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HENDERSON ISLAND (SOUTHEASTERN POLYNESIA): SUMMARY OF
CURRENT KNOWLEDGE

BY

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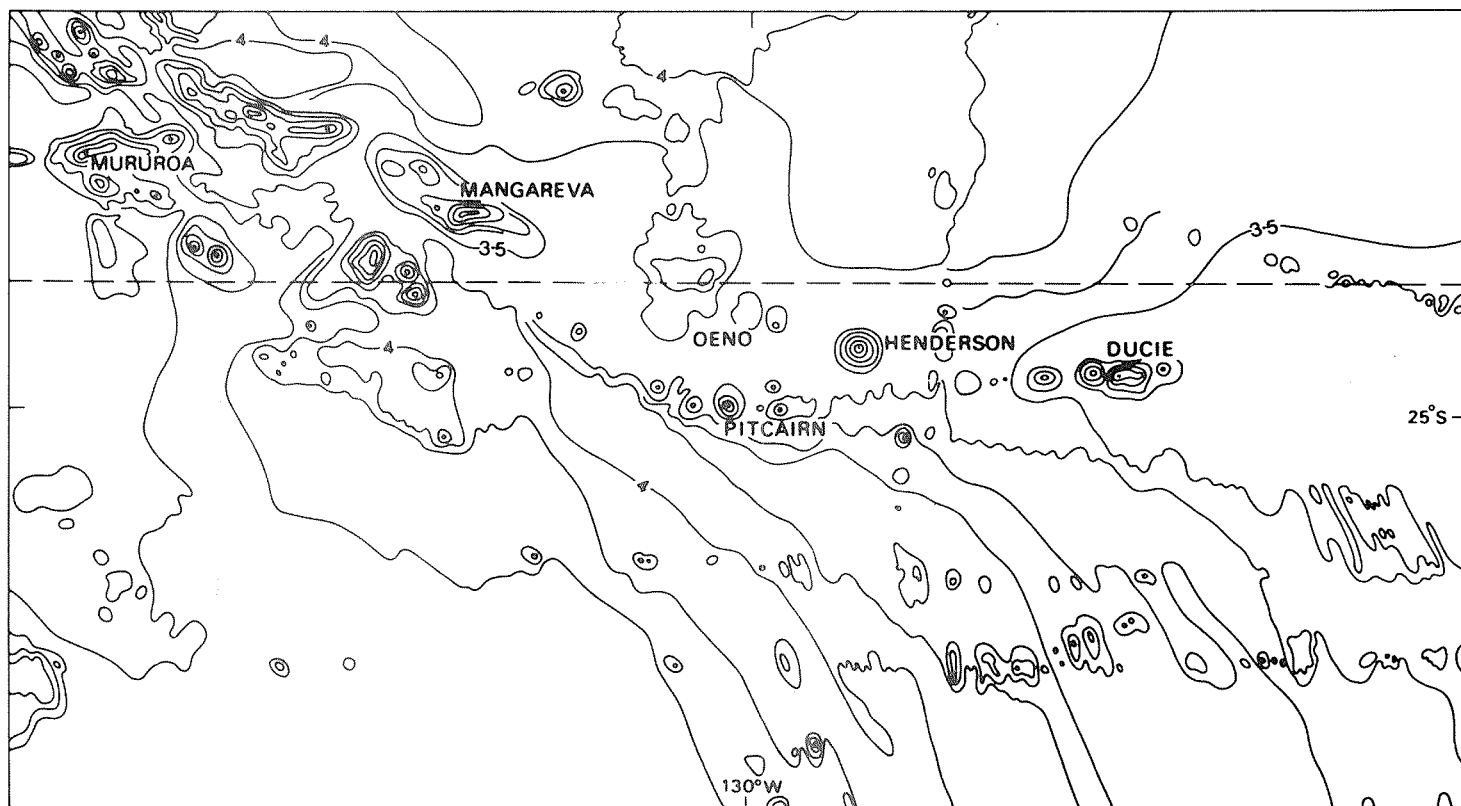


Fig. 1. Henderson Island and surrounding area, South Pacific Ocean, based on the General Bathymetric Chart of the Ocean, 5th edition, sheet 5-11, 1980.

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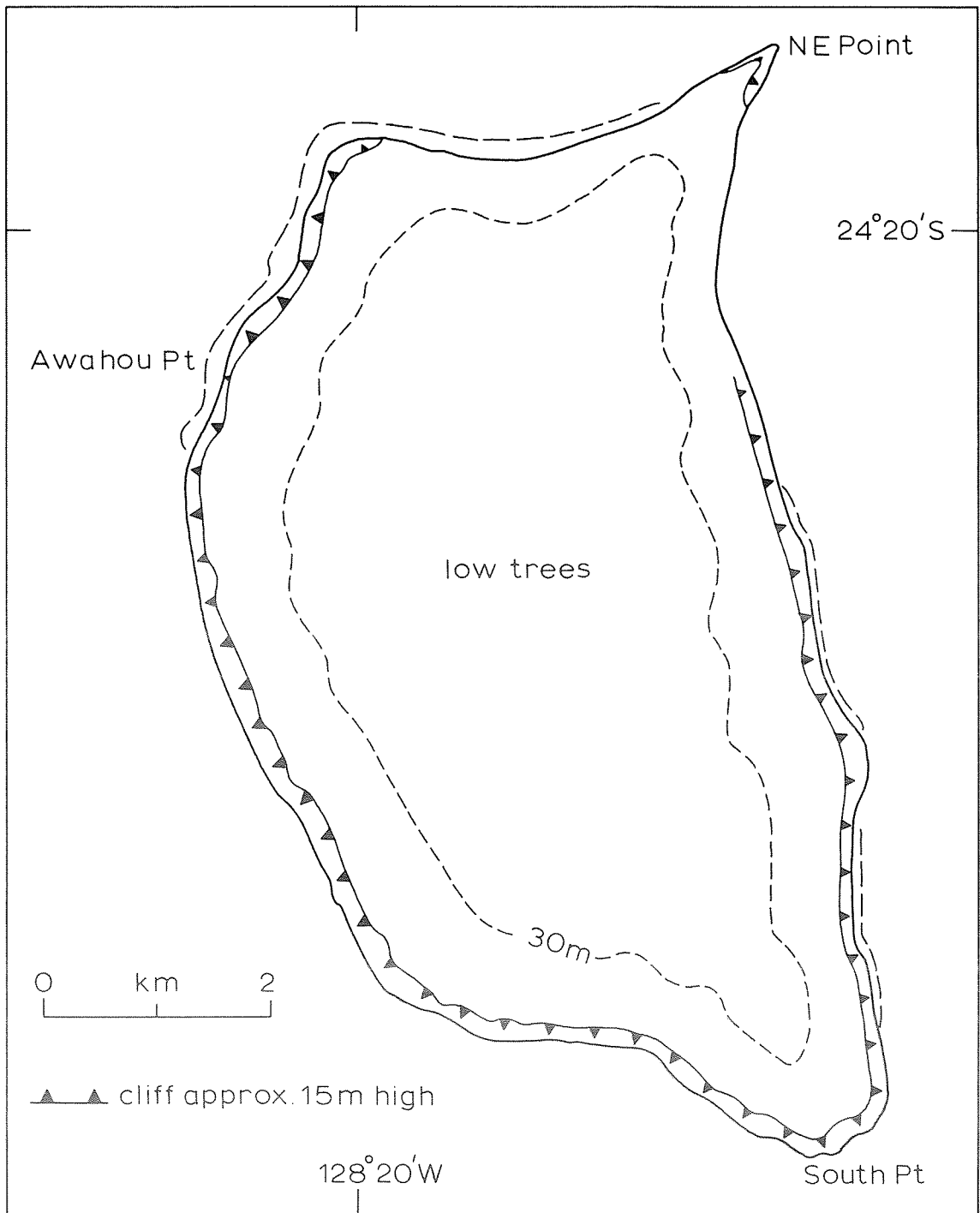


Fig. 2. Henderson Island (from the Admiralty chart).

HENDERSON ISLAND (SOUTHEASTERN POLYNESIA): SUMMARY OF CURRENT KNOWLEDGE

by F. R. Fosberg*, M.-H. Sacht* and D. R. Stoddart**

INTRODUCTION

The tropical seas are liberally sprinkled with coral islands. Many of them are associated with continents and large continental islands, in relatively shallow water, rising from continental shelves. Many, also, are in deep water - atolls, barrier reef islets round high islands, 'almost atolls', tops of drowned karsts, and a few moderately elevated atolls. These last are among the most fascinating of all, scientifically.

There is no obvious reason to think that these are anything but ordinary atolls that have been tectonically elevated a few tens of metres above present sea level. Yet several features are frequently observed that are not evident on the sea-level atolls which are present in the coral seas in such large numbers. Terra rossa soils cover the limestone tops of some of them. Phosphate, earthy or indurated, or both, covers the tops and fills pits and crevasses of some, occasionally in enormous quantities, and is present at least in some quantities on most or all of them. Fantastically eroded, deeply and sharply pinnacled and pitted limestone surfaces are common. Endemic species of plants and animals, very rare on low atolls, are found in some numbers on almost all raised atolls of which we have even meagre knowledge. Whether or not these phenomena are related is at present not clear. Much further work on as many as possible of these islands is needed to elucidate this problem.

The basic difficulty of the above statement is that, of the 20 or 30 such 'oceanic' islands or groups of islands, most have been greatly altered by long-established human occupancy, or phosphate mining, or both. Of the exceptions, the 'Rock Islands' of Palau and the Lau Group of Fiji are rugged karst, not comparable with raised atolls; Medinilla has been used as a bombing target; only Aldabra and Henderson remain reasonably unaltered. We are not here considering the many 'continental' limestone islands.

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Aldabra and Henderson are topographically and physiographically very different, though both are probably raised atolls. Aldabra has been studied intensively during the past 17 years, is now well-known, and is legally protected. Henderson is relatively poorly known, and protected only by its remoteness and unsuitability for human habitation.

During the past year the isolation and pristine condition of Henderson have been and are seriously threatened by a project of a wealthy American to build a house, landing facilities, and an airstrip on it. This is being opposed by scientific and conservation bodies, which are petitioning the British Government to deny permission to carry out this project. This circumstance has brought out and underscored the paucity of reliable scientific information, except of a reconnaissance nature, about Henderson. This has caused the ARB editors to bring together a summary of what is known of the geography, history, ecology, flora and fauna of this island, with a bibliography of pertinent literature. This paper is, therefore, a factual record of the published information on Henderson: it sets down what has been discovered, at what time, and by whom, about the island.

GEOGRAPHY

Henderson is an elevated limestone island situated in 24°22'S and 128°20'W. Its nearest neighbours are Pitcairn, 200 km to the west-southwest; Oeno, 200 km to the west; and Ducie, 360 km to the east. It rises as an isolated conical mound from depths of ca 3.5 km, on a trend line which continues that of the Tuamotus and Gambiers eastward to Ducie, and is presumably a reef-capped volcano.

The island has a greatest length of 9.6 km and greatest width of 5.1 km, based on the Admiralty chart; its area is 37 sq km. It is usually said to rise about 33 m (100 ft) above sea level. Early authors stressed the flatness of its summit, but those on the Mangarevan Expedition were impressed by a central depression which they interpreted as a former atoll-lagoon. The upper surface consists of an intricate dissected limestone, with pits and crevasses 3-7 m deep. The island is surrounded by steep cliffs of bare limestone, with occasional pocket beaches. There is a fringing reef 200 m wide, at least on the north and northwest sides backed by a wide beach (St John and Philipson (1962)).

No meteorological records are available, but the island lies in the Southeast Trades, and from its location probably has a mean annual rainfall of 1500 mm. The tidal range at springs is probably close to that of the Gambiers and eastern Tuamotus (1.0 m) (Admiralty Tide Tables 1983). Tidal measurements at Ducie by Rehder and Randall (1975) showed a regular semidiurnal tide.

