STUDIES ON THE FAUNA OF CURAÇAO AND OTHER CARIBBEAN ISLANDS: No. 167

MARINE LOCALITIES

by

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Some twenty-five years have passed since short descriptions were published of marine and saltpond habitats sampled in the Caribbean during three zoological collecting trips made by the author in 1930, 1936/37 and 1948/49 (these *Studies*, vol. *4*, no. 17, 1953). Sampling of the shallow coastal waters of the Caribbean was continued in 1955, 1963/64, 1967, 1968, 1970 and 1973, during six visits the main purpose of which was not always the study of the marine fauna. Although collecting was done single-handed and rather incidentally, with no other equipment than a knife, fine-meshed nets, formaldehyde and alcohol, the material collected proved to be sufficiently valuable for scientific purposes to justify the publication of a list of the new marine localities.

In this paper the descriptions of the "Marine Habitats", published in 1953 (p. 56–58) are included, but those of the "Salt Pond Habitats" (p. 69–77) are only referred to.

The list is preceded by an INDEX in which the Stations are roughly

arranged according to characteristics such as water movement, substrate and salinity.

The REFERENCES include all publications on material collected in these localities.

Because of the restricted and primitive way of collecting, certain spectacular groups of animals may be absent in the samples, while others have been poorly preserved. Although the author realises these shortcomings, he is confident that his collecting work will contribute to our knowledge of the invertebrate fauna of Antillean shallow water environments. Furthermore he hopes that it will encourage specialized research workers to pay more attention to this highly variegated and easily accessible area.

Although the author tried to be self-supporting, he could not work without material help and moral support from a great number of persons and authorities; of these only a few can be mentioned.

In particular he would like to express his gratitude to the STATE UNIVERSITY AT UTRECHT which allowed him to undertake his Caribbean trips; to the GOVERNMENT OF THE NETHERLANDS ANTILLES which graciously invited him three times; and to the FOUNDATION FOR SCIENTIFIC RESEARCH IN SURINAM AND THE NETHERLANDS ANTILLES, under whose auspices the greater part of this research was carried out, and whose Treasurer, dr. J. H. WESTERMANN, favoured the author with his help and constructive criticism. Last but not least thanks are due to Mrs C. H. E. WAGENAAR HUMMELINCK née BERKELBACH VAN DER SPRENKEL who affectionately looked after the home and the children during his absence.

The Caribbean Marine Biological Institute served as the author's pied-a-terre at Curaçao on several trips. The friendly cooperation of its directors, dr. JACQUES S. ZANEVELD, dr. INGVAR KRISTENSEN and dr. FREEK CREUTZBERG will not easily be forgotten. The author especially remembers the excursions made in the company of ZANEVELD in the period preceding the foundation of the Carmani, while KRISTENSEN's enthusiastic support was highly appreciated.

Dr. P. J. ROOS, Amsterdam, assisted in 1967 in the study of the Lac of Bonaire. In 1970 the author joined dr. C. G. VAN DER MEER MOHR, Leiden, in his investigations into the processes of limestone formation on the same island.

The Lerner Marine Biological Station at Bimini was visited in 1949. Prof. dr. FREDERICK M. BAYER was the author's host during a short visit to the Marine Laboratory of the University of Miami in 1963. Thereafter he enjoyed the hospitality of dr. JOHN E. RANDALL and the staff of the Institute of Marine Biology of the University of Puerto Rico at Mayagüez. During the same trip he was received by dr. JOHN B. LEWIS at the Bellair's Research Institute of McGill University in Barbados, while dr. Hermano GINÉS and dr. FERNANDO CERVIGÓN arranged his stay at the Estación de Investigaciones Marinas de Margarita, La Salle. In 1973 dr. MARCO E. C. GIGLIOLI was his host at the Mosquito Research & Control Unit

in Grand Cayman, while prof. dr. IVAN GOODBODY arranged his stay at the Department of Zoology of the University of the West Indies, Jamaica.

Finally, the author wishes to mention the always pleasant assistance of his close collaborators at the Zoological Laboratory, Utrecht, drs. LOUISE J. VAN DER STEEN and dr. Harry A. TEN HOVE.

One does not expect that the localities visited would have remained unaltered between 1930 and 1973. In fact, some of the changes were so dramatic, that the author has decided to reproduce a few photographs which are of little direct value to zoologists, but which illustrate such changes in the Netherlands Antilles.

From a report by J. BOEKE (1907) on the situation of commercial fisheries the reader gets an impression of the beautiful Schottegat before this largest inland bay of C u r a ç a o became one of the largest seaports in the Western Hemisphere, and the site of a large Shell oil-refinery. In those times St. Annabaai and Schottegat closely resembled the present Spaanse Water. The Spaanse Water lagoon and Caracasbaai were successfully studied in 1920 by C. J. VAN DER HORST (1924). Many years ago, however, the Spaanse Water was turned into a watersports centre, while Caracasbaai became an important bunker station.

The Rifwater also underwent major changes because of the growth and modernization of the capital of Willemstad, while Piscaderabaai has been badly affected by the building of hotels.

In 1955 the Caribbean Marine Biological Station was built on a piece of shoreland which at that time was frequented only by fishermen; its neighbour was the Piscadera Bay Club of the C.P.I.M. (Shell). At present it is hemmed in by large hotels while the outer bay suffers badly from tourist activities. In June 1972 the entrance to the Piscadera inner-bay was widened by dredging and the lagoon behind the Carmabi was filled up. At one time there were plans to convert this lagoon into a yacht-haven.

The water of Piscadera inner-bay is very turbid, and the phosphate content is considerably higher than that in other bays. While the turbidity may be caused largely by suspended particles, the eutrophication can be considered to be the result of an influx of biologically cleansed effluent from several residential developments,

at Klein Hoffie. Since October 1960 the bay receives daily a maximum of 1,000 m^3 of drainage water, with a strongly fluctuating chloride content averaging 250 mg Cl'/l. Prior to this there was a discharge of un-cleansed water from the Julianadorp sewer only. This effluent amounted to up to one quarter or one fifth of the present quantity.

In the vicinity of Aruba's capital, Oranjestad, the coastline has changed markedly as a result of dredging in Paardenbaai harbour and the extension of the airport far into the Lagoon of Bucuti. The establishment of the Lago (Exxon) oil refinery has also had far-reaching consequences for the whole southeastern coast. In contrast the character of the mangrove-bordered Spaans Lagoen seems to have been changed little by the establishment of industrial complexes near its mouth and the construction of bridges. The Eagle Pier has been removed in December 1974.

In Bonaire the habitats around Kralendijk remained almost unaltered although the wall of coral debris (that gave Bonaire's capital its name) has been turned into a "boulevard" and the old-fashioned jetty replaced by more modern seaport facilities. It is to be expected that the harmful effects of the construction and exploitation of a yacht-haven at Playa Lechi will be kept to a minimum with a view to the interests of the large scuba diving centre near Hotel Bonaire.

Lac was investigated in 1967 because development plans threatened to disturb this spacious mangrove lagoon. If this area is going to be developed into a second tourist-centre for the island, it will be extremely difficult to save its natural character. Bonaire's reputation as an unspoilt beauty spot in the Caribbean has already suffered as a result of the construction of an extensive salt plant in the southern part of the island and the building of a large oil terminal in the northwest. Several local people, however, keep trying to reconcile industrialisation and the development of tourist-trade with nature conservation – witness the Flamingo Sanctuary, Washington National Park, and the efficient measures to protect underwater life.

In Sint Maarten the rapid development of tourism has brought considerable changes to the natural environment. The formerly quiet Great Bay is now bustling with activity reaching as far as the deepwater pier at Point Blanche, and the Great Saltpond and Fresh Pond are becoming more and more enveloped in the expansion of Philipsburg.

The spacious Simson Bay Lagoon became hypersaline after its narrow entrance became closed up during the construction of a new bridge, after the old one had been destroyed by a hurricane. A few years afterwards, a new connection with the sea was made at the opposite northeastern French side, while in 1972 the original entrance was opened again. So now the Lagoon has two openings, at the Marigot side and near Simson Bay, which account for its growing importance for recreation purposes. Furthermore, the extension of the airport and ambitious hotel enterprises in the Low Lands brought about many changes, by which the Flamingo Pond did not come in connection with the Lagoon again.

Saba got some new marine habitats on account of the recent construction of a pier at Fort Bay, the islands only safe anchorage.

St. Eustatius got a 300 meter long pier near Oranjestad in 1976. Now an oil terminal is being built at Tumble Down Dick Bay, which has already radically changed the natural character of the northwestern region.

Several localities were visited more than once but only a few of the larger areas were sampled intensively enough to permit the study of environmental changes in detail: Piscaderabaai for the first time in 1963, Lac in 1967.

In Piscaderabaai (Piscadera inner-bay) the mangrove-roots are densely covered with oysters (*Crassostrea rhizophorae*) and barnacles (mainly *Chthamalus bisinuatus*) which in many places are thickly overgrown with ascidians (notably large patches of *Didemnum*). There are great masses of sponges and actinians (mainly *Aiptasia pallida*), beautiful colonies of hydroids (especially *Halecium halecinum* and *Laomedea bicuspidata*) and luxuriant patches of bryozoa (*Amathia, Zoobotryon* and *Bugula*), while in places *Schizoporella* may occur as the dominant organism. *Thalassia testudinum* occurs only in some shallow places, while *Halimeda* is almost absent. The bottom of the inner bay consists for the greater part of blackish mud, carrying in some shallow places large numbers of *Chione cancellata* and three *Corbula* species, while *Brachydontes exustus* is found nearly everywhere along the rocky shores.

In Lac, however, there are no mangrove-oysters and only very few barnacles (*Chthamalus angustitergum*), while ascidians, sponges, actinians and bryozoa are much less predominant than in Piscadera Bay. Hydroid colonies of *Dynamena crisoides* – common in the Piscadera outer-bay – are found in many places, and the athecate *Myrionema hargitti* is as strikingly present here as in many other Caribbean clear-water lagoons. The bottom of Lac is covered with a luxurious growth of *Thalassia*, in many places mixed with *Halimeda opuntia*. Locally *Codakia orbicularis* abounds, but *Chione* is absent. *Oreaster reticulatus* and several species of *Strombus* found in the basin of Lac are lacking in Piscadera's inner-bay. The author has been told that *Cassiopea* – common in Lac – used to occur in Piscaderbaai; in that case the bay must have been filled with clear water and would have had well-sheltered places; conditions which no longer exist.

Roughly the land-locked bays of the Netherlands Antilles may be classified into two groups:

a) Fairly large bays which, in general, are hand-shaped, drowned valley systems. – They are relatively deep (provided they have not been filled up to a high degree with sediment), and have shallow places only there where after rains much sediment is deposited. These places are (or were) as a rule indicated by groves of *Rhizophora* (e.g. Spaanse Water, St. Jorisbaai, Piscaderabaai).

b) Bays of various sizes and more or less ovally shaped, that essentially are shallow water areas separated from the sea by a porous wall of coral debris. – Where much sediment is supplied, the inner shores may be covered with a mangrove belt in which, after heavy rains, considerable quantities of sand and mud are being retained (e.g. Lac); if no sediment is supplied these lagoons have an "oceanic" character (e.g. Awa di Oostpunt, Curaçao).

Obviously all bays, lagoons, ponds and puddles may become hypersaline if they are effectively closed off from the sea.

Coastal and inland waters cannot be properly classified; there are too many variations in prevailing conditions, whether local or not, while environmental changes often occur suddenly and may easily escape observation.

In spite of this an attempt has been made to give the following simplified and highly arbitrary CLASSIFICATION OF SALINE INLAND WATERS *in which collections were made.*

LAND-LOCKED BAYS OR ALMOST ENCLOSED LAGOONS

MORE OR LESS HANDSHAPED BAYS OR LAGOONS: drowned valleys completely intersecting a coastal range of neogene limestone

entrance relatively wide	
clear water	Spaanse Water, in part (Cur.)
turbid, slightly polluted . . .	Lagoen (Bon.); Spaanse Water, in part, St. Jorisbaai, Playa Grandi, Boca Bartool (Cur.); Spaans Lagoen (Ar.)
turbid, polluted	Schottegat (Cur.)
entrance relatively narrow	
turbid, rather polluted . . .	Piscaderabaai (Cur.)

MORE OR LESS OVAL BAYS OR LAGOONS: land-locked and almost completely surrounded by limestone or coral debris

entrance relatively wide	
clear water	North Sound (Cayman); Lac (Bon.); Awa di Oostpunt, Fuikbaai W part, Lagoen St. Jan (Cur.)
turbid, slightly polluted . . .	Fuikbaai, E part (Cur.)
entrance relatively narrow	
clear water	Fort Rupert Lagoon (Jam.); Great Lagoon (Barbuda); Awa Blanco, Lagoen Blanco, Lagoen di Venni, Sta Marta lagoons (Cur.)
turbid, slightly polluted . . .	Rifwater (Cur.)

MORE OR LESS OVAL OR IRREGULARLY SHAPED BAYS OR LAGOONS: land-locked and generally not surrounded by limestone except here and there when there is calcareous debris

entrance relatively wide	
clear water	Oyster Pond (St. M.); La Restinga (Marg.)
turbid, slightly polluted . . .	Kingston Harbour, in part (Jam.); Bahía Fosforescente (P.R.)
turbid, polluted	Kingston Harbour, in part (Jam.); Port Castries (St. L.); St. George Lagoon (Gren.)
entrance relatively narrow	
clear water	Krause Lagoon (St. C.); Simson Bay Lagoon (St. M.); Manche à Eau (Guad.); Las Maritas (Marg.)
turbid, slightly polluted . . .	Punta Mangle, Punta Piedras (Marg.); Awa Lodo di Lac (Bon.)

SALTLAKES, SALTPONDS OR SALTFLATS

(s = seepage; salinity in g Cl′/l)

MORE OR LESS HANDSHAPED SALINES: drowned valleys intersecting a coastal range of limestone, separated from the sea by coral debris

Low salinity (< 50)	Bartool *s*, Slagbaai *s*, Goto *s* (Bon.); Sta María *s*, Jan Thiel *s* (Cur.)
High salinity (50–110) . . .	Bartool, Foensjie, Tam, Goto (Bon.)
Very high salinity (> 110). .	Sta Marta, Sta María (Cur.)

MORE OR LESS OVAL SALINES: shallow and surrounded by limestone, generally separated from the sea by coral debris

Low salinity (< 50)	Spot Bay *s* (Cayman); Flamingo Pond (St. M.); Martinus *s*, Pekelmeer *s*, Oranjepan *s*, Plenchi *s*, Cai *s*, Klein Bonaire (Bon.)
High salinity (50–110) . . .	Dog Island, Sandy Ground (Ang.); Martinus, Pekelmeer *s*, Flambaai, Plenchi, Cai, Klein Bonaire (Bon.)
Very high salinity (> 110). .	Corozo (P. R.); Maze Bay (Ang.); Blauwe Pan, Pekelmeer, Witte Pan, Oranje Pan, Cai (Bon.)

MORE OR LESS OVAL OR IRREGULARLY SHAPED SALINES: shallow and generally not surrounded by limestone, mostly separated from the sea by non-calcareous debris

Low salinity (< 50)	Yallahs *s* (Jam.); Papayo (P. R.); Great Saltpond *s*, Atwell's Pond, Fresh Pond, Simson Bay Lagoon (St. M.); Grande Saline *s* (St. B.); Grande Anse (Dés.); Pt Salines (Gren.)
Very high salinity (> 110). .	Great Saltpond, Grande Case (St. M.); Grande Saline (St. B.); Guayacuco (Marg.); Awa di Chico (Bon.)

INDEX
OF MARINE AND SALTPOND HABITATS

Numbers referring to island localities outside the Leeward Group are in italics

SHELTERED COAST, SOMETIMES EXPOSED TO WAVE ACTION

rocky shore
- limestone 1002, 1017, 1018, 1020, 1049A, 1056, 1057, *1125*, 1316, 1357, 1646, 1651
- no limestone *1546*, *1705*

rocky shore with sand
- limestone 1018A, 1019, 1027, 1049, 1055, 1056B, 1057A/C, 1058, *1125A*, *1126*, 1315, 1328, 1330, 1331, 1359, 1369, 1379, 1380, 1459, *1540*, *1682*
- no limestone *1116*, 1216, *1389*, *1439*, *1549*

sand
- with rock or coral debris 1001, 1049B/C, 1056C, 1058C, *1114*, 1213, 1301, 1303, 1310A, 1370, 1371, 1379, 1453, *1683*, *1694A*
- without rock debris *1117*, *1118*, *1128/B/C*, 1302A, 1310, *1540B*, *1541*

muddy sand or sandy mud
- with rock or coral debris *1127*

FLOATING SUBSTRATE 1053, 1054

OFFSHORE *1413*, *1414*, *1431*
(Poles, beams, etc.: *1128A*, 1302, 1331, *1541*, *1705*)

SHELTERED BAYS AND OPEN LAGOONS (incl. reefs, tide pools and creeks)

OFTEN EXPOSED TO DISTINCT WAVE ACTION

rocky shore
- limestone 1020A
- no limestone 1021, *1121*

rocky shore with sand
- limestone 1020B/D, 1023A, 1024, 1029/A, 1317, 1334, *1387*, *1411*, *1437A*, 1591, 1620
- no limestone 1022, 1070, 1556, 1557

sand
- with rock or coral debris 1007, 1023, 1020C, 1129, 1211A, 1301, 1303, 1307, 1373A, *1386*, *1419A*, 1453, 1559, 1565, 1566, 1620, *1680*
- without rock debris 1007A, 1009, 1019A, 1304, 1329, *1385*, *1410*, *1418*, *1419*, 1454, 1455, 1456/A, *1531*, 1561, 1563, 1564, 1567, 1568, 1569, 1570, 1571, 1652, 1666, *1684*

muddy sand
- with rock or coral debris 1070A, *1437*, 1455A, 1457, 1458, 1459/A, 1558
- without rock debris 1447, *1543*

SOMETIMES EXPOSED TO DISTINCT WAVE ACTION

rocky shore
limestone 1463B
rocky shore with sand
limestone 1354, 1355, 1463
no limestone *1382*, *1383*
sand
with rock or coral debris 1203, 1210A, 1211, *1408A*, 1460, 1461, 1462, 1463A
muddy sand or sandy mud
with rock or coral debris 1004, 1006, *1151*, 1318, 1359, 1361, *1409*
without rock debris 1003, 1004A, 1005, 1062, 1210, 1404, *1438*, *1547*, *1551*, 1572, 1573, 1647, 1653, *1693*, *1698*, *1699*
mud
without rock debris 1202, *1417*, *1550*, *1685*

FLOATING SUBSTRATE 1711

OFFSHORE *1392*
(Poles, beams, etc.: *1151*, 1202, 1029A, 1334, 1409, *1419*, *1438*, 1447, 1459, 1462, 1620, *1680A/B*, *1699*)

LAND-LOCKED BAYS OR ALMOST ENCLOSED LAGOONS (incl. tide pools, creeks, canals and holes)

SOMETIMES EXPOSED TO WAVE ACTION

rocky shore
limestone 1469B, 1592B
no limestone 1710
rocky with sand or muddy sand
limestone 1039, 1344, 1473, *1535*, 1591
no limestone *1429A*
sand
without rock debris 1338, *1423A*, *1536*, 1669
muddy sand or sandy mud
with rock or coral debris 1034, 1039A, *1148*, 1325, 1342, 1360, *1391*, 1493, 1494, *1538*, 1709
without rock debris 1062, 1339, 1349, *1404*, *1424/A*, *1429/B*, 1464, 1469, 1472, 1473A, 1479, 1495, 1503, *1534*, 1592, 1593/A, 1594, 1622, 1623, 1653, 1669, *1674*, *1690*, 1709A
mud
with rock or coral debris 1038, *1132*, 1305, 1340, 1488, 1492, 1497, *1548*, 1629, *1689*
without rock debris 1066, *1428*, *1434*, *1435*, 1481, 1498, 1501, 1574, 1576, 1672, 1673, *1689A*

USUALLY NOT EXPOSED TO WAVE ACTION

rocky edge
limestone *1427*
rocky with sand or muddy sand
limestone 1708A
sand
without rock debris *1405*, *1423B*, 1599
muddy sand or sandy mud
with rock or coral debris *1129*, 1320, 1323, 1325A, 1329, 1351, 1449, 1450, 1465, 1598, 1640, 1642, 1670, 1671A, *1677*, *1686*, *1687*
without rock debris 1035, *1130*, *1131*, *1150*, 1201, 1350, *1396*, *1412*, *1421*, *1422/A*, 1448, 1452, 1467/B/C, 1471A/B, 1474/B, 1475, 1480/A, 1486/A, 1487, 1499, 1500, 1523, 1524, 1526, 1527, *1532*, *1537*, *1545*, 1578, 1582, 1583, 1584, 1587, 1588, 1589, 1590, 1595, 1597, 1601, 1602, 1604, 1621, 1625, 1626, 1628, 1630, 1631, 1632, 1639, 1641, 1671, *1678*, *1679*
mud
with rock or coral debris 1008, 1028, 1036, 1321, 1322, 1468, 1476, 1485, 1503, 1596, 1603, 1614, 1644, 1668A, 1708
without rock debris 1008A, 1036A, 1064, 1065, 1155, 1217, 1337, *1406*, *1420*, *1422B*, *1423*, *1406*, 1434, 1446, 1466, 1467A, 1474A, 1478/A/B, 1483/A, 1489, 1490, 1491, 1496, 1502/A, 1522, 1525, *1533*, *1539/A*, *1544*, 1575, 1577, 1579, 1580, 1585, 1586, 1600, 1618, 1624, 1627, 1633, 1635, 1636, 1637, 1638, 1643, 1667, 1668

FLOATING SUBSTRATE 1218, 1341, 1470, 1477, 1482, 1484, 1593A, 1634
(Poles, beams, etc.: *1129*, *1148*, *1391*, *1435*, 1501, 1503, *1538*, *1548*, *1689*)

TANK OR OUTLET 1528, 1672, 1673

ENCLOSED LAGOONS, MARINE PONDS AND POOLS (excl. tide pools, incl. seepages)

sea water	= about 20 g Cl′/l	moderately strong brine	= 80–110 g Cl′/l
very weak brine	= 25–50 g Cl′/l	strong brine	= 110–170 g Cl′/l
weak brine	= 50–80 g Cl′/l	very strong brine	= 170 or more g Cl′/l

LAKE OR MUDFLAT

salinity about equal to sea water
- rocky or sandy *1681*, 1706
- muddy 1662, 1663, *1702*

very weak brine
- sandy or rocky 1089, 1090, 1091, *1402*
- muddy *1401*, 1608, 1654

weak brine
- muddy *1130B*, 1607, 1609/A

moderately strong brine 1093

strong brine 1092

POND

salinity lower than sea water
- muddy 1014, 1015, *1400a*, *1436*, *1691*, *1696*

salinity about equal to sea water
- rocky or sandy 1332, 1347, 1357
- muddy 1010, 1025, 1319, 1326, *1130*

very weak brine
- muddy *1133*, *1132B*, *1132a*, 1335, 1374, *1381*, *1400*, 1581, 1605, 1655

POOL, DITCH OR SWAMP

salinity lower than sea water
- muddy 1047, *1436A*, *1444*, *1688*, *1695*, *1697*

salinity about equal to sea water
- rocky or sandy 1026, 1031, 1032, 1033, 1345, 1346, 1348, 1451A, 1611, 1612, 1613, 1614/A
- muddy 1306, 1554, 1555, 1654, *1674A*

very weak brine
- rocky or sandy *1139*, 1606
- muddy *1130A*, *1403*, *1692*, 1694

weak brine
- muddy 1656, 1657, 1658

very strong brine 1048

SALINAS AND SALTPONDS (incl. their seepages)

POOL OR DITCH

salinity lower than sea water *1390A*, 1615, 1676A, 0129
salinity about equal to sea water 1095A, 1100, 1504A
very weak brine *1122*, *1134*, *1426*, 1451, 1619
weak brine 1665
moderately strong brine 1052a, 1072, 1104, *1137B*

POND OR SALTFLAT

salinity lower than sea water 1012
salinity about equal to sea water *1390*, 1504
very weak brine 1012a, 1013, 1072a, 1073d, 1078, 1094, *1426A*, 1664
weak brine 1044, 1051, 1073/a/b/c/e/f, 1074, 1616, 1617/A, 1660, 1664A, 1648, 1649
moderately strong brine 1052, *1146*, *1147*, *1616A*, 1659
strong brine 1075, 1076, 1094A, *1137A*, 1610
very strong brine 1040, 1041, 1042, 1043, 1077, 1661

LAKE OR SALTFLAT

salinity lower than sea water 1106A, *1676*
salinity about equal to sea water . . . . 1050d, 1083b/c, 1084/a, 1086/a, 1099 a/b, 1103, 1104A, 1105, 1106, 1619
very weak brine 1050/a/b, 1051A, 1083/a, 1085, 1087, 1088, 1090, 1095, 1096, 1097, 1099a, 1101, 1103a, 1104, *1122*, *1144*
weak brine 1050c, 1095a, 1101a, 1102, *1145*
moderately strong brine 1045, 1080/a, 1082, 1097a, 1098, 1107, 1108, *1137*, *1138*, *1140*, *1425*
strong brine 1081, 1109/a/b, *1135*, *1136*, *1143*
very strong brine 1040, 1041, 1042, *1123*, *1141*, 1445

MARINE HABITATS

excluding all salt-water habitats which are not, rarely or very imperfectly in communication with the sea

including all marine habitats already described in *Studies 4*, p. 59–68

Florida Keys (Plate Ia)

1408 VIRGINIA KEY, NE side, 4.IX.1963.
Sandflat with *Syringodium* and *Thalassia* beds; ½–1½ m deep.

1408A – Sea grass with pieces of coral and concrete; 4.IX.1963; 1–2 m.

1409 – The Marine Laboratory, 1.IX.1963.
Concrete and wooden poles in muddy water with tidal flow, largely covered by *Balanus* and *Chthamalus*, sponges, hydroids, *Didemnum* and other ascidians; 0–2 m.

1410 KEY BISCAYNE, North Point at Bear Cut, 1.IX.1963. (Pl. Ia)
Sandflat with dense *Syr.* and *Thal.*; ½–1½ m.

1410A – Single *Rhizophora* amidst *Thal.* bed, in part covered by *Isognomon*, *Balanus* and *Tetraclita*; 1.IX.1963; 0–1 m.

1410B – Pools with *Thal.* and *Syr.* on sand beach; 1.IX.1963.

1411 – Northeastern tip of Key, 7.IX. 1963.
Sandy beach with mangrove rock, tide pools with *Zoanthus* and *Tetraclita*, *Thal.* and *Halodule*; 0–1 m.

1412 – Creek in northwestern mangrove swamp, 31.VIII.1963.
Drainage canal about 6 m wide; poor *Rhiz.* and *Avicennia*, *Cassiopea* on muddy sand; ½–1½ m.

1413 SOLDIER KEY, E side, 0.3 km offshore, 5.IX.1963.
Muddy sandflat with scattered *Thal.* and gorgonids; 2 m.

1414 ELLIOTT KEY, E side, 3 km offshore, 5.IX.1963.
Small coral reef on sand bottom with *Thal.* and *Syr.*; 2–6 m.

Bimini

1150 SOUTH BIMINI, Massy Creek, 17.VIII.1949.
Muddy inlet with *Thalassia* and *Rhizophora*; 0–1 m deep.

1150A – Sandy mud with *Thal.*, numerous *Cassiopea*; 17.VIII.1949; ¼–1 m.

1151 NORTH BIMINI, Lerner Marine Laboratory dock, 20.VIII.1949.
Woden poles in sandy mud with *Thal.*, numerous *Isognomon*; 0–1 m.

1152 – Entrance Point, W shore, 18.VIII.1949.
Beachrock with sandy rock debris, pools with numerous *Tetraclita*; 0–½ m.

New Providence

1149 BETWEEN HOG ISLAND AND ATHOL ISLAND, 16.VIII.1949.
Sandy area with *Thalassia* and some *Syringodium*; 2–3 m deep.

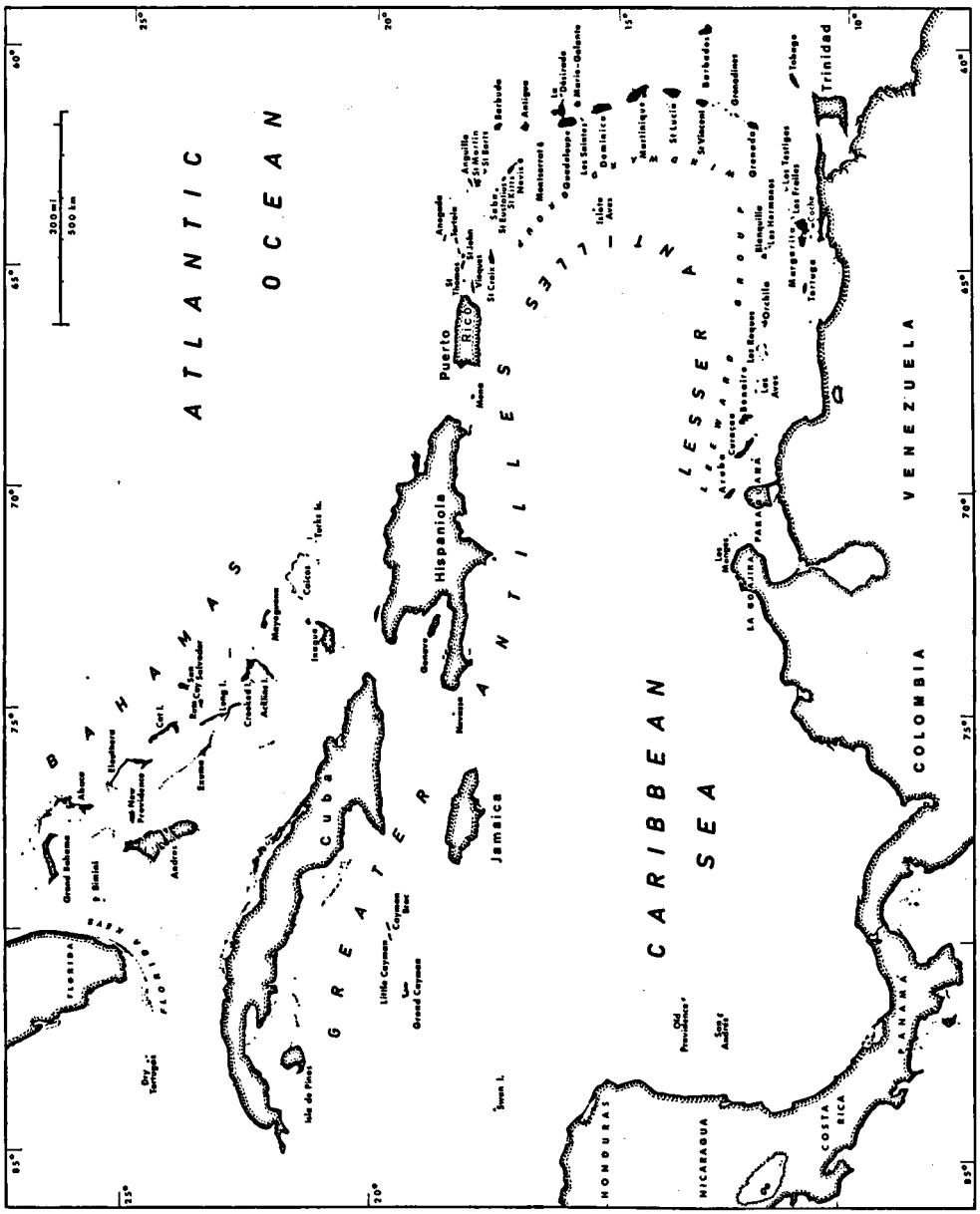

Fig. 1. Sketch-map of the CARIBBEAN REGION.

