As to the temperature preceeding this period of develop Chamberlin is not quite certain, for his language is as follows:—*

"There was, however, a terrestrial source of heat and lig critical importance, namely, that arising from the infall of the tesimals. If this infall were at a rate sufficient to heat the surf of the earth above 500° C. life of the present types would have bee pro-hibited. The present stage of the inquiry does not permit an very confident opinion as to whether this excess was reached or not. Leaving this question open, it is to be noted that if, at the stage when an atmosphere and hydrosphere could be held, the infall of planetesimal rapid as to heat the surface to a prohibitive temperature, the rate of in must almost certainly have declined as the number of planetesimals the earth's feeding zone was diminished so that, long before the supp was exhausted and growth ceased, the rate must inevitably have fall below the prohibitive limit. If, therefore, the earth were too hot for h when one-fifth grown, its temperature might have become suitably mi when one-fourth, one-third, one-half, or three-fourths grown. Growth after this permissive stage was reached would be slow and the period required for its completion would still be long."

It is obvious therefore, that even the Planetesimal Theory does not negative the view that high temperatures did obtain in the earth's atmosphere before a hydrosphere was formed or even after one was developed, and that the conditions which would obtain, on the basis of the Nebular Theory, as favorable to the origin of life, would obtain in the planetesimal development of the earth.

Just at what period in the earth's history these conditions obtained it is not now possible to say. We know that highly developed forms like *Olenellus*, forms quite as highly developed and specialized as vertebrates. appeared in the early Cambrian Period, and therefore, the development of such highly specialized forms must have begun at a vastly earlier stage. But back of all this is a period incalculably longer, a period during which the cell was specializing into animal and vegetable types and back still of that period was another of still greater duration which was required to develop in the cell, still neither animal nor vegetable definitely, those peculiar processes which the animal as well as the vegetable cell now manifests when it undergoes what is known as cell division.

To have fixed in the cell, animal and vegetable, those mitotic

* Carnegie Institution Year Book, No. 3, 1905, p. 250.