A

DESCRIPTIVE CATALOGUE

OF THE

ROCK SPECIMENS

IN THE

MUSEUM OF PRACTICAL GEOLOGY,

WITH EXPLANATORY NOTICES OF THEIR NATURE AND MODE OF OCCURRENCE IN PLACE.

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the Eocene fresh-water beds are deposited. The volcanic rocks are principally assignable to a later period.

150. VOLCANIC ASHES (consolidated).
Pont du Château.

151. PUMICEOUS VOLCANIC CONGLOMERATE.
Monts Dome.

152. DOMITE OR EARTHY TRACHYTIC PORPHYRY.
Puy de Dome.

153. BASALT.
Puy de Dome.

154. TRACHYTIC TUFF.
Gergovia, near Clermont Ferrand.
Contains olivine.

H. W. BRISTOW.

Wall-case 2.

Arranged and described by H. W. BRISTOW.

Nos. 1 *to* 105, *from the Island of Ascension, were collected by Mr. Charles Darwin, F.R.S., and Captain Ord, R.E.*

The Island of Ascension, situated between the coasts of Africa and Brazil, is nine miles long by six in breadth. Its entire surface, which is broken into mountains, hills, and ravines, is covered with ashes, cinders, pumice, and lava. Its general appearance is that of a mass of smooth, bright-red conical hills, with truncated summits, rising from a plain of black, sterile lava. The highest point on the island, Green Hill, is 2,870 feet above the sea-level.

Nos. 1 to 14e, are varieties of Lava, of which 4 to 8 and 10 are more or less cellular, while 9, 11, and 13 are more compact.

Nos. 14 to 14e, as well as No. 106, from Chatham Island, Galapagos Archipelago, from the superficial parts of a lava-stream, are especially remarkable for their singular forms. They are described as being scattered over the surface of the ground, presenting the appearance of logs and branches of trees.

Nos. 15 to 26 represent varieties of laminated beds, which alternate with and pass into Obsidian.

The great number of these are composed of Pearlstone and Pitchstone, with occasional nodules of Obsidian, alternating with felspathic layers.

Nos. 18, 22, and 23 are sphærulitic, while 16, 19 to 21, 24 and 25 contain included crystals of glassy felspar, lying lengthways, or with their longest axes parallel with the laminæ in which they are included; an arrangement which is due to the motion of the mass while in a heated state.

Nos. 27 to 31 show the passage from Pitchstone into Obsidian.

It may be observed that Pitchstone and Obsidian are merely different forms of the same substance, caused by the unequal rate at which the liquified mass of melted rock has been cooled. Obsidian (or the more perfect form of volcanic glass) is from the superficial portion of the mass which has cooled most rapidly, while the more dull, opaque interior portion into which true Obsidian passes at a slight depth, and which has cooled more slowly, is termed Pitchstone. See page 244.

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* See also No. 275, Case 6, p. 259.

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Nos. 31 to 31c are varieties of volcanic slag, exhibiting different degrees of fusion.

Nos. 32 to 62 are from the series of trachytic rocks which form the more elevated and central, and likewise the south-east part of the island. Nos. 57 to 58 are augitic lavas, with included crystals of glassy felspar.

Nos. 63 and 64 are pumiceous. 65 to 67 volcanic ashes and sand, or the more finely divided products of eruption.

No. 68 to 73 are varieties of softer Tufa, and 105 are concretions which occasionally occur in it.

Nos. 85 to 92 are volcanic bombs and fragments of rocks which have been shot forth during aëriform explosions, and are now found mixed with masses of scoriæ. Nos. 86 to 88 exhibit striking proofs of their having been in a fluid state, and of having had a rotatory motion communicated to them when originally vomited from the crater. This is especially to be observed in 86.

Siliceous sinter is represented by Nos. 95 to 99. It occurs in the altered Trachytes either in the form of irregular masses or in seams. The formation of these, as well as of the thin plate-like veins No. 93, has been produced by the segregation or infiltration of siliceous matter.

