

have gone down 3000 feet through sandstone alone; and seldom are the intercalated beds of limestone and shale of sufficient extent to mark a horizon and serve as the means of measuring the thickness. At New Haven, Conn., an artesian boring was carried down 4000 feet through porous sandstone without finding variation enough in texture to get a supply of water.

The layers often have a cross-bedded structure and other evidences of strong currents. In many regions they are here and there covered with ripple-marks, mud-cracks, raindrop impressions, footprints of Reptiles and Amphibians; the fine shales with tracks of Insects and Crustaceans — facts which indicate temporary exposures above the water level of great sand-flats and mud-flats. A slab from Greenfield, Mass., a dozen feet long, now in the Yale Museum, is covered throughout with deep impressions of raindrops — the work of a short large-drop shower. The impressions are a little elliptical so as to register the direction of the accompanying wind. Besides this, two lines of large three-toed tracks cross the slab, and those of the longer line are dotted by the raindrops, showing that a biped reptile had passed that way before the shower began.

The material of the sandstones and conglomerates, exclusive of the calcareous, is almost solely such as would be afforded by the wear of granite, gneiss, mica schist, syenite, and other crystalline rocks of the neighboring hills or mountains; and the amount of mica and other ingredients and kinds of rock material vary with the kind of rock in the adjacent hills. Several examples of this are mentioned by Emerson, Fontaine, and others. The feldspar is usually fresh and undecomposed, and well mixed with the quartz, showing no evidence of any assortment of the ingredients by beach action. The ingredients are often in proportions fitted to make granite again by subjection to metamorphic action. Mica is sparingly present except where mica schists exist on the border of the areas. There are also limestone conglomerates in regions where Cambrian or Lower Silurian rocks exist along the border; and occasionally stones of a quartzose conglomerate derived from a Cambrian sandstone or quartzite.

The coarsest conglomerates consist of stones of all sizes up to five feet across, and usually occur along the eastern or western border of an area. In Montague, Mass., east of the Connecticut, on the eastern border of the area, and in Branford, Conn., some of the bowlders are three feet across. Similar cases exist on the west border of the western area in New Jersey, Virginia, and North Carolina. In the Pittsylvania belt, the larger stones are four to five feet in diameter. Near Point of Rocks, Md., the stones are of Paleozoic limestone, and some are two feet through; the finer variety of this limestone conglomerate is the "Potomac pudding-stone marble."

The *Coal-measures* in the Richmond basin and Virginia, and in North Carolina, consist of beds of shale and sandstone with thick beds of good coal. In the Richmond area there are two to eight coal-beds, and the main bed is 10 to 40 feet thick; but they include some thin dividing layers of sandstone and shale. The Coal-measures are situated within 250 to 500 feet of the bottom