former members to formations, which she designated as the Chipola formation, the Oak Grove sand, and the Shoal River formation. Cooke and Mossom (1929, p. 98) retained these names for their typical development but revived the name "Hawthorn formation" for the nearly equivalent beds in the peninsula, which represent a different facies. The formations now included in the Alum Bluff group are the Hawthorn (east of the Apalachicola River), the Chipola, and the Shoal River. The Oak Grove sand is here made a member of the Shoal River formation.

Characters—The Alum Bluff group consists predominantly of micaceous sand, sandy clay, fuller's earth, and limestone. The best-known parts of it are the fuller's earth of the Hawthorn formation and the shell beds of Chipola, Shoal River, and Oak Grove, typical characteristic faunas. The Chipola, the most variable, ranges in composition from coarse silicious sand to limestone; the Shoal River consists chiefly of fine sand and clay. The Hawthorn includes fuller's earth, sandy clay, and sandy phosphatic limestone, which leaches into white vesicular sandstone.

Thickness—Accurate measurements of the thickness of the Alum Bluff group are wanting. Cole (1938) assigns 555 feet of the Port St. Joe well to the Miocene, but this includes some Tampa limestone at the bottom and possibly some Duplin marl at the top. He tentatively allots 210 feet of this interval to the Chipola and about 110 feet to the Shoal River, not including the *Arca* zone, which he classified as Choctawhatchee formation [Shoal River formation]. As this well is some 40 miles seaward from the nearest outcrop of the Alum Bluff, the thickness at the surface may be quite different. The thickness of the Hawthorn formation is probably particularly variable because it includes local lenses of fuller's earth. A well at Quincy, which started in fuller's earth of the Hawthorn formation, reached the Tampa limestone at a depth of 210 feet (Cole, 1944, p. 13). Nearly 410 feet is assigned to the Hawthorn in a deep well 4 miles northwest of Hilliard (Cole, 1944, p. 23).

Distribution—During Alum Bluff time the sea extended across the southern tip of South Carolina, across southern Georgia almost to the Fall line, across all of Florida, southern