Grand Cayman (Fig. 2; Pl. IIa, IIIa)

1684 NORTH SOUND, entrance at Head of Barkers, 10.VI.1973.
Sandflat with *Thalassia* and *Halodule*, pieces of rock; 0–½ m deep.

1685 – Entrance at Head of Barkers, SE of 1684, 10.VI.1973.
Soft mud with young *Rhizophora*; 0–½ m.

1686 – Sea dyke at Head of Barkers, 10.VI.1973.
Drainage canal abt 6 m wide in connection with Sound; muddy sand near *Rhiz.*, numerous *Cassiopea*; 0–1½ m.

1687 – Sea dyke at Barkers, near 1686, 15.V.1973. (Pl. IIa)
Mud and sand near *Rhiz.*, numerous *Cassiopea*; ½–1 m.

1689 – SW part of Sound at Turtle Crawls, 25.V.1973.
Wooden poles of decaying jetty in muddy area, *Rhiz.*; 0–1 m.

1689A – Soft mud with *Thal.*, near *Rhiz.*; 25.V.1973; ¼–1 m.

1690 – NE lagoon near Rum Point, 27.V.1973. (Pl. IIIa)
Sand and mud with some *Rhiz.* and a few protruding rocks, many *Cassiopea*; 0–1 m.

1693 – SOUTH SOUND at Red Bay, 23.V.1973.
Sandy bay with *Rhiz.*; 0–1½ m.

1694 – Jackson's Point, ½ km S, 9.VI.1973.
Limestone in surf, with rock pools; 0–½ m.

1694A – Large sandy pool next to 1694; 9.VI.1973; 0–¾ m.

Little Cayman (Pl. Ib, IIIb)

1698 SOUTH HOLE SOUND, The Bight, 5.VI.1973. (Pl. IIIb)
Rhizophora in sandy mud; 0–½ m deep.

1698A – Sandy flat with *Thalassia* and *Halodule*; 5.VI.1973; ½–1 m.

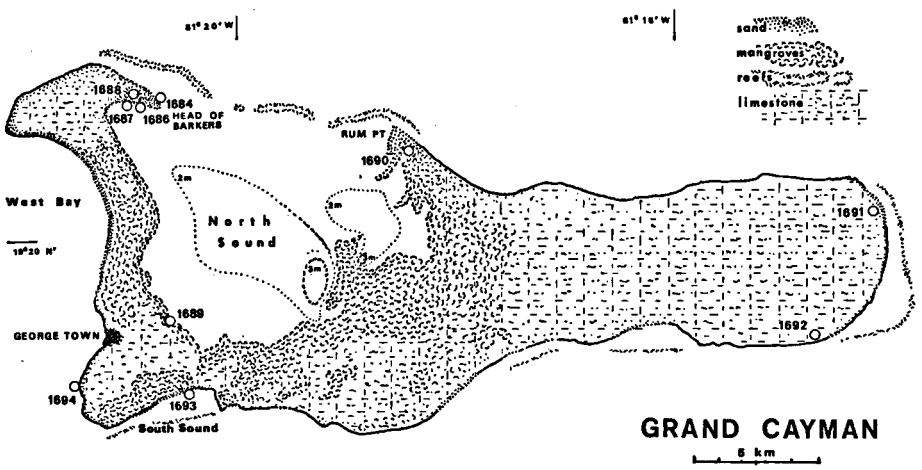

Fig. 2. Sketch-map of GRAND CAYMAN, showing marine and saltpond localities.

1699 – Jetty of Southern Cross Club, 7.VI.1973.
Wooden piling on sandy flat with dense *Halodule*; 0–1 m.

1700 OWEN ISLAND, shore of S. Hole Sound, 7.VI.1973. (Pl. Ib)
Sandy beach with a few *Rhiz.*; 0–½ m.

1700A – Sandflat with *Halodule*; 7.VI.1973; ½ m.

Cayman Brac (Pl. IVa)

1701 SOUTH EAST BAY LAGOON, Red Shrimp Hole, 3.VI.1973. (Pl. IVa)
Hole in limestone terrace with tidal flow and mudflat; 0–1 m deep.

1702 – Mudflat near 1701, 3.VI.1973.
Mud with *Rhizophora*, limestone rock, growth of *Ruppia*; 0–½ m.

1703 WEST POINT, The Ledges, 3.VI.1973.
Sandy shore with limestone debris; 0–½ m.

Jamaica (Pl. IVb)

1148 KINGSTON HARBOUR, Kingston, Myrtle Bank landing, 15.VIII.1949.
Wooden and concrete piles in muddy area with numerous *Balanus* and *Chthamalus*; 0–1 m deep.

1677 – Fort Rocky Lagoon, W of Airport, 7.V.1973.
Muddy sand and coral debris, decaying wood, *Rhizophora*; 0–½ m.

1678 – Small Boat Channel, E of Port Royal, 7.V.1973.
Rhiz. in mud, muddy sand with *Halodule*; 0–1 m.

1679 PORT ROYAL, Fort Rupert Lagoon, 15.V.1973.
Rhiz. in mud, muddy sand with *Halodule*, *Batophora* and *Caulerpa*, numerous small *Cassiopea*; 0–1½ m.

1680 – Landing of Marine Laboratory, 15.V.1973.
Rock debris in muddy surroundings; ½–1 m.

1680A – Concrete piles; 10.V.1973; 0–1 m.

1680B – Stone wall; 10.V.1973; 0–½ m.

1682 DRUNKEMANS KEY, NW side, 15.VI.1973.
Rock debris with some *Rhiz.*; 0–½ m.

1683 – N side of Key, 15.VI.1973. (Pl. IVb)
Sandy debris; 0–1 m.

Puerto Rico (Fig. 3; Pl. Va)

1415 MAYAGÜEZ BAY, 4 km off Punta Cadena, 14.IX.1963.
Hard bottom, muddy sand with shell debris and sponges (dredged by J. E. Randall & staff); about 90 m deep.

1416 – 4 km off Añasco River, 14.IX.1963.
Soft bottom, sandy mud (dredged by Randall); about 10 m deep.

1417 ISLA MAGUEYES near La Parguera, NE tip, 17.IX.1963.
Rhizophora in muddy lagoon with *Thalassia*, largely covered by sponges; 0–2 m.

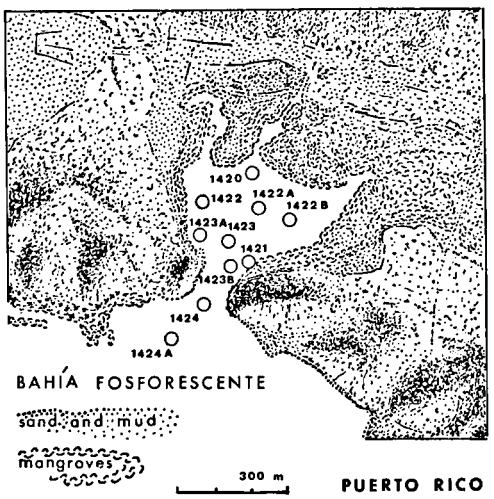

Fig. 3. Sketch-map of the Bahía Fosforescente, PUERTO RICO, with station numbers (from an aerial photograph reproduced by ODUM, BURKHOLDER & RIVERO 1959, p. 162).

1418 MÁGIMO reef, SE of Magueyes, 12.IX.1963.
Sand flat with *Syringodium* and scattered *Thal.*, *Cassiopea*; 1½–2½ m.

1418a – Same locality at twilight; 17.IX.1963; 2 m.

1419 MATA DE LA GATA reef, SE of Magueyes, 12.IX.1963.
Poor *Rhiz.* and scanty *Thal.* on muddy beach with old jetty; 0–1 m.

1419A – *Porites* flat with some *Thal.*, pools; 12.IX.1963; 0–½ m.

1420 BAHÍA FOSFORESCENTE, E of La Parguera, N part, 17.IX.1963.
Sandy mud with *Thal.* and *Halodule*, *Rhiz.* with *Isognomon*; 0–½ m.

1421 – SE part, 17.IX.1963. (Pl. Va)
Muddy sand with *Thal.*, *Halo.* and *Syr.*, *Rhiz.* with *Isognomon*; 0–1 m.

1422 – NW part, 17.IX.1963.
Sandy mudflat near *Rhiz.*; 1½–2 m.

1422A – N part; muddy sandflat with *Thal.*; 17.IX.1963; 1½–2 m.

1422B – NE part; muddy bottom near *Rhiz.*; 17.IX.1963; 3–3½ m.

1423 – Central part, 17.IX.1963.
Muddy bottom [20.4 g Cl′/l]; 4–4½ m.

1423A – SW part; sandflat with *Thal.* and *Halimeda*; 17.IX.1963; 1–1½ m

1423B – SE part; sandflat with *Thal.*; 17.IX.1963; 1½–2 m.

1424 – Entrance, 17.IX.1963.
Sandy mud; 4–5 m.

1424A – Outer bay; muddy sand with algae; 17.IX.1963; 4–5 m.

Saint Thomas

1674 BENNER BAY Lagoon, 30.IV.1973.
Rhizophora in sandy mud; 0–1 m deep.

1674A – *Avicennia* swamp; 30.IV.1973.

1675 MAGENS BAY, 30.IV.1973.
Pieces or rock on sandy beach; 0–½ m.

Saint John (Pl. Vb)

1407 TURNER BAY, E part, 18.VI.1955. (Pl. Vb)
Porfiritic rock, boulders and coarse sand; 0–½ m deep.

1408 FRANK BAY, S of Cruz Bay, 19.VI.1955.
Non-calcareous pieces of rock on sandy beach; ½–1 m.

Saint Croix (Pl. VI)

1404 KRAUSE LAGOON, sea side, 15.VI.1955. (Pl. VIa)
Muddy sandflat with clumps of *Rhizophora*, with *Halodule*, *Syringodium*, *Thalassia* and *Batophora*, many *Cassiopea*; 0–2 m deep.

1405 – Entrance, 15.VI.1955.
Narrow canal among *Rhiz.* with tidal flow [20.25 g Cl′/l]; ½–1½ m.

1406 – Basin of lagoon, 15.VI.1955.
Shallow mudflat with *Rhiz.*, *Bat.*, *Hal.* and *Thal.*, numerous *Cassiopea*; 0–1 m.

Anguilla (Pl. VIIa)

1142 North of SANDY GROUND, 19.VI.1949.
Beachrock with sandy reef; 0–1½ m deep.

1704 CROCUS BAY, N side, 3.VII. 1973. (Pl. VIIa)
Limestone and igneous rock near sandy beach; 0–1 m.

Saint Martin (Fig. 4; Pl. VIII–Xa, XIIb)

1399 POINT BLANCHE BAY, E coast, 5.VI.1955.
Beachrock and rock debris, pools; 0–½ m deep.

1125 GREAT BAY, Point Blanche Bay, 26.VI.1949.
Hard tuffoid rocks with limestone, tide pools; 0–½ m.

1125A – Conglomeratic rock with balanids, some sand; 26.VI.1949; ½–1½ m.

1126 – E shore, 11.VI.1949. (*Stud. 4*, pl. VIIIb)
Rocky beach with debris, tide pools, some *Thalassia*; ¼–½ m.

1127 – Northeastern shore, 16.V.1949.
Rocky beach with sandy debris, some *Thal.*; ½–1 m.

1128 – Northeastern beach, Philipsburg, 16.V.1949. (Pl. VIIIa)
Sand beach; ¼–½ m.

1128a – Sand beach; 5.VIII.1949; 0–¼ m.

1128A – Small wooden wreck on sand; 26.V.1949; 0–1 m.

1128Aa – Wooden beams, sandflat with *Oreaster*; 24.VI.1955; 0–1 m.

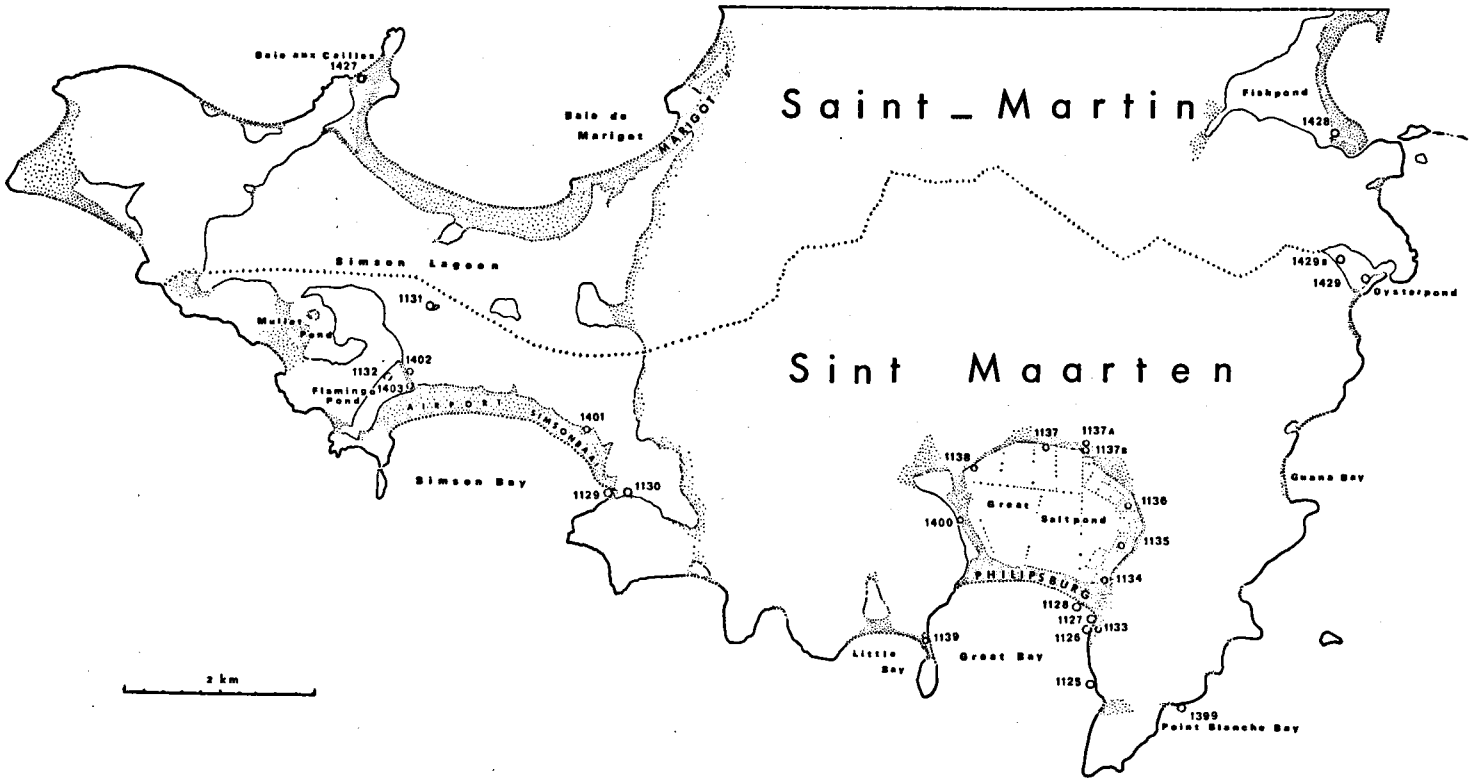

Fig. 4. Southern part of ST. MARTIN, showing marine and saltpond localities.

1128B – Detached *Ulva* etc. on sandflat, numerous *Oreaster*; 26.VI.1949; ¾–1½ m.

1128C – Sandflat with *Thal.*, many *Oreaster*; 14.VI.1949; 1½–2½ m.

1129 SIMSON BAY BRIDGE, 4.VIII.1949. (Pl. Xa)
Wooden poles with *Isognomon* oysters in sandy lagoon entrance with *Thal.*, strong tidal flow; 0–1 m.

1130 SIMSON BAY LAGOON, outlet, 27.V.1949.
Sandy lagoon with *Rhizophora* and *Thal.*; 0–1 m.

1131 – Little Key, W shore, 2.VIII.1949. (Pl. XIIb)
Muddy sand with some *Thal.* and *Batophora*, on *Rhiz.*; 0–1 m.

1132 – Flamingo Pond, W shore, 8.VI.1949.
Rocky shore of muddy lagoon with much *Bat.*, on *Rhiz.* and *Avicennia*; 0–1 m.

1132A – Muddy bottom with small *Thal.* and *Bat.*; 8.VI.1949; ½–1½ m.

1427 BAIE AUX CAILLES, NW of Simson Lagoon, 24.IX.1963.
Recently made gutter in beachrock, abt 1 m wide with water flowing into pool 30 × 20 × 1 m; 0–½ m.

1428 ÉTANG AUX POISSONS (Fish Pond), l'Embouchure, 3.X.1963.
Inlet with tidal flow among *Rhiz.*, scanty *Thal.*, *Syringodium* and *Sargassum* on muddy sand; 0–1½ m.

1429 OYSTER POND, SE part near mouth, 13.X.1963.
Sandy part of lagoon with some *Rhiz.* and patches of *Thal.*, *Syr.* and *Halimeda*; 0–1½ m.

1429A – Rocky shore near *Rhiz.*; 13.X.1963; 0–½ m.

1429B – SW part; sandy mud with *Thal.* and *Halodule*, several *Cassiopea*; 13.X.1963; ½–1½ m.

La Fourche (Five Island, Fourchu)

1124 FIVE ISLAND Bay, NE shore, 2.VI.1949. (*Stud. 4*, pl. IIIa)
Rocky shore with andesitic debris, some *Syringodium* and *Halodule*; 0–1½ m deep.

Saint-Barthélemy (St. Barts)

1121 PUBLIC, near Gustavia. 4.VI.1949.
Rocky shore with sandy andesitic debris; 0–1 m deep.

Saba (Pl. XIV)

1120 FORT BAY, W side, 21.VII.1949. (*Stud. 4*, pl. VIIIa)
Steep coast of andesite rock; 0–1½ m deep.

1120A – Andesitic rock, coarse debris; 6.X.1963; 0–3 m.

1431 – Offshore, 6.X.1963.
On three specimens of *Strombus gigas* (collected by fishermen, possibly from Saba Bank).

1705 – Fort Bay Pier, 7.VII.1973. (Pl. XIVb)
Wooden poles, recently constructed; 0–1 m.

1705A – Stone wall, recently constructed; 7.VII.1973; 0–1 m.

1432 Cove Bay at Flat Point, 5.X.1963. (Pl. XIVa)
Andesitic rock, coarse debris; 0–1 m.

Sint Eustatius (Statia) (Pl. XV)

1116 Gallows Bay, near Oranjestad, 15.VII.1949. (Pl. XVa)
Andesitic rock with pebbles; 0–¼ m deep.

1116A – Rocky beach; 15.VII.1949; ¼–1 m.

1116B – Rocky bottom with big boulders; 15.VII.1949; 1–2 m.

1117 Downtown near Billy Gut, 13.VII.1949.
Sandy beach from andesitic rock; 0–½ m.

1118 – Billy Gut, 13.VII.1949.
Sandy shore with andesite debris; ½–1½ m.

1119 Tumble Down Dick Bay, S part, 10.VII.1949.
Steep rocky shore of andesitic rock with some sand; ¼–½ m.

1433 Concordia Bay, Zeelandia, NW corner, 10.X.1963. (Pl. XVb)
Andesitic cliff and sand beach; 0–1 m.

Saint Christopher (St. Kitts) (Pl. XVI)

1397 Frigate Bay, SE part, 20.VII.1955. (Pl. XVI)
Cliff of volcanic tuff, boulders and sand; 0–1 m deep.

1398 Basseterre near St. Thomas Point, 30.VI.1955.
Cliff of andesitic rock, pebbles and debris; 0–1 m.

Barbuda (Fig. 5; Pl. XVII–XVIII)

1394 Martello Tower Beach, 8.VII.1955.
Pieces of limestone rock on sand beach, algae; ¼–1 m deep.

1395 Two Feet Bay, E coast, 10.VII.1955. (Pl. XVIIb)
Limestone cliff, sandy rock pools with some *Thalassia*; 0–½ m.

1396 Great Lagoon, S of Codrington Village, 4.VII.1955.
Sandy bottom with *Batophora*, *Thal.* and *Halodule*, scattered *Rhizophora*, several *Meandrina*; 0–1 m.

1531 – West side of Lagoon entrance at Billy Point, 22.VII.1967. (Pl. XVIIIa)
Rhiz. on sandy *Thal.* flat; 0–1½ m.

1532 – East side of Lagoon entrance, 22.VII.1967.
Rhiz. on sandy mud with *Thal.*, *Bat.* and *Penicillus*; 0–1 m.

1533 – Entrance of Cuffy Creek, 22.VII.1967.
Sandy mudflat with clumps of *Batophora*, numerous *Batillaria*; 0–1 m.

1534 – Lobster Point, N of Palm Beach, 23.VII.1967.
Rhiz. in sandy mud with *Thal.* and *Halo.*; 0–1 m.

1535 – Palm Beach Landing, 23.VII.1967.
Sandy rock debris, concrete, coarse sand; 0–1 m.

1536 – SW corner of Lagoon, 23.VII.1967.
Steep sandy beach with *Thal.* and *Halo.*, pools with *Bat.*; 0–1 m.

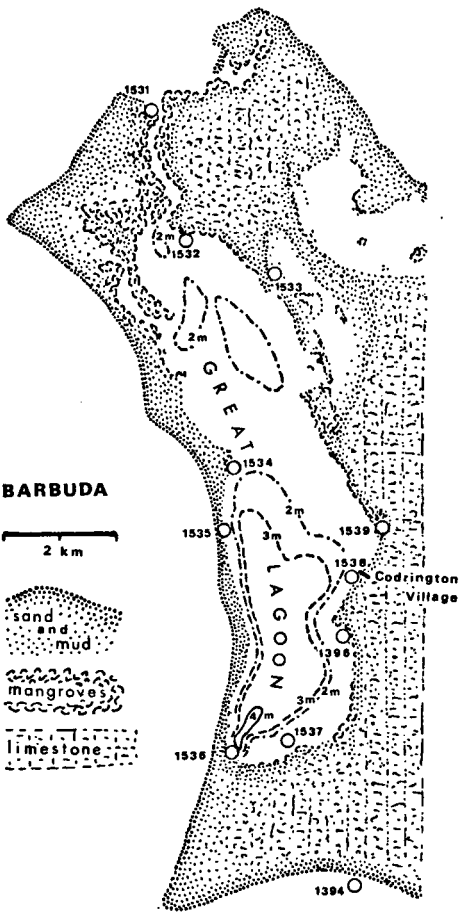

Fig. 5. The Great Lagoon of BARBUDA and surroundings, showing marine localities (adapted from BRASIER 1975, p. 45).

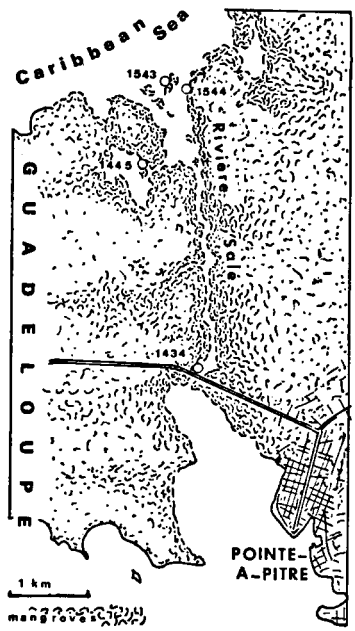

Fig. 6. Sketch-map of the Rivière Salé, GUADELOUPE, with the localities studied.

1537 – S part of Lagoon, Foot Bay, 23.VII.1967.
Muddy sand with *Bat.*, several *Meandrina*; ½–1 m.

1538 – Castle Landing at Codrington Village, 21.VII.1967. (Pl. XVIIa)
Poles of small pier in muddy sand with debris, some *Bat.*, sponges and ascidians; 0–1½ m.

1539 – N of Castle Landing, 24.VII.1967. (Pl. XVIIIb)
Rhiz. in soft mud with *Halo.*; 0–½ m.

1539A – Near 1539; boat in soft mud among *Rhiz.*, with *Acetabularia*; 24.VII. 1967; 0–½ m.

Antigua (Pl. XIXb)

1393 DEEP BAY, near Fort Barrington, 17.VII.1955. (Pl. XIXb)
Volcanic tuffoid rock, pebbles and coarse sand; 0–1 m deep.

1540 DICKINSON BAY, N part, 19.VII.1967.
Limestone rock and boulders near sandy beach; 0–1 m.

1540A – Boulders in sand with *Thalassia* and *Syringodium*; 19.VII.1967; ½–1 m.

1540B – Eroded *Thal.* flat; 26.VII.1967; ½–1 m.

1541 – Pier of Caribbean Beach Club, 26.VII.1967.
Wooden poles in sand; 0–1¼ m.

Montserrat

1542 FOXES BAY, N of Plymouth, 20.VII.1967.
Andesitic boulders on magnetite sand beach, scattered *Sargassum*; 0–½ m deep.

Guadeloupe (Fig. 6)

1434 RIVIÈRE SALÉE near Pont de la Gabarre, 4.II.1964.
Very muddy locality at margin of growth of *Rhizophora* with *Isognomon*; 0–1 m.

1543 – Northern entrance, 16.VII.1967.
Rhiz. in muddy sand with shell debris; 0–1 m.

1543A – Muddy sand with shell debris near *Rhiz.*; 16.VII.1967; ½–1 m.

1544 – Near northern entrance, E side, 16.VII.1967.
Rhiz. in soft mud; 0–¾ m.

1545 – La Manche à Eau, 16.VII.1967.
Rhiz. with *Isognomon* in sandy mud; 16.VII.1967; 0–½ m.

1545A – Sandy mud with *Halodule* and *Thalassia*, near *Rhiz.*; ½–1 m.

1435 BAIE NORD-OUEST, near Moule, 28.I.1964.
Small muddy inlet near sand beach, some *Rhiz.*, few wooden poles (Possibly brackish after rains); 0–1½ m.

La Désirade (Pl. XXb)

1437 GRANDE ANSE, near bridge, 23.I.1964.
Muddy rock debris, small beds of *Thalassia* and *Halodule*; branches of *Hippomane* tree; 0–1 m deep.

1437A – Beachrock with sandy debris, pools; 23.I.1964; 0–1 m.

1438 – Poles of former pier at landing, 25.I.1964. (Pl. XXb)
Wooden and concrete poles in muddy sand, *Thal.* beds with *Syringodium*; 0–1½ m.

Dominica (Pl. XIXa)

1546 PRINCE RUPERT BAY, near Portsmouth, 15.VII.1967. (Pl. XIXa)
Andesite rock debris with some coarse sand; 0–1 m deep.

Islote Aves (Isla Aves, Bird Island)

1114 NORTHERN LAGOON, 12.V.1949.
Sandy shore with some debris of coral and beachrock; 0–1 m deep.

1114A – Sandy coral debris, 12.V.1949; ½–1½ m.

1115 NORTHERN REEF, 12.V.1949.
Flat of beachrock with fissures; 0–1 m.

Martinique (Pl. XXI)

1439 ANSE DE L'ÂNE, near Trois Îlets, 10.II.1964.

Sand beach, andesitic rock debris, floating algae, some *Thalassia*; 0–1 m deep.

1440 ÎLET HARDY, W coast, 11.II.1964. (Pl. XXIa)
Small sand beach near limestone cliff, floating algae; 0–½ m.

1547 ANSE DE TROIS RIVIÈRES, Sainte-Lucie, 12.VII.1967. (Pl. XXIb)
Rhizophora, mud and sand with *Thal.*; 0–1 m.

Saint Lucia

1548 PORT CASTRIES, Trou Garnier, 11.VII.1967.
Rhizophora and wreck with sheet iron in soft mud, slightly polluted area; 0–1½ m deep.

Saint Vincent (Pl. XXIIa)

1549 CALLIAQUA BAY, at Johnson Point, 10.VII.1967. (Pl. XXIIa)
Sandy shore with pebbles of andesite, branches of single *Conocarpus* tree, some *Thalassia*; 0–1 m deep.

1549A – Volcanic rock with barnacles, coarse sand; 10.VII.1967; 0–½ m.

Barbados

1441 LAKES BEACH, N of Belleplaine, St. Andrew, 17.II.1964.
Flat rocks with algae on sand beach; 0–½ m deep.

1442 ALLEYNES BAY OFF HOLETOWN, St. James, about 800 m offshore, 19.II.1964.
Sponge bottom, muddy sand with shell debris (dredged by John B. Lewis & staff of Bellair's Institute); 90–100 m.

1443 – About 1600 m offshore; muddy sand with shell debris, corals and sponges (dredged by Lewis); 19.II.1964; 180–200 m.

1552 SALT BAY of Marley Vale, St. Philip, 6.VII.1967.
Limestone cliff; 0–¼ m.

1553 CONSET BAY, St. John, 7.VII.1967.
Limestone cliff on sandy shore with scanty *Thalassia*; 0–¼m.

Grenada (Pl. XXIIb)

1389 WHITE BAY, Point Salines, 26.I.1955.
Beachrock on sand beach, pools with some *Thalassia* and *Syringodium*; 0–½ m deep.

1391 LAGOON ST. GEORGE, jetty near Hotel Santa María, 24.I.1955.
Poor *Rhizophora* in muddy sand, concrete and wooden poles in somewhat polluted area; 0–½ m.

1392 ST. GEORGE'S BAY, offshore, 22.I.1955.
On three *Strombus gigas* collected by fishermen; ? 5–10 m.

1550 HOG ISLAND near Point Salines, 8.VII.1967. (Pl. XXVIIa)
Rhiz. in mud, *Isognomon* and ascidians; 0–1½ m.

1550A – Mud with *Thal.*; 8.VII.1967; 1–2 m.

1551 – Near Mount Hartman, about 300 m W of 1550, 8.VII.1967.
Rhiz. in sandy mud, numerous balanids; 0–½ m.

1551A – *Thal.* in muddy sand near *Rhiz.*; 8.VII.1967; ½–1 m.

Tobago

1385 BUCCOO BAY, near hamlet, 16.I.1955.
Sandy bottom with scattered *Acropora* and other corals, *Halimeda*; 2–2½ m deep.

1386 – Near Reef, 16.I.1955.
Sandy bottom with some reef debris and corals; ½–1 m.

1387 BUCCOO REEF, 16.I.1955.
Porites-flat with *Acropora*; ½–1 m.

1388 RED POINT, SW of Scarborough, 14.I.1955.
Cliff of volcanic rock with numerous *Balanus*, boulders and pebbles; 0–½ m.

Trinidad

1382 MONOS island, Avalon Bay, 10.I.1955.
Metamorphic rock, large pebbles and some coarse sand; ½–1½ m deep.

1383 – Morris Bay, 10.I.1955.
Sandy and muddy debris of metamorphic rock, dead wood; 0–½ m.

1384 MARACAS BAY, 29.I.1955.
Metamorphic rock and boulders, sandy beach with decay; 0–1 m.

Margarita (Pl. XXIII)

1216 PUNTA MOSQUITO, S of Porlamar, 4.VI.1936.
Sandstone and shales; 0–1 m deep.

1217 LAGUNA DE LAS MARITAS, N of Punta Mosquito, 4.VI.1936.
Muddy pool between sand bar and growth of *Rhizophora*; 0—1 m.

1217a – Shallow border of large lagoon with extensive growth of *Rhiz.*; almost isolated pool, with muddy sand and mud; 13.I.1964; ¼–1 m.

1217A – *Rhiz.* in very soft mud with *Ruppia*; 13.I.1964; 0–1½ m.

1446 PUNTA MANGLE, 11.I.1964. (Pl. XXIIIa)
Very muddy lagoon with *Rhiz.* and *Avicennia*; 0–1 m.

1447 PUNTA DE PIEDRAS, Estación Invest. Marinas, 12.I.1964.
On poles of old jetty in muddy sand, *Thalassia* beds; 0–1 m.

