

shire, Roxburghshire, and Kirkcudbright, volcanic sheets occupy the same position, and extend across into the English border.

The upper subdivision of the Calciferous Sandstones, known as the Cement-stone group, consists of two sections differing from each other in lithological character, and pointing to distinct conditions of deposit. The lower section is made up of thin-bedded white, yellow, and green sandstones, gray, green, blue, and red clays and shales, with thin bands of pale argillaceous limestone or cement-stone. Seams of gypsum occasionally appear. These strata are, on the whole, singularly barren of organic remains. They seem to have been laid down with great slowness, and without disturbance, in inclosed basins, which were not well fitted for the support of animal life, though fragmentary plants serve to show that the adjoining slopes were covered with vegetation. They underlie the volcanic zone in Stirlingshire and the Lothians, and overlie it in Berwickshire. The upper section is chiefly developed in the basin of the Firth of Forth, where, overlying the volcanic zone, it presents an entirely distinct lithological aspect and is abundantly fossiliferous. It there usually consists of yellow, gray, and white sandstones, with blue and black shales, clay-ironstones, limestones, "cement-stones," and occasional seams of coal. The sandstones form excellent building stones, the city of Edinburgh having been built of them. Some of the shales are so bituminous as to yield, on distillation, from thirty to forty gallons of crude petroleum to the ton of shale; they have consequently been largely worked for the manufacture of mineral-oils. The limestones are usually dull gray or yellow, and close-grained, in seams seldom more than a few inches thick, and graduate by addition of clay and protoxide of iron into cement-stone; but occasionally they swell out into thick lenticular masses like the well-known limestone of Burdie House, so long noted for its remarkable fossil fishes. This limestone appears to be mainly made of the crowded cases of a small ostracod crustacean (*Leperditia Okeni*, var. *scoto-burdigalensis*). The coal-seams are few and commonly too thin to be workable, though one of them, known as the Houston coal, has been mined to some extent in Linlithgowshire. The fossils of the Cement-stone group indicate an alternation of fresh or brackish water and marine conditions. They include numerous plants, of which the most abundant are *Sphenopteris affinis* (Fig. 364), *Lepidodendron* (two or three species), *Lepi-*