The top of the island, as well as any land at the bases of the cliffs, is densely vegetated by tangled scrub and scrub-forest, but the central part of the depression and the makatea are more sparsely covered. In places, where the forest is taller and the canopy more complete, it is possible to walk freely for short distances. The tallest trees are

Pandanus tectorius Parkinson, which in places rises as an emergent above the general canopy. The crowns of such emergents are conspicuously pyramidal or conical. The dried fallen leaves of Pandanus cover the ground in many places.

The scrub and much of the scrub-forest is in many areas so dense and tangled that walking through it is impossible without the constant and vigorous use of a machete, and exhausting and slow even with the use of one. Such scrub is as likely to be on dissected limestone as on solid soil, adding to the difficulty of traversing it. In some parts the difficulty is increased by the presence of Caesalpinia bonduc, a tangled vine beset with hooked prickles, which amply explain and justify a name used in Hawaii for this widely-distributed species, 'wait-a-bit'.

Fresh water is almost completely absent. Slight dripping has been observed from the roofs of certain caves. A spring from a rock cleft below high tide level at the north end of the island has been reported (Naval Intelligence Division 1943, 92), but its degree of permanence is unknown. Presumably there is some development of a Ghyben-Herzberg lens within the island, but nothing is known of this.

Biogeographically the island is very interesting because of its remoteness from obvious source areas. Comparison of its habitats with those of sea level and slightly-elevated atolls in the Tuamotus, in terms of effective salinity, proportions of different substrata (sand, dissected limestone, cliffs, level soil, etc.) is of great potential interest, but has yet to be considered except in a very preliminary manner. Study of the effects of geologically long continuous exposure above water, compared with the very short history of emergence of the sea-level atolls, could be rewarding. None of these lines of research can develop very far without much more information about the island than we have at present. Comparison with Aldabra would then be profitable.

ARCHAEOLOGY

As noted above, Henderson has been, in historic times, uninhabited, with only brief visits by Pitcairn Islanders and occasional scientific parties. However, on one such visit, in 1971, Dr Yosi Sinoto, of the Bishop Museum, discovered and made preliminary investigations on an archaeological site at the north end of the island. With his kind permission we quote his preliminary account of this discovery from a paper read in Nice in 1976:

"Henderson Island, known also as Elizabeth Island, is located about 105 miles northeast of Pitcairn Island. This tiny, raised, coral-limestone island is flat-topped with 100-ft-high cliffs rising from the shorelines. Since some time before its discovery by Quirós in 1606, the island has been uninhabited (Markham 1904). In 1971, while prospecting on the north shore, we found five shelters, one of which included burials, and a cave. The cave is situated at the base of a cliff at the back of the beach flat. Test pits in front of the cave

revealed three cultural layers. The top of Layer II was a hard, coral-pebble-paved layer indicating an occupational floor. At the bottom of Layer III we found a fireplace on top of the sterile deposit.

"More than 250 portable artifacts were uncovered from the excavations. These included 100 fishhooks and blanks, of which 75 are pearl-shell, and 90 coral (Porites sp.) abraders for making fishhooks. There were 36 basalt adz sections and fragments. This is striking because basalt rocks and pearl shells are not available from the island, and the distribution of these artifacts in the three cultural layers is revealing. The lowest layer yielded only pearl-shell fishhooks, Hawaiian-Marquesan-type coral files, and basalt adzes, all broken beyond type identification, except that cross sections could be recognized as quadrangular to trapezoidal. The quantity of these artifacts decreased in the middle layer and was drastically reduced in the top layer, where hammer-oyster-shell hooks and Henderson-type coral files appeared. In the top layer, fossilized Tridacna-shell adzes appeared. Gradual material adaptation - the gradual change from the use of imported materials to the use of local resources - is excellently demonstrated here. Pearl-shell fishhook types found were early Marquesan, Phase II, and coral files were Hawaiian-Marquesan types, previously found only in those two island groups. There is no doubt that the early Henderson material culture had a close affiliation with the early Marquesan culture; as the materials that were brought to Henderson were exhausted, the locally available resources were exploited. There were eight pieces of volcanic glass, resembling pitchstone fragments, associated with basalt adzes and pearl shells. These are also foreign to the island but may suggest contact with Pitcairn Island, where pitchstone is available. Another shelter yielded artifacts made only of local materials.

"A charcoal sample collected at the bottom of the cave site was dated at A.D. 1160+110 (I-6344) and charcoal from the top of the middle layer was dated at A.D. 1455+105 (I-6343). Thus the span of the occupation at this site was more than 300 years. Quirós's party landed on Henderson in 1606 and found pandanus trees, but no inhabitants. Whatever the reason for the disappearance of the inhabitants, it must have happened just prior to Quirós's visit."

DISCOVERY

The island is named after Captain James Henderson, of the Hercules, who called there on 17 January 1819: Beechey (1831, I, 64) proposed that Henderson's name be applied to it, rather than that of the vessel Elizabeth, then used on charts, on the grounds that the Hercules visit preceded that of the Elizabeth by several months. Beechey also erroneously suggested that both ships had been preceded by the crew of the wrecked whaler Essex. In fact Hercules was first, followed by Elizabeth, Captain Henry King, on 1 March 1819, and members of the crew of the Essex from 20 December 1819 until 5 April 1820. Beechey's vessel H.M.S. Blossom called on 3 December 1825, and was responsible for the first scientific observations.

Beechey's account of the discovery of Henderson has been followed by several later authors, including the Admiralty Handbook (Naval Intelligence Division 1943, 92) and St John and Philipson 1962, 176). As early as 1837, however, Moerenhout suggested that Henderson was among the islands discovered by Pedro Fernández de Quirós in 1606, a proposal adopted by Meinicke (1876), Beltran y Rózpide (1882-3), Caillet (1884), Markham (1904) and Sharpe (1960). Maude (1968, 66) commented that 'there can be no doubt as to the identification of these islands'.

Accounts of the Quirós expedition

Quirós sailed from Callao, Peru, on 21 December 1605, in his flagship San Pedro y San Pablo, together with the Almiranta and San Pedro. He gives the following account in his Narrative, edited by Markham (1904):

"On the 25th [January 1606] we saw the first weeds; and on the 26th we saw birds of several kinds flying together. On this day, at 11 o'clock, we discovered the first island in latitude 25°, and reckoned it to be 800 leagues [ca 4740 km] from Lima. It has a circumference of 5 leagues [30 km], many trees, and a beach of sand" (Markham, ed. 1904, I, 192).

This island, subsequently identified as Ducie Atoll, was variously termed Luna-Puesta and La Encarnación. Quirós stood off to westward without landing.

"Still steering on the same course, on the 29th of January, at dawn, we sighted another island near, and presently stood towards it. The launch to the S.W. found a port in a small bay, where she anchored in 27 fathoms, and almost on shore. The ships did the same. ... Three men were sent from the Almiranta in a dingey to land. Fearing to remain they came back quickly, bringing certain fruits known to some on board, which were too unripe to eat. They said that the landing was very bad for a dingey, and would be much worse for larger boats. This island was supposed to be 870 leagues [5160 km] from Lima. It is 10 leagues [60 km] round. It is massive, moderately high, open, having groves and plains. It is steep, too, and its beaches are rocky. It is only inhabited by birds. Its latitude is 24°45'. It was named 'San Juan Bautista'; and as it had no port where we could get wood and water, we continued our voyage to the W.N.W." (Markham, ed. 1904, I, 193).

San Juan Bautista is the island identified as the present Henderson.

The discovery of the two islands is also described by the Chief Pilot, Gaspar de Leza. The first, Ducie, which he called Anegada, was met with on 26 January 1606 in latitude 25°S, 1000 leagues [5900 km] from Callao. During the 27th they sailed on, and at 10 leagues [60 km]

NW by N determined their latitude as 24°50'S. On the 28th they made 30 leagues [180 km] on a westerly course. 'This day we again saw a great number of birds of many kinds, chiefly grey gulls and terns.' The discovery of Henderson is described as follows:

"29th. Second Island: Sin Puerto. - 24°45'S., 1075 leagues [6375 km] from Callao. In the morning we saw another island, about 6 to 7 leagues [35-42 km] long, N. and S., all flat, with a hill to the S. It is all clean rock round the coast. The distance from the 'Anegada' is about 75 leagues [445 km]. ... This island is very green, and full of trees and open spaces. The wind which blew over this island brought a smell of flowers and herbs: for they were abundant. The Almiranta got out a skiff, and sent it to the shore with three persons. They jumped on shore, but were afraid to leave the boat. They brought back certain fruits and herbs, and said that they saw pebbles of different colours on the beach, and stones which they did not know, but which were pleasant to the sight. ... To the NE. of the place where we had been there was a beach, which appeared to be larger than the first; and if any one should chance upon this island at any time, the N.E. side should be taken to find this beach." (Markham, ed. 1904, II, 330-331).

Yet a further name for Henderson is provided by the second-in-command, Luis Vaez de Torres, when he states that the second island discovered was 'about 10 leagues [60 km] in circumference. We named it San Valerio' (Markham, ed. 1904, II, 465). Juan de Iturbe on the same voyage describes Henderson as 'seventy leagues [415 km] distant from the first, completely round and uniform of aspect with sheer cliffs. It would be seven leagues [42 km] in circumference' (Kelly, ed. 1966, II, 281).

Finally, Fray Martin de Munilla, chaplain to the fleet, gives a more circumstantial account:

"an island, a little over ten leagues [in circumference] [60 km] was sighted rising from the sea about eight varas [6.7 m; 1 vara = 84 cm]. It was flat and round, the higher parts bore a uniform aspect, but formed after the manner of a riven rock with some high cliffs facing the sea. ... We saw a small beach between two morros [bluffs]. ... Two men went ashore and brought back a fruit like a green pineapple [Pandanus]. Two Chinese who were on board the capitana said that the fruit was edible and that it was plentiful in China. Returning presently they reported that the harbour was not suitable, but that there were fish in abundance. There, too, they found some trees, though these were small, but they had seen no sign of people. ... This island would be sixty leagues from the other [355 km from Ducie] and in relation to each other they stood E W 1/4 N W SE. It lies in latitude 24-3/4°S ." (Kelly, ed. 1966, I, 153-155).

Account of Captain King

After the Quirós expedition there are no further recorded visits to Henderson until that of the Hercules on 17 January 1819: we have seen no account of that occasion. However, King (1820) has described his visit with the Elizabeth on 1 March 1819. He found

"a large island on the weather-beam, ... as level as a bowling-green. ... [We] endeavour to land at a sandy-beach not far distant from the ship, which, after some difficulty, we accomplished. After hauling the boats up among the trees, we all went up in different directions; within hail of each other, in quest of vegetables or animals; but, after a search of four and a half hours, we returned to the boats, having seen one parrot, and shot a few pigeons. The island abounded with young trees and underwood, nor did we observe the smallest appearance of quadrupeds, except here and there a rat; the ship's name Elizabeth, was now given to the island. The British Colours were displayed on the island, and greeted with three cheers, and a bumper of grog was drunk to the health of his Majesty. While these ceremonies were performing, a proper person was employed in carving the ship's name, and the other particulars upon a tree, near the spot we landed. ... We landed on the south-west part of the island, among some coral rocks, at the back of which is the beach before mentioned. It appears about six leagues in circumference, and we found no anchorage. ... The latitude of Elizabeth's Island is 24°26'S., longitude west of Greenwich 127°50'." (King 1820, 381-382).

The wreck of the Essex

The destruction of the whaler Essex, Captain George Pollard, by a whale on 20 November 1819 on 0°40'S., 119°0'W, and the subsequent voyage in small boats of the survivors to Henderson and beyond provided the origin of the Moby Dick story made famous by Melville. The boats arrived at Henderson on 20 December, after drifting for a straight-line distance of 2100 km. Most of the party left again for the Juan Fernandez Islands after a few days at Henderson. Their boats became separated and the survivors suffered appalling privations: in the captain's boat the cabin boy, Owen Coffin, was selected by lot to be killed and eaten after the food was finished, and another man who died was also cannibalised. The first mate's boat was finally rescued in 33°45'S, 81°03'W, close to their destination, after a voyage of some 4000 km. The three crew members who had remained on Henderson were finally taken off on 5 April 1820.

