

BOTANICAL AND OTHER OBSERVATIONS ON REDONDA, THE WEST INDIES

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THERE ARE MANY SMALL ISLANDS in the West Indies, but none is so intriguing as Redonda to the traveler in the Leeward Islands. Isolated and pinnacle-like, Redonda is a landmark to the sailors who pass it. Since deep water surrounds the rock, one can approach it closely, only to learn that a landing appears to be difficult, if not impossible. From the east, Redonda appears to live up to its descriptive name as a round island, and as the descriptions of Redonda have varied little from the original supplied by Columbus, who named it, one suspects that few of the recent writers have done more than reword an earlier description. At one time, the island of Redonda supported a mining operation and had about 130 people living on it, but for the last half a century it has been uninhabited. The island, however, is reported to have a "king" representing a regency now in the second dynasty. There are only meager botanical records from Redonda, and only one other biologist, an entomologist, has climbed to the crest.

During several weeks of field work on Montserrat in January, 1961,¹ I saw Redonda daily in the distance. Finally, the temptation to visit it became overwhelming, and with the assistance of Mr. Kingsley Howes, my wife and I chartered the schooner "Melody" for a day and the trip to Redonda. Departure before the break of dawn allowed a smooth and rapid passage to the island, where we landed, climbed to the peak, explored the shaft of the phosphate mine, and collected some samples of the vegetation. Descending in midafternoon, we set sail and broke out of the lee of the island with some difficulty, returning to Montserrat before sunset through rougher seas. The diversity of the vegetation, although mostly of weedy species, was unexpected. This alone compensated for the physical difficulties of the trip. It is not to be recommended to a tourist.

Redonda lies about 25 miles southeast of Nevis, and 15 miles northwest of Montserrat. It is clearly visible from both of these larger islands. Redonda is recorded as being about 1.5 miles long and 0.3 miles wide, and the highest point is given by Martin-Kaye as 975 feet by aneroid reading (Reports on the geology of the Leeward and British Virgin Islands, p. 77. 1959). The island is obviously volcanic in origin, presumably of the post-Pliocene period, and a part of the volcanic chain of the Leeward Island group including Saba, St. Eustatius, St. Kitts, Nevis, and Montserrat. It is a fragment of a volcano, however, for the western two-thirds have been

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lost in ocean depths, which reach 600 fathoms a short distance off shore. From the sea, the western face of the island is sheer, broken only by a mining scar at the northern end and one or two flume-like gullies farther south. In places, the vertical face appears to extend the full 975 feet. Various colored rocks and multiple layers of lava flows draw one's eye. Sea-eroded cliffs 100 feet high surround the remainder of the island, making the initial assault a formidable feat, impossible except in one place. Clearly some cataclysmic event split Redonda in the past to leave the fragment present today. The local story that this split occurred in the 17th century and was observed by a passing sea captain cannot be checked. One can only wonder when the discrepancy developed between the early descriptions of the island and its present condition.

Redonda was discovered and named by Columbus on November 11–12, 1493, on his second voyage. Morrison, in *Admiral of the Ocean Sea* (p. 410), relates that "from the northern end of Montserrat, Columbus sighted a large island to the northwestward but did not care to beat up to it against a trade wind. He named it Santa Maria la Antigua."

"Proceeding in a general northwesterly direction the fleet passed a small steep and rounded but inaccessible rock less than a mile long, which Columbus named Santa Maria la Redonda, St. Mary the Round. Redonda retains her name and her importance as a sea mark to this day; but she has never been worth inhabiting."

Other historians have about the same story. In the *Life of Christopher Columbus*, by his son Ferdinand (p. 125), it is reported that "from here he proceeded to Santa Maria la Redonda, to which he gave the name because it is so round and smooth that it is impossible to climb its sides without a ladder." Markham (*Columbus*, p. 152, 1892) reports Redonda to be "a round islet [that] was seen to the westward, so steep on all its sides that it seemed inaccessible without stairs or ropes thrown from the top." More recently, Sir Frederick Treves, in *The Cradle of the Deep* (1908), described Redonda (p. 196) as "a smooth pale fabric of stone rising out of the sea, like the dome of some immense submarine hall, whose span is a mile. It reaches to the height of 1,000 feet. It is bare as a pebble. . . ." Ober (*A Guide to the West Indies, Bermuda and Panama*, p. 343, 1920) says of Redonda, "It appears scarcely more than a rock pinnacle rising above the sea between Nevis and Montserrat, but it is a mile and a half in length by a mile in breadth, with an altitude of 1,000 feet. The Spaniards called it Redonda, or the Round Island, from its shape." Thus, the dimensions suggested by the chroniclers of Columbus do not vary from those of the present. It is not clear whether Columbus, viewing the island in the late evening, passed to the east and did not notice the steep western face, or whether the island has truly split since the time of discovery.

