

tageous circumstances than I was myself, may direct their researches.

XII. AGGLOMERATE LIMESTONE OF THE BARIGON, OF THE CASTLE OF CUMANA, AND OF THE VICINITY OF PORTO CABELLO.—This is a very complex formation, presenting that mixture and that periodical return of compact limestone, quartzose sandstone, and conglomerates (limestone breccia) which in every zone peculiarly characterises the tertiary strata. It forms the mountain of the castle of San Antonio near the town of Cumana, the south-west extremity of the peninsula of Araya, the Cerro Meapire, south of Caraco, and the vicinity of Porto Cabello. It contains (1) a compact limestone, generally of a whitish grey, or yellowish white (Cerro del Barigon), some very thin layers of which are entirely destitute of petrifications, while others are filled with cardites, ostracites, pectens, and vestiges of lithophyte polypi: (2) a breccia in which an innumerable number of pelagic shells are found mixed with grains of quartz agglutinated by a cement of carbonate of lime: (3) a calcareous sandstone with very fine rounded grains of quartz (Punta Arenas, west of the village of Maniquarez), and containing masses of brown iron ore: (4) banks of marl and slaty clay, containing no spangles of mica, but enclosing selenite and lamellar gypsum. These banks of clay appeared to me constantly to form the lower strata. There also belongs to this tertiary stratum, the limestone tufa (fresh-water formation) of the valleys of Aragua near Vittoria, and the fragmentary rock of Cabo Blanco, westward of the port of La Guayra. I must not designate the latter by the name of nagelfluhe, because that term indicates rounded fragments, while the fragments of Cabo Blanco are generally angular, and composed of gneiss, hyaline quartz, and chloritic slate, joined by a limestone cement. This cement contains magnetic sand,* madreporas, and vestiges of bivalve sea shells. The different fragments of tertiary strata which I found in the littoral Cordillera of Venezuela, on the two slopes of the northern chain, seem to be superposed near Cumana (between Bordones and Punta Delgada); in the

* This magnetic sand no doubt owes its origin to chloritous slate, which, in these latitudes, forms the bed of the sea.