Chase (1821; Gibbings, ed. 1935) wrongly identified their first landfall as Ducie, but it was clearly Henderson: first, because of their description of the island, and second, because they found there a tree carved with the words 'The Elizabeth' (Gibbings, ed. 1935, 60) which had been there ten months before.

The island was described by Chase as "about six miles long and three broad; with a very high ragged shore, and surrounded by rocks; the sides of the mountains were bare, but on the tops it looked fresh and green with vegetation" (Gibbings, ed. 1935, 52). Chappel described it as "about eight or nine miles round, low and flat, nearly covered with trees and underwood" (ibid, 78). Of particular interest is Chase's record of a "fine white beach" in the northwest (ibid, 70).

The Essex narrative is retold by Heffernan (1981), and mention is made below of other observations made on the island.

Account of Captain Beechey's visit

The most graphic and detailed accounts of Henderson in the early literature are those resulting from the hydrographic survey made by H.M.S. Blossom under Captain F. W. Beechey during a single day in December 1825. Beechey's own account is as follows:

"At noon on the 2d of December, flocks of gulls and terns indicated the vicinity of land, which a few hours afterwards was seen from the mast-head at a considerable distance. At daylight on the 3d, we closed with its south-western end, and dispatched two boats to make the circuit of the island, while the ship ranged its northern shore at a short distance, and waited for them off a sandy bay at its north-west extremity.

"We found that the island differed essentially from all others in its vicinity, and belonged to a peculiar formation, very few instances of which are in existence. ... The island is five miles in length, and one in breadth, and has a flat surface barely eighty feet above the sea. On all sides except the north, it is bounded by perpendicular cliffs about fifty feet high, composed entirely of dead coral, more or less porous, honeycombed at the surface, and hardening into a compact calcareous substance within, possessing the fracture of secondary limestone, and has a species of millepore interspersed through it. These cliffs are considerably undermined by the action of the waves, and some of them appear on the eve of precipitating their superincumbent weight into the sea; those which are less injured in this way present no alternate ridges or indication of the different levels which the sea might have occupied at different periods, but a smooth surface, as if the island, which there is every probability has been raised by volcanic agency, had been forced up by one great subterraneous convulsion. The dead coral, of which the higher part of the island consists, is nearly circumscribed by ledges of living coral, which project beyond each other at different depths; on the northern side of the island the first of these had an easy slope from the beach to a distance of about fifty yards, when it terminated abruptly about three fathoms under water. The next ledge had a greater descent, and extended to two hundred yards from the beach, with twenty-five fathoms water over it, and there ended

as abruptly as the former, a short distance beyond which no bottom could be gained with 200 fathoms of line. Numerous echini live upon these ledges, and a variety of richly coloured fish play over their surface, while some cray-fish inhabit the deeper sinuosities. The sea rolls in successive breakers over these ledges of coral, and renders landing upon them extremely difficult. It may, however, be effected by anchoring the boat, and veering her close into the surf, and then, watching the opportunity, by jumping upon the ledge, and hastening to the shore before the succeeding roller approaches. In doing this great caution must be observed, as the reef is full of holes, and the rugged way is strewn with sea-eggs, which inflict very painful wounds; and if a person fall into one of these hollows, his life will be greatly endangered by the points of coral catching his clothes and detaining him under water. The beach, which appears at a distance to be composed of a beautiful white sand, is wholly made up of small broken portions of the different species and varieties of coral, intermixed with shells of testaceous and crustaceous animals.

"Insignificant as this island is in height, compared with others, it is extremely difficult to gain the summit, in consequence of the thickly interlacing shrubs which grow upon it, and form so dense a covering that it is impossible to see the cavities in the rock beneath. They are at the same time too fragile to afford any support, and the traveler often sinks into the cavity up to his shoulder before his feet reach the bottom. The soil is a black mold of little depth, wholly formed of decayed vegetable matter, through which points of coral every now and then project.

"The largest tree upon the island is the pandanus, though there is another tree very common, nearly of the same size, the wood of which has a great resemblance to common ash, and possesses the same properties. We remarked also a species of budleia, which was nearly as large and as common, bearing fruit. It affords but little wood, and has a reddish bark of considerable astringency: several species of this genus are to be met with among the Society Islands. There is likewise a long slender plant with a stem about an inch in diameter, bearing a beautiful pink flower, of the class and order hexandria monogynia. We saw no esculent roots, and with the exception of the pandanus, no tree that bore fruit fit to eat." (Beechey 1831, I, 61-64).

A more succinct account was provided by Lieut. Peard, also on board H.M.S. Blossom:

"On the 2nd December [1825] several Noddies and Boatswains' birds were seen about the Ship, and we made Elizabeth Island which like the last [Ducie] is of coral and uninhabited; but I suppose 70 feet high and 16 or 18 miles in circumference. The cliffs in many parts, more particularly the North part are

washed by the sea into curious and fantastic Arches, and large caverns are formed into which the waves dash and force a passage through wide openings in the top. A Beach of the most dazzling whiteness and apparently composed of the finest sand every here and there presented itself, and seemed to invite us to the shore. Our boats however made the circuit of the Island and found it by no means an easy access, some of the Officers landed by wading through the Surf, and discovered that the beach was composed of coral, madrepora and shells bleached by the sun." (Gough, ed. 1973, 75).

LATER HISTORY

Apart from scientific investigations by visiting expeditions, much of the later history of Henderson is connected with that of neighbouring Pitcairn, discovered by Carteret in 1767 and settled by the Bounty mutineers in January 1790. The settlers remained unaware of Henderson until the arrival of the Elizabeth in 1819 (hence the currency of the name Elizabeth on Pitcairn until at least mid-century), and did not visit the island until 4-11 March 1843, according to the Pitcairn Island Register (Murray 1854, 281). The visit led to 'a very unfavourable report' on the island. The visit is described in some detail by Brodie (1851, 17-18):

"Not long ago, eleven of these islanders, along with John Evans (one of the three resident Europeans), were carried to Henderson's, or Elizabeth Island, in an American whaling vessel, on an exploring expedition. The landing was anything but good, and the soil not near so rich as that of their own island, being of a much more sandy nature. Water there appeared to be none; but, after a long search, they found a fresh-water spring below high-water mark. Some cocoa-nuts, which had been purposely carried there, were planted upon the best ground they could find. Several goats had been likewise shipped for turning out, but were actually forgotten until some time after they were returned on board. They were only a few hours on the island, and, therefore, were unable to form or give any detailed description of it. Elizabeth Island is of a peculiar formation, very few instances of which are known, viz., dead coral, more or less porous, elevated in a flat surface, probably by volcanic agency, to the height of eighty feet. It is five miles in length, one in breadth, and thickly covered with shrubs, which makes it difficult to climb. It was called Henderson's Island after the captain of the ship Hercules of Calcutta, though first visited by the crew of the Essex, an American whaler, two of whom landed on it after the loss of their ship, and were subsequently taken off by an English whaler, who heard of their fate at Valparaiso. They are very anxious to procure a small vessel or large boat, of about twenty tons burden, to enable them to visit this island at pleasure, and bring off house-timber as required, as likewise to convert it into a run for their live stock; thus relieving their little island from

that burden, and enabling them to direct the whole of its capabilities to the use of man. They have established a sort of Bank among themselves, in which a large part of the money paid by vessels for refreshments, is suffered to accumulate for the purpose of purchasing a small vessel."

The next visit from Pitcairn to Henderson did not take place until 16 August 1851:

"Twelve of the inhabitants sailed in the Joseph Meigs for the purpose of visiting Elizabeth Island. On their arrival at the island they discovered a human skeleton, and as nothing could be found that may lead to discover who this unfortunate individual was, it must remain a mystery." (Pitcairn Island Register, in Murray 1854, 295).

This visit was followed by another on 11 November 1851:

"Thirty-eight of the inhabitants sailed in the ship Sharon, of Fairhaven, for the purpose of visiting Elizabeth Island. On Friday, 14th, after a boisterous passage of three days, they landed upon Elizabeth Island, when they immediately set about wooding the ship, and exploring the country, which is evidently of coral formation. The soil is very scanty, and totally unfit for cultivation. Various specimens of marine shells are dispersed all over the surface of the island, which, in combination with the thickly scattered pieces of coral, renders travelling both difficult and dangerous. Water is found on the north-west part of the island slowly dripping from the roof of a cave, which cannot be reached without the aid of ropes. The island rises about sixty feet above the level of the sea. Eight human skeletons were also found upon the island, lying in caves. They were doubtless the remains of some unfortunate seamen, as several pieces of a wreck were found upon the shore." (Murray 1854, 295-296).

Since then, Henderson has been visited by Pitcairn Islanders on a fairly regular basis, chiefly to cut miro wood, Thespesia populnea, from which carvings are made for sale to visitors.

Formal possession of Pitcairn for the British Crown, as a British Colony by settlement, was taken by Capt Russell Elliott, H.M.S. Fly, on 29 November 1838, and the island came under the administration of the Western Pacific High Commission in 1898. Although Capt King, of the Elizabeth, had informally raised the British flag on Henderson in 1819, the island was not formally annexed (at the same time as Oeno and Ducie) until 1902, when a party from Pitcairn raised the flag on 10 July. All three islands were included with the administration of Pitcairn in 1938. Pitcairn itself is governed by an Island Council, under the authority of a Governor resident at the British Consulate-General in Auckland, New Zealand. Henderson and the other two islands remain, of course, uninhabited.

Table 1. Visitors to Henderson Island: summary

<u>Date</u>	<u>Visitor</u>	<u>Activity</u>	<u>Main publication</u>
1606 29 Jan	Quirós	Discovery	Markham, ed. 1904; Kelly, ed. 1966
1819 17 Jan	James Henderson <u>Hercules</u>	Re-discovery	
1819 1 Mar	Henry King <u>Elizabeth</u>	Re-discovery	King 1820
1819 20 Dec - 1820 5 Apr	Crew of the <u>Essex</u>	Survival	Gibbings, ed. 1935 Heffernan 1981
1825 3 Dec	F. W. Beechey H.M.S. <u>Blossom</u>	Survey	Beechey 1832 Hooker and Arnott 1841
1827 9 Oct	Hugh Cuming	Biological collections	St John 1940 and various papers on shells
1838 29 Nov	Capt R. Elliott H.M.S. <u>Fly</u>	Possession	
1843 4-11 Mar	First visit by Pitcairn islanders		
1851 16 Aug	Second visit by Pitcairn islanders		
1851 11 Nov	Third visit by Pitcairn islanders		
1877	Wreck of <u>Allen Gowie</u>		
1881	Grice, Summer & Co	Phosphate survey	
1900	G. Ellis	Phosphate survey	
1902 10 July	Visit by Pitcairn islanders	Accession	
1907 Sept	G. C. Ellis, J. T. Arundel, A. E. Stephen	Phosphate survey; bird collection	North 1908
1912 Aug-Sept	D. R. Tait, J. R. Jamieson	Phosphate survey; various collec- tions	Ogilvie-Grant 1913a, 1913b; St John and Philipson 1962; Tait 1912, Smith 1913

1922 Mar-Apr	Whitney South Sea Expedition R. H. Beck, E. H. Quayle, C. C. Curtis	Birds; plants	Murphy 1924a and later papers; Brown 1931, 1935; Brown and Brown 1935
1934 16-22 June	Mangarevan Expedition - H. St John, F. R. Fosberg, E. C. Zimmerman, C. M. Cooke, D. E. Anderson	Plants, insects, molluscs	St John and Philipson 1962
1937 Aug	J. R. Rivett-Carnac, H.M.S. <u>Leander</u>	Survey	
1943 Nov.	Adm Richard E. Byrd and party	Survey	
1948 Aug	Capt G.S. Webster H.M.C.S. <u>Awahou</u>	Survey, light built	
1957 3-4 Feb	W. H. Lintott	Plants, birds	St John and Philipson 1962; Williams 1960
1957	R. Tomarchin with chimpanzee		McLoughlin 1971
1971 Jan	H. A. Rehder, J. E. Randall, Y. Sinoto	Archaeology, marine biology	
1981	A. M. Ratliff(e?)	Survey	

All the islands were visited during a defence reconnaissance by H.M.S. Leander, Capt J. R. Rivett-Carnac, in August 1937, when Beechey's chart of Henderson was revised and a flagpole raised. According to Bourne and David (in prep.) further visits are said to have taken place by United States parties in 1943 and 1966.