Although many naturalists passed the island of Redonda in the 17th, 18th, and 19th centuries, apparently not one of them reached it. Only Sir Hans Sloane appears to have noted the island, and even he fails to comment on its shape in his published writing. G. R. de Beer (*Sir Hans Sloane and the British Museum*, 1953) refers to a letter from Sloane which

is now in the British Museum. Sloane wrote of his trip north from Barbados in September, 1687, "Between Montserrat and Nieves lies a very small Island called Redondo or Rotunda, discovered by Columbus in his



ABOVE: Redonda as seen from the southeast. BELOW: Redonda from the northeast. The wave-cut cliffs and the cirques are from one to several hundred feet high.

Second Voyage, who gave it the name Santa Maria Rotonda, from its Figure. It consists of one Rock, very Perpendicular and high, looking like a Pyramide, and if there were nothing but Rock, but I was inform'd by those who have been on it, that there is on its top an Acre or two of very good Ground, that it has a very good Landing-Place, and a Well of very good fresh Water. It has also a great store of Iquanas of black color. Many Boobies, and other Birds that come hither to lay their Eggs at proper Seasons."

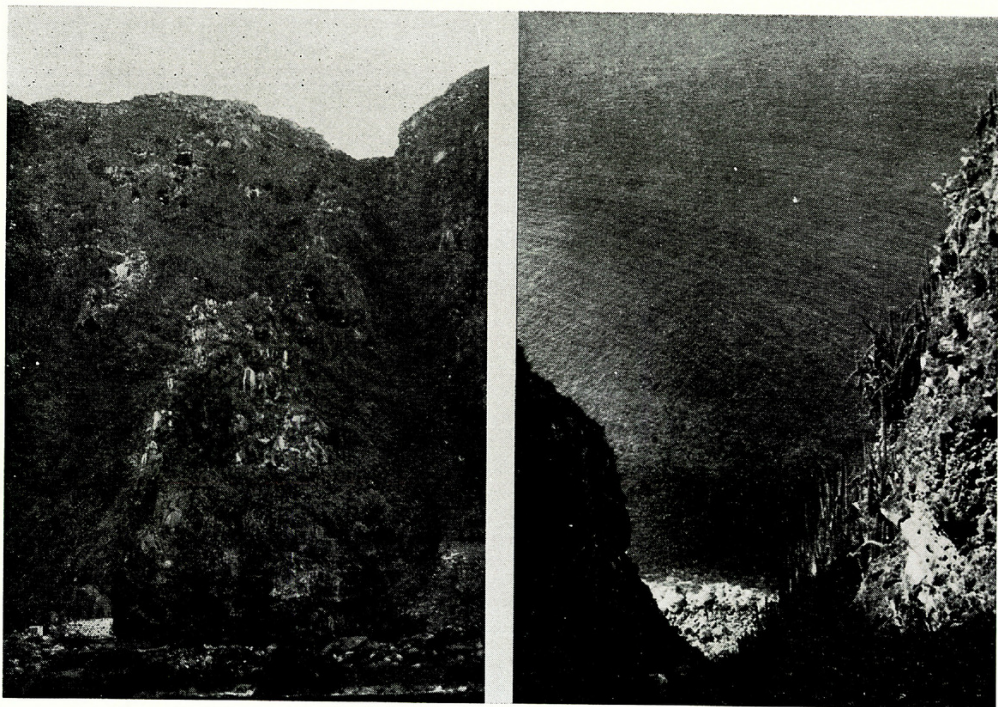
Redonda was not visited by a naturalist until the Smithsonian-Bredin expeditions of 1956 and 1958 stopped at the island. Waldo Schmitt related in the Smithsonian Report (457-8, *pl.* 6. 1957; 429-30. *pls.* 9, 10. 1959) of his visit to the shore and of the ascent of Redonda by J. F. Gates Clarke, who climbed the ridge on the first visit, and on the second made the ascent and spent the night collecting insects, while defending himself from the rats which infest the rock. Dr. Clarke gathered a few plant specimens, but some of these were lost, and others so ruined in the descent as to be of little use, and so were discarded. Dr. Clarke's photographs remain, to the present, the only published photographs of the island and its summit. Several comparisons between his photographs and my own or between our observations will be made.