In the same manner the Jasper, (Nos. 100 to 102,) which also forms large irregular masses in the altered Trachyte, was probably produced by a process (as suggested by Mr. Darwin) analogous to that by which wood becomes gradually silicified; that is, by the gradual removal, particle by particle, of the original rock, (in this case a basaltic rock,) accompanied by the simultaneous substitution of siliceous matter and iron.

Nos. 106 to 109 are varieties of scoriaceous Lava from Chatham Island, Galapagos Archipelago; while 110 to 113 are cellular basaltic Lavas, the latter containing crystals of Olivine.

Nos. 116 to 117 are from the Cape de Verde Islands.

Various kinds of Lava from New Zealand (White Island) are represented by Nos. 121 to 126. 127 and 128 are specimens of siliceous sinter. 129 and 130, gypsum; 131 and 132, native sulphur; and 133, the ashes with which the country around Auckland is covered.

Nos. 134 and 135 are from volcanic springs at Kertch, in the Crimea.

Volcanic rocks from the Island of Ascension.

Presented by CHARLES DARWIN, F.R.S., and Captain ORD, R.E.

1 & 2. VOLCANIC SLAG OR CINDER.

3. RED SCORIACEOUS LAVA, partly vesicular.

From the outer portion of the stream.

4 & 5. CELLULAR OR VESICULAR BASALTIC LAVA.

6. SLAG, *from an iron-furnace* at Wolverhampton; for comparison with the two preceding specimens.

7. VESICULAR BASALTIC LAVA, showing the elongation of the vesicles in the direction of the current.

8. Slightly vesicular BASALTIC LAVA, the vesicles elongated in the direction of the flow.

9. BASALT, in one part slightly scoriaceous.

10. VESICULAR BASALTIC LAVA. Some of the vesicles filled with crystals of *glassy felspar.*

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11. COMPACT, BROWN, BASALTIC LAVA (slightly vesicular in places), with crystals of *glassy felspar*.

12. VESICULAR BASALTIC LAVA, with crystals of *augite*.

13. COMPACT, BROWN, BASALTIC LAVA, with crystals of *olivine*.

14, 14a, 14b, 14c, 14d, and 14e. Six specimens of fragments from the superficial parts of a BASALTIC LAVA CURRENT, presenting singularly twisted and convoluted forms, and exhibiting lines formed by the flowing of the stream while in a viscous or slightly fluid state.

(See Darwin "On Volcanic Islands," p. 35.)

Laminated beds alternating with and passing into Obsidian.

15. PEARLSTONE, with a lamellar structure, and containing slightly waved tortuous layers in the upper part.

16. PEARLSTONE, containing small irregular masses of *Obsidian* in thin, slightly tortuous layers, with included fragments of somewhat cellular Lava, in which are small crystals of *glassy felspar*.

17. PITCHSTONE, with thin, parallel and slightly tortuous felspathic layers, containing crystals of *glassy felspar*.

17a. SMALL IRREGULAR NODULES OF OBSIDIAN, either standing separately or united into thin layers, and cemented together by soft, white and pale-greenish matter, resembling pumiceous ashes.

(See Darwin "On Volcanic Islands," p. 57.)

18. Thin, slightly tortuous layers of pale grey-coloured FELSPATHIC STONE, between which are layers of opaque brown *sphærulites* (*obsidian-globules*) in a soft, pearly base.

19. Irregular nodules of OBSIDIAN (*Pearlstone*) alternating with thin layers of a felspathic rock, which contain crystals of *glassy felspar*.

(See Darwin "On Volcanic Islands," p. 57.)

20. COMPACT HEAVY ROCK, with a crystalline felspathic base, mottled with a black mineral, and abounding with crystals of *glassy felspar*.

(See Darwin "On Volcanic Islands," pp. 56 and 57.)

21. COMPACT CRYSTALLINE ROCK, banded in straight lines, with numerous, extremely thin, white and grey laminæ, composed chiefly of *felspar*, and containing numerous perfect crystals of *glassy felspar*, placed lengthways; they are also studded with microscopically minute amorphous black specks of *augite* or *hornblende*.