1448 – N of the Estación Invest. Marinas, 12.I.1964.
Rhiz. and dead branches with balanids, sponges and ascidians in narrow entrance of lagoon; 0–1½ m.

1448A – Muddy sand near *Rhiz.*, some *Thal.*; ½–1 m.

1449 PUENTE DE LA RESTINGA, E side, 11.I.1964. (Pl. XXIIIb)
Concrete and rock debris in entrance of large lagoon, muddy, *Rhiz.* with ascidians and sponges; 0–1 m.

Los Frailes

1214 ISLA (Puerto) REAL, SW shore, 18.VI.1936.
Sandy debris of igneous rock; 3–4 m deep.

1215 LA PECHA, SW shore, 19.VI.1936.
Sandy debris of igneous rock; 1–2 m.

Blanquilla

1213 PLAYA DEL JAQUE, 22.VII.1936.
Sandy debris of igneous rock; 2–4 m deep.

Tortuga

1211 SOUTHWESTERN COAST, 1.VIII.1936.
Sandy debris and muddy sand with *Thalassia*, and *Rhizophora*; 0–1½ m deep.

1211A – Sandy reef with *Acropora cervicornis*; 1.VIII.1936; 3–4 m.

Centinela

1212 SOUTHWESTERN COAST of small island (est. 100 × 50 × 20 m), 31.VIII 1936.
Silicified shales, with some *Balanus* only; 0–¼ m.

Las Aves

1210 AVE DE BARLOVENTO, SW shore, 27.VII.1936.
Muddy sand with *Thalassia*, *Rhizophora*; 0–1 m deep.

1210A – Sandy reef debris with *Thal.*; 27.VII.1936; 1–1½ m.

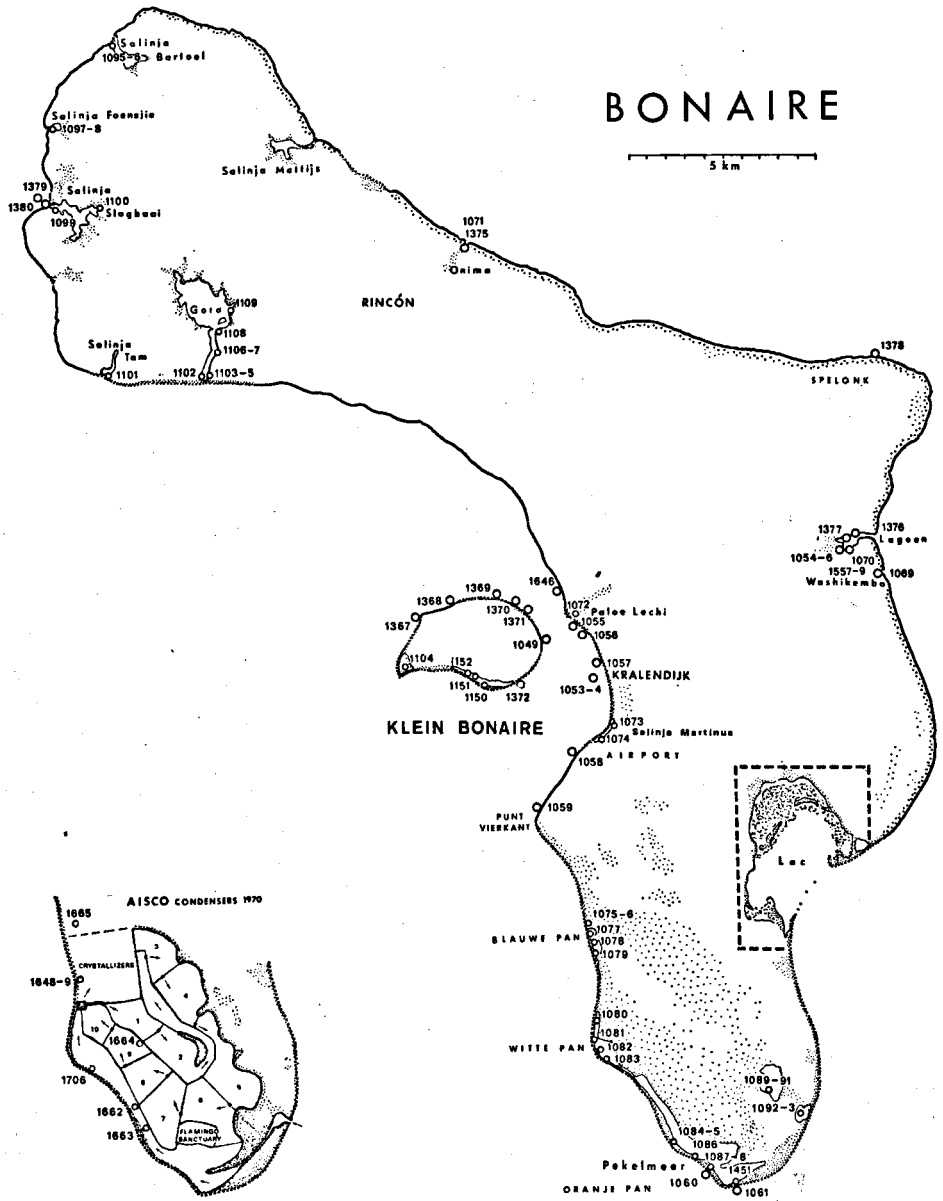

Fig. 7. BONAIRE and KLEIN BONAIRE with station numbers of marine and saltpond localities. Inset: Southern Bonaire, after the condensors of the Antillean International Salt Company had been constructed, in 1970.

Bonaire (Fig. 7–9; Pl. XXIV, XXVIIa, XXVIII–XXIXa, XXXI–XXXIV)

1053 KRALENDIJK ROADSTEAD, 21.IX.1948.
Two buoys, cleaned 20 months before, for the greater part covered by algae; 0–1½ m deep.

1054 – Two wooden buoys, cleaned 4 years before, in part covered by *Millepora*; 21.IX.1948; 0–1½ m.

1055 PALOE LECHI (Playa Lechi), overflow of Salinja, 4.IX.1948.
Rocky beach with coral debris, beachrock and muddy sand; ½–1½ m.

1056 – S of Salinja, 4.IX.1948.
Coarse beach rock; 0–1/10 m.

1056a – Beachrock with small pools (Zaneveld coll.); 6.IV.1955; 0–½ m.

1056A – Rocky beach, small tide pools; 4.IX.1948; 0—¼ m.

1056Aa – Rocky beach with small tide pools; 24.II.1949; 0–¼ m.

1056B – Rocky beach with some sand; 4.IX.1948; ¼–1 m.

1056Ba – Rocky beach; 27.II.1949; ½–1 m.

1056C – Sandy reef; 4.IX.1948; 1–2½ m.

1056Ca – Sandy reef; 30.VIII.1948; 1–2½ m.

1646 – N of Salinja, at Hotel Bonaire, 25.IX.1968.
Beachrock with tide pools; 0–½ m.

1057 KRALENDIJK, near Pasanggrahan, 3 & 5.IX.1930.
Coarse beachrock, small tide pools; 0–1 m.

1057a – Rocky beach; 14–16 & 19–20.IX.1930; 0–1 m.

1057b – Rocky beach; 10 & 26.X.1930; 0–1 m.

1057A – Rocky beach with coral debris and sand; 20.IX.1948; 0–1/10 m.

1057B – Rocky beach; 20.IX.1948; 1/10–½ m.

1057C – Rocky beach with some sand; 20.IX.1948; ½–1½ m.

1058 NEAR DE HOOP, S of Kralendijk, 11–12 & 16–17.V.1930.
Limestone cliff with sandy reef; 0–1½ m.

1058a – Limestone rock and sandy reef; 12 & 30–31.X.1930; 0–1½ m.

1058b – Limestone cliff and sandy reef; 6 & 11.XI.1930; 0–1½ m.

1058A – Limestone rock with debris; 10.IX.1948; 0–1/10 m.

1058B – Limestone cliff and sandy reef; 10.IX.1948; ¼–1 m.

1058C – Sandy reef; 10.IX.1948; 1–3 m.

1059 PUNT VIERKANT, N side, 9.IX.1948. (Pl. XXIVa)
Limestone cliff with debris; 0–1/10 m.

1059a – Low limestone cliff with debris; 26.III.1955; 0–¼ m.

1059A – Surf notches with coarse rock debris with *Turbinaria* and *Sargassum*; 9.IX.1948; ¼–1 m.

1059Aa – Limestone cliff with coarse debris; 26.III.1955; ¼–1 m.

1059B – Sandy reef; 9.IX.1948; 1–2 m.

1059Ba – Limestone debris and sandy reef; 26.III.1955; ½–1½ m.

1059C – Two rock pools in spray zone; 26.III.1955; 0–1/5 m.

1060 ORANJEPAN, 15.V.1930.
On *Sargassum*, cast ashore.

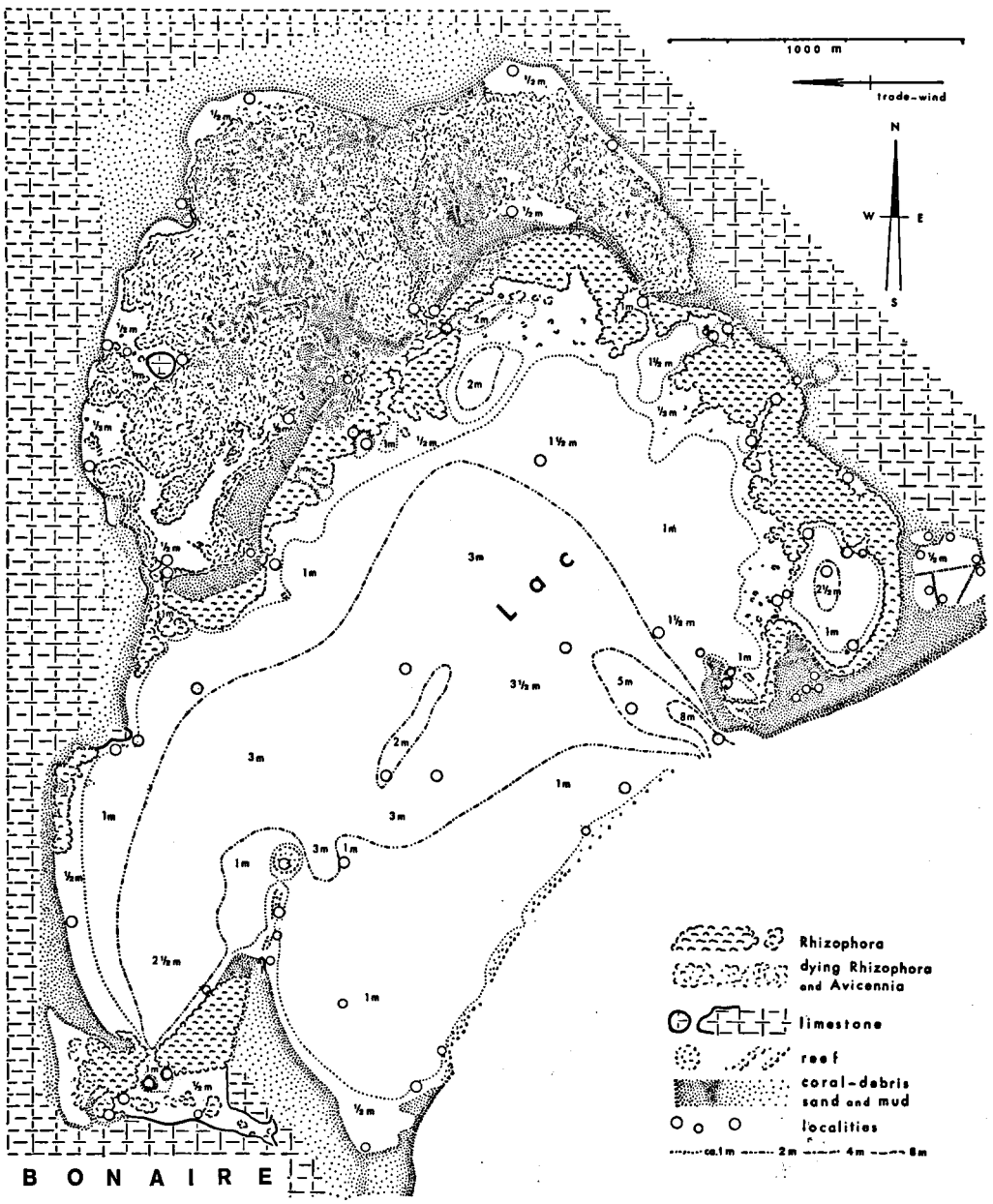

Fig. 8. Sketch-map of Lac, BONAIRE, from aerial photographs by KLM Aerocarto, April 1961.

1060a – On *Sargassum* and other algae, cast ashore; 7.IX.1930.

1060A – Rocky beach with coral debris (J. S. Zaneveld coll.); 12.IV.1955; 0–½ m.

1061 – Near Zuidpunt; on detached *Sargassum*; 27.X.1930.

1067 LAC, ENTRANCE, near E point of Cai, 17.IX.1948.
Sandflat with *Thalassia*; 1½–2 m.

1068 – Boca behind reef, 5, 9 & 26.X.1930.
Sandy reef with debris; 1–2 m.

1068a – Sandy reef with much *Acropora*; 1.X.1948; 1–2 m.

1373 – Sorobon (Soerebon) Point, 17.IV.1955.
Limestone with sandy debris (20.3 – 20.5 – 21.5 g Cl'/l); 0–½ m.

1373A – N of Sorobon Pt.; *Porites* with *Thal.*, *Lithothamnium*; 17.IV.1955; ¼–½ m.

1560 – About 30 m S of Cai, 25.VIII.1967.
Sand, tidal current (daily var. 19.8–20.2 – 21.9 g Cl'/l); 8 m.

1561 – 200 m W of Cai, 11.VIII.1967.
Sand with some *Thal.* and *Syringodium*; 6 m.

1562 – Boca behind reef, Bao di Dam, 500 m SW of Cai, 25.VIII.1967.
Among *Acropora cervicornis*; 1 m.

1563 – Cas di Meeuchi, Bao di Dam, 700 m SE of Sorobon Pt., 25.VIII.1967.
Sand with *Thal.* several *Diadema*; ½ m.

1564 – Awa Blancu, 400 m NE of Sorobon Pt., 25.VIII.1967.
Sandy slope with detached algae; *Thal.*, many *Tripneustes*; 1–2½ m.

1565 – Secu di Sorobon, 100 m N of Sorobon Pt., 21.VIII.1967.
Sandy *Lithothamnium* ridge, some *Thal.*, *Tripneustes*; ¼–1 m.

1566 – Secu di Sorobon, 250 m N of Sorobon Pt., 21.VIII.1967.
Porites flat with *Thal.* and *Lithothamnium*; 1/10–½ m.

1647 – Cas di Meeuchi, S border, 28.X.1968.
Rhiz. on sand; 0–¾ m.

1647A – Whitish sandy mud; 28.X.1968; 0–½ m.

1647Aa – Greyish sandy mud with *Rhiz.*; 9.III.1970; 0–½ m.

1651 – Dam near Awa Blancu, 9.III.1970. (Pl. XXVIIa)
Coarse beach rock with pools; 0–½ m.

1652 – Awa Blancu, 10.III.1970.
Sandflat; 1 m.

1567 LAC, CENTRAL PART of basin, Binnenklip, 1 km WSW of Cai, 24.VIII. 1967.
Sand with some *Thal.* and *Porites*; 3 m.

1568 – Binnenklip, 1 km WSW of Cai, 24.VIII.1967.
Thin layer of sand on limestone, *Porites* and *Siderastrea*; 2 m.

1568A – Sand on limestone; 10.III.1970; 2½ m.

1569 – 300 m E of Palu Calbas, 11.VIII.1967.
Sandy bottom with *Thal.*, *Syr.* and *Halimeda*, *Tripneustes* and *Oreaster*; 2 m.

1570 – 1 km W of Cai, 11.VIII.1967.
Sand with *Thal.*, *Cassiopea*; 3 m.

1571 – 500 m W of Cai, 11.VIII.1967.
Sand with *Thal.*; 3½ m.

1572 – 250 m WNW of Cai, 11.VIII.1967.
Muddy sand with *Thal.* and *Halimeda*; 2 m.

1573 – 1 km NW of Cai, 25.VIII.1967.
Muddy sand with *Thal.* and *Halimeda*; 1½ m.

1064 LAC, NORTHEAST PART of basin, Puitu (Poejito), 12, 16 & 19.X.1930.
On *Rhiz.* in soft mud, *Thal.* with *Cassiopea*; 0–1½ m.

1064a – On *Rhiz.* in mud with *Thal.*; 18.XI.1930; 0–1 m.

1064b – On *Rhiz.* in mud with *Thal.*; 17.IX.1948; 0–1 m.

1064c – On *Rhiz.* in mud; 17.IV.1955; 0–1 m.

1064A – Muddy *Thal.*-flat with *Cassiopea*; 12 & 19.X.1930; 1–1½ m.

1064Aa – *Thal.* on mud, *Cassiopea*; 18.XI.1930; 1–1½ m.

1064Ab – Mud with *Thal.*, *Cassiopea*; 17.IX.1948; 1–1½ m.

1064Ac – Muddy bottom with *Thal.* and *Cassiopea*; 17.IV.1955; 1–2 m.

1065 – Entrance to Puitu, 17.IX.1948.
Mudflat with *Halimeda* and *Thal.*; ½–1 m.

1066 – NE shore of Cai, Pariba di Cai, 1.IX.1948. (Pl. XXVIIIb)
Shallow part of muddy lagoon with *Thal.* and *Avicennia*; ¼–1 m.

1066a – Mud with *Thal.*, on *Rhiz.* and *Avicennia*; 25.II.1949; 1 m.

1066b – Mud with *Rhiz.* and *Avicennia*, *Cassiopea*; 19.III.1936; 0–½ m.

1574 – 500 m NE of Cai, 10.VIII.1967.
Muddy, scanty *Thal.*, *Cassiopea*; 2½ m.

1574a – Mud with *Thal.* and *Halimeda*; 11.III.1970; 3 m.

1575 – Entrance of Puitu, 300 m NE of Cai, 11.VIII.1967.
Soft mud with *Rhiz.*, *Thal.*: 0–½ m.

1575A – Mud with *Thal.* and *Halimeda*; 11.VIII.1967; 1/10–½ m.

1575Aa – Mud with *Thal.*, some *Halimeda*; 11.III.1970; ¼–½ m.

1576 – NE of Cai, Pariba di Cai, 16.IX.1967.
Mud with *Rhiz.*, *Thal.*; 0–½ m.

1576A – Muddy, with *Thal.* and *Halimeda*; 16.IX.1967; ¼–1 m.

1577 – S part of Puitu, 10.VIII.1967.
Sandy mud with *Rhiz.*, *Thal.*, *Caulerpa*; 0–½ m.

1577a – *Rhiz.* in mud; 11.III.1970; 0–½ m.

1577A – *Halimeda-Thal.*-flat, sandy mud with numerous *Codakia*, 10.VIII. 1967; ½ m.

1577Aa – Mudflat with *Thal.*, *Codakia*; 11.III.1970; ½ m.

1578 – S Puitu, 10.VIII.1967.
Thal.-flat on sandy mud with *Codakia*, *Rhiz.* with *Chthamalus*, *Cassiopea*; 0–½ m.

1579 – NE Puitu, 10.VIII.1967.
Mud with *Rhiz.*, numerous *Codakia*, *Cassiopea*; 0–½ m.

1579A – Mud with *Thal.*; 10.VIII.1967; 1–1½ m.

1580 – NW Puitu, 10.VIII.1967.
Mud, *Rhiz.* with *Chthamalus*, *Thal.* with *Codakia*; 0–½ m.

1580A – Soft mud with *Rhiz.* leaf decay; 10.VIII.1967; ¼–½ m.

1582 LAC, NORTH PART of basin, Boca di Pos, entrance, 14.VIII.1967.
Rhiz. in muddy area; 0–½ m.

1582A – Sandy mud, some *Thal.* and *Halimeda*, *Cassiopea*; 14.VIII.1967; ½–1 m.

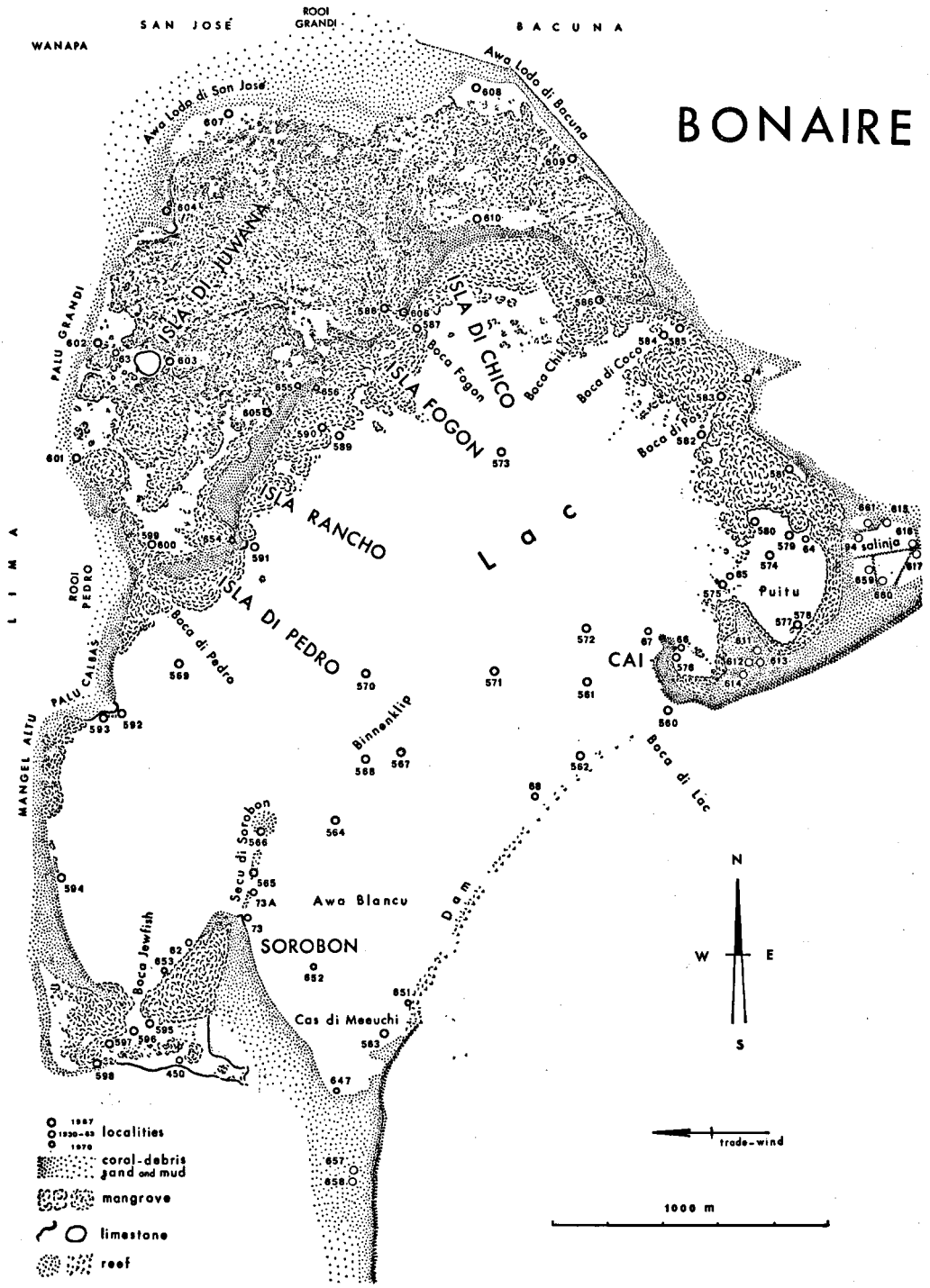

Fig. 9. Lac, BONAIRE, with localities. For Station numbers 62, 63 ... 450, 560, 561 etc. read: 1062, 1063, ... 1450, 1560, 1561 etc. (73 = 373)

1583 – Boca di Pos, creek; sand and mud with *Batophora*, *Rhiz.*; 14.VIII 1967; 0–1 m.
1583A – Sandy mud with *Thal.* and *Halimeda*; 14.VIII.1967; 1 m.
1584 – Boca di Coco, entrance, 15.VIII.1967.
Mud on sand with *Rhiz.* and *Avrainvillea* (abt. 22 g Cl′/l); ½–1 m.
1584A – Muddy sand with *Avrainvillea*, *Halimeda* and *Thal.*; 15.VIII.1967; ½–1 m.
1584Aa – Muddy sand with *Avrainvillea*; 11.III.1970; 1 m.
1585 – Boca di Coco, creek; mud and sand with *Rhiz.*; 0–½ m.
1585A – Mud on sand, dense *Avrainvillea*, some *Thal.*; 15.VIII.1967; ½–1 m.
1586 – Boca Chikitu, creek, 15.VIII.1967.
Mud on sand with *Rhiz.*, *Acetabularia* (abt. 22 g Cl′/l); 0–¼ m.
1586A – Mud with dense *Avrainvillea*, and *Bat.*; 15.VIII.1967; ¼–1 m.
1587 – Boca Fogon, entrance, 24.VIII.1967.
Sandy mud with *Acetabularia* and *Rhiz.*; 0–½ m.
1587A – Sandy mud with *Avrainvillea* and *Halimeda*; 24.VIII.1967; ½–1 m.
1588 – Boca Fogon, creek; muddy sand with *Rhiz.* and *Acetabularia*; 24.VIII.1967; 0–½ m.
1588A – Mud and sand; 24.VIII.1967; 1½ m.

1589 LAC, WEST PART of basin, inlet S of Fogon, entrance, 14.VIII.1967.
Sandy mud, *Rhiz.* with some *Chthamalus*; 0–½ m.
1589A – Muddy sand with *Halimeda* and *Avrainvillea*, some *Thal.*, *Cassiopea*; 14.VIII.1967; ¼–¾ m.
1590 – Inlet S of Fogon, creek; sandy mud with *Rhiz.*, *Thal.* and *Bat*; 14.VIII.1967; 0–½ m.
1590A – Sandy mud with some *Thal.*; 14.VIII.1967; ½–1 m.
1591 – Punta di Rancho, 500 m E of Boca Pedro, 18.VIII.1967.
Sand on limestone, with *Thal.* and *Halimeda*; 0–½ m.
1592 – Punta di Palu Calbas, 5.IX.1967.
Muddy sand with *Rhiz.*, *Halimeda* and *Thal.*; limestone; 0–½ m.
1592A – Muddy sand with *Thal.* and *Avrainvillea*; 5.IX.1967; ¼–¾ m.
1592B – Low limestone cliff; 5.IX.1967.
1593 – Punta di Palu Calbas, S, 5.IX.1967.
Muddy sand with *Thal.* and *Halimeda*; ¼–¾ m.
1593A – Tree trunk washed ashore; 5.IX.1967.
1594 – Playa Mangel Altu, 600 m W of Sorobon Pt., 23.VIII.1967.
Sandy bottom, *Thal.* flat with *Halimeda*; ½–1 m.
1594A – Muddy sand; 23.VIII.1967; ¼ m.

1062 LAC, SOUTH PART of basin, Sorobon (Soerebon), 26.X.1930. (Pl. XXVIIIa)
Rhiz., sandy mud with *Thal.*; 0–1½ m.
1062a – *Rhiz.*, scanty *Thal.* on sandy mud; 17.IV.1955; 0–1½ m.
1450 – Boca Jewfish, S shore, 6.XII.1963.
Sandy rock debris overgrown by algae; *Rhiz.* with dense *Acetabularia*, *Cassiopea*; ¼–1 m.
1595 – Boca Jewfish, near entrance, 24.VIII.1967.
Rhiz. with *Caulerpa verticillata*; ¼–1½ m.
1595A – Sandy mud, 24.VIII.1967; 2 m.

1596 – Boca Jewfish, 24.VIII.1967.
Sink hole with some mud; 2–5 m.

1596A – Sandy mud with decay; 24.VIII.1967; 2 m.

1597 – Boca Jewfish, SW part, 22.VIII.1967.
Sandy mud with *Rhiz.* and *Acetabularia*; 0–¼ m.

1597A – Sandy mud with *Rhiz.*, dense *Acetabularia*, *Thal.* (abt. 22 g Cl′/l); 0–¼ m.

1598 – Boca Jewfish, SW corner, 22.VIII.1967.
Sandy mud with *Rhiz.*, *Acetabularia*, *Bat.*, *Halodule* and *Chondrilla*, *Cassiopea*; 0–¼ m.

1598A – Sandy mud on limestone with scanty *Thal.*; 22.VIII.1967; ¼–½ m.

1653 – Sorobon, near Boca Jewfish, 10.III.1970; 0–½ m.

1653A – Muddy sand with *Thal.* and *Halimeda*; 10.III.1970; ¼–1 m.

1599 LAC, NORTHWEST (SALINE) part, Boca Pedro, N creek, 4.IX.1967.
Sandy creek with *Rhiz.*, tidal flow; 0–½ m.

1600 – Awa di Pedro, near Boca, 4.IX.1967.
Mud with *Thal.* and *Rhiz.* (21.5 g Cl′/l); 0–¼ m.

1601 – Awa di Palu Grandi, S part, 31.VIII.1967.
Muddy bottom with *Rhiz.*, *Acetabularia* and *Bat.*, *Cassiopea*; 0–½ m.

1601A – Muddy sand with *Bat.*, scanty *Thal.*; 31.VIII.1967; 0—½ m.

1601B – Mud, with poor *Thal.* and *Avrainvillea*; 31.VIII.1967; ¼–1 m.

1602 – Awa di Palu Grandi, N part, 30.VIII.1967.
Muddy sand with *Rhiz.* and *Acetabularia* (26.3 g Cl′/l); 0–½ m.

1602A – Muddy sand with *Bat.* and *Acetabularia*; 30.VIII.1967; ¼–½ m.

1602B – Muddy sand with limestone debris, some *Thal.*, *Acetabularia* and *Bat.*; 30.VIII.1967; 0–¼ m.

1603 – Isla Juwana, E shore, 13.VIII.1967.
Mud on limestone, with *Rhiz.* and *Acetabularia*; 0–½ m.

1603A – Mud on limestone, with much *Bat.*; 13.VIII.1967; 0–1 m.

1604 – Punta Wanapa, 18.VIII.1967.
Creeks in *Salicornia*-flat near *Avic.*, with *Bat.* and *Ruppia*; 0–¼ m.

1069 BOCA WASHIKEMBA, 16.V.1930.
Sea weeds cast ashore.

1375 – Beachrock with pools, limestone; 7.IV.1955; 0–1 m. (Pl. XXXIa)

1070 LAGOEN, S SHORE, 14.IX.1948. (Pl. XXXII)
Diabase rock, debris, near *Rhiz.*; 0–1/10 m.

1070c – Rock debris, *Rhiz.*, some *Thal.*; 9.IV.1955; 0–1 m.

1070A – Diabase with muddy sand, *Rhiz.* with *Chthamalus*; 28.X & 2.XI.1930; ¼–1 m. (Pl. XXXIb)

1070Aa – Diabase rock with muddy sand, *Rhiz.* with *Chthamalus*; 14.IX.1948; ½–1½ m.

1070Ab – Grove of *Rhiz.* on rocky beach; 9.IV.1955; 0–1 m.

1554 – SW corner, 19.IX.1967. (Pl. XXXII)
Muddy *Avicennia* grove; 0–¼ m.

1555 – Sheet of water in *Avicennia* grove, *Uca*; 19.IX.1967; 0–¼ m.

1556 – SW part, 19.IX.1967.
Muddy sand with *Rhiz.*, some rock; 0–1 m.