Although currently uninhabited, Redonda has not always been so. At some unspecified period prior to 1860, ores containing phosphate were discovered on Redonda, and between 1865 and 1912 this material was mined. Shephard (*Am. Jour. Sci.* II. 47: 428. 1869; 48: 96. 1870) described this mineral as Redondite, a name later shortened to Redonite, and currently considered to be variscite. It is included in a porphyritic or felsparphyric olivine basalt. In 1891, Hitchcock (*Bull. Geol. Soc. Am.* 2: 7. 1891) reported an analysis to show concentrations of P_2O_5 as high as 42.9%, but a modern analysis of the residue remaining on Redonda yielded only 18% P_2O_5 .

Mr. Fred W. Morse visited Redonda in the company of Prof. Charles H. Hitchcock in the summer of 1890, and reported on the trip (*Popular Science Monthly* 46: 78-87. 1894). His colorful description of Redonda and the activities thereon is worth repeating. Redonda was reached after a sail of three hours from Montserrat, Mr. Morse related. "As we approached the pier, a boat manned by two negroes put off to meet us, with a strongly built man with a pleasant face and brown beard and dressed in white linen sitting in the stern. The man proved to be Captain H —, the superintendent of the mine, who welcomed us to Redonda and transferred us with our baggage to the shore.

"The beach was only a few yards in width, and above us towered the cliffs, over five hundred feet high. Groups of men stood on their brink, looking down at us and appearing like silhouettes against the clear sky. The ascent to the plateau above . . . was accomplished upon an aerial tramway.

"Two stout, heavy wire cables were stretched up the gorge and firmly anchored at both ends. Upon each cable ran a trolley, from which was



LEFT: Western escarpment of Redonda, showing remnants of the cable base and landing. An ascent must be made in the right-hand (southern) gully. RIGHT: View down the gully from the saddle. Plants of *Cephalocereus* and *Melocactus* are visible on the right. Notice the narrow coastal shelf and the deep water within a few yards of shore.

suspended a large iron bucket. To each trolley was attached the end of a light yet strong wire cable, which passed over a set of heavy pulleys at the top of the cliff, thus causing one bucket to ascend as the other descended. When passengers or freight were to be raised, the bucket at the top of the cliff was filled with water from a tank, and the lighter load at the bottom was quickly drawn up. The speed was regulated by means of brakes applied to the pulleys.

"The main cables were eight hundred feet long and the load was raised to the height of five hundred and twenty-five feet above the beach. In places the wires ran at a height of sixty feet above the uneven surface of the gorge.

