valleys, much exposed to avalanches. The hospice on the summit is first mentioned in 1331, and from 1683 onwards was in charge of two Capuchin friars. But in 1775 the buildings near it were damaged by an avalanche, while in 1799-1800 everything was destroyed by the French soldiery. Rebuilt in 1834, the hospice was burnt in March 1905. The mule path (dating from about 1293) across the pass served for many centuries, for though Mr Greville, in 1775, succeeded in taking a light carriage across, the carriage-road was only constructed between 1820 and 1830. Now the pass is deserted in favour of the great tunnel (pierced in 1872-1880, 9¼ m. in length, and attaining a height of 3786 ft.), through which runs the railway (opened in 1882) from Lucerne to Milan (175½ m.), one of the greatest engineering feats of the 19th century. It runs mainly along the eastern shore of the Lake of Lucerne, from Lucerne to Flüelen (32¼ m.), and then up the Reuss valley past Altdorf and Wassen, near which is the first of the famous spiral tunnels, to Goeschenen (56 m. from Lucerne). Here the line leaves the Reuss valley to pass through the tunnel and so gain, at Airolo, the valley of the Ticino or the Val Leventina, which it descends, through several spiral tunnels, till at Biasca (38 m. from Goeschenen) it reaches more level ground. Thence it runs past Bellinzona to Lugano (30½ m. from Biasca) and reaches Italian territory at Chiasso, 35 m. from Milan. In 19o9 the Swiss government exercised the right accorded to it by the agreement of 1879 of buying the St Gotthard Railway from the company which built it within thirty years of that date. (W. A. B.C.)

**ST** HELENA, an island and British possession in the South Atlantic in 15° 55' 26" S., 5° 42' 30" W. (Ladder Hill Observatory). It lies 700 m. S.E. of the island of Ascension (the nearest land), **1200** m. W. of Mossamedes (the nearest African port), 1695 N. W. of Cape Town, and is distant from Southampton 4477 m. It has an area of about 47 sq. m., the extreme length from S.W. to N.E. being 10¼ m. and the extreme breadth 8¼. The island is of volcanic formation, but greatly changed by oceanic abrasion and atmospheric denudation. Its principal feature, a semi- circular ridge of mountains, open towards the south-east and south, with the culminating summit of Diana’s Peak (2704 ft.) is the northern rim of a great crater; the southern rim has disappeared, though its débris apparently keeps the sea shallow (from 2o to 50 fathoms) for some 2 m. S.E. of Sandy Bay, which hypothetically forms the centre of the ring. From the crater wall outwards water-cut gorges stretch in all directions, widening as they approach the sea into valleys, some of which are 1000 ft. deep, and measure one-eighth of a mile across at bottom and three-eighths across the top (Melliss). These valleys contain small streams, but the island has no rivers properly so called. Springs of pure water are, however, abundant. Along the enclosing hillsides caves have been formed by the washing out of the softer rocks. Basalts, andesites and phonolites, represent the chief flows. Many dikes and masses of basaltic rock seem to have been injected subsequently to the last volcanic eruptions from the central crater. The Ass’s Ears and Lot’s Wife, picturesque pinnacles standing out on the S.E. part of the crater ridge, and the Chimney on the coast south of Sandy Bay, are formed out of such injected dikes and masses. In the neighbourhood of Man and Horse (S.W. corner of the island), throughout an area of about 40 acres, scarcely 50 sq. yds. exist not crossed by a dyke. On the leeward (northern) side of St Helena the sea-face is generally formed by cliffs from 600 to 1000 ft. high, and on the windward side these heights rise to about 200o ft., as at Holdfast Tom, Stone Top and Oid Joan Point. The only practicable landing-place is on the leeward side at St James’s Bay—an open roadstead. From the head of the bay a narrow valley extends for 1½ m. The greatest extent of level ground is in the N.E. of the island, where are the Deadwood and Long- wood plains, over 170o ft. above the sea.

*Climate.*—Although it lies within the tropics the climate of the island is healthy and temperate. This is due to the south-east trade-wind, constant throughout the year, and to the effect of the cold waters of the South Atlantic current. As a result the temperature varies little, ranging on the sea level from 68° to 84° in summer and 57° to 70° in winter. The higher regions are about 10° cooler. The

rainfall varies considerably, being from 30 to 50 in. a year in the hills.