A light was erected on a steel tower 6.7 m tall at a height of 38 m by the Colonial Vessel Awahou, Suva, Capt G. J. Webster, on 11 August 1948. Because of maintenance difficulties it was abandoned in 1954 (this information is provided from Admiralty archives by Lt Cdr David).

SCIENTIFIC STUDIES

The first formal scientific studies were those carried out during the visit of H.M.S. Blossom in 1825 when plant collections were made and subsequently reported by Hooker and Arnott (1832) and Hemsley (1885).

On 9 October 1827 Mr. Hugh Cuming visited the island on a general collecting trip, gathering specimens of plants, mollusk shells, and various other groups of animals. He spent only one day there, according to the following, from a letter to Wm. J. Hooker dated "March 21st, 1832":

"On the 9th made Elizabeth [Henderson] Island, a high coral island without a lagoon, covered with shrubs and palms [Pandanus] principally. Jessamines [probably Jasminum didymum] and Laurels [probably Pittosporum sp. with aromatic foliage] but few in flower. In the clefts of rocks collected some fine ferns. On the 11th made Pitcairn Island. ..." (St John 1940).

During phosphate explorations in September 1907, A. E. Stephen collected birds and made incidental observations, both reported by North (1908). The first substantial study and collections, however, were those carried out by D. R. Tait and J. R. Jamieson in August and September 1912. No full account of this investigation has appeared, but birds were reported by Ogilvie-Grant (1913a, 1913b), marine molluscs by Smith (1913), and plants by St John and Philipson (1962). Extracts, at least, from Tait's diary and report exist in a manuscript letter to Sir John Murray (1913).

The two major studies of the island are: (1) That of the Whitney South Sea Expedition in March and April 1922. E. H. Quayle and C. C. Curtis collected plants and birds, the former reported in Brown's Flora of Southeastern Polynesia (1931-1935) and the latter in a wide range of publications cited below. (2) The Mangarevan Expedition in 1934 spent the period 16-22 June on Henderson. H. St John and F. R. Fosberg collected plants, reported by St John and Philipson (1962), E. C. Zimmerman insects, and C. M. Cooke land molluscs. The invertebrate collections were reported in a wide range of systematic papers. No formal ornithological observations were made during this visit, though notes on birds were made, but not published, by Fosberg.

In 1957 W. H. Lintott visited Henderson with several Pitcairn Islanders on 3-4 February. His bird observations were reported by Williams (1960) and his plant collections by St John and Philipson (1962). Finally, in January 1971, two brief visits were made by H. A. Rehder, J. E. Randall and Y. Sinoto, aboard the Westward, during the National Geographic Society-Oceanic Institute Expedition (which also made the first comprehensive study of Ducie: Rehder and Randall 1975). It was during this expedition that Sinoto made the first preliminary studies of pre-European Polynesian habitation on Henderson.

GEOLOGY

Most writers on Henderson state that it is an elevated atoll with original lagoonal summit depression preserved; some have speculated on the recency of its uplift. It appears, however, to be very similar to other makatea islands in the central and east Pacific, in which the main limestones are broadly of mid-Tertiary age and in which the topography results from post-uplift erosion. McNutt and Menard (1978) have suggested that many of these islands have resulted from crustal loading by an adjacent volcano, which in the case of Henderson would be Pitcairn. Pitcairn stands only 347 m above sea-level, but rises 3.5 km from the ocean floor. Two phases of surface volcanism have been identified, with K-Ar ages of 0.46-0.63 and 0.76-0.93 million years (Duncan et al. 1974). The total span of volcanism for the whole Pitcairn cone must be much greater, however, and the crust on which it stands has an age of roughly 30 million years. McNutt and Menard (1978) calculate the amount of uplift of Henderson caused by the Pitcairn loading to be 32 m (compared with an actual uplift which they state to be 30 m); Oeno and Ducie are not uplifted, because the former is in Pitcairn's moat and the latter beyond the arch.

The location of Henderson along a prolongation of the Tuamotu-Gambier axis has already been mentioned. Basalts at Mururoa in the eastern Tuamotus have been dated at 6-8 million years at a depth of 438 m (Labeyrie et al. 1969). The surface volcanics of the Gambier Archipelago (maximum elevation 441 m) are also of similar age (4.77-5.98 m yr: Bellon 1974; 5.33-7.15 m yr: Brousse et al. 1972). These and the dates for Pitcairn suggest a volcanism migration rate of 11 cm/yr.

It seems likely that the limestones of which Henderson are composed are of late Tertiary age, and may have been exposed for a few million years. The 'lagoonal' topography may well be a karst erosion feature, and the columns and pinnacles within the depression also karst features rather than patch reefs. The low-lying areas surrounding the high core at least on the leeward side could (by comparison with makatea islands elsewhere) be a last interglacial reef.

Actual geological investigations of Henderson are limited to prospecting for phosphate deposits. The first such survey was carried out in 1881 by Grice, Summer and Co of Melbourne (then lessees of Malden); they found only 200 tons of guano. A permit to exploit was held by Capt J. Rasmussen during 1903-1907, but was not taken up. G. C. Ellis

and J. T. Arundel of the Pacific Phosphate Company, aboard the Tyrian, made a brief survey in 1907. No useful deposits were found, but Hutchinson (1950, 213) quotes analyses of two samples with $\text{Ca}_3\text{P}_2\text{O}$ contents of 8.5 and 18.0% respectively.

In 1908 a twelve-month license to prospect on Henderson, Oeno and Ducie was issued to James Banks and James Watt, who made a preliminary visit to the first of these (these details are derived from papers in the Ministry of Defence Hydrographic Department archives very kindly made available by Lt Cdr A. C. F. David to Dr W. R. P. Bourne, who drew them to our attention). A license for them to exploit guano was issued to them on 14 December 1909, to extend from 1 April 1912 to 31 March 1924, with the right to occupy the island, erect buildings, and to cut and use timber and other vegetable growth, and the obligation to plant quick-growing trees on two conspicuous points, and to erect a beacon 25 ft high. Banks visited Henderson in July 1912 at the time of the survey of the island by D. R. Tait and J. R. Jamieson. On 11 October 1912 the rights were transferred to a new company, Henderson Island Limited, under the chairmanship of Sir John Murray, and Banks became the Company's agent. During this survey a house and six sheds were built of corrugated iron to house the survey party. Tait's own report, dated 20 January 1913, in the Hydrographic Office archives, was extremely disappointing, and on 30 January Watt reported the Company's intention to give up the lease: 'the island was useless not only in regard to the supply of phosphates, but for any other purpose.' The lease was accordingly terminated, and the Company dissolved.

VEGETATION AND FLORA

What was evidently Pandanus was reported at Henderson by Munilla during the Quitós expedition in 1606, and again by Beechey in 1825. The first collections were made by Lay and Collie during the Beechey expedition: four species were reported from these collections by Hooker and Arnott (1841, 64-69) and three more by Hemsley (1885, 15). These were:

Asplenium nidus L. (in Hemsley 1885, 15)

Euphorbia sparrmannii Boiss. (as E. ramosissima Hooker and Arnott, the Henderson specimen being their type)

Glochidion pitcairnense (F.Br.) St. J. (as Bradleia? glochidion in Hooker and Arnott 1841, 69)

Tournefortia argentea L. (in Hemsley 1885, 15)

Canthium odoratum (Forst.f.) Seem. (as Chiococca odorata in Hooker and Arnott 1841, 65)

Guettarda speciosa L. (in Hemsley 1885, 15)

Ixora fragrans (Hooker and Arnott) Gray (as Cephaelis? fragrans in Hooker and Arnott 1841).

Since then, four major collections of plants have been made. First, D. R. Tait collected 91 numbers representing 55 species in August-

September 1912; the collection was determined by St John nearly fifty years later (St John and Philipson 1962). Second, E. H. Quayle and C. C. Curtis collected some twenty species, including four ferns, during the Whitney Expedition in 1922. This material was included in Brown's Flora of Southeastern Polynesia (Brown 1931, 1935; Brown and Brown 1935), where Santalum hendersonense was described as a Henderson endemic. Most of the Whitney collections were also cited by St John and Philipson (1962), though curiously these authors do not include the Whitney Expedition in their list of botanical collections. Third, large collections were made by St John and Fosberg during the Mangarevan Expedition in 1934, and published both in numerous systematic papers and as a comprehensive listing by St John and Philipson (1962). Finally, W. H. Lintott collected 25 species in 1957, and these too were reported by St John and Philipson (1962). St John and Philipson mention that J. H. Maiden collected 'a few common species', said to be reported in his 1896 paper on Pitcairn, but this paper does not in fact mention Henderson plants.

The flora listed by St John and Philipson (1962) includes 8 ferns and 55 angiosperms; to these should be added Sesuvium portulacastrum L., and Capparis sandwichiana DC. collected during the Whitney Expedition and by Lintott, and inadvertently omitted from their list. The plants are listed with some revision of nomenclature in Appendix 1. In addition to the main listings by Brown (1931, 1935), Brown and Brown (1935), and St John and Philipson (1962), Henderson plants collected by the Mangarevan Expedition have been included in many systematic papers, notably by Copeland (1938), five species of ferns; Skottsberg (1937), two species of Liliaceae; von Poellnitz (1936), Portulaca; Skottsberg (1938), Santalum; Heimerl (1937), Peperomia; and Sherff (1937), Bidens. It is of interest that no less than eight species, or 12 per cent of the recorded flora, have only been collected on one occasion, by D. R. Tait in 1912.

Six species and five varieties of angiosperms are described as endemic to Henderson, not including the new variety of Korthalsella margaretae defined by Brown (1935) but reduced to K. vitiensis by St John and Philipson (1962, 180), or the new variety Polypodium europhyllum C. Chr. var. hendersonianum E. Br. (in Brown and Brown 1931) which they reduce to Microsorium vitiense (Baker) Copeland. The endemic species and varieties presently accepted are:

Peperomia hendersonensis Yuncker (in Yuncker 1937, 16-17)

Celtis paniculata Planch. var. viridis F. Br. (in Brown 1935, 32)

Santalum hendersonense F. Br. (in Brown 1935, 66)

Myrsine hosakae St John (in St John and Philipson 1962, 189-190)

Nesoluma st-johnianum H. J. Lam and Meeuse (in Lam and Meeuse 1938, 153-154)

Geniostoma hendersonense St John (in St John and Philipson 1962, 190)

Heliotropium anomalum Hooker and Arnott var. candidum St John
(in St John and Philipson 1962, 192)

Canthium barbatum (Forst. f.) Seem. var. christianii Fosb.
forma calcicola Fosb. (in Fosberg 1937)

Bidens hendersonensis Sherff (in Sherff 1937, 6)
var. hendersonensis Sherff (in Sherff 1937, 6)
var. subspathulata Sherff (in Sherff 1937, 7)

Comments on some of these species are given in Appendix 1. Other taxa originally defined from Henderson Island material, but not endemic to the island, include Euphorbia ramosissima Hooker and Arnott (= E. sparrmannii Boiss. in Appendix 1), Cassia glanduligera St John (in St John and Philipson 1962, 181-184), also in the Australs; and Dianella intermedia Endl. var. gambierensis F. Br. (in Brown 1931, 152), also on Mangareva.