1557 – Sandy shales near *Rhiz.*; 19.IX.1967; 0–¼ m.
1558 – S part, 19.IX.1967.
Sandy and muddy beach with *Rhiz. Chthamalus*; 0–1 m.
1559 – Sandy bottom with shell debris near *Rhiz.*; ½–2 m.

1376 LAGOEN, N SHORE, E side, 2.IV.1955. (Pl. XXXIVa)
Limestone cliff with diabase, coarse debris; 0–1 m.
1377 – Central part, 2.IV.1955. (Pl. XXXIVb)
Diabase rock near sandy beach with debris, some *Thal.*; 0–1 m.

1378 BOCA SPELONK, 14.IV.1955.
Limestone cliff in surf (J. S. Zaneveld coll.); 0–½ m.

1071 BOCA ONIMA, 19.IX.1948.
Limestone cliff; 0–½ m.
1071A – Sandy limestone debris in surf, with *Sargassum*; 19.IX.1948; ½–1 m.
1071B – On *Sargassum*, cast ashore; 19.IX.1948.
1071Ba – On *Sargassum* and other algae cast ashore; 19.V.1930.
1071C – Spray pools 2 × 1 × ½ m; 19.IX.1948.

1379 SLAGBAAI, NW side, 200 m offshore, 3.IV.1955.
Large *Acropora* and other corals, largely overgrown by algae; 3–6 m.
1380 – Beach, 3.IV.1955.
Rocky beach with sand and pebbles, small pools; 0–½ m.

Klein Bonaire (Pl. XXXVIIIa)

1049 EAST COAST at Landing, 10.IX.1930.
Sandy shore with reef debris; 0–1½ m.
1049a – Sandy reef debris of old Landing; 17.X. & 8.XI.1930; 0–1 m.
1049A – Rocky shore at sandy beach; 13.IX.1948; 0–1 m.
1049B – Reef debris on sandy beach; 13.IX.1948; 0–1½ m. (Pl. XXXVIIIa)
1049C – Sandy reef; 13.IX.1948; 1–3 m.
1049Aa – Low limestone cliff at sandy beach; 30.III.1955; 0–1 m.

1367 WEST COAST, West Point, 28.III.1955.
Beachrock with sandy reef; 0–1 m.
1368 – Noordwestpunt; low limestone cliff with sandy reef; 28.III.1955; 0–1 m.

1369 NORTH COAST, W, 30.III.1955.
Low rocky beach with sandy reef; 0–1 m.
1370 – NE; sandy shore with beachrock; *Thalassia* and some *Syringodium*; 30.III.1955; 0–1 m.
1370a – Sand with beachrock, *Thal.* and *Syr.*; 18.III.1970; ¼–½ m.
1371 – ENE; shallow limestone flat with pools and fissures with sand; 13.IV.1955; 0–½ m.

1372 SOUTHEASTERN COAST, 13.IV.1955.
Rocky beach with coral shingle and sand (J. S. Zaneveld); 0–½ m.

Klein Curaçao

1046 WESTERN SHORE, 1.X.1948.
Sandy beach with some limestone rock, *Sargassum*; 0–1 m.
1046a – Sand with some rock debris (J. S. Zaneveld); 9.I.1955; 0–1 m.
1363 – SW; sandy beach (Zaneveld); 9.I.1955; 0–1 m.

1362 NORTHWESTERN SHORE, 9.I.1955.
Limestone (Zaneveld); 0–1 m.
1365 – Rocky coast (Zaneveld); 16.I.1955; 0–½ m.
1366 – Northward; limestone (Zaneveld); 16.I.1955; 0–½ m.

1364 SOUTHEASTERN SHORE, 9.I.1955.
Sandy beach with limestone debris (Zaneveld); 0–½ m.

Curaçao (Fig. 10–13; Pl. XL–LII)

1016 BOCA GRANDI, Savonet, 28.IV & 2.V.1930. (Pl. XLa)
Rocky beach with sand; 0–1 m.
1016a – Sandy beach with beachrock; tide pools; 24.II.1970; 0–½ m. (Pl. XLb)
1016A – On *Sargassum*, cast ashore; 2.V.1930.

1313 UNA BOCA, Noordpunt, 6.I.1955.
Limestone terraces and debris (J. S. Zaneveld coll.); 0–½ m.

1314 PLAJA KALKIE, Westpunt, 4.I.1955.
Limestone cliff with terraces, some sand (Zaneveld); 0–1 m.

1315 WESTPUNT BAAI, 3.I.1955. (Pl. LIIb)
Rocky beach with sand, huge boulders (Zaneveld); ½–1 m.
1316 – S part; limestone cliff (Zaneveld); 0–3 m.

1017 KNIP BAAI, S side, 8.I.1949.
Perpendicular conglomeratic cliff; 0–1½ m.
1018 – N side; steep limestone cliff; 6.II.1949; 0–1½ m.
1018A – Rocky shore with sand; 6.II.1949; 0–½ m.

1019 PLAJA DJERIMI, N corner, 11.XII.1948.
Rocky shore with sand; 0–1½ m.
1019A – Sandy bottom with *Syringodium*, loose plants; 29.I.1949; 2½–4 m.

1020 BOCA LAGOEN, N side, 13.XI.1948.
Steep Limestone cliff; 0–1½ m.
1020A – Rocky beach with small tide pools; 13.XI.1948; 0–½ m.
1020B – Sandy beach with pebbles; 13.XI.1948; 0–½ m.
1020C – S side; sand and rock debris; 27.XI.1948; 2–3 m.
1020D – S side; rocky shore with *Porites*; 27.XI.1948; ½–1 m.

1021 ST. KRUIS BAAI (Boca Santa Cruz), S side, 23–24 & 26.IV.1930.
Rocky shore (cherts) with tide pools; 0–½ m.

1022 BOCA SANTOE PRETOE (Boca Chikitoe), 12.III.1949.
Rocky beach with *Dictyonema*, quartzite pebbles; ½–1½ m.
1022A – Coarse sand with quartzite pebbles; 12.III.1949; 0–½ m.

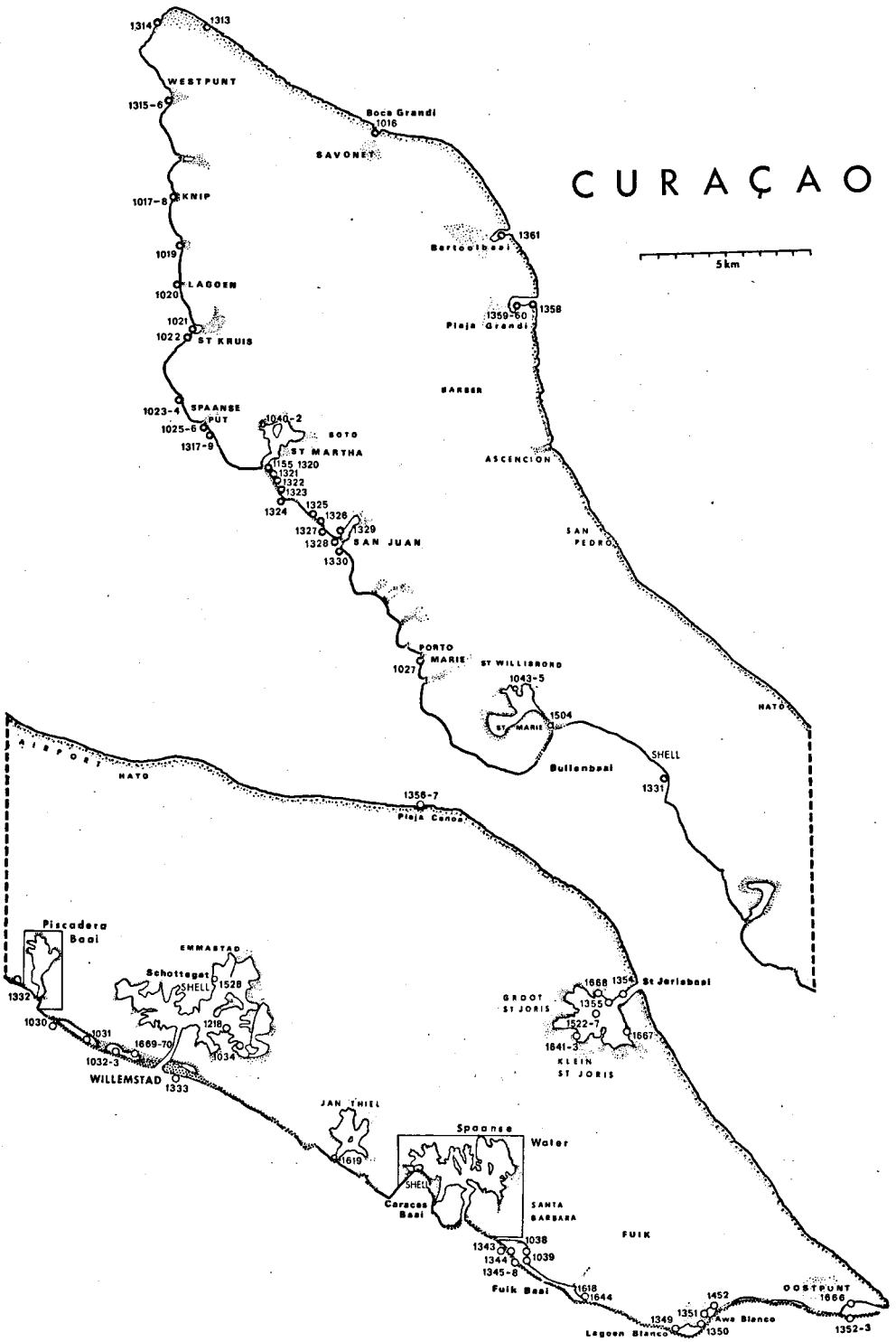

Fig. 10. CURAÇAO, with station numbers of marine and saltpond localities. Insets: see Figs. 11–13.

1023 PLAJA HOELOE (Playa Hulu), 28.X.1948.
Sandy reef, *Acropora cervicornis* and *Porites*; ½–1½ m.

1023a – Sandy reef with debris; 19.III.1949; ¼–1 m.

1023A – Rocky shore with sand; 19.III.1949; 0–½ m.

1023Aa – Rock debris with sand (Zaneveld); 26.XII.1954; 0–1 m.

1024 – S cliff with sandy reef; 2.IV.1949; 0–1 m. (*Stud. 4* pl. VIa; *20* pl. Ia)

1025 SPAANSE PUT BAAI (Boca Pos Spanjo), 16.II.1949.
Pool, 40 × 20 × 1 m, between cliff and wall of coral shingle, probably not rarely in communication with sea, muddy sand with many algae; 0–1 m.

1025A – On *Rhizophora* in muddy sand; 16.II.1949; 0–½ m.

1026 – Pools between cliff and porous wall (J. G. de Jong coll.); II.1949; 0–½ m.

1317 PLAJA FRANKIE, near Spaanse Put Baai, 27.II.1955.
Limestone shore with sandy beach; 0–1 m.

1318 – Shallow lagoon with sandy reef debris; 27.II.1955; 0–1 m.

1319 – Muddy pool with much *Caulerpa*, 50 × 10 × 1 m, separated from lagoon by porous wall, some *Rhiz.* (Zaneveld); 27.II.1955; 0–1 m.

1320 SANTA MARTA BAAI, creek, 3.III.1955.
Entrance of narrow lagoon with tidal flow, 5 × 1 m; muddy bottom with *Batophora*, numerous *Cassiopea* (tidal range 20.38–20.48 g Cl′/l); ¼–1 m.

1321 – First lagoon; very muddy with much *Bat.*, *Cassiopea* (20.03–20.63 g Cl′/l); 3.III.1955; ¼–1 m.

1322 – Second lagoon; narrowly connected with First; soft mud, few *Bat.*, many *Cassiopea*, *Zoanthus* (20.66–20.93 g Cl′/l); 3.III.1955; ¼–1 m.

1323 – Third lagoon, almost isolated larger part of 1322, 200 × 30 × 1½ m, separated from the sea by wall of coral debris; sandy bottom with soft mud, much *Thalassia* (20.26–20.63 g Cl′/l); 25.II.1955; ¼–1 m.

1324 CAPE SANTA MARTA, E of bay, 24.II.1955.
Limestone cliff with boulders (20.10–20.18 g Cl′/l); 0–1 m.

1325 SINT JAN (San Juan), W part of lagoon, 6.III.1955. (Pl. XLIb)
Part of narrow lagoon, 800 × 50 × 1½ m, communicating with the sea through two recent openings of 15 × ½ m in coral shingle wall; muddy sand with *Halimeda*, poor *Thal.* and *Rhiz.*; 0–1 m.

1325A – E part of lagoon; sandy mud with much *Halimeda* and *Zoanthus* far from entrance (26–28 °C); 6.III.1955; 0–1 m.

1326 – E part of lagoon, pool, 6.III.1955. (Pl. XLIa)
15 × 15 × ½ m, separated from sea by narrow wall of coral shingle; some soft mud with *Caulerpa* and *Zoanthus* (30 °C) (Zaneveld); 6.III.1955; 0–½ m.

1327 – Rocky shore with large pebbles (Zaneveld); 6.III.1955; 0–½ m.

1328 BOCA GRANDI DI SAN JUAN, W shore, 6.II.1955.
Coral debris on sandy beach (Zaneveld); 0–1 m.

1329 – W part of lagoon; muddy sand (Zaneveld); 6.II.1955; 0–1 m.

1330 – E shore of Boca; huge boulders (Zaneveld); 6.II.1955; 0–1 m.

1027 PORTO MARIE BAAI, 15 & 17.IV.1930.
Rocky shore with sandy reef, *Acropora cervicornis*; 0–1½ m.

1331 BULLENBAAI, C.P.I.M.wharf, 6.I.1955.
Coarse pebbles on sandy beach, wooden poles, iron pipes (Zaneveld); 0–2 m.

1029 PISCADERA BAAI, BOCA PISCADERA (outer bay), 29.I.1949.
Rocky shore with sand at Piscadera Bay Club; 0–1½ m.

1029A – On fence and poles of swimming pool; 29.I.1949; 0–1 m.

1453 – NE part, 3.I.1964; 3½ m.
Sand with a few limestone boulders.

1453a – Sand; 29.XI.1963; 3½ m.

1454 – Central part, 2.I.1964.
Sand; 4 m.

1455 – W part, 2.I.1964.
Sand; 3½ m.

1455A – Muddy sand in bottle; 2.I.1964; 3½ m.

1456 – W part, 2.I.1964.
Coarse sand; 3 m.

1456A – Coarse sand; 29.XI.1963; 4 m.

1457 – NE part, Carmabi beach, 5.I.1964.
Sandy pebbles, some coral; 1–2 m.

1458 – NW part, 5.I.1964.
Muddy sand with rock debris; 1–1½ m.

1459 – Carmabi beach, 1.I.1964.
Pebbles overgrown with algae, sheet iron, rock; 0–½ m.

1459A – Sandy pebbles with *Halimeda*; 14.X.1967; 0–1 m.

1620 – Carmabi pier, 14.X.1967.
Iron and wooden poles, numerous *Spirobranchus*; 0–1 m.

1711 – Carmabi, 1.IX.1973.
From Boston Whaler; 0–½ m.

1711A – From rope of same boat; 1.IX.1973; 0–½ m.

1460 PISCADERA BAAI, BOCA STROINK (entrance), W, 14.XII.1963. (Pl. XLVIIa)
Small sandy inlet with *Rhiz.*, *Didemnum* and other ascidians; 0–½ m.

1460A – Sand with leaf decay and *Halimeda*, some *Thal.*; 14.XII.1963; ½ m.

1461 – W, S of water-pipe, 14.XII.1963.
Sandy bottom with *Rhiz.*; distinct tidal flow; 0–1 m.

1461A – Very shallow pools, decay of *Rhiz.* and *Bontia*; 14.XII.1963; 0–½ m.

1462 – Water-pipe, 2.I.1964. (Pl. XLVIb)
Iron supports in tidal flow, with dense *Pennaria*, *Didemnum*, *Styela* and *Microcosmus*; 0–1 m.

1463 – W side, N of water-pipe, 14.XII.1963.
Some beachrock with muddy sand, *Rhiz.* with dense *Didemnum*, *Styela* and *Microcosmus*, some *Thal.*; 0–1 m.

1463A – Sandy bottom with *Halimeda*, scanty *Thal.*; 14.XII.1963; 1 m.

1463B – Limestone with some debris; 14.XII.1963; 0–½ m.

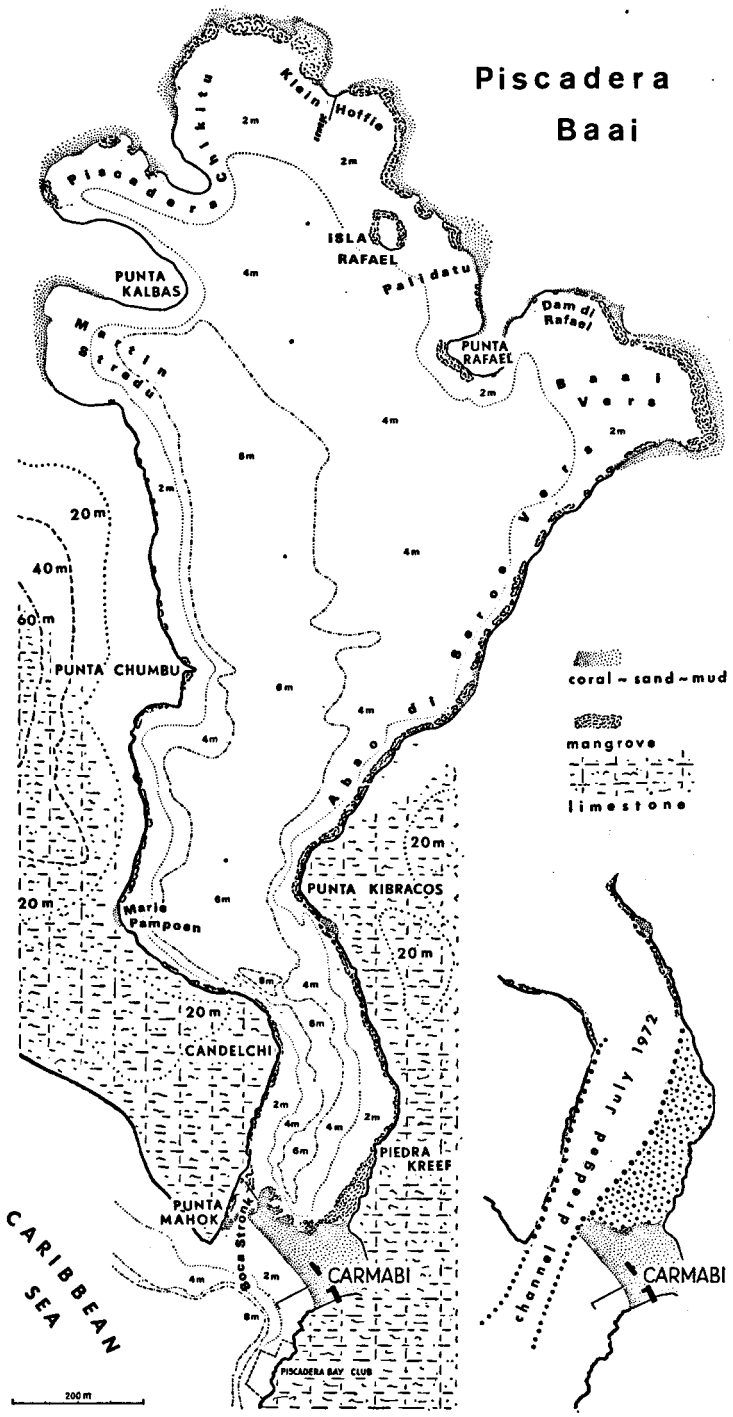

Fig. 11. Sketch-map of Piscaderabaai, CURAÇAO. Inset: situation of entrance after dregding operations in 1972.

1464 – E, N of water pipe, 28.XI.1963.
Muddy bottom. *Rhiz.* with *Didemnum*, *Diplosoma* and other ascidians; 0–½ m.

1464A – Sandy mud with *Hali.*; 11.XII.1963; 1 m.

1465 – Small inlet E of entrance, 11.XII.1963.
Sandy mud with *Rhiz.*; 0–½ m.

1465A – Muddy bottom with sandy places, scanty *Thal.*; 11.XII.1963; ½–1 m.

1028 PISCADERA BAAI, BINNENBAAI (Pading, inner bay), S PART, near Carmabi, 2.II.1949. (Pl. XLIXb)
Rock debris and sand with soft, blackish mud; ½–1½ m.

1028A – *Rhiz.* with oysters, much *Didemnum* and other ascidians; 2.II.1949; 0–1 m.

1466 – Near Carmabi; Rhiz. with *Crassostrea* and *Didemnum*; 17.XII.1963; 0–1 m. (Pl. XLIIIb)
Rhiz. in soft mud, with much *Styela* and *Microcosmus*; 0–1 m.

1466a – *Rhiz.* in soft mud, many oysters and *Balanus*: 0–½ m.

1466A – Soft mud among *Rhiz.*; 17.XII.1963; 1–1½ m.

1466Aa – Soft mud near *Rhiz.*; 29.X.1967; 1 m.

1467 – SE part, 29.XI.1963.
Muddy sand; 1½ m.

1467A – S part; sandy mud with *Thal.*; 29.XI.1963; 4 m.

1467Aa – Muddy with some gravel; 21.X.1968; 4 m.

1467B – SW part; sandy bottom; with some *Thal.*; 29.XI.1963; 2 m.

1467C – Central part; sandy mud; 25.X.1963; 5 m.

1468 – E side, at Enoch, 18.XII.1963.
Diabase debris with mud, *Rhiz.* with oysters overgrown by *Didemnum*; 0–1 m.

1468A – Rocky bottom with some mud; 18.XII.1963; 1½ m.

1469 – W side, Candelchi, 18.XII.1963.
Scanty *Rhiz.* on rocky shore, many oysters with *Microcosmus*, *Styela* and *Didemnum*; 0–1 m.

1469a – *Rhiz.* in muddy rock debris; 27.VII.1973; 0–1 m.

1469A – Rocky or sandy bottom with some mud; 18.XII.1963; 1–1½ m.

1469B – Limestone cliff and rock debris; 18.XII.1963; 0–½ m.

1470 – Central part at 4th Buoy, 31.X.1963.
Buoy overgrown by oysters and *Didemnum*, *Styela*, etc.; 0–¾ m.

1471 – Central part near 4th Buoy, 25.X.1963.
Sandy mud; 5½ m.

1471A – E side, near Punta Kibracos; sandy mud with shell debris; 29.XI. 1963; 2 m.

1471B – W side, at Marie Pampoen; muddy sand with shell debris; 29.XI. 1963; 2 m.

1671 – SE part, near Carmabi, 30.III.1970.
Rhiz. in mud and sand; 0–½ m.

1671A – Sandy mud with rock debris; 30.III.1970; 1–1½ m.

1708 – E shore, N of destroyed area, 27.VII.1973.
Rhiz. on rocky shore with some mud; 0–1 m.

1708A – Rocky bottom with mud; 27.VII.1973; 1–1½ m.

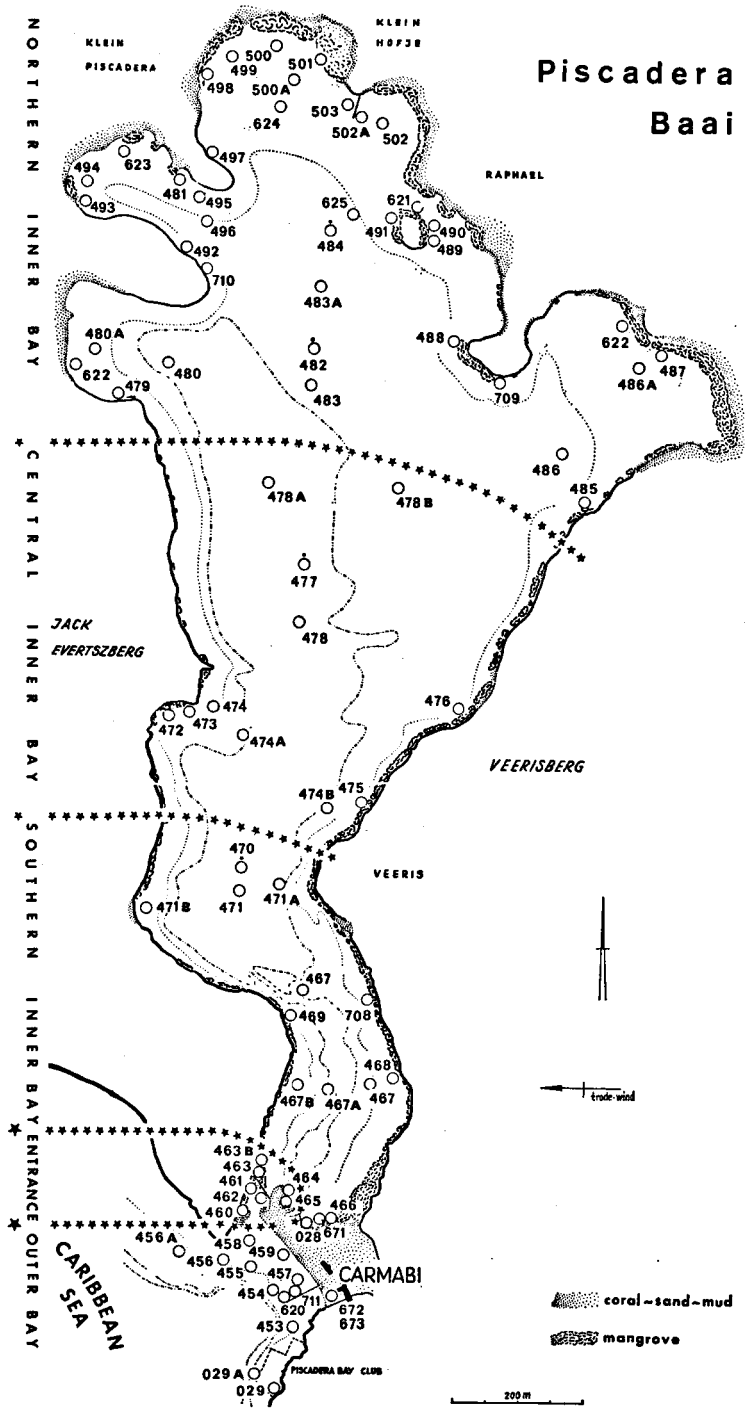

Fig. 12. Piscaderabaai, CURAÇAO, with localities. For Station numbers 028, 029, 453, 454 etc. read: 1028, 1029, 1453, 1454 etc.

1472 PISCADERA BAAI, BINNENBAAI, CENTRAL PART, SW, Punta Chumbu, 25.VII.1962.
Rhizophora (Louise J. van der Steen coll.); 0–½ m.
1472a – *Rhiz.* with *Didemnum* (v. d. S.); 26.IX.1962; 0–½ m.
1472b – *Rhiz.*; 25.II.1970; 0–1 m.
1472A – Mud (v. d. S.); 25.VII.1962; ½–1 m.
1472Aa – Mud (v. d. S.); 26.IX.1962; ½–1 m.
1472Ab – Mud; 29.II.1970; 1–1½ m.
1473 – SW, Punta Chumbu, 13.XII.1963.
Rhiz. on rocky shore, many oysters, *Styela* and *Microcosmus*; 0–1 m.
1473a – *Rhiz.*; 27.IX.1967; 0–½ m.
1473b – *Rhiz.*; 26.VII.1973; 0–1 m.
1473A – Sandy gravel with very little mud; 13.XII.1963; 0–1 m.
1473Aa – Muddy gravel and sand; 27.IX.1967; ½–1½ m.
1474 – SW, Punta Chumbu, 29.XI.1963.
Sandy mud with shell debris; 2 m.
1474a – Shell debris with mud; 21.X.1968; 2 m.
1474A – Mud; 29.XI.1963; 4 m.
1474Aa – Mud; 21.X.1968; 4 m.
1474B – SE, N of Punta Kibracos; sandy mud with shell debris; 29.XI.1963; 2 m.
1475 – SE, N of Punta Kibracos, 13.XII.1963.
Rhiz., many *Crassostrea*, *Ecteinascidia* and *Styela*; 0–1 m.
1475A – Sandy debris with some mud; 13.XII.1963; 0–1 m.
1476 – E, Abao de Seroe Vers, 25.VII.1962.
Rhiz. with *Didemnum* (v. d. Steen); 0–½ m.
1476a – *Rhiz.* (v. d. S.); 26.IX.1962; 0–½ m.
1476b – *Rhiz.*; 25.VII.1973; 0–1 m.
1476A – Mud (v. d. S.); 25.VII.1962; 1 m.
1476Aa – Mud (v. d. S.); 26.IX.1962; 1 m.
1476Ab – Rock debris with mud; 3.VIII.1973; 0–1 m.
1477 – Middle of Central part, 3rd Buoy, 31.X.1963.
Buoy, crowded with in part decaying *Styela* and *Microcosmus*; 0–¾ m.
1478 – Middle of Central part, S of 3rd Buoy, 25.X.1963.
Mud; 5 m.
1478A – NW; mud with debris of sea urchins; 29.XI.1963; 5½ m.
1478B – NE; mud; 2.XI.1963; 4½ m.

1479 PISCADERA BAAI, BINNENBAAI, NORTHERN PART, SW, inlet, Martin Stredu (Martins Streedels), 11.XII.1963.
Muddy sand, scanty *Rhiz.* with *Crassostrea* and *Chthamalus*, many *Brachydontes*; 0–½ m.
1479a – *Rhiz.*; 26.VII.1973; 0–1 m.
1479A – Sandy mud with scanty *Thal.*, many *Chione*; ½–1 m.
1480 – Entrance of Martin Stredu inlet, 30.X.1973.
Muddy sand; 5 m.
1480A – Martin Stredu inlet; muddy sand with *Brachydontes*; 30.X.1963; 2 m.
1481 – Punta Piscadera Chikitu, 25.VII.1962.
Rhiz. with *Brachydontes* (v. d. Steen); 0–½ m.