(See Darwin "On Volcanic Islands," p. 56.)

22. Thin slightly tortuous layers of GREY FELSPATHIC STONE, passing into *Pearlstone*, alternating with minute globules of *Obsidian* (*dark brown opaque sphærulites*).

In the specimen a thin layer of the brown sphærulites, closely united, intersects a layer of similar composition, and after running for a short space in a slightly curved line, again intersects it and likewise a second layer, lying a little way beneath that first intersected.

(See Darwin "On Volcanic Islands," pp. 58 and 59.)

23. Slightly tortuous layers of LIGHT-GREY PEARLSTONE, sometimes passing into *Pitchstone*, with numerous lines of minute white sphærulites, which are dissected out on two of the weathered sides of the specimen: (allied to No. 18.)

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24. Irregular nodules of OBSIDIAN, united into thin layers, which alternate with other thin felspathic layers, containing crystals of *glassy felspar*.

25. Irregular layers of PEARLSTONE, with crystals of *glassy felspar*, and passing into *Pitchstone*, alternating with irregular dull red-coloured trachytic layers.

26. Irregular layers of PITCHSTONE and greenish-grey *felspathic layers*.

27, 27a, & 27b. PITCHSTONE, showing the characteristic conchoidal fracture and sharp, cutting edges.

28. GREEN PITCHSTONE, OR OBSIDIAN.

29, 29a to 29g. BLACK OBSIDIAN or VOLCANIC GLASS, with a conchoidal fracture and sharp, cutting edges.

30. BLACK OBSIDIAN, full of minute globular vesicles, which become gradually less perfectly defined until the whole passes into compact Obsidian.

The vesicular structure is owing to the expansion of included gases or aqueous vapour which were not entirely driven off during the fusion of the melted mass.

31. OBSIDIAN, passing into vesicular, scoriaceous Lava, and presenting an appearance of perfect fusion.

31a. VOLCANIC SLAG, SCORIA, or CINDER, presenting an appearance of partial fusion, and converted in some places, into layers of Obsidian.

31b. VOLCANIC SLAG, SCORIA, or CINDER, presenting an appearance of imperfect fusion.

31c. VOLCANIC SLAG, SCORIA, or CINDER, presenting an appearance of imperfect fusion and covered, superficially, in some places, with an iridescent lustre.

The specimen contains a few small fragments of scoriaceous Lava, which have become entangled with and taken up by the partially fused slag.

Trachytic series of rocks occupying the more elevated and central, and likewise the south-eastern, parts of the Island of Ascension.

32. Somewhat friable WHITE TRACHYTE, appearing when viewed in mass, like a sedimentary Trachytic Tufa.

The specimen is earthy and in a decomposing state, passing into china-clay. It also contains some cavities, with crystals of *glassy felspar*.

33. Pale greenish-grey, decomposing TRACHYTIC PORPHYRY, with crystals of *glassy felspar*, black microscopical specks, and brown stains (decomposed crystals of *augite*).

(See Darwin "On Volcanic Islands," pp. 42 and 43.)

34 & 35. Slighly laminated, pale-grey, TRACHYTE.

36. Pale grey LAMINATED TRACHYTE.

From the base of Garden Hill.

The specimen contains a few crystals of *glassy felspar*, and has a weathered surface

37. Pale greenish-grey TRACHYTE, containing crystals of *glassy felspar*, and decomposing crystals of *augite*.

The specimen is covered with a white efflorescence of *chloride of sodium*, probably derived from the sea-water with which it has been saturated.

38. Pale greenish-grey TRACHYTE, with numerous crystals of *glassy felspar* and *augite*, and black microscopical specks.

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39. Pale grey TRACHYTE, with crystals of *glassy felspar* and a few decomposed crystals of *augite*.

The specimen shows a weathered surface.

40. Pale grey TRACHYTIC ROCK, honeycombed with irregular cavities, presenting a carious appearance, and a strong resemblance to silicified wood.

41. *Another* variety of No. 40, having some of the cavities filled with a white powder.