Four adventive species are listed:

Cocos nucifera. This is recorded as being planted as early as 1843 by the Pitcairn Islanders (Brodie 1851, 17). Trees were found by Stephen in 1907 (North 1908), by Bank (1909) (a dozen trees divided between the north and west landings), and by Tait (1912). Collected by the Mangarevan Expedition in 1934, when Fosberg noted that the trees were 'all young'. Probably repeatedly planted by the Pitcairn Islanders over the years.

Cordyline terminalis, collected only by the Mangarevan Expedition in 1934, when Fosberg noted half a dozen plants.

Aleurites moluccana, collected only by the Whitney Expedition in 1922.

Achyranthes aspera, collected only by Tait in 1912, and the only one of the four not a deliberate introduction.

In addition James Bank in his report of 5 January 1909 records planting limes and oranges, and these are mentioned, together with potatoes, by Maude (1951, 63).

Besides the vascular plants, the Mangarevan Expedition also collected three species of Fungi, five lichens and ten bryophytes, all listed by St John and Philipson (1962). An earlier list of the bryophytes was given by Bartram (1940).

MAMMALS

There are no native mammals on Henderson. Several have, however, been landed since the island was discovered. Goats were first taken to Henderson from Pitcairn in 1843, but through inadvertence were not landed before the vessel left (Brodie 1851, 17). Three were, however, released during the visit of the Whitney Expedition in 1923 (Beck 1923), but had disappeared by the time of the Mangarevan Expedition in 1934.

Pigs were landed by D. R. Tait in 1912, but of these there is no subsequent record. Mice are mentioned as being numerous at the north landing by James Bank (1909), but are not otherwise recorded. The only numerous introduced mammal is the Polynesian Rat. King (1820) found it there in 1819. Bank mentioned it as numerous at the north landing in 1909, and Stephen had also found it present in 1907 (North 1908). Specimens were collected by the Whitney Expedition and listed under Rattus exulans (Peale) by Tate (1935).

BIRDS

The Quirós expedition recorded seabirds in the neighbourhood of Henderson - Gaspar de Leza specifies 'grey gulls and terns' - in January 1606. Much later, in 1819, King (1820) recorded a parrot and a few pigeons, and later in the same year the castaways from the Essex recorded tropicbirds in holes, with young and eggs, and also 'small birds, about the size of a blackbird', roosting in the trees (Gibbins, ed. 1935, 55, 79).

The first collections of birds, however, were made by A. E. Stephen in 1907, and the specimens described by North (1908). D. R. Tait and J. R. Jamieson also made collections in 1912, and these were reported by Ogilvie-Grant (1913a, 1913b). The major contribution to the ornithology of Henderson was, however, the Whitney Expedition in 1922, which resulted in a long series of papers referred to below. Subsequently, W. H. Lintott made some observations in 1957, and these were incorporated in Williams's (1960) paper on the birds of Pitcairn.

A comprehensive summary of knowledge of the birds of Henderson is in preparation by Bourne and David. This section therefore simply keys the published literature on the seabirds, shorebirds and land birds, and the manuscript records by Beck and Quayle of the Whitney Expedition. Nomenclature follows that of du Pont (1976) who listed most or all of the birds known from the island.

Seabirds

Pterodroma ultima Murphy Murphy's Petrel, Oeno Petrel

Recorded by du Pont (1976).

Pterodroma neglecta (Schlegel) Kermadec Petrel

Collected by Beck and Quayle in 1922.

Recorded by Murphy and Pennoyer (1952, 27); as breeding by Williams (1960). P. ultima and P. neglecta are regarded as distinct by Williams and du Pont (1976) and both recorded by them for Henderson.

Pterodroma alba (Gmelin) Phoenix Petrel

Collected by Quayle and Beck in 1922, called Henderson Petrel.

Recorded by Murphy and Pennoyer (1952,33); and as breeding by Williams (1960) and King (1967).

Pterodroma arminjoniana heraldica (Salvin) Herald Petrel

Recorded by Murphy and Pennoyer (1952, 39); and as breeding by Williams (1960) and King (1967).

Puffinus nativitatis Streets Christmas Shearwater

Shearwaters of undetermined species were recorded as 'very plentiful' by Stephen in 1907 (North 1908). This species recorded as probably breeding by Williams (1960) and King (1967). Apparently not collected on Henderson by the Whitney Expedition in 1922.

Puffinus pacificus pacificus (Gmelin) Wedge-tailed Shearwater

Collected by Beck in 1922.

Recorded as breeding by Murphy (1951) and Williams (1960).

Gygis alba candida (Gmelin) White Tern

Noted as 'plentiful' and egg reported by Stephen in 1907 (North 1908). Recorded as G. candida (Gmelin) by Ogilvie-Grant (1913a, 1913b). Collected and noted as a white-footed form by Quayle and Beck in 1922. Recorded as breeding by Williams (1960).

Anous stolidus pileatus (Scopoli) Common Noddy

Noted as 'not so plentiful' by Stephen in 1907 (North 1908). Recorded as A. leucocapillus (Gould) by Ogilvie-Grant (1913a, 1913b). Collected by Beck and Quayle but not common in 1922. Recorded as breeding by Williams (1960) and Baker (1951).

Anous tenuirostris minutus Boie Black Noddy

Rare, one collected by Beck or Quayle in 1922.

Procelsterna coerulea skottsbergii Bonaparte Blue-grey Noddy,
Grey Ternlet

Seen and collected by Beck and Quayle in 1922, not common. Recorded as P. coerulea (Bennett) by Ogilvie-Grant (1913a, 1913b) and as P. c. skottsbergii in Peters (1934). Recorded as breeding by Williams (1960).

Phaethon rubricauda subsp. (Gmelin) Red-tailed Tropicbird

Recorded as breeding by Beck in 1922, and Williams (1960), based on local reports.

Sula dactylatra personata Gould Masked Booby

One individual collected by Quayle in 1922. Recorded as common, with chicks, in January 1957, by Lintott (Williams 1960).

Sula leucogaster plotus (Forster) Brown Booby

Sight record in 1957 recorded by Williams (1960).

Sula sula rubripes Gould Red-footed Booby

Recorded by Ogilvie-Grant (1913a, 1913b) (as S. piscator) and by Murphy (1936); noted as probably breeding by Williams (1960). Henderson specimens were included by Grant and Mackworth-Praed (1933, 118) under their new species S. nicolli, but this is now regarded as a colour phase of S. sula.

Fregata minor subsp. (Gmelin) Greater Frigatebird

Described as 'numerous' by Stephen in 1907 (North 1908). Seen and collected by Beck and Quayle in 1922. Recorded as probably breeding by Williams (1960), based on local information.

Shorebirds

Numenius tahitiensis (Gmelin) Bristle-thighed Curlew

Summer migrant, collected by Quayle and Beck in March-April 1922 (Stickney 1943).

Heteroscelus incanus incanus (Gmelin) American Wandering Tattler

Summer migrant, recorded in March-April 1922 (Stickney 1943).

Calidris alba (Pallas) Sanderling

Recorded by Stephen in 1907 (Ogilvie-Grant 1913a, 1913b); seen but not collected by Quayle in 1922.

Wading birds

Egretta sacra sacra Gmelin Reef Heron

One individual seen by Beck and Quayle in 1922.

Land birds

Porzana atra North Henderson Island Rail, Henderson Island Crake

Collected by Stephen in 1907, who noted it as 'plentiful', and described as Porzana atra n.sp. Black Water Crake by North (1908). Collected by Tait in 1912 and independently described by Porzana murrayi n.sp. by Ogilvie-Grant (1913a), a name abandoned by Ogilvie-Grant (1913b). Recollected in 1922 by Quayle and Beck of the Whitney Expedition and assigned to a new endemic genus as Nesophylax ater (North) by Murphy (1924). Described under North's name, with a colour plate, by Ripley (1977, 235, plate 29), without reference to Murphy (1924). Listed as breeding by Williams (1960).

The widespread and closely related Porzana t. tabuensis Spotless Crake occurs on nearby Oeno (Murphy 1924, Amadon 1942, Williams 1960).

Ptilinopus purpuratus insularis (North) Henderson Island Fruit Pigeon

Described in flocks of twenty or more by Stephen in 1907, and named as Ptilopus insularis n.sp. by North (1908). Collected by Tait in 1912 and described as Ptilopus coralensis Peale by Ogilvie-Grant (1913a). Listed as Ptilopus insularis North by Ogilvie-Grant (1913b). The Whitney collections in 1922 were listed under the same name by Murphy (1924). Named as an endemic subspecies of Ptilinopus purpuratus (Gmelin), widely distributed in the Societies and the Tuamotus, by Ripley and Burckhead (1942). Listed as still common and breeding by Williams (1960).

Vini stepheni (North) Henderson Island Parrot

Noted as 'not very plentiful' by Stephen in 1907, and described as Calliptilus(?) stepheni n.sp. by North (1908). Collected by Tait in 1912 and described as Vini hendersoni n.sp. by Ogilvie-Grant (1913a). Named as Vini stepheni (North), with a colour plate, in Ogilvie-Grant (1913b). Collected by Beck and Quayle of the Whitney Expedition in 1922 and said to be common; and listed by Amadon (1942). Listed as breeding but apparently not very common by Williams (1960). An endemic species.

Acrocephalus vaughani taiti (Ogilvie-Grant) Henderson Island Warbler

Collected by Tait in 1912 and named Acrocephalus taiti n.sp. by Ogilvie-Grant (1913a, 1913b). Collected by Quayle and Beck of the Whitney Expedition in 1922, said to be very common; and listed as Conopoderas vaughani taiti (Ogilvie-Grant) by Murphy and Mathews (1929). Listed as breeding by Williams (1960), who also notes the presence of A. v. vaughani (Sharpe) on Pitcairn. An endemic subspecies.

REPTILES

Lizards were apparently first observed by Stephen in 1907, when he found them 'very plentiful' (North 1908). Six skins were collected by the Whitney Expedition in 1923 and listed by Ortenburger (1923) and later by Burt and Burt (1932) as Emoia cyanura (Lesson), a widespread species. A gecko has been seen but we do not know of specimens or an identification. The green sea turtle, Chelone mydas (L.), comes ashore to lay its eggs on the few beaches (Quayle 1922).

TERRESTRIAL ARTHROPODA

No special effort has ever been made to collect any of the Henderson Island arthropods, except the insects, which were gathered by Zimmerman in 1934. Even this can only be regarded as preliminary, being the results of one man's work for only six days. A longer, less hurried effort, with light traps, Berlese funnels and other special methods, could be expected to yield a tremendous increase in the known invertebrate fauna of the island.

A discussion written by Dr. Frank G. Howarth, of B. P. Bishop Museum, Honolulu, states the case very well:

"The [terrestrial] arthropod fauna of Henderson I. is still quite poorly known. Only about [40] species have been recorded to date, of which about [a third] are likely endemics. Judging from the recorded lushness and diversity of the flora, the insect fauna should be at least an order of magnitude greater. Zimmerman (1935) wrote that a number of endemic species were collected during the week's stay of the Mangarevan Expedition. Apparently, only a few taxonomic groups have been worked up from those collections, as only 15 families of arthropods are represented in the published records. Based on the known faunas of other small Pacific islands, one would expect to find at least 100 families and a total arthropod fauna of a few hundred species of which approximately 50% would be endemic to Henderson or perhaps also to Pitcairn I. For example, there are apparently no published records of Lepidoptera (moths), which is second only to the Coleoptera in numbers of species on other Pacific islands. Neither are there any records for Collembola, Orthoptera, Myriapoda, or native Hymenoptera, all of which should be expected there.

"Many insects and relatives are probably endemic to the Pitcairn Group. As the fauna and flora on the inhabited island of Pitcairn itself become more ravaged by goats and other man-caused perturbations, Henderson Island will become more important as a refuge or Noah's Ark for many of these restricted species.