1481a – *Rhiz.* (v. d. S.); 26.IX.1962; 0–½ m.
1481A – Mud (v. d. S.); 25.VII.1962; 1 m.
1481Aa – Mud (v. d. S.); 26.IX.1962; 1 m.
1482 – Middle of Northern part, 2nd Buoy, 31.X.1963.
Buoy, crowded with *Symplegma* and *Styela*, oysters with *Chthamalus* and mussels; 0–¾ m.
1483 – South of 2nd Buoy, 25.X.1963.
Mud; 4 m.
1483A – North of 2nd Buoy; mud; 25.X.1963; 3½ m.
1484 – Middle of northernmost part, 1st Buoy, 2.XI.1963.
Buoy, with dense *Styela* and *Microcosmus*, *Ostrea* and *algae*; 0–¾ m.
1485 – E, Abao di Seroe Vers, 11.XII.1963.
Rhiz. on rocky shore, many *Crassostrea*, *Styela* and *Microcosmus*; 0–1 m.
1485A – Rock debris and mud; 11.XII.1963; ½–2 m.
1486 – NE inlet, Baai Vers, 30.X.1963.
Sandy mud; 3½ m.
1486A – Sandy mud with shell debris; *Caulerpa*; 2 m.
1487 – Baai Vers, near Dam di Raphael, 25.XI.1963. (Pl. XLIIc, *Stud. 25* pl. VIIa)
Poor *Rhiz.* on muddy diabase debris, with *Crassostrea*, *Ecteinascidia*, *Symplegma* and *Styela*; 0–1 m.
1487a – *Rhiz.* in muddy sand; 27.IX.1967; 0–½ m.
1487a – *Rhiz.*; 25.II.1970; 0—1 m. (dupl.)
1487b – *Rhiz.*; 25.VII.1973; 0–1 m.
1487A – Sandy mud; 27.IX.1967; 1–1½ m.
1487A – Mud; 25.II.1970; 1½ m. (dupl.)
1488 – N. Raphael peninsula, 25.VII.1962.
Rhiz. with *Crassostrea* (v. d. Steen); 0–½ m.
1488a – *Rhiz.* (v. d. S.); 26.IX.1962; 0–½ m.
1488A – Mud (v. d. S.); 25.VII.1962; 1 m.
1488Aa – Mud (v. d. S.); 26.IX.1962; 1 m.
1489 – Northern islet, Isla di Rafael, 25.XI.1963.
Rhiz. with *Crassostrea*, ascidians and sponges, *Caulerpa*; 0–1 m.
1490 – N of Isla di Rafael, 30.X.1963.
Muddy growth of sponges near *Rhiz.*; 2 m.
1491 – Isla di Rafael, W side, 25.VII.1962.
Rhiz. (v. d. Steen); 0–½ m.
1491a – *Rhiz.* (v. d. S.); 26.IX.1962; 0–½ m.
1491A – Mud (v. d. S.); 25.VII.1962; 1 m.
1491Aa – Mud (v. d. S.); 26.IX.1962; 1 m.
1492 – W side, entrance of inlet near Punta Kalbas, 29.X.1963.
Muddy debris of diabase with *Ulva* and some *Syringodium*; 1–1½ m.
1493 – NW inlet of Piscadera Chikitu, 25.XI.1963.
Coarse muddy sand with *Rhiz.*, many oysters; 0–1 m.
1493a – *Rhiz.* in muddy sand; 20.IX.1967; 0–½ m.
1493b – *Rhiz.*; 26.VII.1973; 0–½ m.
1493A – Muddy sand; 20.IX.1967; ½–1½ m.
1493Aa – Sandy rock with some mud; 26.VII.1973; 0–½ m.

1494 – NW inlet of Piscadera Chikitu, 29.X.1963.
Muddy sand near *Rhiz.* with some *Ulva*, *Syr.* and *Thal.*; ½–1 m.

1495 – NW part at Punta Piscadera Chikitu, 29.X.1963.
Muddy sand with *Ulva*, *Thal.* and *Halodule*, abundant *Chione*; 1–2 m.

1496 – Entrance of NW inlet of Piscadera Chikitu, 30.X.1963.
Mud; 3½ m.

1497 – N side of Punta Piscadera Chikitu, 25.XI.1963.
Decomposed diabase, coarse sand with some mud, *Enteromorpha* and *Ulva*; 0–1 m.

1498 – Northern inlet of Piscadera Chikitu, W, 25.XI.1963.
Rhiz. in mud smelling of oil, with *Isognomon* and *Crassostrea*; 0–1 m.

1498a – *Rhiz.*; 26.VII.1973; 0–1 m.

1499 – N inlet of Piscadera Chikitu, NW, 26.X.1963.
Sandy mud with *Ulva* and *Caulerpa*; 1½–2 m.

1500 – N inlet of Piscadera Chikitu, N, 25.X.1963.
Sandy mud with algae, near *Rhiz.*; 1½ m.

1501 – Old and rusty sewer-pipe of Hoffie Chikitu, 25.XI.1963.
Dead *Rhiz.*, diabase debris with mud, *Caulerpa* and *Enteromorpha*; 0–½ m.

1502 – E of sewer-pipe, 25.X.1963.
Mud; *Brachydontes*; 1½ m.

1502A – Near mouth of sewer-pipe; mud; 26.X.1963; 2½ m.

1502Aa – Near sewer-pipe; mud; 21.X.1968; 2½ m.

1503 – Sewage of Hoffie Chikitu, 31.X.1963. (Pl. XLIIIa)
Iron supports of sewer-pipe, few small algae, *Brachydontes*; 0–1 m.

1503a – Iron supports of sewer-pipe, some small algae; 21.X.1968; 0–1 m.

1503A – Iron supports of sewer-pipe; 31.X.1963; 0–½ m.

1503B – Iron supports in mud with *Ulva* and *Brachydontes*; 26.IX.1967; 1 m.

1621 – N side of Isla de Raphael, 26.IX.1967.
Rhiz. with plenty of oysters and balanids; 0–1 m.

1621a – *Rhiz.*; 25.VIII.1973; 0–1 m.

1621A – Mud and sand, numerous *Chione*; 26.IX.1967; 1–1½ m.

1621Aa – Sandy mud with abundant *Chione*; 21.X.1968; 2 m.

1622 – Martin Stredu inlet, 29.IX.1967.
Somewhat muddy sand with *Thal.*; ¼–1 m.

1623 – NW inlet of Piscadera Chikitu, 26.IX.1967.
Rhiz. in muddy sand, greatly overgrown by sponges; 0–1 m

1623A – Muddy sand, crowded with *Chione*; 26.IX.1967; ½–1 m.

1624 – N inlet of Piscadera Chikitu, W, 21.X.1968.
Shell debris and mud; 2½ m.

1625 – W of Isla di Rafael, 21.X.1968.
Sandy mud; 3½ m.

1709 – Punta Raphael, 3.VIII.1973.
Rhiz. in sand and debris; 0–½ m.

1709A – Among *Syr.* on muddy sand; ½–1 m.

1710 – Punta Kalbas, 3.VIII.1973.
Non-calcareous rock and debris; 0–½ m.

1030 PARASASA, near Piscadera Baai, 1.II.1949.
Rocky beach with coral shingle and small pools; ¼–½ m.

1031 ZAQUITÓ, SE corner, 1.II.1949.
Pool in porous wall of coral shingle, 5 × 5 × ½ m, probably not rarely in communication with lagoon; 0–½ m.

1032 RIFWATER, S. shore, 1.VIII.1932.
Pools in porous wall of coral debris, communicating with lagoon (M. Realino Janssen coll.); 0–½ m.

1033 – S shore; pool in coral debris (J. G. de Jong coll.); II.1949; 0–½ m.

1669 – N shore at Sint Elisabeth Gasthuis, 24.II.1970.
Sandy area of disturbed part of lagoon with *Halodule*, *Cassiopea*; 0–½ m.

1670 – S of St. Elisabeth Gasthuis, 24.II.1970.
Rhiz. and *Avic.* in sand and mud; 0–½ m.

1670A – Mud on sand with shell debris; 24.II.1970; 1 m.

1034 SCHOTTEGAT, Parera near Pasanggrahan, 22.VIII.1948.
Diabase rock, coarse sand and some mud, remains of *Thal.*, flaps of algae, polluted by oil; ½–1½ m.

1218 – Venezuelan destroyer; 3.III.1955; 0–2 m.

1333 PIETERMAAI, Willemstad, 17.I.1955.
Limestone terraces, somewhat polluted by oil (Zaneveld); 0–1 m.

1334 CARACAS BAAI, buoy, 9.II.1955.
Iron buoy anchored since 1942; greater part covered by corals, few algae (Zaneveld); abt. 10 m.

1335 – Western lagoon, almost separated from sea; muddy (Zaneveld); 10.I. 1955; 0–½ m.

1336 SPAANSE BAAI at (?) Punta Cabajero, 3.II.1955.
Pebbles of coral rock, polluted by oil (Zaneveld); 0–½ m.

1337 SPAANSE WATER, LAGOEN DI VENNI at Punta Cabajero, 3.II.1955.
(*Stud. 20* pl. II, *25* pl. Ia)
Mangrove lagoon abt. 50 × 30 × 1 m between limestone terrace and rampart of coral debris, narrowly connected with Spaans Lagoen; soft mud, *Thal.* and *Bat.* (Zaneveld); 0–1 m.

1337a – *Rhiz.*, among *Thal.* in mud, slightly polluted by oil, numerous *Cassiopea* (20.23 g Cl'/l); 6.VIII.1955; 0–1 m.

1337b – *Rhiz.*, among weeds on mud and muddy sand, some oil residue, many *Cassiopea*; 2.I.1964; 0–1 m.

1037 SPAANSE WATER, SPAANS LAGOEN, Santa Barbara Beach ,N, 21.IV.1949.
Sandy beach near limestone cliff; 0–1 m.

1037A – S side; sandy beach with a few *Rhiz.* with *Isognomon* and balanids, single *Cassiopea*; 21.IV.1949; 0–1½ m. (Pl. Lc, *Stud. 20* pl. IIIb)

1638 – Northern entrance, Baai di Biná, 1.XI.1968.
Mud; 10 m.

1639 – Muddy sand; 1.XI.1968; 6 m.

1640 – Sandy debris with coral; 1.XI.1968; 3 m.

1035 SPAANSE WATER, INNER BAY, Kabrietenbaai, 9.XII.1930.
Rhiz. with *Isognomon* in muddy area; 0–1 m.

1036 – New Haven, Newport landing, 10.IV.1949.
On and between limestone debris in muddy lagoon; 0–1 m.

1036a – Limestone debris in mud; 5.II.1949; 0–1 m.

1036A – *Rhiz.* with *Isognomon* and sponges in mud; 10.IV.1949; 0–1 m.

1338 – N of Seroe di Boca, Peace Heaven, 1.I.1955.
Sandy, with *Acropora cervicornis*, near *Thal.* (Zaneveld); ½–1½ m

1339 – (?) SW of Spaanse Water, 26.XI.1954.
Sandy mud (Zaneveld).

1340 – (?) Brakke Put, 19.I.1955.
Rock debris, *Thal.*, mussels (Zaneveld).

1341 – Motoryacht at Brakke Put, 6.III.1955.
Scanty growth on cover treated 3 months ago (Zaneveld).

1342 – Brakke Put peninsula, 19.XII.1954.
Sandy mud with *Rhiz.* and *Thal.* (Zaneveld); 0–1 m.

1626 – Kabrietenbaai, 1.XI.1968.
Sandy mud; 5 m.

1627 – Brakke Put Abao, 1.XI.1968.
Muddy, with *Thal.*; 2 m.

1628 – Brakke Put Ariba, 1.XI.1968.
Sandy, with algae; 5 m.

1629 – Jan Sofat, islet, 17.XI.1968.
Rocky, with *Rhiz.* in mud; 0–1 m.

1630 – Near Isla di Yerba, 1.XI.1968.
Muddy sand; 5 m.

1631 – Near Isla Kiniw, 1.XI.1968.
Muddy sand; 4 m.

1632 – Baai di Santa Barbara, 1.XI.1968.
Sandy mud; 2 m.

1633 – SW of Landhuis Santa Barbara, 1.XI.1968.
Muddy; 3 m.

1634 – Buoy in Baai di Santa Barbara, 1.IX.1968.
On buoy in 2 m deep muddy water; 0–½ m.

1635 – N of New Haven, 1.XI.1968.
Shell debris in mud; 3 m.

1636 – New Haven, 1.XI.1968.
Mud; 2 m.

1637 – Near Baai di Biná, centre of Spaanse Water, 1.XI.1968.
Mud; 8 m.

1038 FUIK BAAI, W PART, Duitse Bad, 2.III.1949.
Rocky shore with sandy mud, some *Thal.* near *Rhiz.*; 0–1½ m.

1038a – Rock and mud with *Rhiz.*; 17.IV.1949; 0–1 m.

1038A – *Rhiz.* in mud, several *Cassiopea*; 2.III.1949; 0–1 m.

1038Aa – *Rhiz.* with *Isognomon*; 17.IV.1949; 0–1 m.

1039 – SE of Newport Bath, 20.XI.1948.
Rocky shore with muddy sand, some *Thal.*; 0–1½ m.

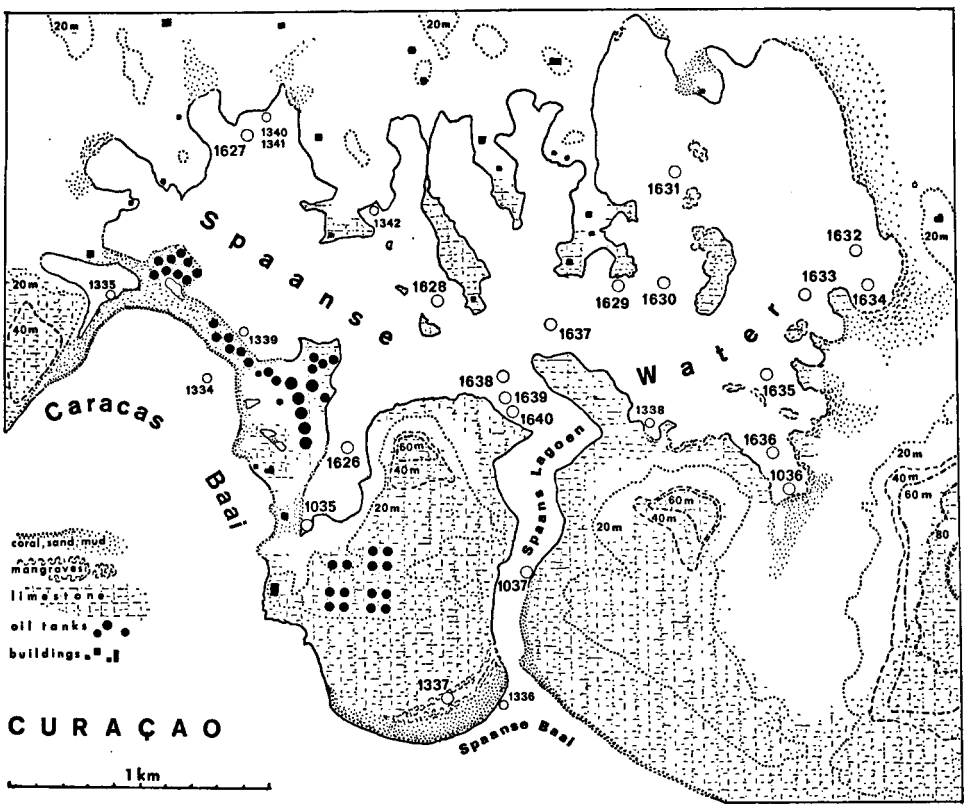

Fig. 13. Spaanse Water, CURAÇAO, with localities. (Exact situation of Sta. 1334–1336 and 1339–1342 not known.)

1039A – Sandy mud with rock debris, few *Thal.*, *Sargassum*; 20.XI.1948; 1–2 m.

1343 FUIK BAAI, W WALL, sea side, 11.I.1955.
Coarse coral debris (Zaneveld); 0–½ m.

1344 – Lagoon side, 11.I.1955.
Limestone debris with *Dictyonema* and *Sargassum* (Zaneveld); 0–3 m.

1344a – Limestone debris (Z.); 13.III.1955; 0–1 m.

1345 – Pool in coral debris, 11.I.1955.
Most western pool, 7 × 5 × ½ m, with *Bat.* (Zaneveld): 0–½ m.

1346 – Second pool, 30 × 8 × ½ m, with *Acetabularia* (Zaneveld); 11.I.1955; 0–½ m.

1347 – Third pool, 50 × 10 × 1 m, with *Avrainvillea* and *Codium* in sandy mud (Zaneveld); 11.I.1955; 0–1 m.

1348 – Fourth pool, 20 × 7 × ½ m, with *Caulerpa racemosa* (Zaneveld) 11.I.1955; 0–½ m.

1618 FUIK BAAI, E PART, Eastern corner, 28.X.1967. (Pl. LIa)
Rhiz. in mud; 0–½ m.

1644 – Eastern corner; muddy rock debris near *Rhiz.*; 5.X.1968; 2 m.

1349 LAGOEN BLANCO, Fuik, W landside, 25.I.1955.
Rocky shore with sand and mud, much *Thal.* (Zaneveld); 0–1 m.

1350 – E side; muddy sand with some *Thal.* (Zaneveld); 25.I.1955; 0–1 m.

1351 AWA BLANCO, W side, 25.I.1955.
Muddy sand and debris, *Acetabularia* and *Penicillus* (Zaneveld); 0–1 m.

1452 – N shore, 27.X.1963. (Pl. LIb)
Shallow part of large lagoon narrowly communicating with sea; sandy mud, *Thal.* beds, branches of *Conocarpus*; 0–1 m.

1352 AWA DI OOSTPUNT, seaside of wall, 25.I.1955.
Surf-swept limestone terrace (Zaneveld); 0–½ m. (Pl. LIIa)

1353 – Lagoonside of wall; rock debris (Zaneveld); 25.I.1955; 0–3 m.

1666 – 30 m from N shore; sand on limestone, scattered *Thal.*; 22.II.1970; 1/10–½ m.

1666A – 30–50 m offshore: sandy, *Thal.* with *Porites*; 22.II.1970; ¼–1 m.

1354 ST. JORIS BAAI, ENTRANCE, N side, 20.II.1955.
Rocky cliff with debris, 250 m from sea, scanty *Thal.*; 0–1½ m.

1355 – Abt. 800 m from sea; much *Thal.* (Zaneveld); 20.II.1955; 1–1½ m.

1522 ST. JORIS BAAI, INNER-BAY, N part, 8.VI.1962.
Mud (W. Chr. de Kock & W. J. J. O. de Wilde); 6½ m.

1523 – N part; sandy mud (de Kock & de Wilde); 8.VI.1962; 1 m.

1524 – NW part; muddy sand (de Kock & de Wilde); 8.VI.1962; 1½ m.

1525 – NE part; mud (de Kock & de Wilde); 8.VI.1962; 5 m.

1526 – S part; sandy mud with shell debris (de Kock & de Wilde); 8.VI.1962; 3 m.

1527 – E part; sandy mud with debris and *Halimeda* (de Kock & de Wilde); 8.VI.1962; 2 m.

1641 – S shore, SE part; muddy sand, *Rhiz.* with oysters and *Chthamalus*; 23.X.1968; 0–1 m.

1642 – Sandy rock debris with *Thal.*; 23.X.1968; 0–1 m.

1643 – Decaying timber in soft mud; *Thal.*; 23.X.1968; ¼–1 m.

1667 – E corner; *Rhiz.* in muddy sand; 25.II.1970; 0–½ m.

1668 – NW inlet; muddy sand with *Rhiz.*; 25.II.1970; 0–½ m.

1668A – Muddy sand with rock debris, old tires, *Thal.* and *Halodule*; 25.II. 1970; ¼–1 m.

1356 BOCA CANOA, 14.I.1955.
Rocky bay, surf (Zaneveld); 0–½ m.

1357 – Beach rock bar with pool 15 × 15 × 1 m (Z.); 13.I.1955; 0–1 m.

1358 PLAYA GRANDI, S side near mouth, 30.I.1955.
Surf-swept limestone cliff (Zaneveld); 0–½ m.

1359 – S side; rock, debris and sand (Z.); 30.I.1955; 0–½ m.

1360 – Hind part; sandy mud with debris, *Rhiz.* and some *Thal.* (Z.); 30.I. 1955; ½–1 m.

1361 BOCA BARTOOL, S side of entrance, 12.II.1955.
Limestone debris and muddy sand with much *Halimeda* and scanty *Thal.* (Zaneveld); 0–1½ m.

Aruba (Fig. 14; Pl. LIIIb–LV)

1001 PUNTA BRABOE, N side, W of Oranjestad, 16–18.VI.1930.
Sandy reef, limestone debris; 0–1½ m.

1001A – *Porites* reef; 16–18.VI.1930; 1–1½ m.

1002 – Exposed limestone, sandy debris; 3.I.1949; 0–1 m.

1303 PAARDENBAAI, key opposite to Oosthaven, 28.IV.1955. (Pl. LIVa)
Sandy, with some *Porites* and *Thalassia, Rhizophora*; 0–1 m.

1003 LAGOEN BOEKOETI (Lagun Bucuti), E of Oranjestad, 18.VI.1930.
Limestone, sandy mud with *Thalassia*; 0–1 m.

1003a – Sandy mud with *Thal.*; 14.XII.1936; ½–1½ m.

1003b – Sandy mud; 20.XII.1936; ½–1 m.

1004 – Limestone cliff, rock debris with sandy mud, slightly polluted by oil, near *Rhiz., Cassiopea*; 29.XII.1948; 0–1½ m. (*Stud. 4* pl. VIIb)

1004A – *Rhiz.*, some *Thal.*; 29.XII.1948; 0–1 m.

1005 BUCUTI reef, S of Oranjestad, LAGOON SIDE, 25.VI.1939. (cf. *Stud. 2* pl. IVb)
On *Rhiz.* in soft, muddy sand; 0–1 m.

1005a – Muddy sand with *Rhiz.*, somewhat polluted by oil; 17.I.1949; 0–1 m.

1005b – On *Rhiz.* in soft, muddy sand with *Thal.*; 8.II.1949; 0–1 m.

1005A – N part of island; sandy area with *Rhiz.* and *Thal.* (J. H. Beerman-Paul coll.); 24.III.1970; 0–2 m.

1007 – S point, 17.I.1949. (*Stud. 2* pl. IVb)
Sandy debris with *Halimeda* and *Zoanthus*, some *Thal., Cassiopea*; ½–1 m.

1007a – Sandy passage between *Rhiz.*, with *Penicillus, Avrainvillea* and *Halimeda* (Zaneveld); 6.V.1955; ½–1 m.

1007A – On *Rhiz.* in sandy area; 17.I.1949; 0–1 m.

1304 – N tip lagoon side; pool 20 × 15 × ¾ m in sand, in connection with sea at high tide, *Cassiopea*; 6.V.1955; 0–¾ m.

1006 BUCUTI reef, SEA SIDE, 26.VI.1930. (cf. *Stud. 2* pl. IVb)
Reef debris with muddy sand, some *Thal.*, small pools; 0–½ m.

1006a – Coral debris with *Porites* and *Thal.*; 17.I.1949; 0–1 m.

1006b – Reef debris with muddy sand, *Porites* flat, *Rhiz.*; 6.V.1955; 0–¾ m.

1008 SPAANS LAGOEN, NORTHWESTERN SIDE, 1.I.1949. (*Stud. 4* pl. VIIa)
Limestone shore of muddy lagoon with many algae near *Rhiz.*; 0–1½ m.

Fig. 14. ARUBA, with station numbers of marine and saltpond localities.

1008a – Rock and mud near *Rhiz.*; 24.III.1970; ¼–1 m.
– Near *Rhiz.*; 10.VIII.1973; 0–½ m.
1008A – On *Rhiz.*; 1.I.1949; 0–1 m.
1008Aa – On *Rhiz.* in mud.; 24.III.1970; 0–1 m.

1305 SPAANS LAGOEN, NEAR OLD BRIDGE, N side, 15.V.1955. (Pl. LVa)
Muddy rock debris, *Enteromorpha* and *Ulva*, balanids; 0.1 m.
1672 – SE side; *Rhiz.* in mud; 24.III.1970; 0–1½ m (same number erroneously used also for outdoor tank of Carmabi). (Pl. LVa)
1673 – SE side; pieces of rock at flood gate; 24.III.1970; 0–2 m (same). (Pl. LVa)

1009 PLAJA MASTER, near Savaneta, 2.I.1949.
Sandy beach with *Avicennia*; 0–1 m.

1009a – Sandy beach with *Avic.* and a few *Rhiz.*; 29.IV.1955; 0–½ m.

1009A – On *Rhiz.* in sand; 2.I.1949; 0–1 m.

1307 – W beach; sandy shore with some reef debris, poor *Thal.* and some *Ruppia* in muddy places; 29.IV.1955; 0–½ m.

1010 LAGOEN MASTER, 2.I.1949.
Shallow pool 40 × 15 × ⅓ between sandy shore and growth of *Rhiz.*, many algae; ½–1 m.

1010a – Muddy pool; 29.IV.1955; ¼–1 m.

1010A – On *Rhiz.*; 2.I.1949; 0–½ m.

1010Aa – On *Rhiz.*; 29.IV.1955; 0–½ m.

1308 SEROE COLORADO (Ceru Corá), Oostpunt, 2.V.1955.
Rocky coast (Zaneveld); 0–½ m.

1309 – Northern terraces; 2.V.1955. (Pl. LIVb)
Limestone cliff with rock pools; 0–½ m.

1650 – SE side; rock pools; 29.IX.1968; 0–½ m.

1310 RINCÓN, 7.V.1955.
Rocky beach with sand behind reef; 0–1 m.

1310A – More seaward; sand with reef debris (Zaneveld); 7.V.1955; ½–1½ m.

1011 BOCA PRINS, 28.VI & 3.VII.1930.
On *Sargassum*, cast ashore.

1311 BOCA ANDICURI, E corner, 11.V.1955. (Pl. LIIIb)
Non-calcareous rock near sandy beach; 0–½ m.

1312 – W corner; coral rock on sand beach; 11.V.1955; 0–½ m.

1301 MALMOK, Arasji, 14.VIII.1955. (Pl. LIIIc)
Rocky beach with sand and diorite boulders, *Thal.* flat with *Porites*; 0–1 m.

1302 DRUIF, Wharf of Arend Petroleum Comp., 4.V.1955. (*Stud. 12* pl. XIIa)
Beam of iron construction in 15 m deep water; overgrown by *Tubastraea*, *Telesto* and sponges; 0–2 m.

1302A – On *Strombus gigas*; 28.IV.1955; 10 m.

SALTPOND HABITATS

including all saltwater habitats which are not, rarely or very imperfectly communicating with the sea

excluding all descriptions of saltpond habitats already published in *Studies 4*, 1953, p. 70–77 [numbers between brackets]

Grand Cayman (Fig. 2; Pl. IIb)

1688 Pool near sea dyke at HEAD OF BARKERS, 10.VI.1973.
Muddy sand in drainage canal; 11.35 g Cl'/l.

1691 NE part of COLLIERS POND, 25.V.1973. (Pl. IIb)
Avicennia swamp near shore; 12.45 g Cl'/l.

1692 OLD ISAACS, 9.VI.1973.
Mudflat with pools on limestone, 0–½ m deep; 27.0 g Cl'/l.

Little Cayman

1695 Pool near PRESTON BAY, 5.VI.1973.
Shallow pool crowded with *Ruppia*, soft mud; 17.75 g Cl'/l.

1696 Pond of SPOT BAY, 5.VI.1973.
Muddy seepage with coral-rock debris; 10.25 g Cl'/l.

1697 Pool at CHARLES BIGHT lagoon, 4.VI.1973.
Muddy seepage near limestone bluff; 5.5 g Cl'/l.

Jamaica

1676 Saltpan E of YALLAHS, near road, 6.V.1973.
Rocky seepage with some mud; 14.6 g Cl'/l.

1676A – Seepage near Cocos grove in SW part, muddy debris, 6.V.1973; 12.9 g Cl'/l.

1681 GREAT SALTPOND, entrance at Fort Clarence, 8.V.1973.
Sandy inlet recently isolated from the sea by sand bar; *Rhizophora* in muddy sand, 0–1 m deep; 15.9 g Cl'/l.

Puerto Rico

1425 SALIÑA COROZO near Cabo Rojo, SW shore, 18.IX.1963.
Sheet of water as part of large saltpond, mudflat with numerous *Artemia*; 99.2 g Cl'/l.

1426 SALIÑA PAPAYO, E of La Parguera, 13.IX.1963.
Muddy ditch, 80 × 1 × ½ m, with turbid, greyish brown water, crowded with *Artemia*; 41.3 g Cl'/l.

1426A – Muddy shore of saltpond; 13.IX.1963; 29.4 g Cl'/l.

Dog Island [1147]

Anguilla (Pl. VIIb) [1143–1146]

Saint Martin (Fig. 4; Pl. Xb–XIIa, XIIIb) [1133–1141; *Stud. 4* pl. Va]

1130A SIMSON BAY LAGOON, former outlet near bridge, 6.VI.1955. (Pl. XIa)
Muddy pool with *Batophora* and dying *Rhizophora*; 31.3 g Cl'/l.

1130B – Muddy sandflat, sampled as deep as ½ m; 16.X.1963; 56 g Cl'/l. (Pl. XIb)
[Almost same locality 11.I.1957, 45.5 g (R. H. Cobben); 8.VI.1959, 48.7 g (H. E. Coomans).]

1132a – Flamingo Pond, recently isolated, W shore, 27.VI.1955.
Muddy pool with poor *Rhiz.* and *Avicennia*, *Bat.* and *Halodule*; 32.1 g Cl'/l.

1132B – Shallow mudflat with dying *Rhiz.*; 16.X.1963; 45.5 g Cl'/l.
[11.I.1957, 35.0 g (Cobben)]

1401 – Jetty of Simson Bay village, 8.VI.1955.
Muddy inlet with *Rhiz.*, *Halodule* and *Bat.*; 29.1 g Cl'/l.
[11.I.1957, 50.5 g (Cobben); 8.VI.1959, 39.6 (Coomans); 16.X.1963, 44.7 g.]

1402 – Near Flamingo Pond, 27.VI.1955.
Sandy shore with poor *Rhiz.*, scanty *Thal.* and *Halodule*; 28.4 g Cl'/l.
[11.I.1957, 63.5 (Cobben); 11.VI.1959, 47.2 g (Coomans); 16.X.1963, 51.3 g.]

1403 – Former entrance of Flamingo Pond, 27.VI.1955.
Bat. pool amidst *Rhiz.* in soft mud, 20 × 15 × 2 m; abt. 30 g Cl'/l.

1137A GREAT SALTPOND, near ruins of salt plant, 29.IX.1963. (Pl. XIIIb)
Muddy pond, 100 × 60 × ½ m, with numerous *Ephydra* chrysalids and *Artemia*; 130.9 g Cl'/l.

1137B – Trough in ruins of salt plant with numerous *Ephydra* and *Artemia*; 29.IX. 1963; 98.5 g Cl'/l. (Pl. XIIIb)

1400 FRESH POND, near bridge, 25.VII.1955.
Muddy pond with *Ruppia* and *Enteromorpha*, various fishes; 25.5 g Cl'/l.

1400a – Muddy pool crowded with *Ruppia*; 15.X.1963; 29.8 g Cl'/l.

Saint-Barthélemy (St. Barts) (Pl. XIIIa) [1122–1123]

La Désirade (Pl. XXa)

1436 SALINE DE GRANDE ANSE, near bridge, 23.I.1964. (Pl. XXa)
Drying shallow pond, 100 × 200 × ½ m, with *Ruppia* and *Chara*; 7.4 g Cl'/l.

1436A – Almost isolated cattle pool, 1 × 1 × ⅓, water turbid and brownish grey, 23.I.1964; 6.0 g Cl'/l.

Barbados

1444 Pool in HOLETOWN RIVER, near bridge, upstream, 18.II.1964.
Muddy pool with limestone debris, 2 × ½ × ½ m, with fishes, shrimps and *Uca*; polyhaline.

Grenada

1390 Saltpond of POINT SALINES, 23.I.1955.
Very shallow mud flat with numerous *Ephydra*-chrysalids; 22.3 g Cl'/l.

1390A – Muddy ditch, 23.I.1955; 17.0 g Cl'/l.

Trinidad

1381 CHACACHACARE island, La Tinta Bay, 11.I.1955.
Saltpond behind wall of quarzitic debris with some *Conocarpus*, much *Ruppia* on muddy places; 29.5 g Cl'/l.

Margarita

1445 SALIÑA DE GUAYACUCO, N of Porlamar, 13.I.1964.
Shallow muddy sandflat, several hundreds meters wide, 2–5 cm deep at sampling place, dead *Artemia*; 175 g Cl'/l.

Bonaire (Fig. 7, 9; Pl. XXV–XXVI, XXVIIb, XXIXb–XXX, XXXV–XXXVI) [1072–1109]

1073e SALINJA MARTINUS, shallow NE part; dead *Conocarpus* in soft mud, *Artemia*; 16.IV.1955; 58.5 g Cl'/l. (Pl. XXVb)

1973f – Same; 19.II.1970; 54.5 g Cl'/l. (Pl. XXVc)

1083c PEKELMEER, seepage through rampart of coral debris, with *Cyprinodon*; 11.IV.1955; 21.2 g Cl'/l.

– Same, pool near flamingo nests, with *Cypr.*; 11.IV.1955; 88 g Cl'/l.