42. GREENISH TRACHYTE, with imbedded fragments of *Obsidian*.

43. BLUISH-GREY TRACHYTE, with pale-brown markings.

(See Darwin "On Volcanic Islands," p. 55.)

44. Pale-purplish EARTHY TRACHYTE, with crystals of *glassy felspar*, and presenting a weathered surface, which is scoriaceous in places.

45. GREY TRACHYTE, with a contorted lamellar structure, minute black specks, and crystals of *glassy felspar*.

46. LIGHT GREY TRACHYTE (*another variety*), with crystals of *glassy felspar and angular scoriaceous fragments*, and streaked with numerous slightly tortuous white lines, which frequently expand into small cavities.

These contain white crystals of *quartz* and minute, brown, acicular, transparent crystals of *augite* (*diopside*).

(See Darwin "On Volcanic Islands," p. 55.)

47. LIGHT GREY TRACHYTE, with layers of *Pitchstone*, in contact with and passing into paler earthy Trachyte, with included fragments of *Pearlstone*.

48. Reddish-brown AUGITIC LAVA, with crystals of *glassy felspar*.

49. Laminated TRACHYTIC LAVA with crystals of *glassy felspar*.

50. LAMINATED LAVA, with crystals of *glassy felspar*, and composed of alternate layers of augitic and felspathic Lavas.

51. BRICK-RED TRACHYTE, with decomposing crystals of *glassy felspar*.

52. AUGITIC LAVA, with crystals of *glassy felspar* and crystals of *specular iron* on one side of the specimen.

53. GREENISH TRACHYTE, with crystals of *glassy felspar* and a few brown stains.

54. TRACHYTE, in a decomposing state, with crystals of *glassy felspar*.

55. TRACHYTE, partially coated with a thin deposit of *quartz*.

56. Reddish-brown AUGITIC LAVA, with numerous crystals of *glassy felspar*.

57. Reddish-brown AUGITIC LAVA (*another variety*), covered on one side with crystals of *gypsum*.

58. Slightly-cellular, greyish AUGITIC LAVA, with numerous well-defined crystals of *glassy felspar*.

59. TRACHYTIC PORPHYRY, composed of crystals of *glassy felspar*, with brown spots in a light brown trachytic base, and forming veins of hard compact Trachyte, in the earthy Trachytes.

60. CELLULAR PORPHYRY, with opaque white crystals of decomposing *glassy felspar*, and decomposed crystals of *oxide of iron*. Some of the cells contain minute hair-like crystals of *analcime*.

Found imbedded in the earthy Trachyte.

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61. Breccia, composed of fragments of *Trachyte* and *Obsidian* in a trachytic base, which also contains a few crystals of *glassy felspar*.

62. Breccia, composed of fragments of *Pitchstone* and *Pearlstone* in a trachytic base.

63. Pumice (porous felspathic *volcanic scoria*).

64. Pumiceous Conglomerate.

65. Volcanic Ash (in a bottle).

66. Consolidated Volcanic Ashes, inclosing a *Pecten*.

67. Volcanic Sand (in a bottle).

68. Soft white Pumiceous Tufa.

69, 70, 71, & 72. Varieties of Trachytic Tufa (in bottles).

73. Bright-red Vesicular Tufa.

74. Fine-grained, partially consolidated Tufa or Peperino, with coarser loose scoriæ.

75 & 76. Peperino, formed of *volcanic sand and ashes* cemented together.

77. Black Trachytic Tufa or Peperino, from the bottom of the volcano.
St. Vincent.

78. Scoriaceous Lava or *Pozzolana*.
Sheepwalk.

79 & 80. Scoriaceous Lava or *Pozzolana*.
High Peak.

81. Volcanic Scoria and Ashes.

82, 83, & 84. Volcanic Scoria, Cinders, and Slags.

Volcanic Bombs.