"A number of special habitats, which undoubtedly occur there, have not been faunistically surveyed. For example, being a raised coralline island a subterranean fauna should exist there, of which the aquatic or 'anchialine' underground fauna should be especially well developed with many native species. A significant terrestrial cave fauna may also have evolved there.

"Distant described 3 new species of Issidae in 1913, and none of these species have been subsequently reported on again. Their status may be problematical. Fennah, 1958, reviewed the fulgorid fauna of SE Polynesia but apparently missed Distant's 1913 paper (!). Fennah described a 4th Issidae as an endemic subspecies with the type subspecies endemic to Pitcairn I. Zimmerman collected a nice series of Catacanthus taiti on the Mangarevan Expedition. The species is still known only from Henderson (based on our collections). Related species occur in the Society and Marquesas Is., and based on the impressive, conspicuous size and color of C. taiti, the fact that it hasn't been found elsewhere, suggests that it is endemic. Both Coleotichus and Ugyops have many native restricted species in the Pacific, thus, it is probable that these unidentified specimens represent at least native species, and may be endemic. The weevils are among the best known groups of arthropods in the Pacific; therefore the 2 listed species are undoubtedly endemic and are of special interest to biogeographers, evolutionists, ecologists and others.

"Based on the above lack of entomological data and the possibility of environmental disturbance, if not by the current venture then by some fool liberating goats or the like, I think it is abundantly clear that we should attempt to launch or assist in a modern entomological/ecological expedition to this island to fill this critical lacuna. Of equal import to science is the predictable occurrence of excellently preserved and highly significant paleontological material in the limestone sink-holes."

Insecta

Stephen found a butterfly abundant in 1907 (North 1908), and Tait states that he sent insects to the British Museum (Natural History) in 1912, but of these we have found only a few published records (Distant 1913). Otherwise most of the insect records published for Henderson are of collections made by Zimmerman on the Mangarevan Expedition in 1934. According to Frank J. Radovsky (in litt.) there are at least 33 species of insects recorded from the island, of which 11 (acc. Frank G. Howarth in litt.) are, so far as known, endemic. We are only able to give a partial list of these, with sources.

Thysanoptera

Thrips albipes Bagnall (in Moulton 1939).

Rhynchota

Atylana parmula thalna Fennah (1958). Endemic.

Catacanthus taiti Distant (1913). Endemic.

Coleotichus sp. (Distant 1913). Possibly endemic.

Devagama fasciata Distant (1913). Endemic.

Devagama insularis Distant (1913). Endemic.

Devagama maculata Distant (1913). Endemic.

Lallemandana insignis insignis (Distant) (Hamilton 1980). Endemic.

Peregrinus maidis Ashmead (Fennah 1958).

Ugyops sp. (Fennah 1958). Possibly endemic.

Coleoptera

Hypothenemus eopolyphagus Beeson (1940).

Microcryptorhynchus orientissimus Zimmerman (1936). Endemic.

Nesonos brunneus Zimmerman (1938).

Notioxenus cylindricus Jordan (Zimmerman 1938).

Rhyncogonus hendersoni Van Dyke (1937). Endemic.

Stephanoderes pacificus Beeson (1940).

Stephanoderes vafer Blandford (Beeson 1940).

Hymenoptera

Cardiocondyla nuda Mayr subsp. nereis Wheeler (1936).

Monomorium floricola (Jordan)(Wheeler 1936).

Tapinoma melanocephalum (Fabr.) var. australe Santschi (Wheeler 1936).

Technomyrmex albipes (F. Smith) (Wheeler 1936).

Tetramorium guineense (Fabr.)(Wheeler 1936).

Nylanderia vaga Forel var. crassipilis Santschi (Wheeler 1936).

Diptera

Dacus setinervis Malloch 1938 (Drew 1975).

Arachnida

Three species of spiders collected by the Mangarevan Expedition are listed for Henderson by Berland (1942):

Thorellia ensifera (Thorell)

Theridion paumotui Berland

Cyrtophora moluccensis Doleschall.

Crustacea

No land crabs have been recorded from Henderson. A very large cenobite, perhaps Birgus, was captured by a member of the party in 1934, but the specimen may not have been saved. Four species of terrestrial isopods, none of them endemic, are recorded from Mangarevan Expedition collections by Jackson (1938). They are Philoscia truncata Dollfus, P. fasciata Jackson, Spherillo montivagus Budde-Lund, and S. marquesarum Jackson.

LAND MOLLUSCA

Land Mollusca were collected by C. Montague Cooke, Jr., during the Mangarevan Expedition. One species was previously recorded, but at least 12-15 additional species were found (Cooke 1934, 44). Cooke and Kondo (1960, 256) estimated the fauna at 18 species. The following records have been published:

Achatinellidae

Tornatellides (Tornatellides) oblongus parvulus n. subsp.

(in Cooke and Kondo 1960, 255), endemic subspecies.

Tubuaia hendersoni n.sp. (in Kondo 1962, 36-38), endemic species.

Endodontidae

Minidonta hendersoni n.sp. (in Solem 1976), endemic species.

Helicarionidae

Diastole (Diastole) glaucina Baker (in Baker 1938, 50), endemic species:

Helicinidae

Orobophana solidula (Gray) (in Cooke and Kondo 1960, 255).

In addition, Cooke and Kondo (1960, 256) mention specimens from Henderson in the following genera: Elasmias, Lamellidea and Tornatellinops (Achatinellidae); Syncera (= Assimineia) (Assimineidae); Melampus (Ellobiidae); Georissa (Hydrocenidae); Nesopupa and Pupisoma (Pupillidae); and Thaumatodon.

MARINE FAUNA

As mentioned above, the schooner Westward made only brief stops at Henderson Island on her trip from Pitcairn to Ducie Atoll and back. Actually only one full day and two afternoons were spent there, and the only extensive collection made was of mollusks.

Fishes

The diving group spent their time searching for and collecting fishes and checking for the presence of Acanthaster planci (Linnaeus), the Crown-of-Thorns. J. E. Randall (pers. comm.) received the impression during the diving operations that the fauna was richer than that of Ducie (Rehder and Randall, 1975, 21-26). He has made no list of species collected and seen, feeling that such a list would be without value considering the shortness of the stay at the island.

Mollusks

See Appendix 2.

Other Invertebrates

No material other than mollusks were collected during the Westward visit, in large measure due to the absence of Dennis M. Devaney during this segment of the trip. One noteworthy comment is that no specimens of Acanthaster planci were seen by the divers despite the fact that one of the programs carried out on the Westward was a survey of the presence of the Crown-of-Thorns in southeastern Polynesia. Beechey (1833, 49) mentions the presence of 'numerous echini' on the reef flat, probably Diadema savignyi Michelin or D. setosum (Leske), as he comments on their capability of inflicting 'painful wounds.'

Beechey also mentions seeing some 'cray-fish' in the cavities on the reef (Panulirus species).

SCIENTIFIC IMPORTANCE AND CONSERVATION

Access to Pitcairn Island (and thus to other islands of the group) requires a license issued by the Office of the Commissioner for Pitcairn, issued by the Governor after the visit has been approved by the Pitcairn Island Council; casual visitors may land at the discretion of the Island Magistrate. There are no conservation measures applicable to Pitcairn or to its associated islands. In 1969 Henderson, Ducie and Oeno were all included in a list of Pacific islands proposed for international scientific supervision, possibly under the proposed 'Islands for Science' Convention (Douglas 1969, 463). No action was taken on this proposal.

In 1982 it became known that proposals had been made to the British Government by a wealthy American citizen, who wished to take up residence on Henderson in exchange for development assistance on Pitcairn. This proposal, when it became known, led to considerable concern in the scientific community, which was openly voiced at the XVth Pacific Science Congress in Dunedin, New Zealand. Appendix 3 gives the text of a resolution on Henderson Island adopted at this Congress.

There has been a growing interest in island biology, first taking on a scientific character with the work of Charles Darwin, but in the last few decades receiving greater and greater scientific attention. One of the preoccupations of this interest has been to determine what the conditions were on different types of islands before humans and especially before Europeans arrived and brought about drastic changes in the nature and functioning of these ecosystems. Very inadequate historical evidence exists, and for most islands none at all. In Henderson we have, preserved, a fine example of one of the most interesting types of island. It has the advantages of being small and remote, and of having a simple enough biota that its relationships, processes and functioning may possibly be understood with adequate investigation.

It is certain that undescribed species exist, especially of smaller and less conspicuous animals. It is equally certain that many of the species inhabiting the island, known or unknown, are threatened by the proposed disturbances, and will immediately become endangered if the development project is carried forward. The amount of attention being given to endangered species at present indicates that, whether for philosophic or practical reasons, a real value is attached to our co-inhabitants of the globe by the better elements of our Western culture. This should not lightly be brushed aside.

The study of islands as microcosms of more complex ecosystems has the practical significance of enabling us to gain some insight into the functioning of the larger and infinitely more complex ecosystems in which the majority of humanity live. Hence it would seem folly to permit the destruction of the only remaining intact example of one of the most important classes of islands that could form an important component of this study. Even its very scarcity or uniqueness would seem to enhance its value, as it does with so many other, mostly less important things.

ACKNOWLEDGEMENTS

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Note

While the present report was being assembled, other naturalists expressed their concern for the future of Henderson Island natural ecosystems in the following report:

Serpell, J., Collard, N., Davis, S. and Wells, S. 1983.

Submission to the Foreign and Commonwealth Office on the future conservation of Henderson Island in the Pitcairn Group. London: World Wildlife Fund-UK, International Union for Conservation of Nature and Natural Resources, and International Council for Bird Preservation. 26 pp.

The need for more adequate knowledge of the biota and ecology of Henderson Island is of such urgency that the Smithsonian Institution, in cooperation with the Royal Society, is actively planning a biological and geomorphological survey of the island, to take place during 1984 if the necessary permits can be secured and funds can be raised.

Appendix 1. A revised list of the vascular plants of Henderson Island.

No additional collections have come to our attention since the account of the flora by St John and Philipson (1962) was published, but much work has been done on the Pacific flora since then, and some names have been changed. Two species collected by Lintott were inadvertently omitted by St John and Philipson. Also our concepts of some taxa differ from those of the authors of that account. Such revisions and changes are presented, with a few explanatory remarks and comments, in the following list.

Asplenium lobulatum Mett.

Asplenium nidus L.

Asplenium obtusatum Forst.f.

Davallia solida (Forst.f.) Sw.

Nephrolepis biserrata (Sw.) Schott

Nephrolepis exaltata (L.) Schott

Perhaps an alternative identification of the preceding.

Cyclophorus blepharolepis C. Chr.

Polypodium vitiense Baker

Microsorium vitiense (Baker) C. Chr.

Polypodium euryphyllum var. hendersonianum E. Br.

We do not see much to be gained from extreme segregation of the genus Polypodium.

Polypodium scolopendria Burm.f.

Phymatodes scolopendria (Burm.f.) Ching

Pandanus tectorius Parkinson

Pandanus sp. of St John and Philipson (1962)

Lepturus repens (Forst.f.) R. Br.

Thuarea involuta (Forst.f.) R. and S.

Henderson is the eastern extreme of this widespread Indo-Pacific beach grass.

Fimbristylis cymosa R. Br. (s.l.)

Fimbristylis sp. of St John and Philipson (1962)

*Cocos nucifera L.

A few trees, originally planted.

*Cordyline fruticosa (L.) Chev.

Cordyline terminalis (L.) Kunth

(Cordyline fruticosa Goepp.) (nom. nud.)

This has frequently been called C. terminalis under the assumption that C. fruticosa (L.) Chev. is an illegitimate later homonym of C. fruticosa Goepp., but that was based only on a reference to a name Dracaena fruticosa H. Berol. that was apparently never published.

Dianella intermedia var. gambierensis F. Br.

Peperomia hendersonensis Yuncker

Endemic to Henderson.

Celtis paniculata var. viridis F. Br.

Procris pedunculata (Forst.) Wedd.