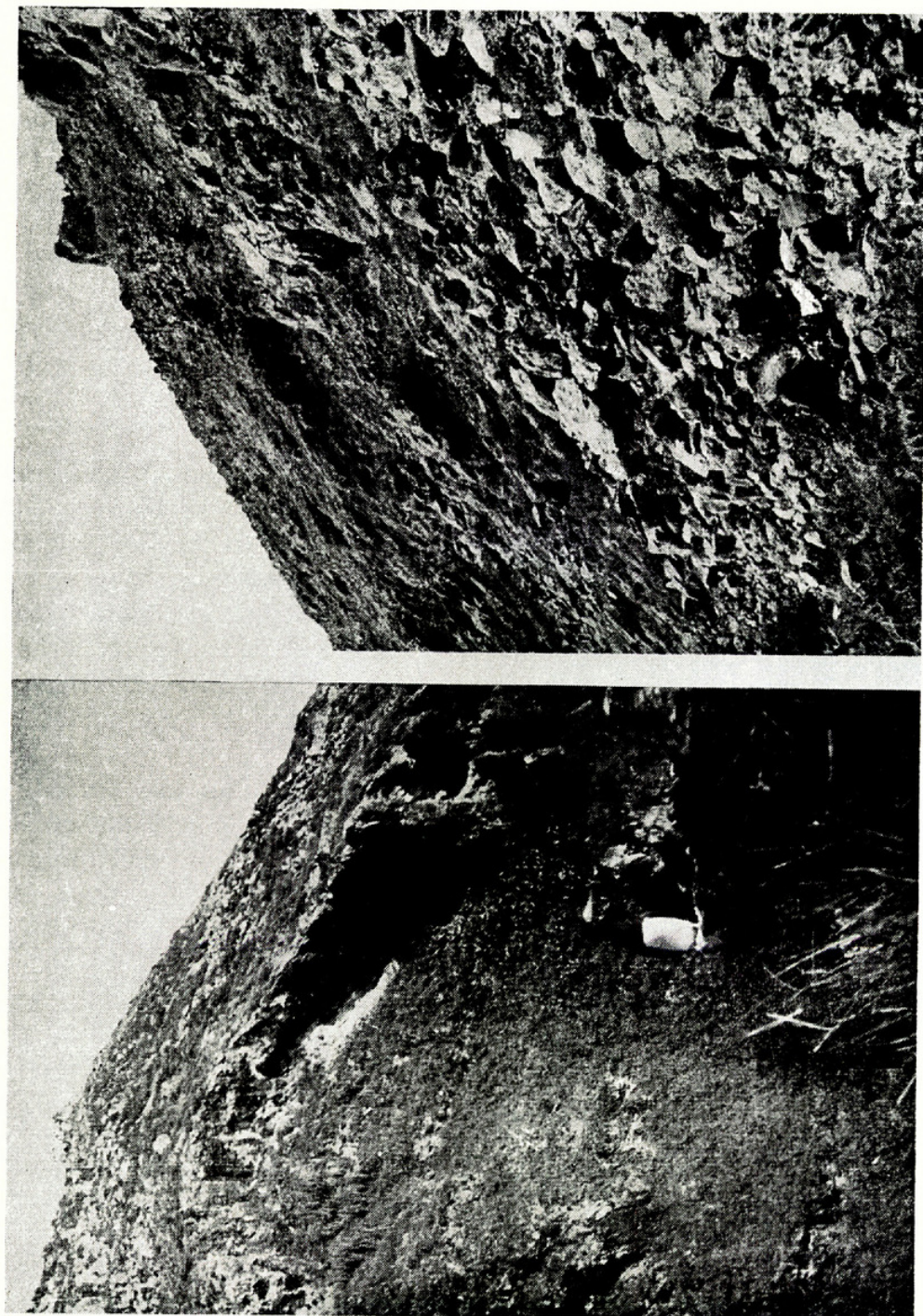
"We were invited to get into the bucket which was at the foot. Captain H — stood on the edge, clinging to the trolley, and we rapidly glided up between the steep walls of the gorge, from whose rocky sides peered round cactus plants like heads of gnomes and several strange shrubs threw down aerial roots as though in a vain effort to reach the thin soil at the bottom. On gaining the landing at the top, we were . . . conducted up the slope a hundred yards to the superintendent's house. The dwelling and office were really two separate buildings joined together by a wide veranda between them and along their front. . . . the buildings had been framed and ready for putting together, and were small cottages with two rooms and with roofs of corrugated iron. We were met at the house by Mrs. H — and her young daughter, Dorothea, who, with the captain, were the sole white inhabitants of the island. A small black boy called Chalmers showed us to our room, where we prepared for dinner. By this time, the short twilight of the tropics had been succeeded by darkness, and when we returned to the dining room with its bright light we could hardly believe that we were upon an almost inaccessible rock in the Caribbean Sea.

"The next morning, just before daybreak, while yet dark as night in the room, we were awakened by the cries of the sea birds, which made their homes by the hundreds in crevices and niches of the cliffs. Very soon a bell rang in front of the house to awaken the workmen in the huts below us."

Later Morse visited the mine. "The path to the mine led us along the eastern slope of the island to the northern face of the main peak, where a wide and deep ravine separated us from the smaller peak. The distance from the house to the mine was about three-fourths of a mile. The path was very steep in places as it ascended towards the summit in order to avoid a deep gorge, and sometimes so narrow that a misstep would give one a bad fall down the slope."

Morse reported on the birds and lizards around the house, and commented that "several sheep and goats, two dogs, some hens, two peacocks, and a white cat comprised the domestic animals of this Crusoe-like home. From time to time the sheep and goats had become wild and had taken to the almost inaccessible parts of the cliffs and gorges, where it was exciting sport to pursue them.

"After lunch, when the sun had begun to descend towards the west,



LEFT: View of western face of Redonda showing the rock pinnacle, the highest point of the island. A cirque formed by erosion and land slides is seen above the resting booby. RIGHT: Scree slope about the middle elevation on the eastern side. *Peperomia* and *Psilotum* were found in moist areas among the rocks.

Captain H — took us down to the plateau below the house to look at the quarters occupied by the workmen. The buildings consisted of two long sheds with close shutters instead of glass windows, and contained for furniture nothing but a tier of bunks or rather shelves, of rough boards along the walls. . . . Near the buildings were ovens where the baking was done. . . . Their fare was simple, consisting of bread and salt beef. The foremen and skilled workmen occupied two smaller houses, but lived in the same manner. Water for drinking was obtained by catching the rain on large inclined surfaces of corrugated iron, and collecting it in reservoirs. Such a reservoir was built at each end of the island for the use of the men, and the superintendent's dwelling was provided with capacious tanks connected with the roof. . . ."