85. Volcanic Bomb of Obsidian.

"The specimen was found, in its present state, on a great sandy plain between the rivers Darling and Murray, in Australia, and at the distance of several hundred miles from any known volcanic region. The external saucer consists of compact obsidian, of a bottle-green colour, and is filled with finely cellular lava, much less transparent and glassy than the obsidian. The external surface is marked with four or five not quite perfect ridges. The lip of the saucer is slightly concave, exactly like the margin of a soup-plate, and its inner edge overlaps a little the central cellular lava. This structure is so symmetrical round the entire circumference, that one is forced to suppose that the bomb burst during its rotatory course before becoming quite solidified, and that the lip and edges were thus slightly modified and turned inwards." (See Darwin "On Volcanic Islands," pp. 38 and 39.)

86. Fragment of a spherical Volcanic Bomb, with the interior parts coarsely cellular, coated with a concentric layer of compact Lava, and this again with a crust of finely-cellular rock, forming the external surface.

"This structure may be explained, by supposing a mass of viscid scoriaceous matter to be projected with a rapid rotatory motion through the air; for whilst the external crust from cooling became solidified, the centrifugal force, by relieving the pressure in the interior parts of the bomb, would allow the heated vapours to expand their cells; but these being driven by the same force against the already hardened crust would become, the nearer they were to this part, smaller and smaller or less expanded until they became packed into a hard solid concentric shell." (See Darwin "On Volcanic Islands," pp. 36 and 37.)

87. Part of a Volcanic Bomb of a similar description to No. 86, and showing the internal structure.

88. Portion of a Volcanic Bomb, composed of coarse and finer cellular rock, of an irregularly

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scoriaceous structure; probably the central portion of the bomb.

89. EJECTED GRANITIC FRAGMENT, consisting of a brick-red mass of felspar, quartz, and small dark patches of a fused mineral, ascertained by its cleavage to be hornblende.

(See Darwin "On Volcanic Islands," p. 40.)

90. EJECTED GRANITIC FRAGMENT (*Syenite*), streaked and mottled with red, and composed of white *potash-felspar*, numerous grains of *quartz*, and small crystals of *hornblende*.

91. EJECTED FRAGMENT (*white granitic rock*), composed of confusedly crystallized white *felspar*, with little nests of a dark-coloured mineral, often carious, externally rounded, and with no distinct cleavage, probably *fused hornblende*. This rock was ejected amongst cinders from one of the more recent volcanos.

(See Darwin "On Volcanic Islands," p. 41.)

92. EJECTED FRAGMENT, *Greenstone*, composed of crystals of *Labrador Felspar*, a little *altered hornblende*, and scales of black *mica*, with white granular *felspar*, filling the interstices.

(See Darwin "On Volcanic Islands," p. 41.)

93. EJECTED FRAGMENT, portions of hard SILICEOUS PLATE-LIKE VEINS, of varying thickness, intersecting the earthy trachytic masses on the flanks of the "crater of the old volcano."

(See Darwin "On Volcanic Islands," pp. 44 and 45.)

94. Seams of compact OXIDE OF IRON, occurring conformably in the lower parts of a stratified mass of ashes and fragments.

"This seam of compact stone, by intercepting the little rainwater which falls on the island, gives rise to a small dripping spring, first discovered by Dampier. It is the only fresh water on the island, so that the possibility of its being inhabited has entirely depended on the occurrence of this ferruginous layer." (See Darwin "On Volcanic Islands," p. 39.)

95. WHITE SILICEOUS SINTER, occurring in altered Trachyte.

(See Darwin "On Volcanic Islands," p. 45.)

96. SEAMS OF SILICEOUS SINTER, occurring in altered Trachyte.

97. WHITE SILICEOUS SINTER.

98. Cream-coloured SILICEOUS SINTER.

99. SILICEOUS SINTER, formed of thin irregular plates of *chalcedonic quartz*, occurring in altered Trachyte.

100. Ochreous-brown coloured *jasper*, occurring in large irregular masses, and sometimes in veins, both in altered Trachyte, and in an associated mass of scoriaceous Basalt.

(See Darwin "On Volcanic Islands," p. 46.)

101. JASPER (*another variety*), inclosing irregular angular patches of *red jasper*, with their edges blending into the surrounding mass.