Korthalsella rubescens (v. Tiegh.) Lecomte

Korthalsella vitiensis (v. Tiegh.) Engler

Santalum hendersonense F. Br.

Endemic to Henderson.

*Achyranthes aspera var. pubescens (Moq.) Townsend

From the brief descriptive remarks by St John and Philipson (1962) this seems to be the widespread var. pubescens (Moq.) as defined by Townsend, Kew Bull. 29 (1974), 473.

Boerhavia tetrandra Forst.f.

Boerhavia diffusa var. tetrandra (Forst.f.) Heimerl

*Species thus marked are introduced.

Pisonia grandis R. Br.

Portulaca lutea Sol. ex Forst.f.

Sesuvium portulacastrum L.

Represented by Lintott H 22 (CHR), not listed by St John and Philipson (1962).

Cassytha filiformis L.

Hernandia sonora L.

Capparis sandwichiana DC.

Represented by Lintott H 24 (CHR), not listed by St John and Philipson (1962).

Lepidium bidentatum Mont.

Pittosporum arborescens Rich. ex Gray

Caesalpinia bonduc (L.) Roxb.

Cassia glanduligera St John

Close to and formerly considered identical with C. gaudichaudii H. and A., of Hawaii. C. glanduligera is also known from the Austral Islands.

Sesbania coccinea (L.f.) Poir.

Sesbania speciosa (Soland.) R. Br. var. tuamotuensis R. Br.

Sesbania atollensis St John

The specimen, Lintott H 1 (CHR) on which the Henderson Island record of Sesbania atollensis St John is based could not be located at Christchurch in 1983 according to Miss B. M. Macmillan (pers. comm.).

Suriana maritima L.

*Aleurites moluccana (L.) Willd.

Euphorbia sparrmannii Boiss.

Euphorbia ramosissima H. and A. (non Loisel.)

Glochidion pitcairnense (F. Br.) St John

Glochidion tahitense var. pitcairnense F. Br.

Endemic to Henderson and Pitcairn Islands.

Triumfetta procumbens Forst.f.

Thespesia populnea (L.) Sol. ex Correa

Xylosma suaveolens subsp. haroldii Sleumer

Pemphis acidula Forst.

Eugenia rariflora Benth.

Meryta brachypoda Harms

Endemic to Henderson and the Austral Islands.

Myrsine hosakae St John

Endemic to Henderson; tree 7 m tall.

Nesoluma st-johnianum Lam and Meeuse

Endemic to Henderson.

Geniostoma hendersonense St John

Tree 3-8 m tall; endemic to Henderson. Beechey's (1825, 63-64) 'species of budleia'.

Jasminum didymum Forst.f.

St. John (1940) suggests that Cuming's "Jessamine" may be this, but does not include it in the 1962 paper. We have no definite record based on a specimen. No complete list of Cuming's "Elizabeth Island" plants has come to our attention.

Alyxia stellata (Forst.) R. and S.

Ipomoea macrantha R. and S.

Ipomoea grandiflora sensu F. Br. non (Choisy) Hallier

Ipomoea glaberrima Bojer

Cordia subcordata Lam.

Heliotropium anomalum var. candidum St John

Endemic to Henderson.

Tournefortia argentea L.f.

Messerschmidia argentea (L.f.) I. M. Johnst.

Argusia argentea (L.f.) Heine

This seems merely to be a Tournefortia adapted to saline strand habitats rather than related to Argusia.

Premna obtusifolia R. Br.

Premna integrifolia L.

Lycium carolinense var. sandwicense (A. Gray) Hitch.

Lycium sandwicense A. Gray

There seem to be almost no differences between the Central Pacific strand Lycium and its relative on both coasts of southern North America.

Canthium barbatum f. calcicola Fosb.

Canthium odoratum (Forst.f.) Seem.

Guettarda speciosa L.

Ixora fragrans (H. and A.) A. Gray

Cephaelis fragrans H. and A.

Morinda umbellata var. forsteri (Seem.) Fosb.

Timonius polygama (Forst.) Robins.

Scaevola sericea var. tuamotuensis (St John) Fosb.

Bidens hendersonensis Sherff var. hendersonensis Sherff

Perhaps the only species of Bidens that reaches tree size. Endemic to Henderson.

Bidens hendersonensis Sherff var. subspathulata Sherff

Endemic to Henderson, if indeed distinct from var. hendersonensis.

Fitchia nutans Hook.f.

Not found on Henderson since the original collection by Hugh Cuming, which is suspected to have actually come from Tahiti. The labels of some of Cuming's collections are known to have been mixed.

Senecio stokesii F. Br.

Appendix 2. A revised list of the marine mollusks of Henderson Island
by Harald A. Rehder.

In 1913 a list of marine mollusks collected at Henderson Island was published by E. A. Smith (1913). This collection was made by J. R. Jamieson and D. R. Tait during their stay on the island while carrying out a survey of the phosphate deposits. Before this list the only species known from this island were those described by Broderip and Sowerby from specimens collected here by Hugh Cuming and possibly also by Beechey.

In January 1971 I spent parts of two days on the island making collections on the reef flat at the large beach on the north coast and also on the adjoining cliffs.

In the following list those species collected by me and not appearing in the 1913 paper by Smith are marked with an asterisk*. The names in Smith's publication, when different, are cited under the presently accepted name.

Haliotis pulcherrima Gmelin, 1791

Patelloida conoidalis (Pease, 1868)

Acmaea conoidalis Pease

Patella flexuosa Quoy and Gaimard, 1834

Patella stellaeformis Reeve, 1842

Broderipia iridescens (Broderip, 1834)

An examination of a large number of specimens of this genus leads me to believe that Broderipia rosea (Broderip, 1834) and B. subiridescens Pilsbry, 1890, represent growth stages of iridescens.

Pseudostomatella (Stomatolina) speciosa (A. Adams, 1850)

Stomatella speciosa A. Adams

Cantharidus marmoreus (Pease, 1867)

Calliostoma roseopictum E. A. Smith, 1913

Turbo petholatus Linnaeus, 1758

Turbo argyrostomus Linnaeus, 1758

Nerita morio (Sowerby, 1833)

Nerita melanotragus Smith, 1884

In my Ducie report (Rehder and Randall, 1975, 29) I erroneously reported this species as Nerita haneti Recluz, 1841.

Nerita plicata Linnaeus, 1758

Littorina coccinea (Gmelin, 1791)

Littorina obesa Sowerby, 1832

Nodilittorina pyramidalis pascua Rosewater, 1970

Littorina trochoides Gray, 1839

Royella sinon (Bayle, 1880)

Rhinoclavis sinensis (Gmelin, 1791)

Cerithium rubus Deshayes, 1843

Cerithium tuberculiferum Pease, 1869

Cerithium atromarginatum Bavay and Dautzenberg

Cerithium nassoide Sowerby, 1855

Cerithium egenum Gould, 1849

Cerithium rarimaculatum Sowerby, 1855

*Dendropoma maximum (Sowerby, 1825)

Epitonium torquatum (Fenau, 1943)

Epitonium perplexum (Pease, 1868)

For a discussion of this identification see my report on the marine mollusks of Easter Island (Rehder, 1980, 52).

Ianthina ianthina (Linnaeus, 1758)

Ianthina communis (Lamarck, 1822)

Vanikoro plicata (Recluz, 1844)

Strombus mutabilis Swainson, 1821

*Lambis truncata (Lightfoot, 1782)

*Lambis (Harpago) rugosa (Sowerby, 1842)

Polinices (Mamilla) simiae (Deshayes, 1838)

Mamilla simiae Deshayes

Natica gualteriana Recluz, 1844

Natica dillwyni Payraudeau, 1826

Cypraea cumingi Gray, 1832

Cypraea irrorata Gray, 1828

Cypraea goodalli Gray, 1832

Cypraea fimbriata Gmelin, 1791

Cypraea minoridens

Cypraea childreni Gray, 1825

Cypraea cicercula Linnaeus, 1758

Cypraea dillwyni Schilder, 1922

Cypraea margarita Gray, 1828, not Dillwyn, 1817

- Cypraea helvola Linnaeus, 1758
Cypraea poraria Linnaeus, 1758
Cypraea caputserpentis Linnaeus, 1758
*Cypraea maculifera Schilder, 1932
Cypraea subteres Weinkauff, 1881
Cypraea scurra Gmelin, 1791
Cypraea isabella Linnaeus, 1758
*Cypraea mappa Linnaeus, 1758
Cypraea schilderorum (Iredale, 1939)
Cypraea arenosa Gray, 1824
*Cypraea ventriculus Lamarck, 1810
Trivia edgari Shaw, 1909
Trivia oryza Lamarck, 1810
Casmaria erinacea (Linnaeus, 1758)
Cassis (Casmaria) vibex (Linnaeus, 1758)
Morum ponderosum (Hanley, 1858)
Bursa (Colubrellina) granularis (Röding, 1798)
Bursa (Colubrellina) affinis (Broderip, 1833)
Maculotriton serriialis (Laborde, 1838)
Maculotriton bracteatus (Hinds, 1844) var.
Phyllocoma convoluta (Broderip, 1833)
Bursa (Craspedotriton) convoluta (Broderip)
Drupa morum Röding, 1798
Drupa horrida (Lamarck, 1816)
Drupa clathrata (Lamarck, 1816)
*Drupa elegans (Broderip and Sowerby, 1829)
Drupa ricinus (Linnaeus, 1758)
*Drupa (Drupina) grossularia Röding, 1798
Morula uva (Röding, 1798)
Drupa morus (Lamarck, 1822)
Morula granulata (Duclos, 1832)
Drupa tuberculata (Blainville, 1832) var.
Morula dealbata (Reeve, 1846)
Thais (Thalessa) intermedia (Kiener, 1835)
*Thais (Thalessa) affinis (Reeve, 1846)

Nassa sertum (Bruguière, 1789)

Iopas sertum (Bruguière)

Vexilla vexillum (Gmelin, 1791)

Vexillum vexillum (Chemnitz, 1788)

Vexillum taeniata (Powis, 1836)

Quoyula monodonta (Blainville, 1832)

Quoyula madreporarum (Sowerby, 1834)

Euplica palumbina (Gould, 1845)

Columbella turturina sensu Smith, 1913, not Lamarck, 1822

Euplica varians (Sowerby, 1832)

Columbella varians Sowerby

Pyrene obtusa (Sowerby, 1832)

Columbella obtusa Sowerby

Engina fuscolineata E. A. Smith, 1913

Engina rosacea (E. A. Smith, 1913)

Tritonidea rosacea E. A. Smith

Tritonidea difficilis E. A. Smith, 1913

Without an examination of the holotypes of the last two species
I am uncertain of their proper generic assignment.

Caducifer decapitata fuscomaculata (Pease, 1860)

Caducifer cylindrica (Pease, 1868)

Colubraria nitidula (Sowerby, 1833)

Alectrion papillosa (Linnaeus, 1758)

Nassa papillosa (Linnaeus)

Nassarius (Telasco) gaudiosa (Hinds, 1844)

Nassa gaudiosa Hinds

Latirus nodatus (Gmelin, 1791)

Mitra (Mitra) stictica (Link, 1807)

Mitra pontificalis Lamarck, 1811

Mitra (Mitra) coffea Schubert and Wagner, 1829

Mitra fulva Swainson, 1829

Mitra (Strigatella) auriculoides Reeve, 1845

Mitra (Strigatella) litterata Lamarck, 1811

Mitra maculosa Reeve, 1844

Vasum armatum (Broderip, 1833)

Neither I nor Jamieson and Tate found this species during our visits to Henderson, although this is the type locality for the species, described by Broderip from material collected by Cuming in 1827. It is found from Rose Atoll, Eastern Samoa, and the Ellice and Phoenix Islands, southeastward to Henderson Island.