1086a – Seepage with flowing sea water through limestone, algae; 6.XII.1963; 28.4 g Cl'/l. (Pl. XXVIIb)

1648 – Canal N of Witte Pan, recently dug; 30.X.1968; brine.

1649 – Canal S of Witte Pan, recently dug; 30.X.1968; brine.

1662 – Between Condensor 7 and 8 of Ant. Int. Salt Co, now connected with sea through inflow at Plenchi; crusts with Cyanophyceae; 5.III. 1970; 22 g Cl'/l.

1663 – At "Old Passage", Condensor 7 of AISCO; various fishes; 5.III.1970; 22 g Cl'/l.

1664 – "Eye" in Condensor 9 at Red Dyke; mud and limestone, *Cyprinodon*; 5.III.1970; 26.2 g Cl'/l.

1664A – Condensor 9; mud, *Cyprinodon*, some *Ephydra*; 5.III.1970; 78 g Cl'/l.

1665 – Bulldozed pool in mudflat N of 1st Crystallizer, 1 m deep; 4.III.1973; 70 g Cl'/l.

1706 – S of Witte Pan, debris near waterline; 20.VIII.1973; very weak brine.

1451 ORANJEPAN, former intake, 6.XII.1963. (Pl. XXVIb)
Ditch 40 × 1 × ½ m with algae in suspension, few small *Cyprinodon*; 31.3 g Cl′/l.

1451A – Outer part of intake, 30 × 1 × ¼ m, in connection with sea at very high tides, coral shingle with algae, many large *Cypr.*; 6.XII.1963; 20.5 g Cl′/l.

1657 SOROBON, bulldozed-pool S of Cas di Meeuchi (1), 9.III.1970
Sandy pool, 20 × 10 × ¼ m, with *Cyprinodon*; 54 g Cl′/l.

1658 – Same (2), 5 × 2 × ¼ m, with *Cypr.*; 9.III.1970; 55 g Cl′/l.

1374 LAC, pool near Bacuna, 29.III.1955.
Almost isolated part of lagoon, 40 × 30 × ½ m between *Rhizophora* and limestone flat, soft mud with *Batophora*; very weak brine.

1581 – Awa di Salinja di Cai, 9.IX.1967.
Almost isolated part of lagoon with *Bat.*, soft mud on limestone with *Rhiz.*; 29.5 g Cl′/l.

1605 – Isla Rancho, NW side, 18.VIII.1967.
Muddy pool with *Rhiz.*, *Avicennia* and *Bat.*, ¼–½ m deep; 36.7 g Cl′/l.

1606 – Isla di Chico, SW end, 17.VIII.1967.
Pool of 10 cm deep in muddy sand with *Avic.*; 42.0 g Cl′/l.

1607 – Awa Lodo di San José, 28.VIII.1967.
Almost isolated part of lagoon, ¼–¾ m deep, blackish mud with *Rhiz.*, *Avic.*, *Bat.* and *Ruppia*; 53.1 g Cl′/l.

1608 – Awa Lodo di Bacuna, N part, 28.VIII.1967.
Almost isolated part of lagoon, 0–¾ m deep, blackish mud with *Avic.*, dead *Rhiz.*, *Bat.* and *Ruppia*, *Cyprinodon*; 52.5 g Cl′/l.

1609 – Awa Lodo di Bacuna, S part, 15.VIII.1967.
Blackish mud with *Rhiz.*, much *Bat.*, *Cyprinodon*; 52.5 g Cl′/l.

1609A – Mud on sand, ¼–¾ m; 15.VIII.1967.

1610 – Awa Lodo di Chico, N side of Isla di Chico, 17.III.1967.
Mud flat with sheet of water, ¼ m deep; 147 g Cl′/l.

1654 – Between Isla di Pedro and Rancho, 7.III.1970.
Swampy mudflat with *Avic.* and *Bat.*, ½ m deep; 34 g Cl′/l.

1655 – Isla Rancho, NW side, 7.III.1970.
Mudflat with *Avic.* and *Ruppia*, ½ m deep; 46 g Cl′/l.

1656 – Isla Rancho, NE side, 7.III.1970. (Pl. XXIXb)
Drying mudflat with sheet of water, *Avic.*, *Salicornia*, with *Cyprinodon*; 68 g Cl′/l.

1611 CAI, Bulldozed-pool E of Cai (1); 9.IX.1967.
Sandy, about 3 × 2 × ½ m, with *Cyprinodon*; very weak brine.

1612 – Same (2), somewhat muddy, *Cypr.*; 9.IX.1967; very weak brine.

1613 – Same (3), sand and mud, *Cypr.*; 9.IX.1967; very weak brine.

1614 – Same (4), coral debris and sand; 9.IX.1967; very weak brine.

1614A – Sandy with beach vegetation; 30.X.1968; very weak brine.

1094A SALINJA DI CAI, W side of abandoned saltpan IV; shallow mud flat with dead *Cyprinodon*; 12.III.1970; about 120 g Cl′/l.

1615 – Seepage of brackish water at N side of saltpan IV; some mud with algae; 9.IX.1967.

1616 – E side of saltpan IV; water reddish and viscous; 9.IX.1967. (Pl. XXXa)

1616A – Same, with dead *Cyprinodon*; 12.III.1970; 110 g Cl'/l.

1617 – W side of saltpan III, opposite 1616; water greenish brown with flaps of Cyanophyceae; 9.IX.1967. (Pl. XXXa)

1617A – Same; much algae, with *Cyprinodon*; 12.III.1970; 57 g Cl'/l.

1659 – Southwestern saltpan I; turbid water with dead *Cypr.*; 12.III.1970; 102 g Cl'/l. (Pl. XXXb)

1660 – Southern saltpan II; turbid, with small *Cyprinodon*; 12.III.1970; 65 g Cl'/l.

1661 – Northwestern pan V; some brine on mud with sheets of algae; 12.III. 1970; 163 g Cl'/l.

1095a SALINJA BARTOOL, seepage at wall of coral debris; brownish water, *Cyprinodon*; 18.III.1970; 65 g Cl'/l.

1095A – Seepage in SW corner, with some *Enteromorpha*; 18.III.1970.

1097a SALINJA FOENSJIE (Saliña Funchi), seepage at wall of coral rubble; turbid water; 18.III.1970; 95 g Cl'/l.

1099b SALINJA SLAGBAAI, seepage of sea water through coral debris, with *Ulva*, numerous *Cyprinodon* and *Mollienesia*; 3.IV.1955. (Pl. XXXVIb)

1104A GOTO, Lagun, seepage of flowing sea water in SE corner, old artificial pool in limestone debris, 3 × 2 × ½ m, with algae; 5.VII.1963.

Klein Bonaire (Fig. 7; Pl. XXXVII, XXXVIIIb–XXXIX) [1050–1052]

1050d SALINJA ARIBA, near wall of coral rubble; very muddy area; 25.III.1955. (Pl. XXXVII)

1051A – Isolated growth of *Rhizophora* on muddy bottom with algae crusts; turbid water, greenish brown, 0–1 m, with *Cyprinodon*; 16.III.1970; 38 g Cl'/l. (Pl. XXXIXa)

1052a – Abandoned saltpan with thick blue-green algae laminations; reddish brown water; 16.III.1970; 107 g Cl'/l. (Pl. XXXIXb)

1104 SALINJA ABAO, SW corner of island, 25.III.1955.
Mudflat with pools of viscous brown water, with dead *Cyprinodon*; 103 g Cl'/l.

Klein Curaçao [1047–1048]

Curaçao (Fig. 10) [1040–1045]

1504 ST. MARIE BAAI, 22.XII.1963.
Seepage behind wall of coral debris, pool 4 × 5 × ½ m of former intake of saltpond; flaps of algae and single *Sargassum*.

1504A – Flowing water between pieces of coral rock; 22.XII.1963; 20.3 g Cl'/l.

1332 KLEIN PISCADERA LAGOONS, 4.II.1955.
Pools up to 20 × 15 × ¾ m, separated from the sea by wall of coral debris (J. S. Zaneveld).

1672 CARMABI, Piscadera Baai, 24.II.1970.
Outdoor concrete tank of Car. Marine Biol. Inst, 1 m deep; "sea water".

1672A – Gutter of same tank; 24.II.1970 (same number erroneously used also for Spaana Lagoen, Aruba).

1673 – Outdoor turtle tank, overflow; 24.II.1970 (same).

1528 SHELL CURAÇAO, Schottegat, Boeska Baai, 11.II.1963.
Outlet of cooling water from oil refinery, with gymnoblastic hydroids (J. H. Iprenburg, coll.).

1528a – Same; VII.1963.

1528b – Same; X.1963.

1619 SALINJA JAN THIEL, 28.X.1967.
Seepage of sea water behind wall of coral debris.

Aruba (Fig. 14; Pl. LIIIa) [1012–1015]

1306 SALINJA BALASHI, SW corner, 1.V.1955.
Wet mud, mangroves, *Uca*.

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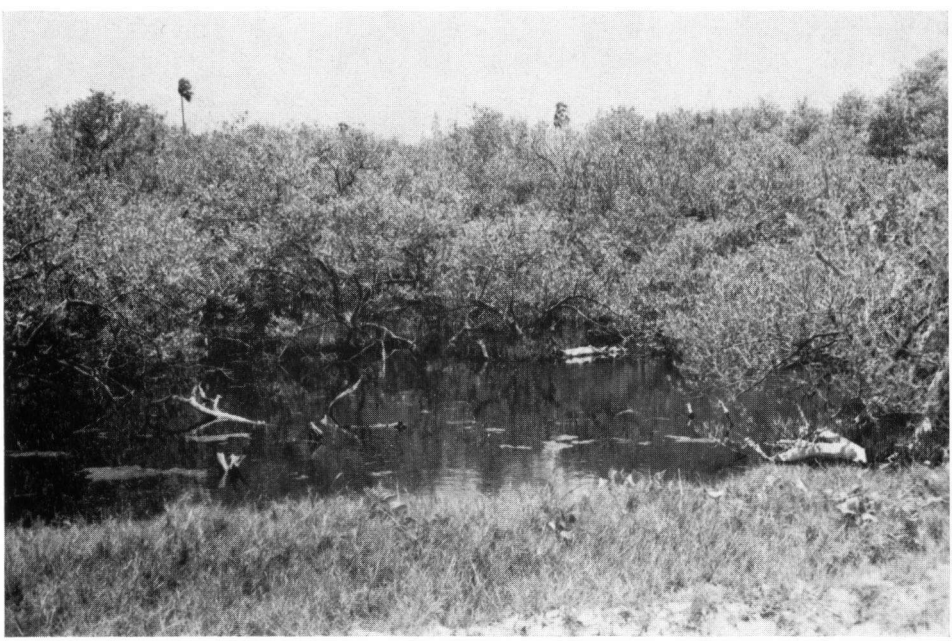
Ia. Sandflat with sea grasses at Bear Cut, Key Biscayne, and isolated clumps of *Rhizophora*. (Sta. 1410; Nov. 1963)

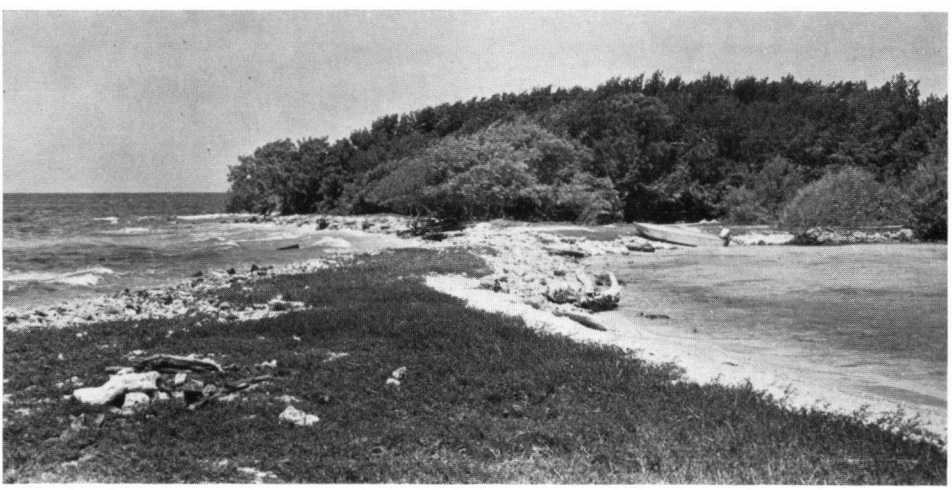
Ib. Lagoon side of Owen Island, a sandy key bordering Little Cayman's South Sound. A sand beach with *Halodule* sea grass and scattered *Rhizophora* trees. (Sta. 1700; June 1973)



IIa. Dyke of Barkers Peninsula, recently constructed for draining mangrove swamps bordering Grand Cayman's North Sound. (Sta. 1687, cf. 1686; June 1973)
IIb. Part of Colliers Pond, an *Avicennia* swamp behind a sandy wall of coral rubble, northeastern tip of Grand Cayman. (Sta. 1691; May 1973)

IIIa. Mangrove cove near Rum Point, Grand Cayman, with some pinnacles exposed from the underlying karst. (Sta. 1690; May 1973)

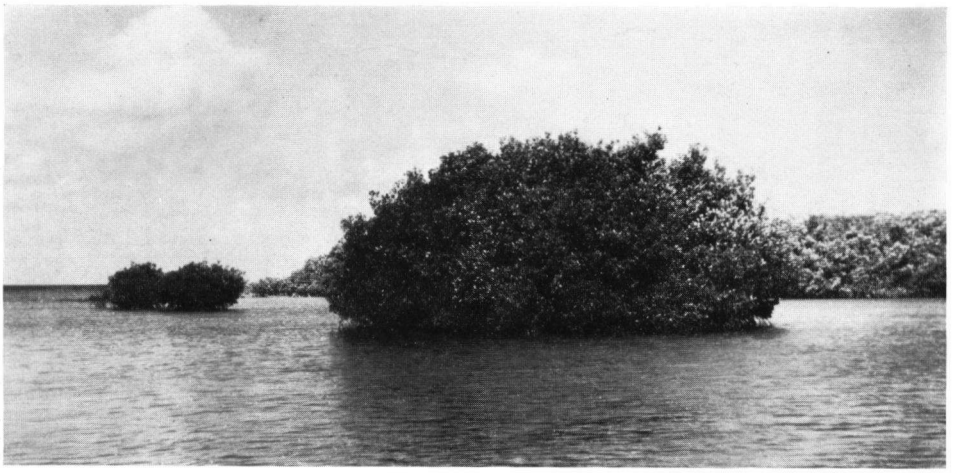
IIIb. Northeastern corner of Little Cayman's South Sound. Red Mangroves on a sandy mudflat with *Thalassia*, bordering a karst shore. (Sta. 1698; June 1973)



IVa. Collecting at the "Red Shrimp Hole" (with gauge), through which a tidal flow runs connecting the shallow mudflat (to the left) with the nearby South East Bay (to right of photograph), Cayman Brac (Sta. 1701 and 1702); June 1973): 'anchialine' habitat of *Barbouria cubensis*.

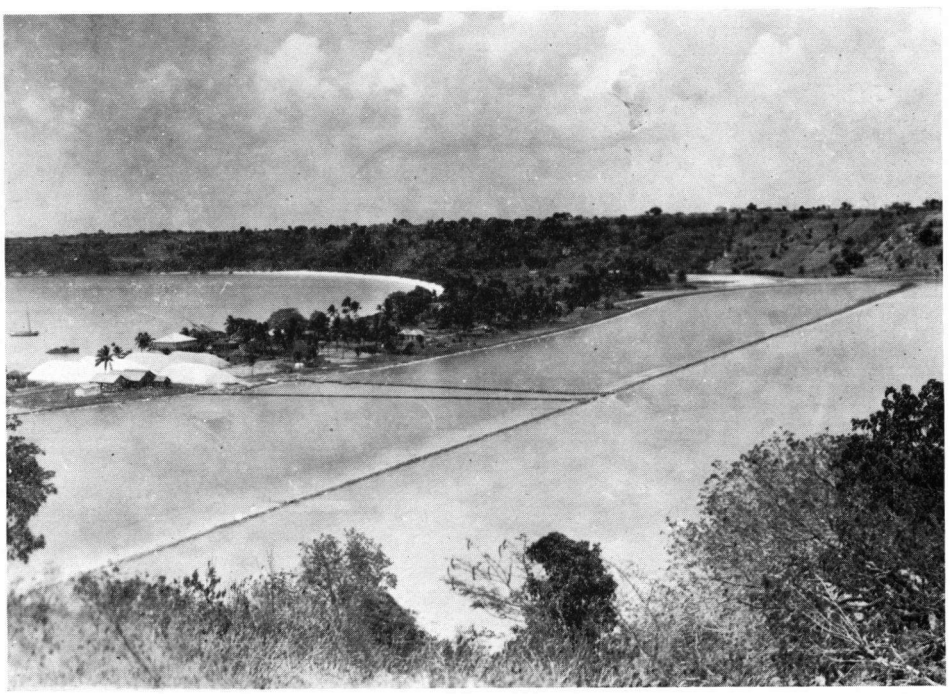
IVb. Drunkemans Key near Port Royal, Jamaica, looking westward. (Sta. 1683; June 1973)

Va. Red Mangroves bordering the southeast shore of Puerto Rico's Bahía Fosforescente. (Sta. 1421; Nov. 1963)
Vb. Scenery at Turner Bay, St. John. (near Sta. 1407; June 1955)

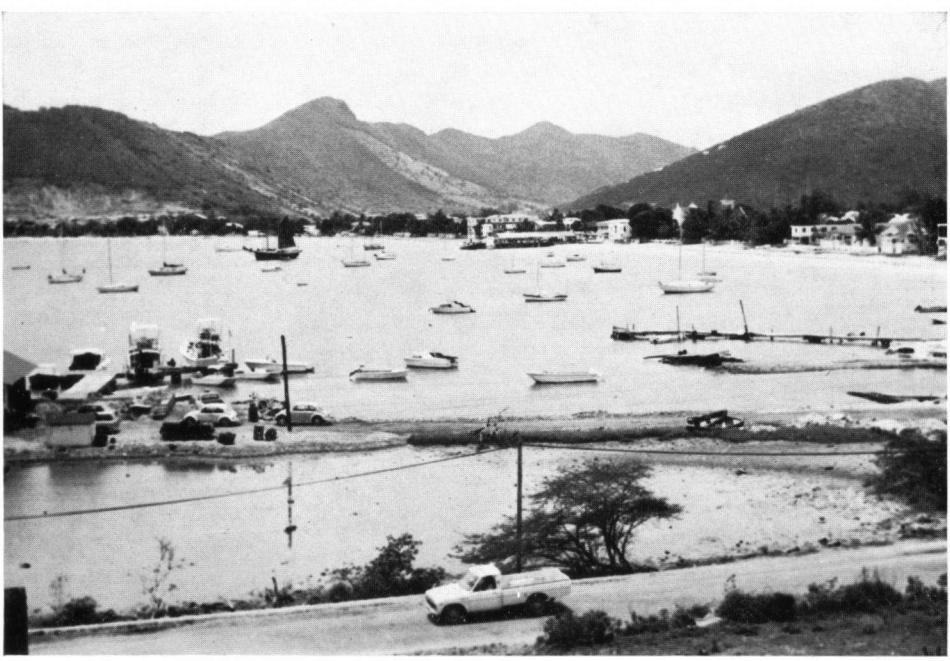


VIa. Outside the narrow entrance of Krause Lagoon, St. Croix. A muddy sandflat with clumps of *Rhizophora*. (Sta. 1404; June 1955)

VIb. Red Mangroves inside the Krause Lagoon, showing young plants colonizing a shallow mudflat with seagrasses and *Batophora*. (Sta. 1406; June 1955). A small portion of Krause Lagoon is now covered by an oil refinery and much of the rest is severely damaged by tailings from an aluminum ore processing plant. Most of the mangrove forest is dead.



VIIa. Northern corner of Crocus Bay, Anguilla, where a steep cliff of limestone and igneous rock meets a white sand beach. (Sta. 1704; July 1973)
VIIb. Saltpond of Sandy Ground, Anguilla, looking northward. (Sta. 1114; June 1949)

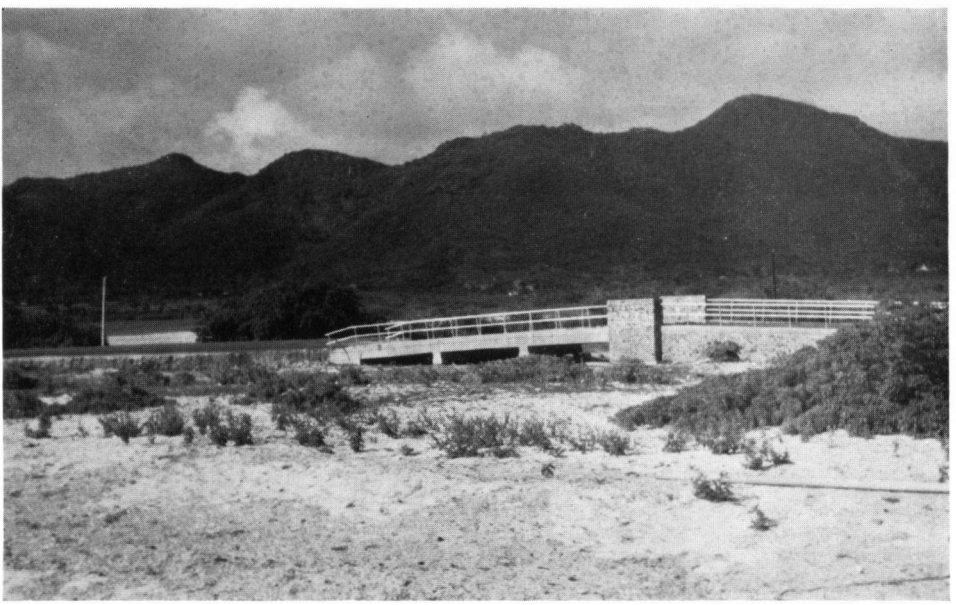


VIIIa. St. Martin's Great Bay in 1955, facing the steep and rocky shore leading to Point Blanche. A desolate bay in front of Philipsburg, with only a few fishermen busy with a beach seine. (cf. Sta. 1125/8; July 1955)

VIIIb. St. Martin's Great Bay in 1973, as seen in opposite direction, from a road now leading to a large pier at Point Blanche, across the remains of Atwell's Pond towards Philipsburg and Cul-de-Sac. A bay often bustling with activity after the expansion of the tourist industry which brought about many changes in the island's scenery. (cf. Sta. 1128, 1133; May 1973)

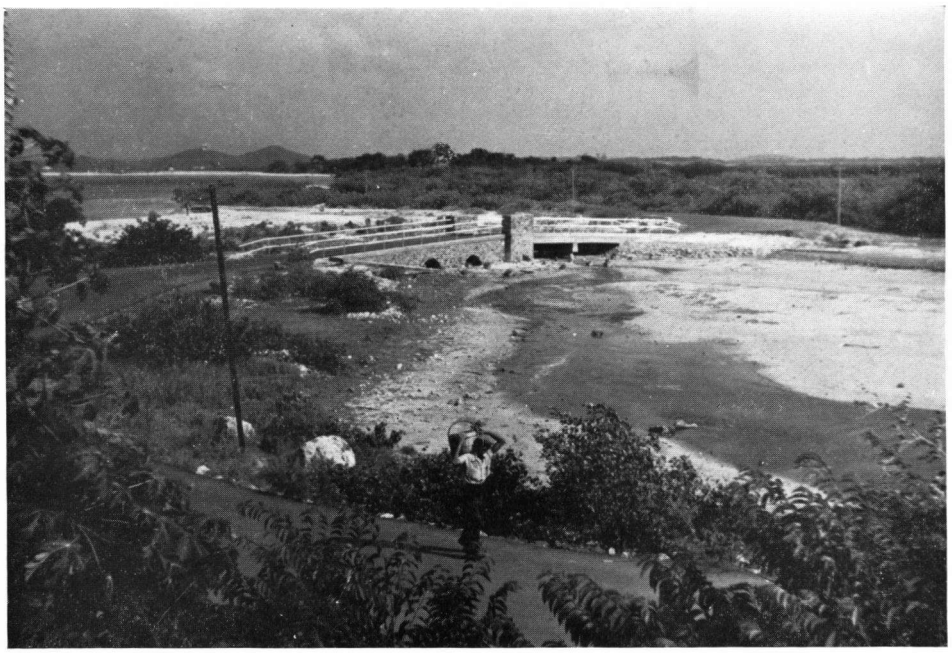
IXa. Simson Bay Lagoon as seen from Cole Bay Hill, with Corner Hill on the left, and the Mamelles on the horizon. In the centre the shallow sandy area near the entrance of the Lagoon. The village of Simson Bay is situated on the sandspit separating the Lagoon (r) from the Bay (l). (May 1949)

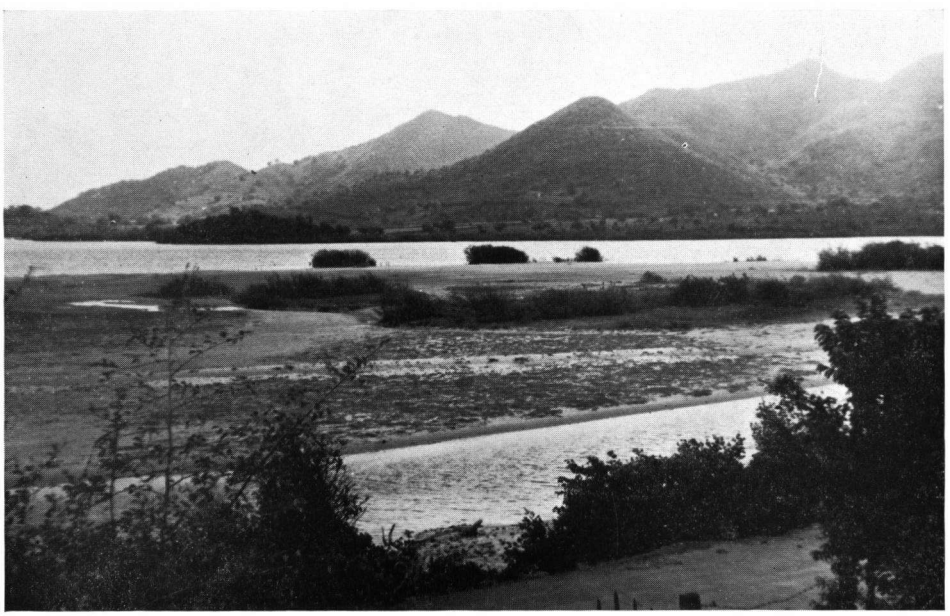
IXb. Simson Bay Lagoon as seen from the slope of Corner Hill towards Marigot. The nearest part of the Lagoon is sandy and very shallow. (May 1949)



Xa. The (old) bridge across the narrow mouth of Simson Bay Lagoon, as seen in a northeasterly direction, towards Saint Peter Hill (l, 317 m) and Sentry Hill (r, 340 m). (Sta. 1129; Aug. 1949)

Xb. The (new) bridge of Simson Bay, during whose construction the Lagoon entrance got completely choked up with sand. (June 1955)



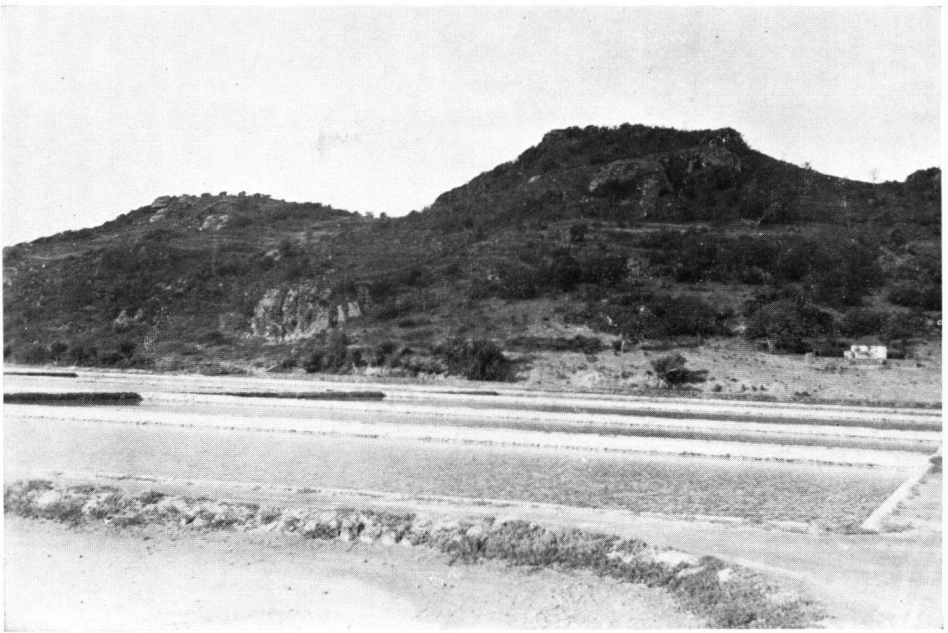


XIa. The silted up entrance of Simson Bay Lagoon, as seen from the Lagoon in a northwesterly direction. (Sta. 1130A; June 1955)

XIb. Sandflat inside the Simson Bay Lagoon, near entrance, which became exposed soon after the entrance was dammed. Saint Peter Hill is in the background (r). (June 1955)

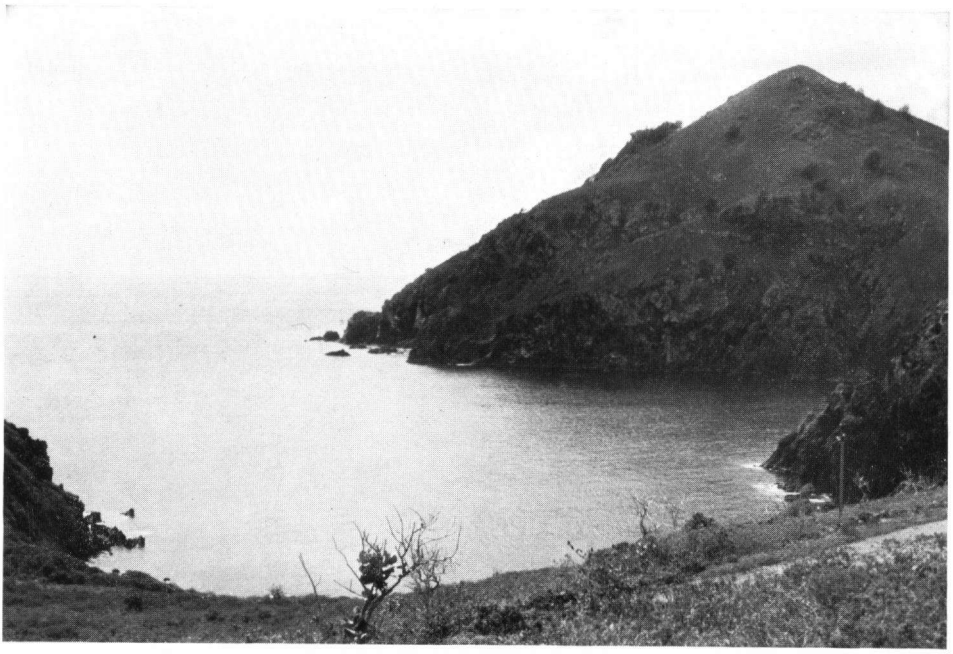
XIIa. A shallow part of Simson Bay Lagoon with dying Red Mangroves which dried out after the entrance had been blocked. Mont Fortune (67 m) is in the background. (Sta. 1130B; June 1955)

XIIb. The American geologist dr. ROBERT A. CHRISTMAN among the Red Mangroves of Little Key, before the Simson Bay Lagoon became a hypersaline habitat. The Mornes Rouges (80 m) in the background. (Sta. 1131; Aug. 1949)