Tempany (West Indian Bull. 15: 22–25. 1915) visited Redonda in 1915, after a disastrous hurricane on August 7, 1899, destroyed the buildings Morse had described. Tempany's descriptions, while less picturesque, give further details on the mining operations and on the living conditions of the workmen. Until the time of Tempany's visit, phosphate rock was mined in four places on the island. The rebuilt dormitories now had space for 180 men, and the working conditions, including the rations of food and water, indicate that life for the laborers from Montserrat was anything but serene. Breakfast and lunch were served at the mine areas. After the cable at the northern end of the island weakened and collapsed, all ore was carried over the treacherous trail in basket loads of 84 pounds each on the heads of the men to the remaining cable near the manager's house.

Although the last shipment of ore was made in 1912, ore was stockpiled at both ends of the cable until July, 1914. It cannot be definitely established when the island was evacuated, but it is known that a skeleton crew was maintained on the island until the hurricane of 1929 blew away the remaining buildings, and the company's lease was finally relinquished in 1930.

Martin-Kaye, in describing the resources of the Leeward Islands, suggests that "the outlook for Redonda, however, is poor. The reserves are not known and to determine them would be expensive. Reports have it that the material was becoming more difficult to win. . . . There is the possibility that important resources remain, and this is supported to some measure by the length of time for which the defunct company held on to the lease. If they thought that the island held little further reserves the lease would presumably have been abandoned earlier."

The story of the "King of Redonda" is worth reporting, for it is well known and often repeated by the residents of the nearby islands. The details vary a bit with the teller, and two published versions are also known. Bradley Smith, in his excellent book *Escape to the West Indies*, gives a straightforward account obtained from Charlesworth Ross, recently commissioner on Montserrat. Apparently the story began in 1865, when Matthew Dowdy Shiel claimed the island of Redonda, and a few years later had his son, Matthew Phipps Shiel, later better known as the

writer M. P. Shiel, proclaimed King Felipe the First. Smith reports that the British Colonial office eventually "tacitly admitted" his claim, although today the island of Redonda remains under the administration of the government of Antigua. Eventually the younger Shiel passed his title to John Gawsworth through an ancient succession ceremony involving the mingling of blood through cuts on the wrist. After Shiel's death in 1947, Gawsworth became King Juan the First, and has since appointed many prominent figures Dukes of Redonda. A more glamorous version of this tale appeared in a recent issue of a popular magazine (*Men Only* [London] 75: 58-60. 1960) under the title of "King of all the Seagulls." The coincidence of a disputed regency and a seemingly profitable mining operation makes one wish for more of the details of Shiel's claim.

THE VEGETATION

A visit to Redonda is becoming increasingly more difficult. Storms of recent years have all but destroyed the loading pier, the remnants of which mark the landing spot. Once on the narrow, boulder-strewn "beach," the only direction one can move is up. The ascent of Redonda is made along a cleft filled with volcanic gravel, which rises at a 60 degree angle. One climbs using all appendages, and the only resting place is the saddle, or ridge, fully 500 feet above the sea. In the afternoon, this valley assumes all of the characteristics of an oven, and, without a hint of a breeze on this, the leeward side, the rocks become too hot to touch. At the ridge, one finds a small level plateau on which are the foundations of former buildings and the rusting machinery of the old phosphate mine. A grassy appearing slope descends at an angle of 30 degrees to the east and the south. Broken water catchments, and the foundation of the manager's house, are on the slope to the north, which is capped with a pinnacle of large boulders. A disintegrating foot path follows a circuitous route of varying altitude to a mine shaft, a short tunnel, at the northern end of the island. In all directions there is a breath-taking view of the northern Caribbean.

Redonda supports a wild herd of nearly one hundred goats, some of the males massive and handsome specimens with beards nearly reaching the ground. Their hooves left prints the width of my hand. Myriads of sea birds nest on the island. During the peak of the laying season, the men from Montserrat visit the island and gather eighty dozen eggs a day for sale on adjacent islands. Rats persist on all parts of Redonda, and sleep is impossible along the shore or in the ruins of the buildings because of the attacks of these animals. Lizards and iguanas are commonly seen, but appear to be more agile than usual in avoiding capture.