Conus lividus Hwass, 1792Conus ebraeus Linnaeus, 1758Conus chaldeus Röding, 1798

Conus hebraeus var. vermiculatus Lamarck, 1810

Conus miliaris Hwass, 1792Conus nanus Sowerby, 1833

Conus ceylonensis var. nanus Sowerby

*Conus sponsalis Hwass, 1792Conus tessulatus Born, 1778

Conus tesselatus Born

Conus rattus Hwass, 1792*Conus sanguinolentus Quoy and Gaimard, 1834Conus retifer Menke, 1829

Conus solidus Sowerby, 1834

Conus tulipa Linnaeus, 1758Conus tenuistriatus Sowerby, 1856

Conus glans var. tenuistriatus Sowerby

Conus pennaceus Born, 1778

Conus pennaceus var. episcopus Hwass 1792

Bulla species (juvenile)Melampus flavus (Gmelin, 1791)

Melampus luteus Quoy and Gaimard, 1832

Arca avellana Lamarck, 1819

Arca maculata Sowerby, 1833

Acar divaricata (Sowerby, 1833)

Arca (Acar) domingensis sensu Smith, not Lamarck, 1819

Barbatia parva (Sowerby, 1833)

Arca (Barbatia) parva Sowerby

*Lima lima (Linnaeus, 1758)Lima bullifera Deshayes, 1863

Spondylus speciesCodakia (Epicodakia) bella (Conrad, 1837)Lucina (Codakia) divergens Philippi, 1850Tridacna maxima (Röding, 1798)Tridacna crocea sensu Smith, not Lamarck, 1819Tridacna squamosa sensu Smith, not Lamarck, 1819Trapezium oblongum (Linnaeus, 1758)Libitina guiniaca (Chemnitz 1784)Chama asperella Lamarck, 1819Chama jukesii Reeve, 1847

It is with some hesitancy that I assign the many valves that I found on the beach to this species. Both Lamarck's species and Chama spinosa Broderip, 1835, described from the Tuamotus, and with which I had originally identified my specimens, have white interiors. Most of my specimens are strongly tinged with purple within, and Lamarck mentions a variety marked with purple inside. Until a series of fresh, unworn specimens can be compared with the types the proper identification of this species will be in doubt. The true Chama jukesii Reeve from Australia may be a related but distinct species.

Arcopagia (Scutarcopagia) scobinata (Linnaeus, 1758)Tellina scobinata LinnaeusSemele australis (Sowerby, 1832)

The known molluscan fauna, which is twice as large as that recorded from Ducie, is typically Polynesian, and most of the species are those commonly found in the Tuamotus, in which island group Henderson should faunally be included. A few species, such as Nerita morio and Nodilittorina pyramidalis pascua show an affinity with the Easter Island-Pitcairn-Rapa subprovince.

Appendix 3. Resolution of the Pacific Science Association adopted at the XV Pacific Science Congress. Feb. 1-11, 1983. Dunedin, New Zealand.

Henderson Island

WHEREAS, elevated coral islands are few in number and of great biological and geological interests; and

WHEREAS, most such islands have been drastically altered by man through commercial exploitation; and

WHEREAS, Henderson Island, in the Pitcairn Group, is a raised coral island of twelve square miles, uninhabited and untouched except for occasional visits by inhabitants of Pitcairn, 100 miles distant, to obtain wood of the miro trees growing at the margin of the wooded interior of the island; and

WHEREAS, Henderson Island is the only habitat of a number of endemic species of angiosperm plants, birds, land snails, and insects, discovered during very limited surveys of the island; and

WHEREAS, Henderson Island, because of its being a raised coral island with narrow fringing reefs, narrow sandy beaches, and steep coral cliffs, has a marine environment unique to that part of eastern Polynesia; and

WHEREAS, preliminary investigations on the island have revealed the presence of important archaeological sites, suggesting early occupation by the Polynesians; and

WHEREAS, a private individual is seeking permission to live on Henderson Island and to build a house, a jet airstrip, and loading facilities for ships;

BE IT RESOLVED that the Pacific Science Association urges the British Government not to permit the proposed development before: (1) a detailed biological survey of the island has been carried out, in which the participation of responsible scientific agencies should be encouraged; (2) the likely ecological effects of the proposed development have been assessed; and (3) the views of Pitcairn Islanders on the proposed development have been obtained.

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NOTE ON HENDERSON ISLAND RESOLUTION

On March 1, 1983, in the House of Lords, Lord Melchett asked Her Majesty's Government a number of questions on the proposed occupancy of Henderson Island, including whether they agree with the view expressed in the International Biological Programme's Report in 1968 that Henderson Island should be preserved as an "island for science."

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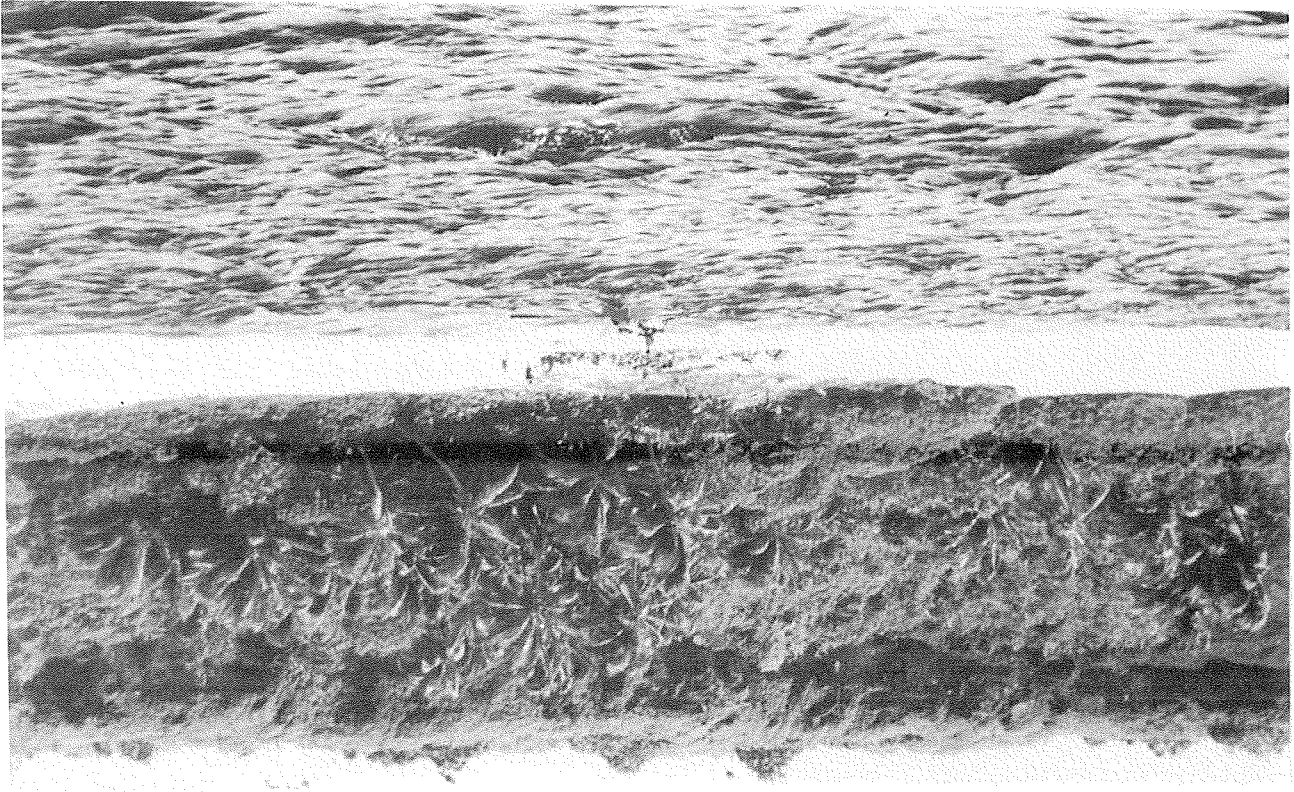
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2. North coast, from sea, closer up. Pitcairn people on beach preparing to load coconuts and Thepesia wood (Rehder photo).

Plate 1. North coast with low cliffs, beach, and coconut and other vegetation back of beach, from sea (Rehder photo).

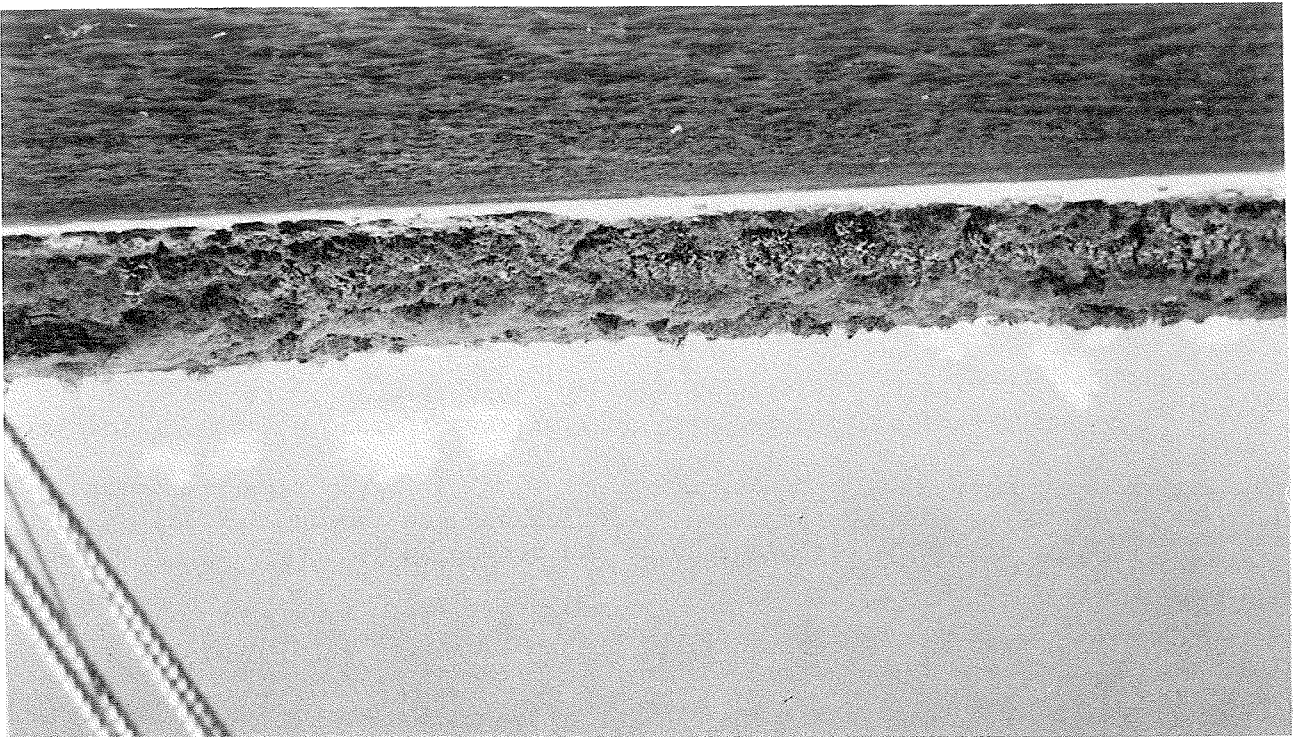




Plate 3. Base of cliff on north coast showing small cave site of archaeological excavation by Dr. Sinoto (Rehder photo).

4. West coast, undercut cliffs (Rehder photo).





Plate 5. West coast, looking north from near south end, from top of cliff (1943 photo).

6. West coast, looking north, near northwest point, from part way up cliff (Fosberg photo).





Plate 7. Cliffs back of North Beach, back-beach scrub in foreground, single coconut tree on top of cliff (1943 photo).

8. Vegetation of interior plateau, from top of large Pandanus tree (Fosberg photo).





Plate 9. Interior of back-beach vegetation, north coast, showing Pandanus (Rehder photo).

10. Tangled interior of vegetation (1943 photo).





Plate 11. Dissected limestone on plateau, forest in background (Fosberg photo).

12. Dissected limestone, on plateau, close-up, surrounded by forest (Fosberg photo).

