

lime was originally deposited in lumps or masses. The lime quite certainly came mainly from the decomposition of marine algae in the manner lately described by Thomas C. Brown. Without entering into a discussion of the questions as to what plants and animals may have contributed to the limy deposit, or in what manner the lime was collected, it is sufficiently evident to me that something deposited lime in small and large masses. The lenses and lumpy patches of relatively pure lime in all parts of the Galena-Trenton frequently inclose fossil shells, etc., in a way to show that these limy bodies *were soft when deposited*; that is to say, they often partly inclose shells, stipes of graptolites, fucoids, etc., either in the manner of objects overflowed by soft lime or in the manner of objects partly sunken into such a soft deposit. Shells of Lingulae are found which had bored into them—and the boring, was done, of course, while they were not consolidated." Sardeson himself advances a rather ingenious hypothesis for the formation of "corrosion conglomerates" (op. cit. p. 276). He believes that the "fucoids" found in the shaly limestones associated with the conglomerates are the roots of a sea-weed, closely related to *Camarocladia*, and that because of the hardness of the sea-floor these roots are supposed to have been able to penetrate vertically but a short distance, and thus could be easily uprooted by the rafting of flotsam at the surface of the water. He concludes: "Since the conglomerates are found in limited horizons instead of throughout the beds or formations, their origin is to be attributed rather to catastrophies, such as rafts of sea-weeds, etc., \* \* \* \*". Here again we may have a true intraformational conglomerate formed by vegetable means.

#### GLEITUNGSPHEOMENE.

Sub-aquatic and sub-aerial-gliding-deformation or solifluction. Under the heading "Sub-aquatic, gliding deformation," Grabau (op. cit. p. 780) writes: "Offshore deposits of sediments on a gently sloping sea or lake bottom may suffer, from time to time, deformation of the surface layers through gliding or slipping down the gently-inclined sea floor. \* \* \* The most remarkable fact about the gliding in Zug was that it took place on an average grade of 6% (3°26'), while the larger and more pronounced movement occurred on a grade as low as 4.4% (2°31')). The material thus slid into the lake was *brecciated* (italics are the author's) and folded with overfolds, overthrusts, reversals of layers, excessive strata, etc., and furnishes an excellent guide to the interpretation of similar movement in the past." Under the heading "Examples of fossil subaqueous solifluction," (op. cit. p. 781), the author quotes