

burg, Bellefonte and elsewhere, has led to the belief that a compilation and discussion of the evidence of the so-called intraformational "conglomerates," breccias, or "corrugations," is needed if we are to arrive at exact conclusions regarding certain common phenomena associated with the history of the ancient seas.

Grabau (2) states that intraformational brecciation is "probably in all cases an extreme of subaquatic-gliding-deformation." The writer does not feel that most of the phenomena observed by him in the Appalachians will bear out this statement. The principal example of folding and brecciation cited by Grabau as due to this cause, is the one at Trenton Chasm, New York. Hahn (3) described the folds as due to "subaqueous solifluction." Grabau (sp. cit. p. 785) states that "Deformation through gliding may result in complete brecciation of the deformed layers. The fragments may lie in all positions, as in the ordinary intraformational conglomerates, or they may consist of thin cakes, many of which in the gliding process have assumed a vertical position in the mass. This forms the so-called 'edgewise conglomerate,' common in the Ordovician limestones of the Appalachian region. The characteristics of all these formations seem to point to rather shallow water as the place of deposition of these strata, and the possible periodic exposure and hardening of the surface layers." The writer has been able to prove to his own satisfaction that some of the edgewise conglomerates in the Bellefonte section are certainly not due to subaquatic-gliding-deformation, neither does he believe that any one hypothesis is able to account for the formation of all intraformational conglomerates, whether the orientation of their fragments be "edgewise" or not. He feels convinced that the folds and edgewise conglomerates exposed to view in the gorge at Trenton Falls are, as previously supposed, truly of tectonic origin, and, therefore, not, in the sense of Walcott's definition, "intraformational conglomerates" at all, since they were not "deposited in the formation." A recent study of the Trenton Chasm, in company with Drs. Raymond and Shuler, produced evidence which points conclusively to the tectonic origin of the folds and edgewise conglomerates, as is amply set forth in Miller's (4) recent paper.

It was only a few years ago that ripple-marks and mud-cracks in limestone were considered rare and unusual phenomena. Indeed stratigraphers and paleontologists did not expect to find and did not hunt for such structures in the Paleozoic limestones. To-day the investigators of the Cambrian and the Ordovician calcareous rocks are reporting such data from the