

POSSIBILITY OF VOLCANIC ORIGIN OF THE CRETACEOUS SEDIMENTARY KAOLIN OF SOUTH CAROLINA AND GEORGIA

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ABSTRACT

The Cretaceous sedimentary kaolin deposits of South Carolina and Georgia occur in a portion of the geologic column which contains abundant evidence of volcanic activity in Texas, Arkansas, Mississippi, and Puerto Rico. It is proposed that volcanic ash from eruptive centers in the Mississippi Embayment and Gulf Coastal region settled on land and was washed into adjacent valleys, lake basins, and possibly lagoons, along with varying amounts of residuum from the erosion surface; alteration of the volcanic ash to montmorillonite, and then to kaolinite, progressed under the influence of subaerial erosion in Cretaceous and later time whenever physical and chemical conditions were favorable.

Several perplexing and previously inadequately explained features of the deposits are clarified if we accept this hypothesis. These features include: (1) The purity of the deposits, being over 95 per cent clay mineral in many deposits 20 ft or more in thickness; (2) General absence of fossils; (3) Lack of bedding; (4) Prevalence of a small but nearly uniform content of TiO_2 as minute crystallites of anatase; (5) Presence of elongate beveled particles, now clay, which have the form of glass shards.

Both the "soft" and the "hard" clay are believed to have developed from the same source. At all places where seen in the field the hard clay occurs immediately beneath a prominent unconformity; its different properties are attributed to changes produced by subaerial weathering. Repeated wetting and drying, which resulted in a smaller particle size, and leaching of silica, resulting in a slight bauxitization, are considered important mechanisms.