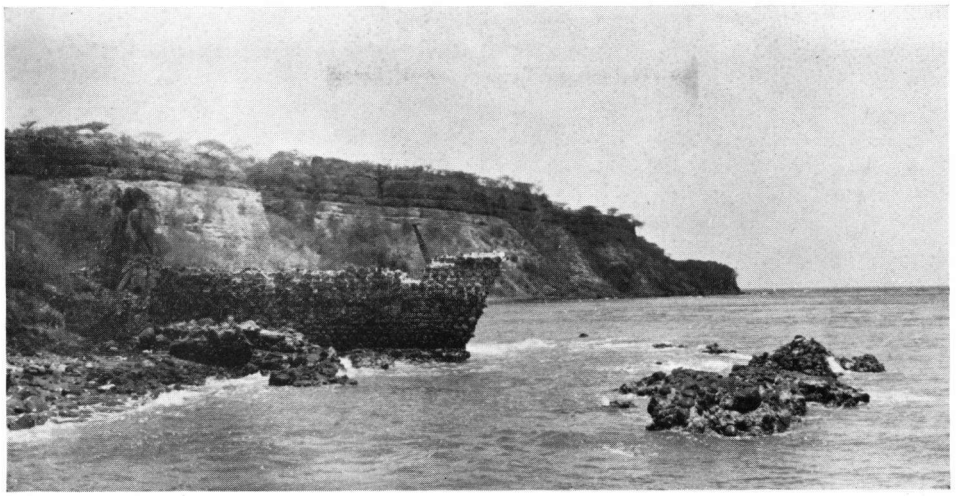
XIIIa. Saltpans of the Grande Saline, St. Barthélemy, which are still in use. (Sta. 1123; June 1949)

XIIIb. A stone basin in St. Martin, crowded with *Artemia salina*; it is part of the ruins of the engine house of Great Saltpond's former salt industry. Eastern part of Phoebe Pond in the background. (Sta. 1137A–B; Sep. 1963)



XIVa. Cove Bay, near Saba's airfield at Flat Point, facing old Booby Hill (224 m). (Sta. 1432; Oct. 1963)

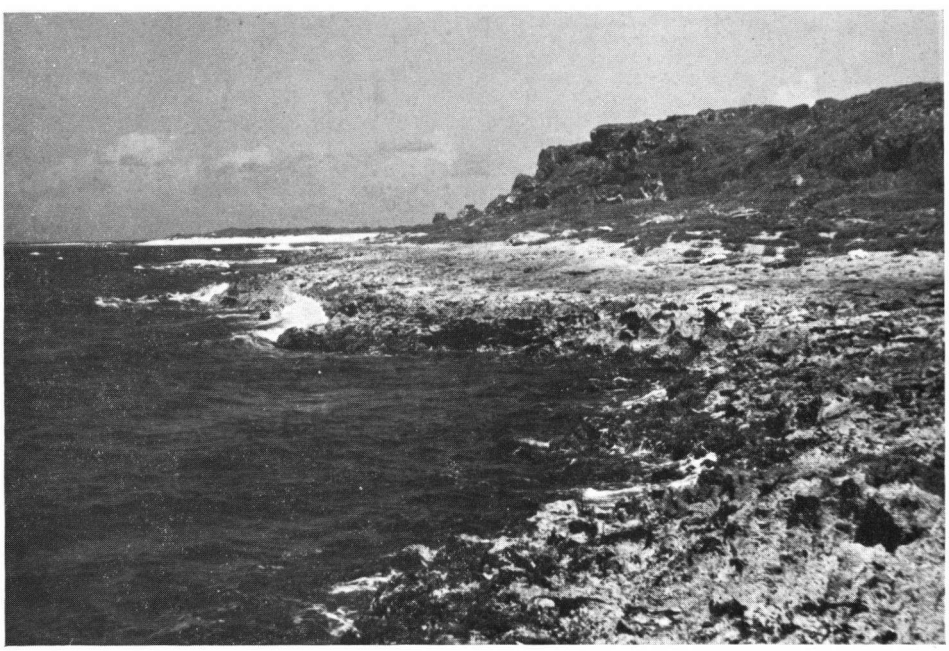
XIVb. Fort Bay, with its recently built pier, Saba's only anchorage. Compare *Stud.4* pl. VIIIa which was taken in the opposite direction. (Sta. 1705; July 1973)



XVa. Ruins of eighteenth century buildings in the surf of Gallows Bay, E of Oranjestad, Statia. Note the steep coastal cliff with horizontal beds of soft volcanic tuff. (cf. Sta. 1116; July 1973)

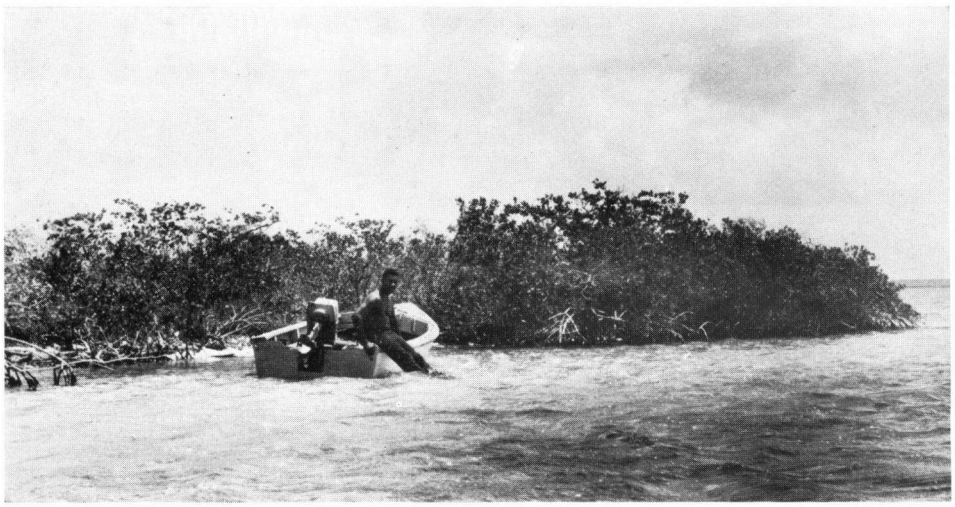
XVb. Northwest corner of Concordia Bay, Zeelandia, where surfswept andesitic rocks meet a wide sand beach covered with decaying sea grass. (Sta. 1433; Oct. 1963)

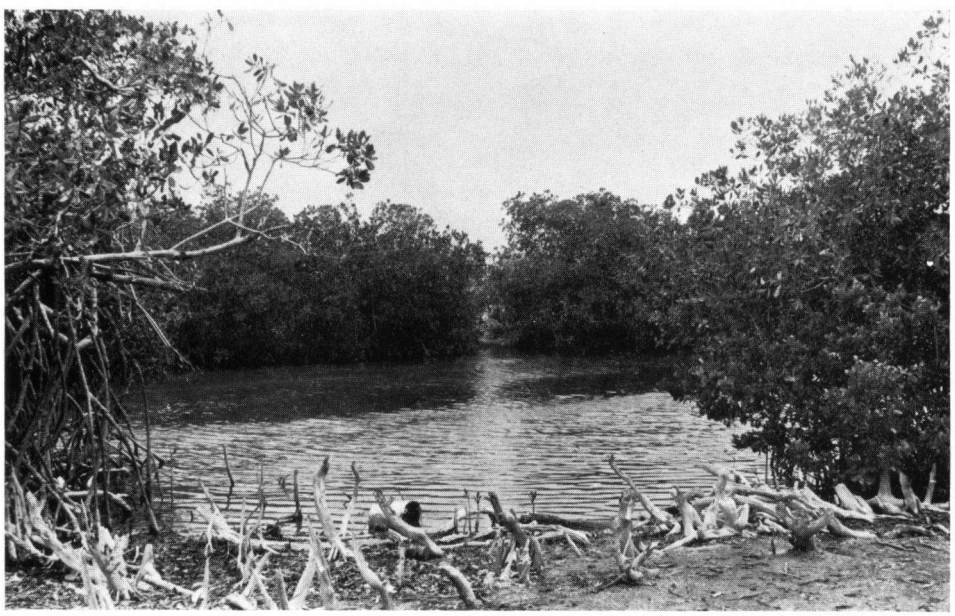
XVIa. The cliffs of Frigate Bay, St. Christopher, covered with a xerophytic vegetation, including many Agaves. (cf. Sta. 1377; July 1955)
XVIb. Andesite rocks in the surf of Frigate Bay; detail of the locality on the other picture. (Sta. 1377; July 1955)



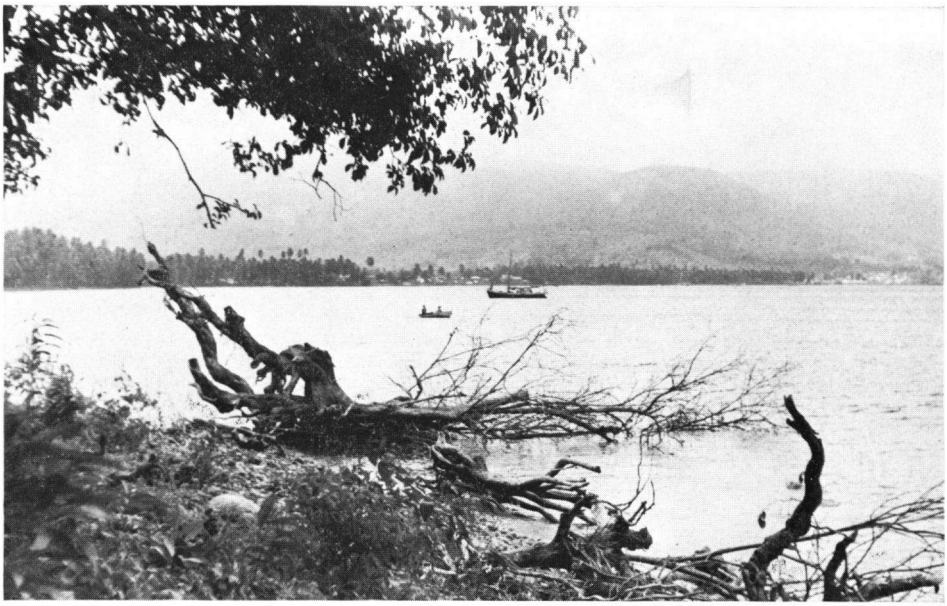
XVIIa. Codrington Village's Castle Landing, a small pier in Barbuda's Great Lagoon. (cf. Sta. 1538; July 1955)

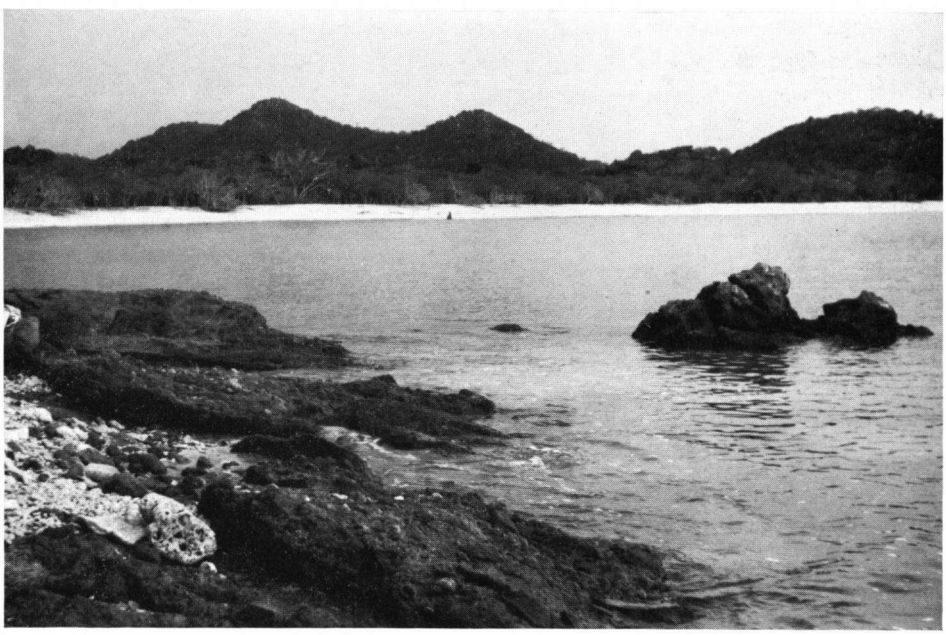
XVIIb. Two Feet Bay, where the limestone terraces of Barbuda's Highlands (alt. 20 m) are facing the eastern trade wind. (Sta. 1395; July 1955)



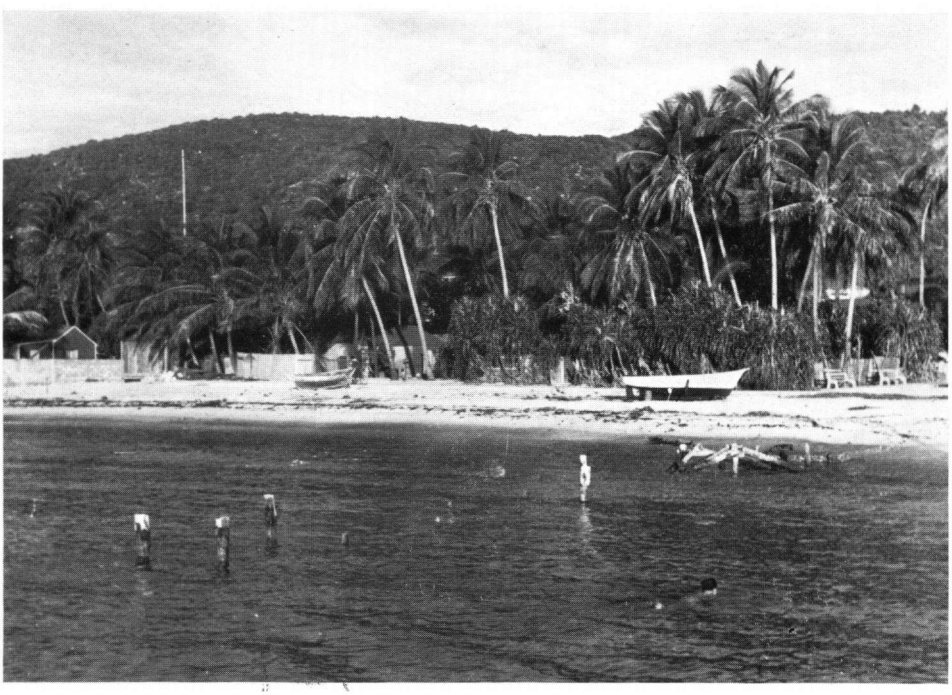


XVIIIa. A mat of Red Mangroves fringing the mouth of Great Lagoon at Billy Point, in a rather exposed situation. (Sta. 1531; July 1967)
XVIIIb. Muddy cove of Great Lagoon, north of Codrington Village. Bare stumps of chopped-off mangroves in the foreground. (Sta. 1539; July 1967)

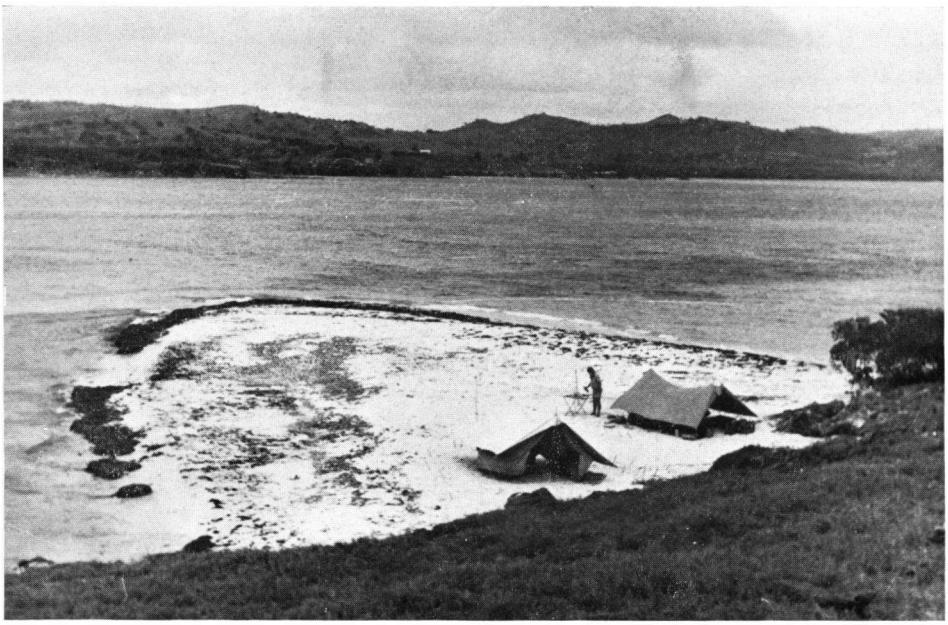




XIXa. Volcanic rock debris and dead trees along the northern shore of Prince Rupert Bay, opposite Portsmouth, Dominica. (Sta. 1546; July 1967)
XIXb. Rocky shore of volcanic tuffs at Deep Bay, near Fort Barrington, Antigua. In the background a white sand beach. (Sta. 1393; July 1955)

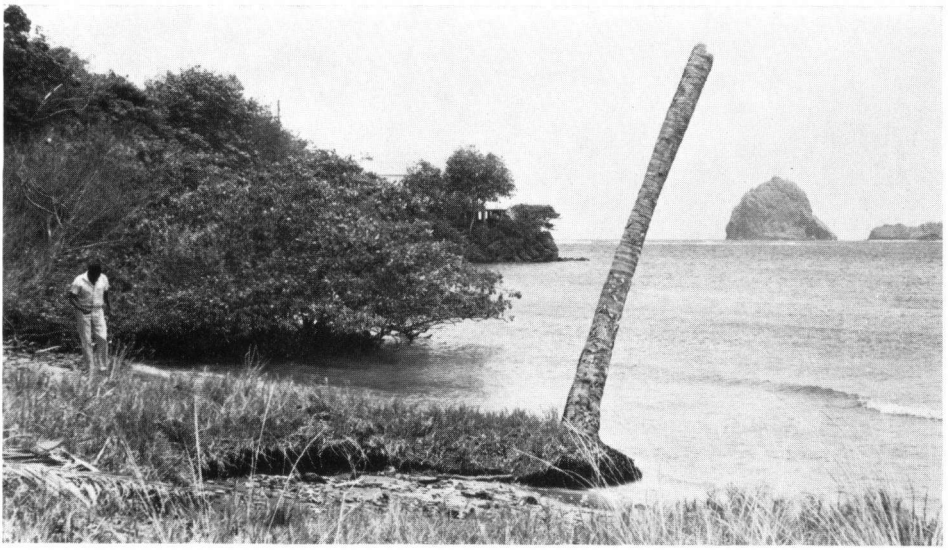


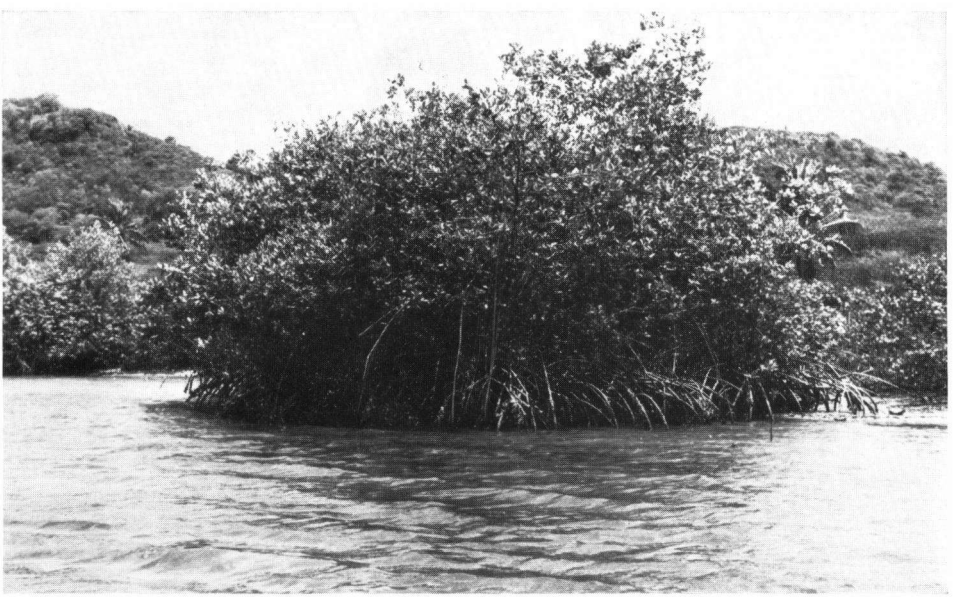
XXa. Saline de Grande Anse, La Désirade. (cf. Sta. 1436; Jan. 1964)
XXb. Poles of a demolished jetty on a sea grass flat at Grande Anse, La Désirade. (Sta. 1438; Jan. 1964)



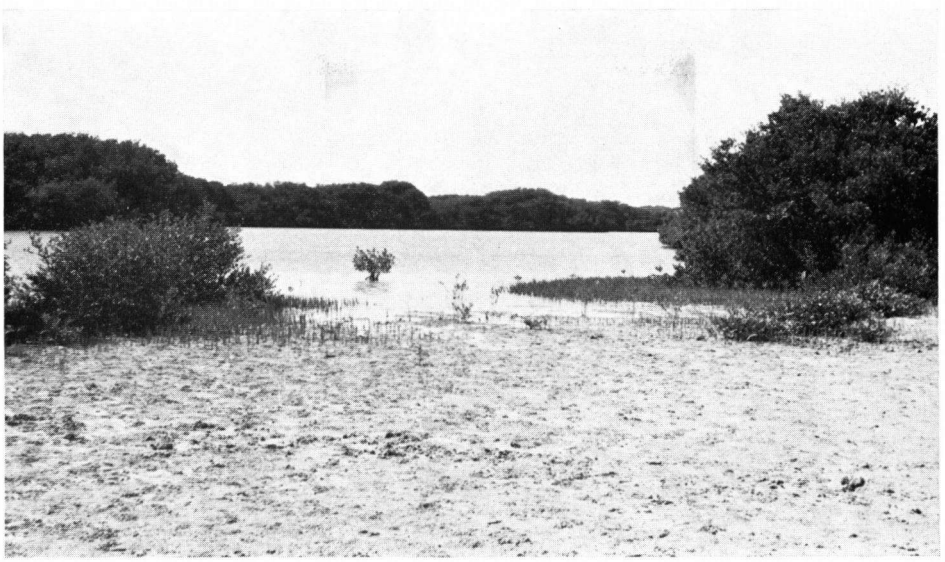
XXIa. Sand spit at the leeward side of Îlet Hardy, a limestone rock near the southeastern coast of Martinique, with camp of the naturalist Père R. PINCHON. (Sta. 1440; Feb. 1964)

XXIb. *Rhizophora* grove in the sandy lagoon of Trois Rivières, Sainte-Lucie, Martinique. (Sta. 1547; July 1967)





XXIIa. Shore of Calliqua Bay, near Johnson Point, St. Vincent, with broken coconut palm and tree of *Conocarpus erecta*. (Sta. 1549; July 1967)
XXIIb. Clump of *Rhizophora mangle* at Hog Island, near Point Salines, Grenada. (Sta. 1550; July 1967)

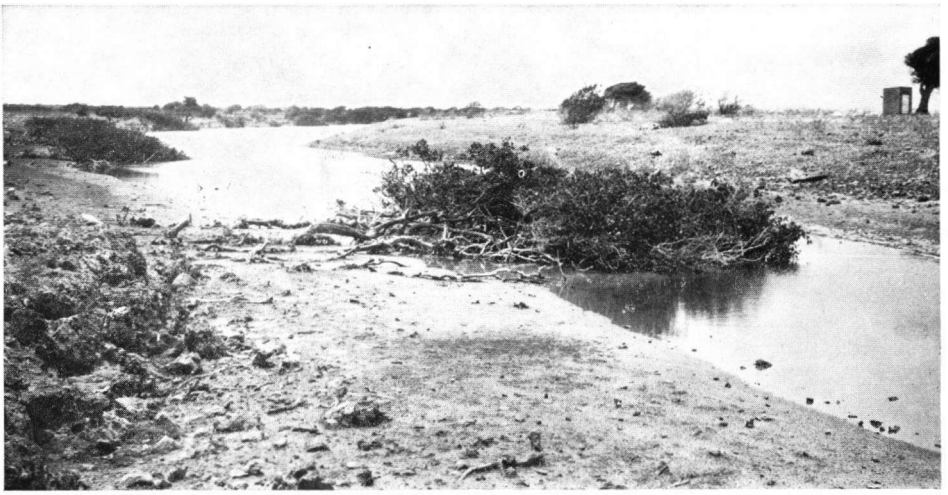


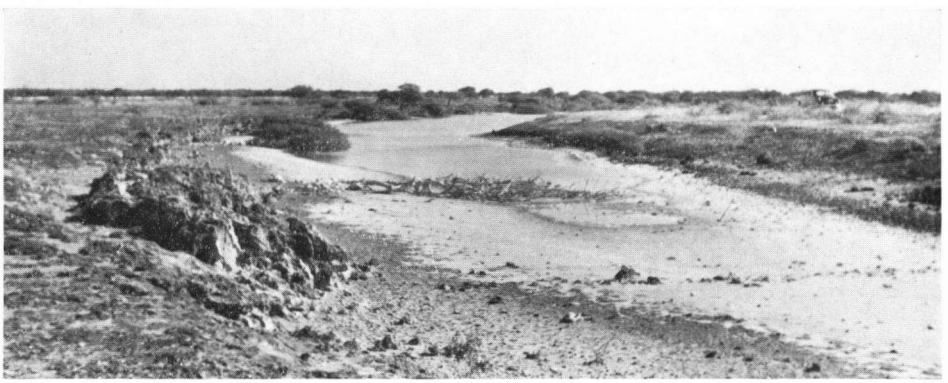
XXIIIa. Mangrove lagoon at Punta Mangle, Margarita, with pneumatophores of *Avicennia* in the foreground. (Sta. 1446; Jan. 1964)

XXIIIb. The mangrove-fringed entrance of Laguna de la Restinga, looking towards the lagoon. (cf. Sta. 1449; Jan. 1964)

XXIVa. Evenly spaced indentations of the limestone cliff at right angles to the sea-front, north of Punt Vierkant. In the foreground a wall of coral shingle; on the horizon the hills of northwestern Bonaire. (cf. Sta. 1059; Dec. 1963)

XXIVb. Wall of coral shingle (mainly *Acropora cervicornis*) south of Playa Lechi, which has been thrown up against the edge of a very low limestone terrace which in places has been exposed near the water line. On the horizon: Klein Bonaire (l) and the Wecua (160 m). (cf. Sta. 1055/6; Sep. 1948)

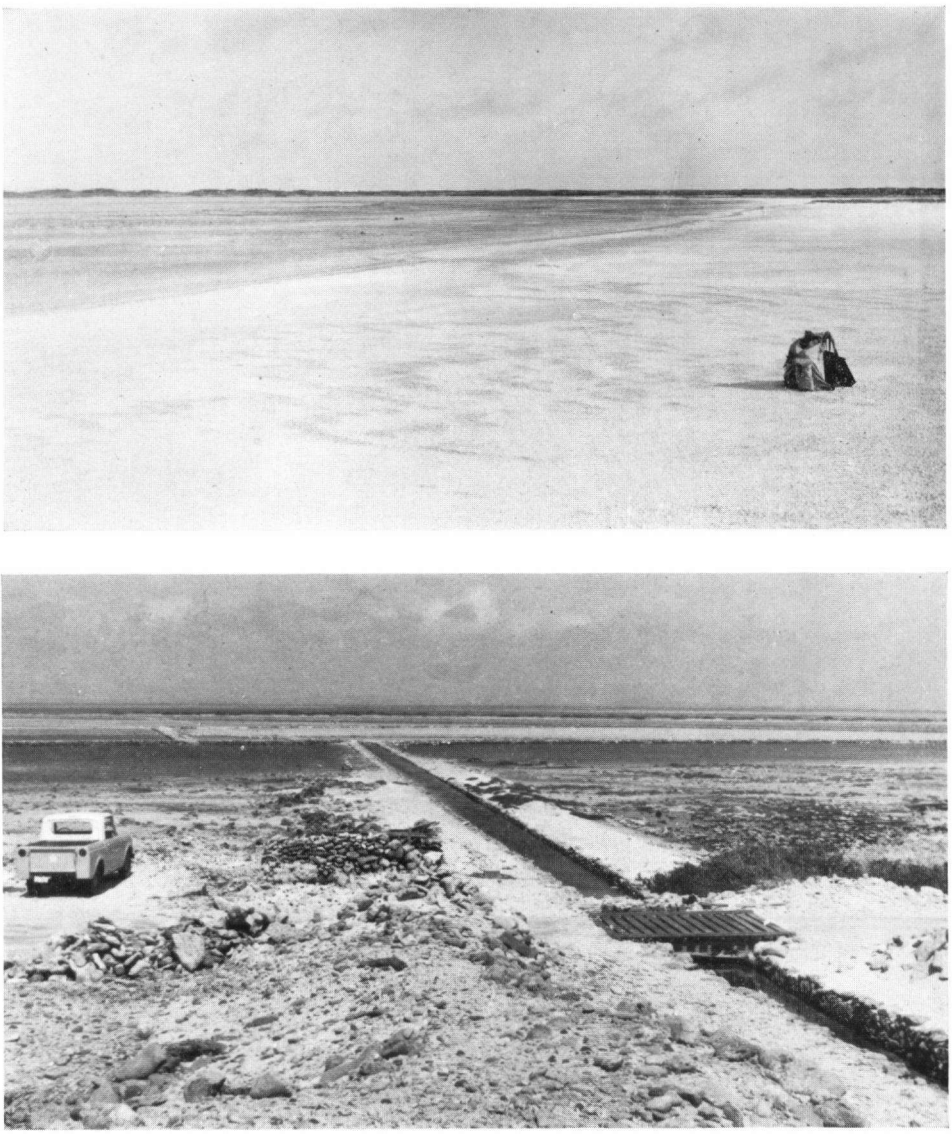




XXVa. Salinja Martinus, a muddy saltpond south of Kralendijk, separated from the sea by a wall of coral debris (r). A flat *Conocarpus erecta* tree roots at the edge of the low limestone plateau (l). Salt water seeps through the wall into the lagoon; brackish water seeps in from the land side. (Sta. 1073; Sep. 1930)

XXVb. Salinja Martinus, 25 years later. The *Conocarpus* tree died a few years before the picture was taken. (Sta. 1073e; Apr. 1955)

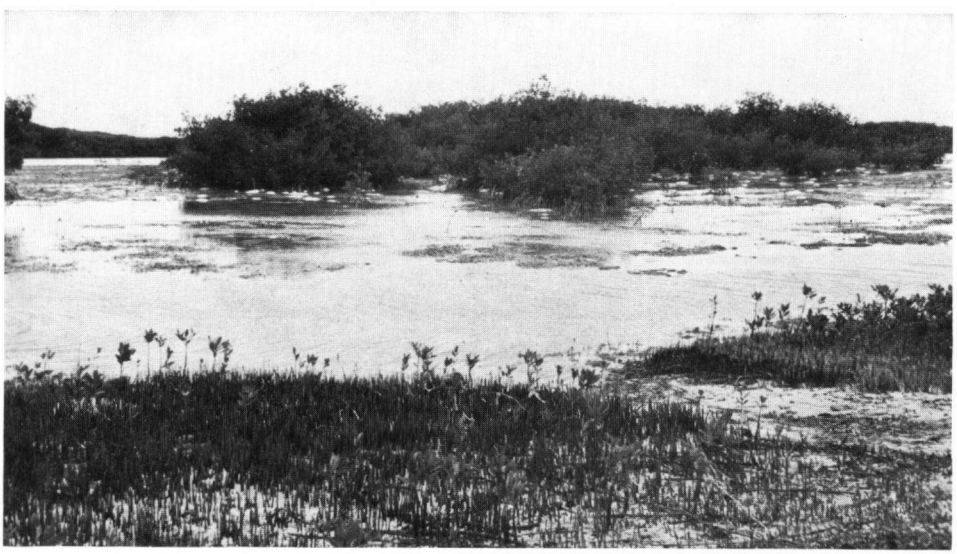
XXVc. Salinja Martinus, 15 years later. The dead *Conocarpus* is still present in almost unaltered surroundings. (Sta. 1073f; Mar. 1970)