102. SCORIACEOUS ROCK, occurring near veins of siliceous sinter (Nos. 96, 97, and 98), having the cells lined and filled with fine concentric layers of *white chalcedony*, which are coated and studded with bright-red *oxide of iron*.

103. SILICEOUS CONGLOMERATE, with small prismatic crystals of *tourmaline* and crystals of *quartz*, and coated with a thin layer of *siliceous sinter*.

104. ROCK RESEMBLING SYENITIC GNEISS, probably from one of the laminated beds alternating with and passing into Obsidian, noticed in Darwin "On Volcanic Islands," pp. 56 and 57.

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105. CONCRETIONS *from pumiceous tufa*, composed of a very tough, compact, pale-brown stone, with a smooth and even fracture, and containing a small proportion of carbonate of lime.

Some of the larger concretions are described as mere shells filled with slightly consolidated ashes. (See Darwin "On Volcanic Islands," p. 47.)

On the lower shelf of this Case several other specimens of Obsidian, Sulphur, Cinders, Ashes, Sand, &c., from Ascension, are placed temporarily. These will be more particularly described in the next edition of the Catalogue.

Volcanic Specimens from the Galapagos Archipelago, Chatham Island.

(Collected and presented by CHARLES DARWIN, F.R.S.)

The Galapagos Archipelago consists of ten islands, situated under the equator, 500 or 600 miles westward of the coast of America. They are all formed of volcanic rocks, and are chiefly remarkable for the immense number of craters with which they are covered. These are formed either of lava and scoriæ, or of tufa; in the latter case they present beautifully symmetrical forms, which appears to be owing to their having been formed while standing out at sea, by the eruptions of volcanic mud, without any lava.

Chatham Island is the largest of three islands, intersected by the parallel of 43° 45″ S., and by the meridian of 176° 40′ W. It contains 477 square miles. The rocks are chiefly volcanic, and the island itself presents a rugged, arid appearance; the dark basaltic lava, of which the surface is composed, being covered by a dwarfed and parched brushwood.—H. W. BRISTOW.

106. BASALTIC LAVA from the surface of the stream, slightly scoriaceous, and twisted and convoluted by flowing while in a viscous state.

From the road near Dead Man's Cove.

107. VESICULAR AND SCORIACEOUS LAVA.

Dead Man's Cove.

108. SCORIACEOUS LAVA.

Evans' Well.

109. VOLCANIC SLAG or CINDER, mixed with fine-grained, friable, brown-coloured *Tufa* or *Peperino*.

From the mouth of the crater.

110. CELLULAR BASALT, containing *olivine* and *calc spar*.

North Hill.

111. BASALTIC LAVA, with numerous small vesicles.

Road from First Well, Charles' Island.

112. CELLULAR BASALT, with *olivine*, and minute crystals of *calc spar*.

Salt Lake, Chatham Island.

113. CELLULAR BASALT.

Bottom of the well near Quebrada.

Some of the cells contain *olivine*, and others crystals of *calc spar*.

114. TRACHYTIC LAVA.

Evans' Well.

115. COMPACT GREENSTONE.

Dalrymple Rock.

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116. PORPHYRITIC GREENSTONE.
Near the summit of Pico d'Estacia, Boã Vista, Cape de Verde Islands.*

Composed of crystals of *hornblende* and flesh-coloured *felspar*, and weathered crystals of *glassy felspar* in a felspathic base.

117. GREEN PITCHSTONE.
Mayo Island, Cape de Verde group.

117a. CELLULAR BASALTIC LAVA.
St. Jago, Cape de Verde Islands.

Some of the cells are elongated, and partly filled with earthy *carbonate of lime*. (See Darwin "On Volcanic Islands," p. 10.)

118. SEMI OPAL between two layers of *chalcedony*, the lowest of which has been formed upon crystals of *calc spar*, which have disappeared, leaving their casts.
Hicaron Island, Coiba.

119. OBSIDIAN, *with sphærulitic concretions*, showing by transmitted light an olive-green colour, on the thin, cutting edges.
Mexico.