The early accounts of the plant life of Redonda are meagre. Morse, who visited the island with Charles Hitchcock, reports of their interest in the minerals, as well as the flora and the fauna. In addition to the "round cactus plants like heads of gnomes" and "several strange shrubs which threw down aerial roots" seen on the west wall of the island, he mentions the "red and yellow blossoms of the cactus" around the manager's house. He reports that "a few air plants, a species of *Tillandsia*,



ABOVE: The grassy slope of Redonda as seen across the plateau (saddle) and site of the former barracks and mining buildings. The ruins of the manager's house are seen toward the upper right. BELOW: A closer view of the rocks and vegetation of the same slope. Volcanic "bombs" are infrequent. *Opuntia repens*, known locally as "suckers," is abundant. *Agave*, *Croton*, *Lantana*, and *Wedelia* species are dominant.

clung to the projections of the rocks and formed almost the sole vegetation at the extreme summit." He was also impressed that "one of the drawbacks to exploring the island was a variety of cactus which the workmen spoke of as 'suckers.' It resembles the prickly pear in form and had a yellow blossom. Its joints or sections were thickly covered with thorns or spines, which were from three-fourths of an inch to an inch and a half in length and barbed at the tip. The joints were easily broken off, and clung to anything upon which their spines could catch. The animals about the place were almost always seen with from one to a half a dozen of these 'suckers' clinging to them. When a barbed spine became imbedded in the flesh it produced a sore unless removed at once, and it was usually necessary to cut it out in order to remove it."

Although Morse wrote, "The remainder of our stay was spent in collecting and preparing specimens of the phosphate, and also of the plants and animals," no records of these collections can be located.

Mr. C. Steffens (*Globus* 67: 49. 1895) reported that the island appeared treeless, but that near the peak were "Gold- und Silberfarne" and under other plants "Tillandsien."

In 1915, Trepany (*loc. cit.* 23) reported, "There is but little vegetation on the island, the surface being rock-strewn and barren, with no depth of soil. The principal vegetable forms which occur are species of Prickly pear (*Opuntia*) and Cacti, notably *Cereus*. It is, however, worthy of note that the silver fern (*Gymnogramme trifoliata*) and the gold fern (*Gymnogramme chrysophylla*) both occur fairly abundantly in places in sheltered crevices in the rocks."

More recently, Martin-Kaye (*loc. cit.* 77) states that Redonda possesses "scant vegetation beyond some coarse grass and extensive networks of particularly pugnaceous varieties of prickly pear. . . ." However, Clarke (Smithson. Rep. 430. 1959) reported, "The inclined plateau forming most of the top of the island is covered by coarse grasses, sedges, a slender narrow-leaved agave, several cacti in great abundance, lantana and several other scrubby shrubs." *Plates 9* and *10* associated with Clarke's report illustrate some of the plants I was able to collect.

Although early observers may have described Redonda to be "as bare as a pebble," plants exist on the island. Some ornamental or useful plants are remaining following cultivation, and a large number of "weeds" were obviously introduced. The typical strand plants of sandy beach and coral rock of the adjacent islands were missing; however, even the steep, wave-washed cliffs were abundantly populated with plants appearing to be perched in crevices or even on boulders soon to fall to the ocean below. The only level ground in the saddle, which formerly was occupied by mining buildings, had a wealth of grasses of wide-spread geographic distribution. The eastern slopes of Redonda were simply piles of boulders, yet on and between the stones were many plants so abundant that the footing was even more treacherous, as the stones were obscured by the growth of *Croton flavens*, *Lantana camara*, and *Wedelia calycina*, the broad-leaved species present.

By far the most memorable plants of Redonda are the "suckers," *Opuntia antillana*, *Opuntia repens*, and *Opuntia triacantha*. No description does justice to the audacity or tenacity of *Opuntia repens*. Truly its pads are delicately attached and its spines retrorsely barbed the full length. The slightest jar caused a fragmentation of the plant, and the pads penetrated with ease the canvas, leather, or heavy rubber footwear of various members of our party. On the rocky plateau, the plants were abundantly branched, extending in many directions, the segments stretching pad on pad over rocks and shrubs. On the cliff faces, plants of the same species seemed to develop a single stem structure. The plants hung in long festoons from the rocks, and single plants appeared to be as much as twenty feet in length. A slight touch with a stick or a falling rock would send the pads as individuals cascading down the slope on the unsuspecting climber below. If my records of the vegetation are inadequate or incomplete, the blame rests on this species alone.

Clarke reported that the only tree on Redonda was an introduced one, but failed to name it. *Casuarina equisetifolia* is clearly shown in his paper (pl. 10, fig. 2) near the ruins of the house of the manager of the mining company. In the vicinity are also introduced specimens of *Bougainvillea spectabilis*, its brilliant red flowers clearly visible from the schooner approaching the island; *Citrus aurantiifolia*, the lime; and *Annona squamosa*, the sugar apple. Since Clarke's visit in 1958, seedlings of *Ficus citrifolia* have been introduced by birds, for a nine-foot sapling is now flourishing from the apex of the central rock in Clarke's photo of the "very tiptop of Redonda" (pl. 9, fig. 2). Other abundant plants, obviously residual from the period of mining operation, are *Ricinus communis* and *Nicotiana tabacum*.