*Flora.—*St Helena is divided into three vegetation zones: (1) the coast zone, extending inland for 1 m. to 1½ m., formerly clothed with a luxuriant vegetation, but now “ dry, barren, soilless, lichen- coated, and rocky,” with little save prickly pears, wire grass and *Mesembryanthemum* ; (2) the middle zone (4oo-18oo ft.), extending about three-quarters of a mile inland, with shallower valleys and grassier slopes—the English broom and gorse, brambles, willows, poplars, Scotch pines, &c., being the prevailing forms; and (3) the central zone, about 3 m. long and 2 m. wide, the home, for the most part, of the indigenous flora. According to W. B. Hemsley (in his report on the botany of the Atlantic Islands),1 the certainly in- digenous species of plants are 65, the probably indigenous 24 and the doubtfully indigenous 5; total 94. Of the 38 flowering plants 2o are shrubs or small trees. With the exception of *Scirpus nodosus,* all the 38 are peculiar to the island; and the same is true of 12 of the 27 vascular cryptogams (a remarkable proportion). Since the flora began to be studied, two species—*Melhania melanoxylon* and *Acalypha rubra—*are known to have become extinct; and at least two others have probably shared the same fate—*Heliotropium pennifolium* and *Demazeria obliterata. Melhania melanoxylon,* or “ native ebony,” once abounded in parts of the island now barren; but the young trees were allowed to be destroyed by the goats of the early settlers, and it is now extinct. Its beautiful congener *Melhania erythroxylon ("*redwood ”) was still tolerably plentiful in 181o, but is now reduced to a few specimens. Very rare, too, has become *Pelargonium cotyledonis,* called “Old Father Live-for-ever,” from its retaining vitality for months without soil or water. *Commi­dendron robustum* (“ gumwood ”), a tree about 20 ft. high, once the most abundant in the island, was represented in 1868 by about 1300 or 1400 examples; and *Commidendron rugosurn ("*scrubwood ”) is confined to somewhat limited regions. Both these plants are char­acterized by a daisy- or aster-like blossom. The affinities of the indigenous flora of St Helena were described by Sir Joseph Hooker as African, but George Bentham points out that the *Compositae* shows, at least in its older forms, a connexion rather with South America. The exotic flora introduced from all parts of the world gives the island almost the aspect of a botanic garden. The oak, thoroughly naturalized, grows alongside of the bamboo and banana. Among other trees and plants are the common English gorse; *Rubus pinnatus,* probably introduced from Africa about 1775; *Hypochaeris radicata,* which above 1500 ft. forms the dandelion of the country; the beautiful but aggressive *Buddleia Madagascariensis; Physalis peru­viana;* the common castor-oil plant; and the pride of India. The peepuI is the principal shade tree in Jamestown, and in Jamestown valley the date-palm grows freely. Orange and lemon trees, once common, are now scarce.

*Fauna.—*St Helena possesses no indigenous vertebrate land fauna. The only land groups well represented are the beetles and the land shells. T. V. Wollaston, in *Coleoptera Sanctae Helenae* (1877), shows that out of a total list of 203 species of beetles 129 are probably aboriginal and 128 peculiar to the island—an individuality perhaps unequalled in the world. More than two-thirds are weevils and a vast majority wood-borers, a fact which bears out the tradition of forests having once covered the island. The *Hemiptera* and the land-shells also show a strong residuum of peculiar genera and species. A South American white ant *(Termes tenuis,* Hagen.), introduced from a slave-ship in 1840, soon became a plague at Jamestown, where it consumed a large part of the public library and the woodwork of many buildings, public and private. Practically everything had to be rebuilt with teak or cypress—the only woods the white ant cannot devour. Fortunately it cannot live in the higher parts of the island. The honey-bee, which throve for some time after its introduction, again died out (cf. A. R. Wallace, *Island Life,* 1880). Besides domestic animals the only land mammals are rabbits, rats and mice, the rats being especially abundant and building their nests in the highest trees. Probably the only endemic land bird is the wire bird, *Aegialitis sanctae Helenae;* the averdevat, Java sparrow, cardinal, ground-dove, partridge (possibly the Indian *chukar),* pheasant and guinea-fowl are all common. The pea-fowl, at one time not uncommon in a wild state, is long since exterminated. There are no freshwater fish, beetles or shells. Of sixty-five species of sea-fish caught off the island seventeen are peculiar to St Helena; economically the more important kinds are gurnard, eel, cod, mackerel, tunny, bullseye, cavalley, flounder, hog-fish, mullet and skulpin.

*Inhabitants.—*When discovered the island was uninhabited. The majority of the population are of mixed European (British, Dutch, Portuguese), East Indian and African descent—the Asiatic strain perhaps predominating; the majority of the early settlers having been previously members of the crews of ships returning to Europe from the East. From 1840 onward for a considerable period numbers of freed slaves of West African origin were settled here by men-of-war engaged in suppressing the slave trade. Their descendants form a distinct element

1 In the “Challenger” expedition reports, *Botany,* vol. i. (1885).