St. Lawrence valley to the Cretaceous boundary of the Paleozoic in Georgia and Alabama. Thus there is gradually being amassed more and more material significant of the diagenesis of the Cambrian and Ordovician rocks, and relating to the history of the seas from and under which they were deposited. It will not do, in this study, to dub all coarse, clastic, intraformational rocks, whose constituents may or may not be rounded, as simple conglomerates all of similar origin. It is believed that a more careful examination of these intraformational structures in the field and laboratory will greatly aid in deciphering the history of the original limestone sediments. Upon the rock-walls of the Bellefonte quarries have been observed many of the structural phenomena which are to be found on shallow water areas, mud-flats and beaches of to-day. Ripple-marks, mud-cracks, edgewise conglomerates and breccias are disclosed in close stratigraphic sequence wherever exposure and subaerial erosion have been able to develop the hidden structures. The conclusion has been reached that nearly all of the intraformational conglomerates and breccias seen at Chambersburg, Bellefonte and Tyrone, Pennsylvania, are of extremely shallow water origin; in fact, their formation postulates an emergence from the sea such as is common under tidal action. That mud-cracked beds and intraformational breccias are in certain cases one and the same thing is, perhaps, the only original contribution to the origin and classification of intraformational structures.

GLOMERATE AND PHENOCLAST.

Before proceeding with the classification of intraformational structures, it seems best to analyze the term conglomerate.* Indeed the study of intraformational "conglomerates" requires a more careful consideration of all conglomerates than has heretofore been deemed necessary. A review of the literature, as well as certain examples studied in the field, has shown that not all intraformational conglomerates are made up of water-worn materials; in fact, certain of them are composed of distinctly brecciated fragments which show no signs of attrition by water transportation, a common characteristic according to most geologists. Walcott (op. cit. p. 192) recognized this diffi-

* Most stratigraphers would certainly agree that true breccias cannot be defined under the general term of *conglomerate*, yet if we refer to the Century Dictionary we discover that although a conglomerate is defined as "a rock made up of the rounded and water-worn debris of previously existing rocks", a breccia is defined as "a conglomerate in which the fragments, instead of being rounded or water-worn, are angular". No less an authority than J. D. Whitney is responsible for these definitions but most geologists would probably refuse to accept them as they stand. Quotation is taken from the Century Dictionary only to show that there is some confusion at least at present in regard to just what *conglomerate* means.