A spire-like cactus (*Cephalocereus royenii*) grew in profusion on the steepest slopes of the western escarpment, but nowhere could the plants be approached with safety in order to make a collection.

Although Clarke reported a cistern on top to be in "good condition," during our visit we found that all of them were dry and so cracked as to appear scarcely capable of holding water. No rainfall records are available, yet fortuitous showers must provide small pools or at least wet places deep in the piles of rock, and many of the scree slopes appeared damp and slippery. In damp, shady places on the eastern slopes, I was surprised to find several plants of *Psilotum nudum*, *Pityrogramma chrysophylla*, *Pilea microphylla*, and *Peperomia simplex*. Among the rocks, usually in slightly protected areas, were many plants of *Tillandsia recurvata*, but none was seen at the summit as Morse reported.

The following species represent the most complete account, to the present, of the vegetation of Redonda. All species cited by number are supported by vouchers deposited in the herbarium of the Arnold Arboretum. Regrettably, large collections could not be made, and several sight records are given for clearly recognized species which either could not be handled in my limited amount of collecting equipment, or just could not be reached over the edges of the precipices.

Lichenes

The determinations of this group were made by Dr. I. M. Lamb, of the Farlow Herbarium, where the supporting specimens are deposited. The unnumbered collections were some of the more colorful lichen-masses and were not separated in the field from the small rocks on which they grew.

Acarospora chrysops (s.n.)

Buellia prospersa (s.n.)

Calopaca sp. (s.n.)

Heppia bolanderi (s.n.)

Parmelia sp. (s.n.)

Ramalina subasperata (15227) — abundant in restricted areas of large boulders.

Roccella babingtonii (15228) — abundant, pendant from the underside of large boulders.

Psilotaceae

Psilotum nudum (15220) — a single clump found in a wet crevice under a large boulder.

Polypodiaceae

Pityrogramma chrysophylla (15231) — the silver form alone was found in a gully on the east slope, but smaller clumps of both the silver and gold forms were growing in cracks on the walls of the cistern above and to the west of the ruins of the manager's house.

Gramineae

Chloris inflata (15251)

Digitaria sanguinalis (15249)

Eragrostis ciliaris (15229, 15253)

Panicum maximum (15256)

Pappophorum pappiferum (15224) — a clump grass with conspicuous inflorescences.

Paspalum laxum (15252) — a large clump grass, the largest and most common grass on the island.

Setaria setosa (15250, 15257)

Trichachne insularis (15254)

Trichachne sp. (15234) — a distinct species which, unfortunately has no available name. Specimens are known from a range extending from Mexico to Peru, and this collection must have been introduced as a weed. Dr. Jason Swallen, who supplied this information, will describe and name the species at a later date.

Tricholaena repens — a colorful and easily recognizable grass, but only locally abundant.

Cyperaceae

Cyperus ligularis (15255) — a heavy clump sedge essentially limited to the higher elevations, the edges of the western precipice, and found occasionally on the sheer faces. Only rarely does the plant assume its normal shape, for the clumps are the favorite nesting places of the boobies (*Sula* spp.). The birds apparently keep the plants trimmed into a cushion shape, and, at the time of our visit, only a few of the lateral shoots bore inflorescences. (See Clarke's illustration *loc. cit.* pl. 10, fig. 1.)

Cyperus sphacelatus (15230)

Bromeliaceae

Tillandsia recurvata (15221) — certainly not as abundant as Morse and Steffens implied. All plants were found growing on rocks at higher elevations.

Agavaceae

Agave montserratensis — although it was impractical to collect specimens of this large *Agave*, a complete set of photographs allows this determination. Trelease's monographic treatment may need revision, but his recognition of many species in the Leeward Island area seems sound. The Redonda specimen appears to be the same as the plants found on Montserrat. Clarke's photograph (*pl. 10, fig. 2*) shows the characteristic habit and the long narrow leaves of this species which it is strange that earlier visitors did not notice. *Agave sisalana* — several plants of this species were seen near the ruins of the mine headquarters, suggesting that the plant may have been introduced as an ornamental or a possible crop plant.

Casuarinaceae

Casuarina equisetifolia (15233) — a single tree of this species was planted near the manager's house and is shown in Clarke's illustration (*pl. 10, fig. 2*). The specimen is pistillate, and no seedlings were to be found. The tree is a favorite nesting place for boobies, and all branches were heavily covered with guano.

Piperaceae

Peperomia simplex (15222) — Dr. T. G. Yuncker kindly identified this material and indicated that it is commonly known as *P. hamiltoniana* Miq., which is properly referred to *P. simplex* Ham. The present plants were abundant in damp areas under rocks and on the scree in gullies on the eastern side.

