

thin muddy marls over the Downton beds, which would have been tilestones had they sufficiently hardened, and which are doubtless the equivalents of the true tilestones.

I consider, therefore, the term "passage-rocks," as used by Sir R. Murchison in the last edition of 'Siluria,' to be a more appropriate appellation for these transition-beds, and one which allows to the palæontologist, as well as the physical geologist, a broad margin for the line of demarcation between the two great epochs of the Silurian and the Old Red.

2. *On the so-called MUD-VOLCANOS of TURBACO, near CARTHAGENA.*

By F. BERNAL, Esq.

[In a letter* to Sir R. I. Murchison, F.G.S.]

(Abstract.)

TURBACO is a village, about fifteen miles from Carthagená, at an elevation of about 980 feet above the sea. At a distance of about three miles from the village, and at a rather higher elevation, in the midst of a forest, are some twenty or thirty conical hillocks, about 8 or 10 feet high, each with its little crater or orifice, about 2 feet in diameter. These are filled with a muddy water; and every two or three minutes a slight noise is heard, a bubbling-up of air or gas takes place, the muddy fluid runs over, and forms into cakes of blue clay. The water is quite cool, nor is there any present or anterior marks or vestiges of the action of fire or heat†.

3. *On the COAL-FORMATION at AUCKLAND, NEW ZEALAND.*

By HENRY WEEKES, Esq.

[Communicated by the President.]

(Abstract.)

THE district is formed of stratified sandy clays, of Tertiary age; they vary in colour from white to light-red. The white clays contain beds of lignite, varying from a few inches to several feet in thickness. Sections of these beds are exposed along the banks of most of the tidal inlets with which the district abounds. In some places, near the hills, the lignite is seen to rest on trap-rock; elsewhere a shelly gravel underlies it.

At Campbell's farm a whitish sandstone lies on the lignite, and at the junction is hardened, and contains ironstone-nodules; these, when broken, yield remains of exogenous plants. A fossil resin is found abundantly in the lignite. On Farmer's Land the lignite is 16 feet thick, including a little shale; at Campbell's it is 7 feet thick, but thins away. There is some iron-pyrites in the lignite, but not sufficient to deteriorate its value as a coal. Similar coal has been found at Muddy Creek to the S.W.; at Mokau, about 100 miles to the south; and near New Plymouth.

* Dated British Consulate, Carthagená, New Granada, April 9, 1859.

† A sketch of these sauses is given in Humboldt's 'Vues des Cordilleras.'

The Tertiary beds of Auckland are everywhere broken through by extinct volcanos, varying from 200 to 800 feet in height. The craters are generally scoriaceous, in a perfect condition, with a depression of the rim usually to the north or east. There are also around the district other volcanic hills, rounded, scoriaceous, more fertile than the crateriform hills, and apparently of an older date.

4. *On the GEOLOGY of the SOUTH-EASTERN PART of VANCOUVER ISLAND.*
By HILARY BAUERMAN, Esq.

(Transmitted from the Foreign Office to Sir RODERICK MURCHISON, F.R.S., F.G.S., and communicated by him to the Geological Society.)

THE following remarks are the results of observations made during the summer and autumn of the year 1858, and are designed to illustrate a series of fossils and rock-specimens collected during the same time from the glacial, tertiary, and cretaceous formations of the island, and from the metamorphic and igneous rocks of Esquimalt and Victoria. The observations have been made at Esquimalt and Nanaimo, and on board H.M.S. "Satellite" in the Gulf of Georgia. The references in the sketch-section annexed are to the map of the S.E. portion of Vancouver Island by J. D. Pemberton, published by Arrowsmith. The beds are described in stratigraphical order, commencing with the lowest.

1. *Metamorphic and Igneous Rocks.*—These are everywhere seen in the neighbourhood of Esquimalt and Victoria, principally occurring in the form of dark-green sandstones and shales, which pass by insensible gradations into serpentine and chlorite-slate. They are very full of small strings and veins of quartz. The harder beds are very much jointed; and it is often difficult to obtain a fresh fracture, owing to their tendency to split into rhomboidal fragments, the surfaces of which are generally much rusted and tarnished from the action of water infiltrated through the joints. Several beds of unfossiliferous crystalline limestone are associated with the metamorphic rocks above-described, and are often of considerable thickness. A section in the cliff at the Boundary Commission Barracks exhibits alternations of compact and shaly blue limestone over a thickness of forty feet, the strata being vertical. At another point on the bay, the same series of beds, with greater variation of mineral character, is seen dipping to the northward, at an angle of 50°.

The metamorphic rocks assume a gneissic character to the northward of Esquimalt. On the shores of Thetis Lake, about two miles distant, dark-green sandstones and mica-slates occur, which are penetrated by dykes of largely crystalline greenstone and syenite: the former is made up of large black scales of hornblende and a light-green felspar, and becomes syenitic by the addition of quartz. The effect of these dykes on the rocks penetrated is very apparent, the beds having been completely fused at the points of contact. At the head of Victoria Harbour a dark laminated gneiss, with quartz-veins, is exposed: the direction of the planes of lamination is N. 50° W.,