120. BASALT, with *Greenstone*.
Kattewar, East Indies.

Volcanic Products from White Island, New Zealand.

Presented by the Lords of the Admiralty.

White Island, or Puhia-i-Wakari, is situated in the Bay of Plenty, in the south-east district of New Zealand. It is six miles in circumference. It contains an active volcano, and yields considerable quantities of sulphur. The flames issuing from its crater are visible at dusk, while its position is marked during the day-time by a white cloud, which rests upon its summit.—H. W. B.

121. VOLCANIC BOMB, composed of *basaltic lava*, with numerous crystals of *glassy felspar*.

122. SCORIACEOUS BASALTIC LAVA, with crystals of *augite* and *glassy felspar*.
Upper Waipa, from the summit of Kokibako, an extinct volcano.

123. Vesicular BASALTIC LAVA.
From the central part of White Island.

Some of the vesicles partly filled with *calc spar*.

124. Part of a pentagonal column of BASALTIC LAVA, five feet in height.
From the interior of the crater, being lava of September 1831.

125. BASALTIC LAVA, forming the sides of extinct volcanos in the vicinity of Auckland, on the neck of land which separates the Frith of Thames from Manukau; *it assumes a columnar form in some places.*

Most probably this specimen is not, in reality, *basaltic lava*, but a portion of a *mud stream*, which has been poured out of the volcano, and subsequently covered by a lava-stream, by which it has been baked, while the columnar form has been caused by its subsequently cooling slowly under pressure.

126. OBSIDIAN, with a conchoidal fracture and sharp, cutting edges, and presenting a lamellar structure from the presence of lines of a white powder. There are also a few disseminated crystals of *glassy felspar*, some of which have apparently undergone partial fusion.

127. SILICEOUS SINTER.
Motu-hora.

* 1260·5 feet above the level of the sea.

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128. Siliceous Sinter, sometimes assuming the form of *chalcedony.*

129. Gypsum, in radiating crystals.

130. Gypsum, in thin prismatic crystals.

131. Crystals of Native Sulphur, sublimed on more earthy impure sulphur.

132. Brecciated Conglomerate, partly covered with *native sulphur.*

From the rock of which the island is chiefly formed.

133. Volcanic Ashes, forming much of the surface of the country in the neighbourhood of Auckland.

Crimea.

134. Mud *from a volcanic spring* at Kertch in the Crimea, and used, when mixed with sand, for making pavements.

Presented by Dr. Mac Pherson.

135. Naphtha, from bituminous springs at Kertch, and used for various purposes instead of pitch.

Presented by Dr. Mac Pherson.

Case in Recess 2.

Geological Model of Arthur's Seat,

By Mr. Robison Wright.

Re-coloured from the Map of the Geological Survey;

By Archibald Geikie, F.R.S.E.

Arthur's Seat is the name of a hill about 820 feet high, and a square mile in extent, forming the eastern boundary of Edinburgh. It consists of two parts, separated by the deep valley of the Hunter's Bog; that to the west rises from the streets of the town in a steep slope crowned by a semicircular mural escarpment, called Salisbury Craigs, which descends on the other side into the Hunter's Bog. The eastern portion of the hill is formed of successive terraces, with dividing valleys running north and south, their southern terminations being marked off by a confused pile of rock which slopes up from the north and east, and descends precipitously on the other sides. This higher part of the hill, which, seen from certain localities, looks like a great irregular cake laid down upon the lower ridges, is crowned by a crag of basalt forming the summit, or Arthur's Seat proper. To this peculiar contour the geology of the hill bears special reference. The ridges are all of hard trap; the intervening valleys consist of softer rocks, which have yielded more readily to disintegration; while the higher irregular mass of rock at the south side belongs to a much later age, and is really what it appears to be, a newer group of ridges set down on the tops of the older ones. The hill is thus of two distinct geological ages. The older rocks form part of the Lower Carboniferous Series, and are all inclined to the east at an average angle of about 20°. The under or westerly part consists of a set of white, red, green, and mottled sandstones, fine conglomeratic grits, coarse limestones, and red and green

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