Moraceae

Ficus citrifolia (15247) — only three plants, all seedlings, were seen on Redonda. The largest grew in a crevice of the top-most boulder of the island, a rock covered with guano. Clarke's photograph of this same rock, taken in 1958, does not show this plant. The other specimens were in unapproachable locations on the steep western face of the island. Clearly the species has been introduced recently by birds.

Urticaceae

Pilea microphylla (15219) — this species occurred on rocks and the damp scree of the eastern gullies.

Amaranthaceae

Amaranthus dubius (15245) — a weed near the old building area.

Centrostachya indica — a weed along the old path to the mine.

Iresine angustifolia (15235) — a rampant herb among rocks at the summit.

Nyctaginaceae

Boerhaavia coccinea — on the plateau and on the western scree slope.

Bougainvillea spectabilis — a woody vine planted and persisting near the ruins of the manager's house.

Portulacaceae

Portulaca oleracea — a weed around the ruins and in the gully one ascends.

Portulaca halimoides (15218) — this, and the following two species, occur primarily on the scree slopes of the western face of the island.

Talinum triangulare (15223)

Trianthema portulacastrum

Annonaceae

Annona squamosa — a small shrub persisting following planting near the manager's house.

Capparidaceae

Cleome viscosa (15241) — a most common weed.

Leguminosae

Centrosema virginiana

Galactia sp. (probably *G. stricta*) — occurring commonly near the ruins, but all of the plants seen were sterile.

Tephrosia cinerea (15237) — an abundant herb found in many locations.

Rutaceae

Citrus aurantiifolia (lime) — a shrub persisting after cultivation near the manager's house.

Euphorbiaceae

Croton flavens (15240) — this species, *Wedelia calycina* and *Lantana camara* represent the most common broadleaved plants and dominant shrubs on the island. All of the plants, however, were of lower stature than the species assumes on other islands. Many of the flat-topped shrubs served as nesting places for the birds, and these plants appeared to be trimmed around the nests.

Croton lobatus (15244) — common herb in the western gully along which one ascends.

Euphorbia hirta (15246)

Euphorbia heterophylla

Jatropha gossypifolia — a weed around the ruins and in the scree of the western gullies.

Phyllanthus amarus — a weed around the ruins.

Ricinus communis — presumably persisting after cultivation; common in gullies on the west face of the island.

Malvaceae

Sida cordifolia (15239)

Cactaceae

Cephalocereus royenii — columnar cacti common on precipitous western escarpment.

Melocactus intortus — found primarily on the sheer western face of the island.

Opuntia antillana — a stout cactus of frequent occurrence.

Opuntia repens — "the sucker"; extremely abundant.

Opuntia triacantha — less frequent than *O. repens*, and less easily fragmented.

Plumbaginaceae

Plumbago scandens (15248) — abundant on the western escarpment.

Apocynaceae

Catharanthus roseus — occasional in mining area.

Asclepiadaceae

Cynanchum parviflorum (15225) — common vine on the plateau. A leafless form of this species hung in festoons from many rocks on the western face.

Verbenaceae

Lantana camara (15236) — an abundant shrubby species represented by the orange-yellow color form. All plants were spineless.

Lantana involucrata — found primarily at lower elevations above the cliffs on the windward side.

Stachytarpheta jamaicensis — infrequent.

Labiatae

Hyptis pectinata (15226, 15242) — frequent in occurrence, but usually browsed by goats.

Leonotis nepetifolia

Solanaceae

Nicotiana tabacum — occasional plants presumably persisting after cultivation.

Scrophulariaceae

Capraria biflora — a weed near the mine ruins.

Acanthaceae

Justicia periplocifolia (15238) — a narrow-leaved form usually browsed into abnormal growth forms. Determined by E. C. Leonard.

Rubiaceae

Oldenlandia corymbosa — occasional among rocks on the eastern slopes.

Compositae

Ageratum houstonianum

Emilia coccinea (15233A)

Pterocaulon virgatum (15232) — a few individuals at the northern end of the island.

Wedelia calycina — one of the common shrubs on the island.

After this article was set in type, I discovered a paper by Harold Box entitled "A Note on the Vegetation of Redonda, B. W. I." (Jour. Bot. 77, 311–313. 1939. Mr. Box, sailing from Antigua, visited Redonda on July 18, 1938. His observations were made from the landing place, since he was unable to climb the cliff. A list of 27 species, including *Talinum paniculatum* and *Lithophila muscoides* which I did not encounter, is given as the lithophyte flora of the island.



Howard, Richard A. 1962. "Botanical and Other Observations on Redonda, the West Indies." *Journal of the Arnold Arboretum* 43(1), 51–66.

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