae points in the Gulf is not more than $3\frac{1}{2}$ —4 inches per annum.