XXVIa. Landscape near Salinja Plenchi before South Bonaire was bulldozed by the Salt Company (AISCO) for making condensors. A smooth tufa crust on soft whitish clay, occasionally covered by a sheet of brackish to hypersaline water. (cf. Sta. 1089, 1091; Mar. 1937)

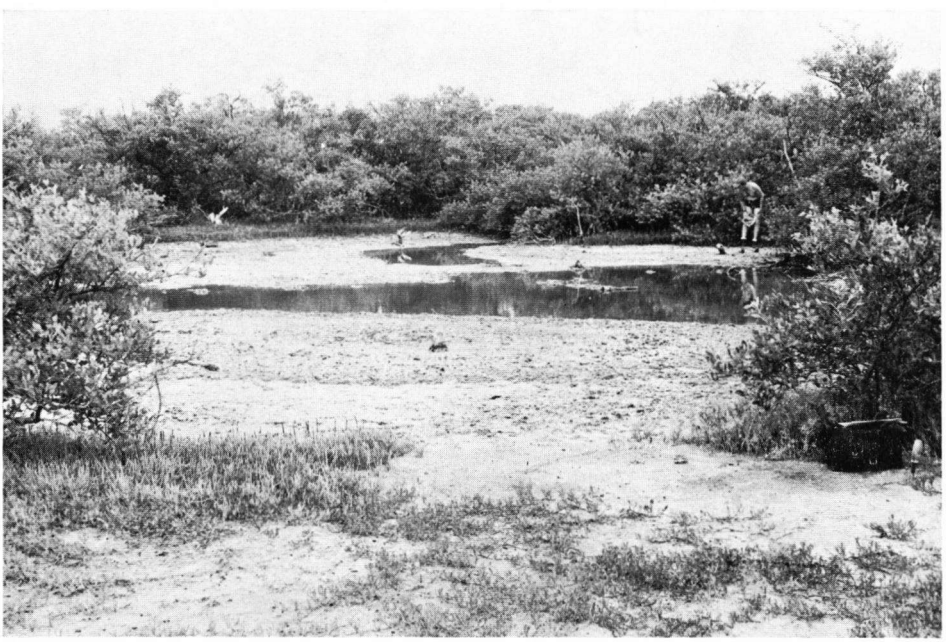
XXVIb. Former intake of Oranjepan, as seen from the wall of coral debris in northerly direction. (Sta. 1451 l of plank-bridge, 1451A r; Dec. 1963)

XXVIIa. Southern part of the rampart, called Dam, which protects the basin of Lac from the surf whipped up by the eastern trade winds. (Sta. 1651; Mar. 1970)
XXVIIb. Seepage on the lake-side of the wall of coral debris which separates Pekelmeer from the sea, north of Oranjepan. Some flamingo eggs were washed ashore from an inundated breeding place on the horizon. (Sta. 1086a; Dec. 1963)



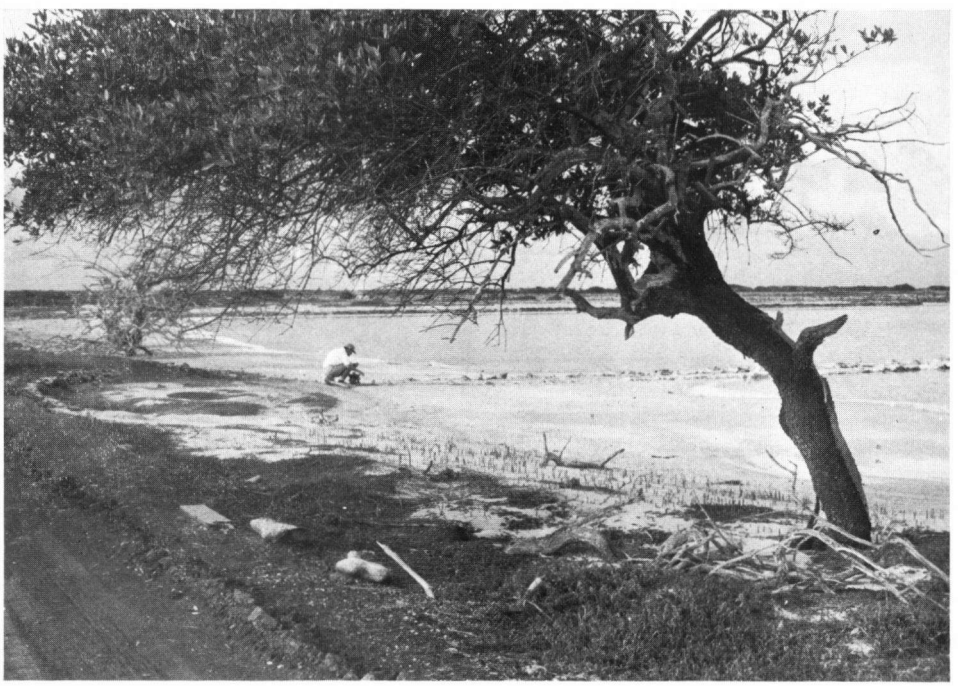
XXVIIIa. Lagoon side of the Sorobon peninsula, overlooking Lac towards the entrance of Boca Jewfish. Remnants of construction works in the foreground. (cf. Sta. 1062; Sep. 1967)

XXVIIIb. Lagoon side of Cai peninsula, Pariba di Cai, with colonizing growth of *Rhizophora*. Abundant slender pneumatophores from roots of nearby *Avicennia* in the foreground. (cf. Sta. 1066; Mar. 1970)



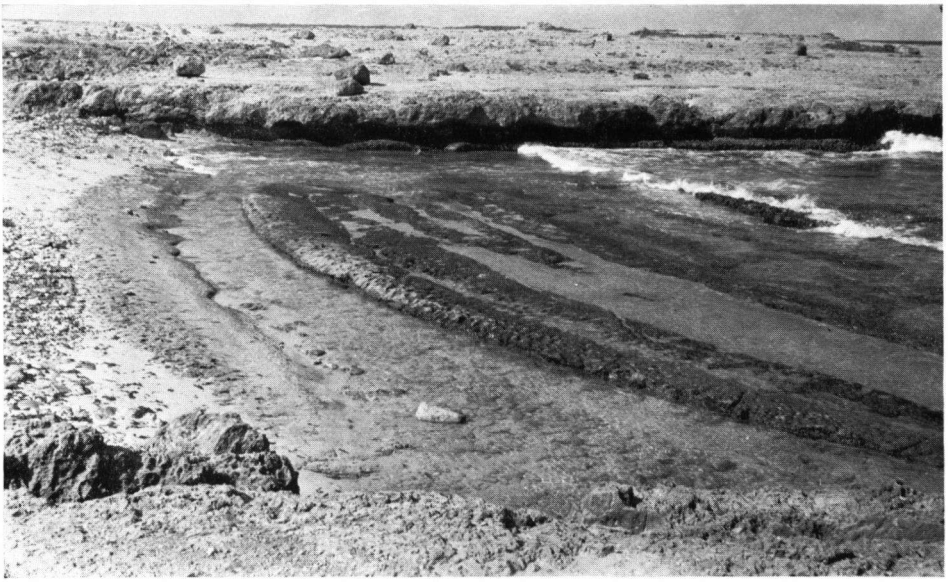
XXIXa. Playa di Palu Calbas, a muddy sand beach covered by decaying leaves of *Thalassia* in the southeastern part of Lac. The luxuriant mangroves of Boca di Pedro on the horizon. (cf. Sta. 1569 and 1592; Aug. 1967)

XXIXb. Drying mudflat with sheet of water among *Avicennia* on Isla Rancho, Lac. *Salicornia* in the foreground. (Sta. 1656; Mar. 1970)



XXXa. Abandoned saltpans near Cai, south of Bacuna, Bonaire. (Sta. 1616 r, 1617 l; Sep. 1967)

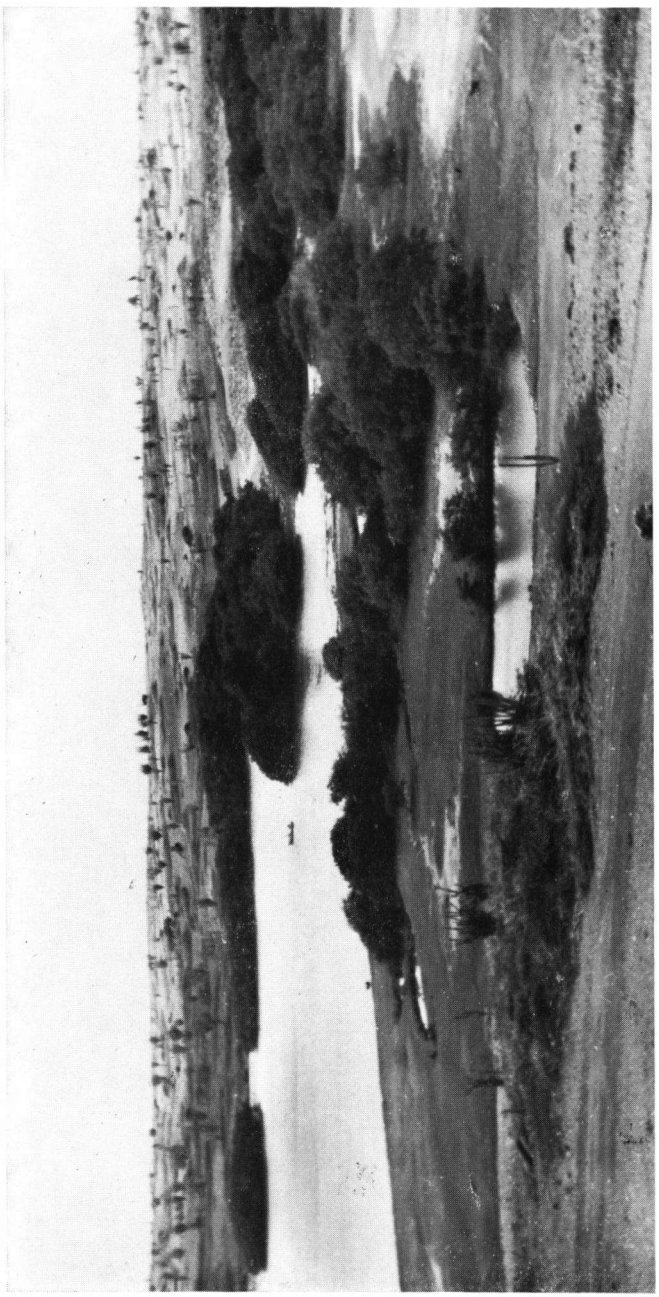
XXXb. Saltpan along the road to Cai, fringed by salt and gypsum deposits. A surviving Black Mangrove is framing the picture. (Sta. 1659; Mar. 1970)



XXXIa. Boca Washikemba, fully exposed to the eastern trade wind, with conspicuous seaward sloping beachrock layers. (Sta. 1375; Apr. 1955)

XXXIb. A narrow fringe of *Rhizophora* locally borders the southern shore of Lagoen, Bonaire. Eroded blocks of diabase protrude through the sandy beach. (Sta. 1070A; Nov. 1930)

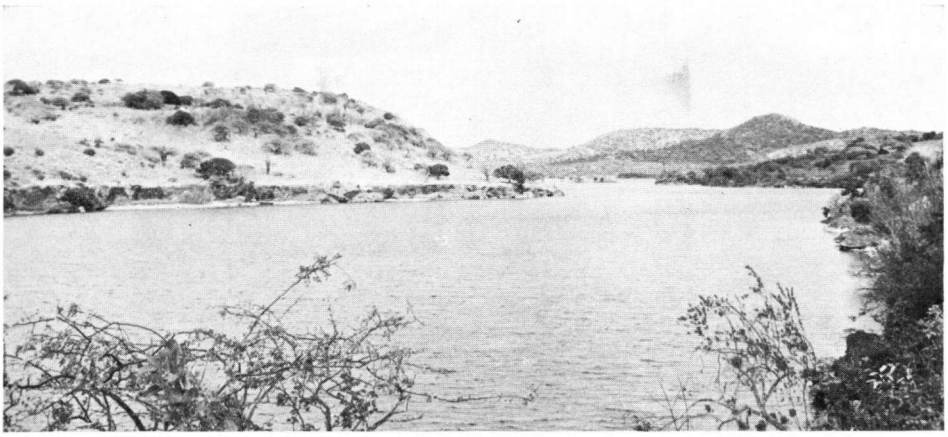
XXXII. Western part of Lagoen, Bonaire, with a discontinuous fringe of *Rhizophora* at its southern border, and an *Avicennia* grove in the remotest corner (r). The mudflats are overgrown by *Batis maritima*; in the foreground a wind-flattened *Prosopis juliflora* and *Cereus repandus*; on the flat diabase hills more scattered organ-pipe cactuses. (cf. Sta. 1070 l, 1554 r; Apr. 1948)

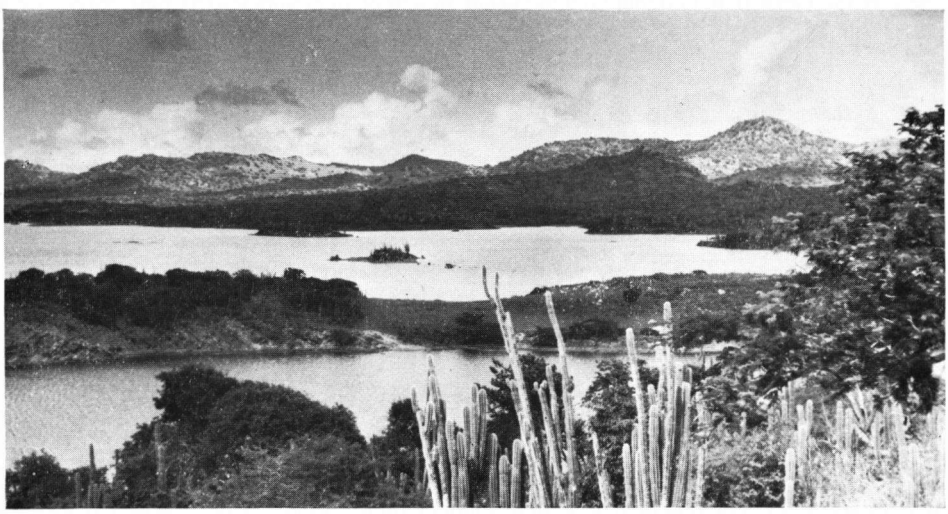


XXXIII. Western part of Lagoen as in the preceding picture, but almost twenty years later. The aspect of the southern shore has not changed significantly, but Black Mangroves are now occupying part of the formerly tree-less mudflats. (Nov. 1967)

XXXIVa. Eastern part of Lagoen, Bonaire, obviously a drowned valley which intersects a coastal limestone terrace, and penetrates the inland formations of diabase and other non-calcareous rocks. (Sta. 1376/7; Apr. 1955)

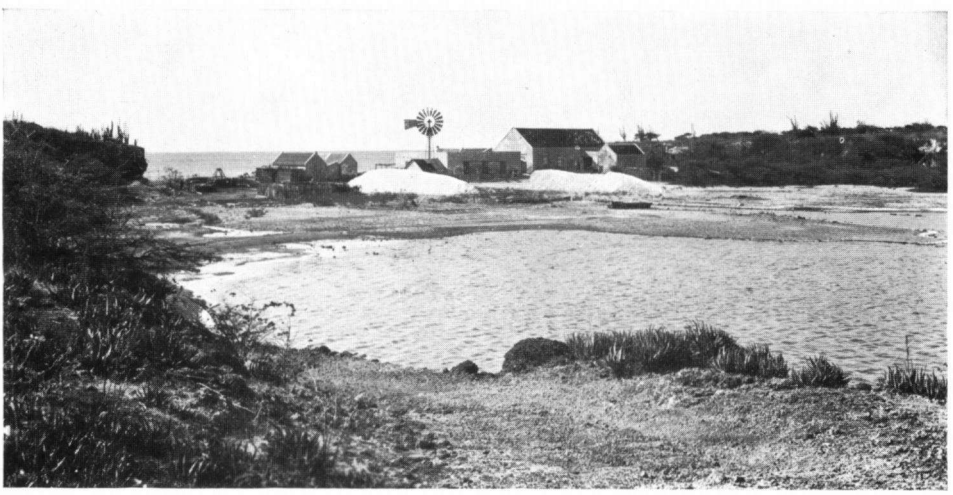
XXXIVb. Diabase rocks exposed along the northern shore of central Lagoen, with dr. J. S. ZANEVELD collecting seaweeds. (Sta. 1377; Apr. 1955)





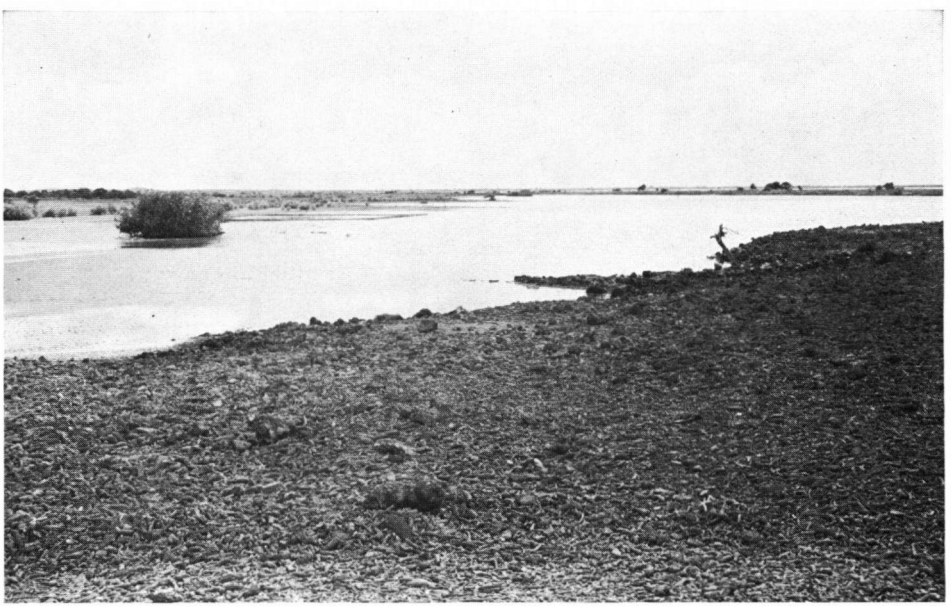
XXXVa. Lagun di Goto, Bonaire, looking towards the non-calcareous inland hills, the highest top of which is the Juwa (206 m). Greatest depth measured 16 m. (cf. Sta. 1105/7; Mar. 1970)

XXXVb. Salinja Grandi di Goto, looking north towards the Juwa and the hills further west. Greatest depth measured 8 m. Columnar *Lemaireocereus griseus* in the foreground. (Dec. 1963)



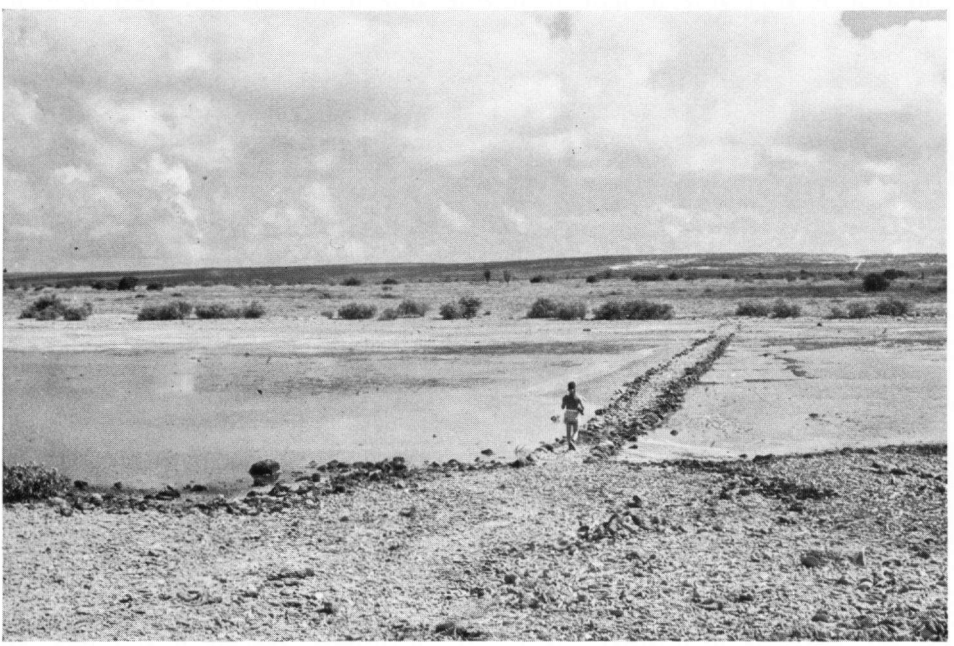
XXXVIa. Southernmost part of Goto, with seepages inside the high wall of coral rubble (r), looking northeast towards the limestone-capped Montagne (144 m). (cf. Sta. 1102/5; Dec. 1963)

XXXVIb. View of Slagbaai, Bonaire. The salina is separated from the sea by a permeable wall, on which are heaps of salt, plantation buildings, and a windmill for crushing salt. To the left the remnant of a former intake; in the foreground a neglected growth of *Aloe*. (cf. Sta. 1099; Sep. 1930)



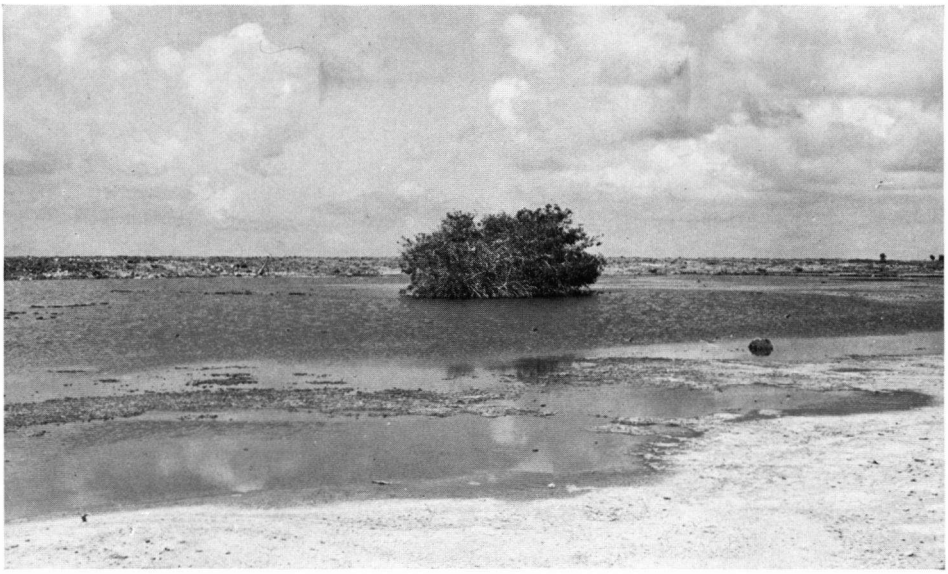
XXXVIIa. The salina of Klein Bonaire, as seen from the porous wall of coral rubble which separates this saltpond from the sea. Scattered trees of *Bontia* are rooted at the edge of a low limestone plateau; a clump of *Rhizophora* is growing in the water, and a small *Conocarpus* tree survives on the rampart. (cf. Sta. 1050/1; June 1930)

XXXVIIb. The salina of Klein Bonaire did not change much in forty years, except that the small *Conocarpus* has died, and the clump of *Rhizophora* became somewhat larger. Even some of the larger stones can be identified in identical positions in the two photographs. (cf. Sta. 1050d and 1051A; Mar. 1970)



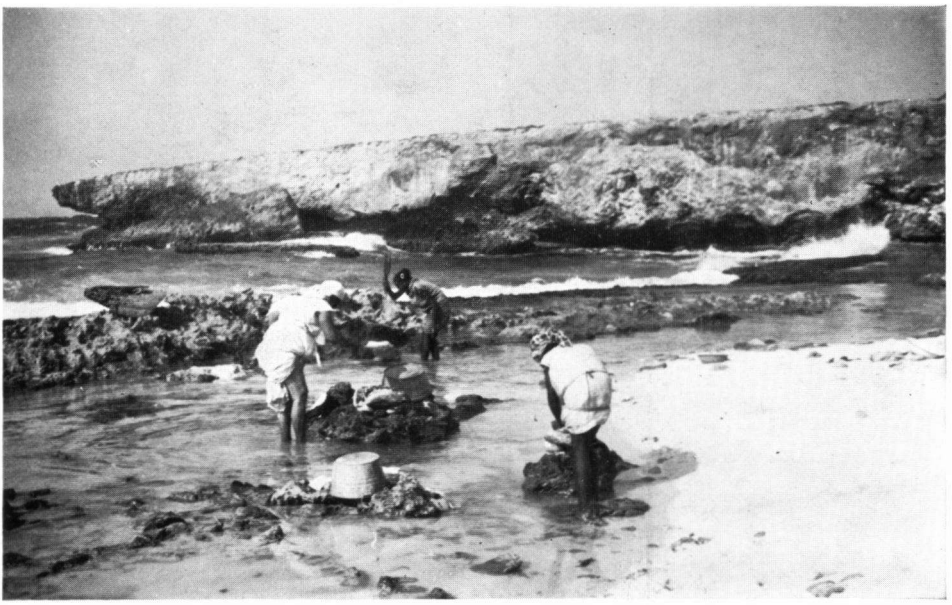
XXXVIIIa. The "old landing" of Klein Bonaire, opposite Kralendijk. A sandy shallow behind a reef, with scattered pieces of limestone. A *Bontia* tree marks the spot where the edge of a low limestone terrace was covered by the wall of coral rubble which forms the sea front of the south coast of Klein Bonaire. (cf. Sta. 1049–B; Sep. 1948)

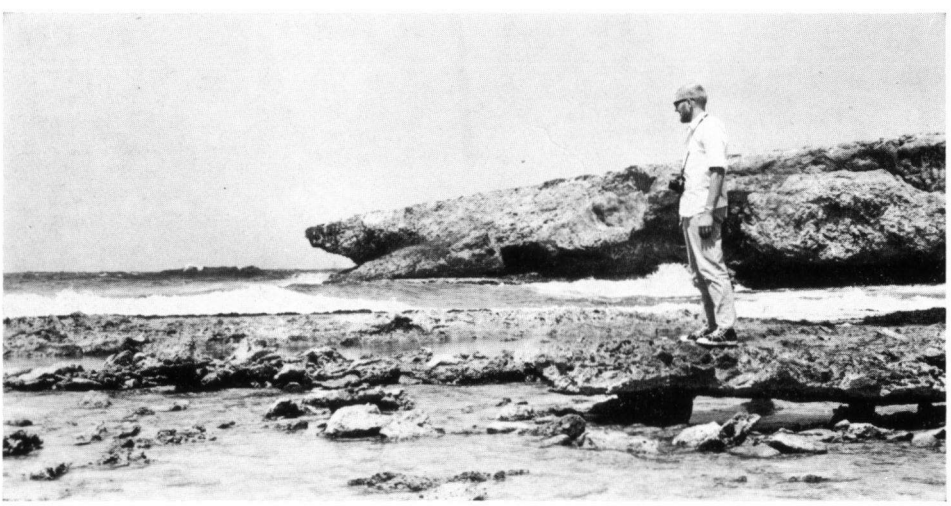
XXXVIIIb. Eastern part of the salina of Klein Bonaire. A path of coral rubble leads to a place on top of the rampart where in former days a small lime kiln stood in which mangrove-peat was burned. (cf. Sta. 1050; Mar. 1970)



XXXIXa. *Rhizophora mangle* growing in a hypersaline environment; its roots are coated by blue-green algae. See XXXVII. (Sta. 1051A; Mar. 1970)

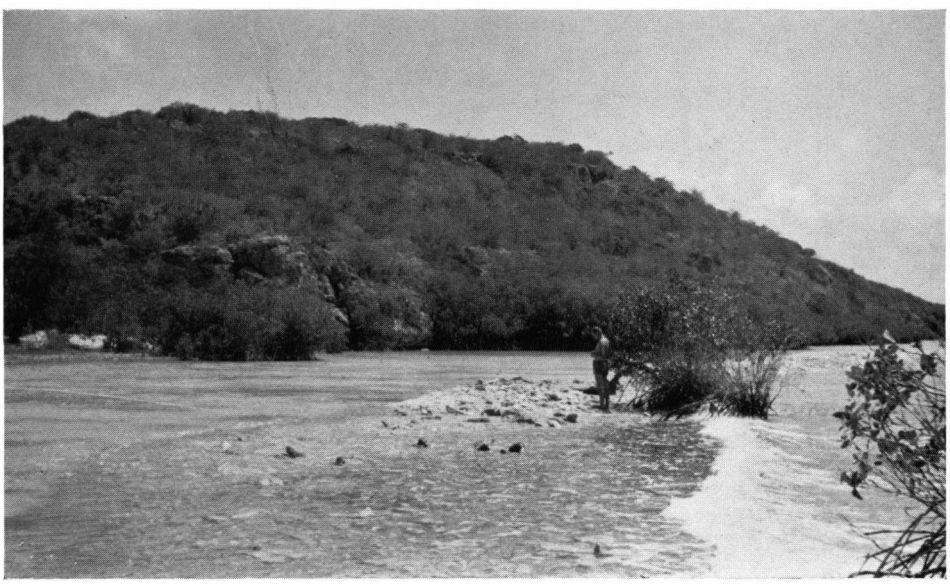
XXXIXb. Abandoned saltpan in the salina of Klein Bonaire, filled up by gelatinous, stromatolithic algal mats, being studied by the Dutch geologist dr. C. G. VAN DER MEER MOHR. See XXXVII behind clump of mangroves. (Sta. 1052–a; Mar. 1970)



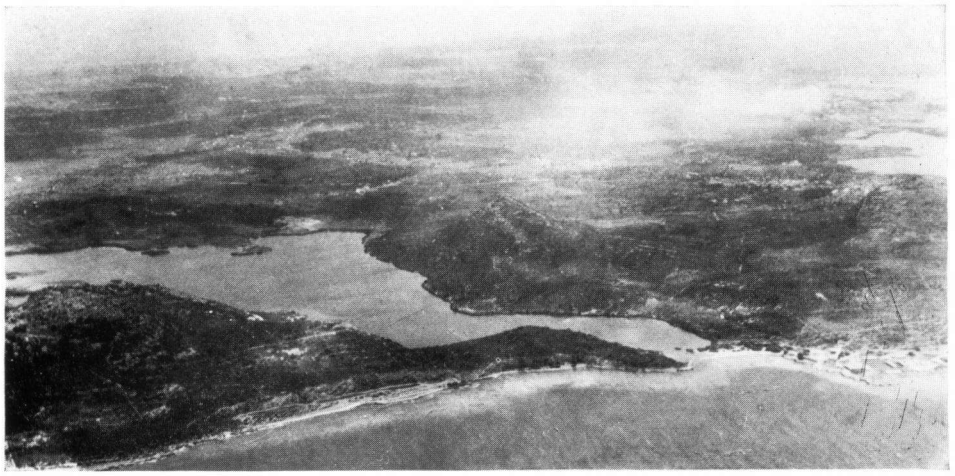


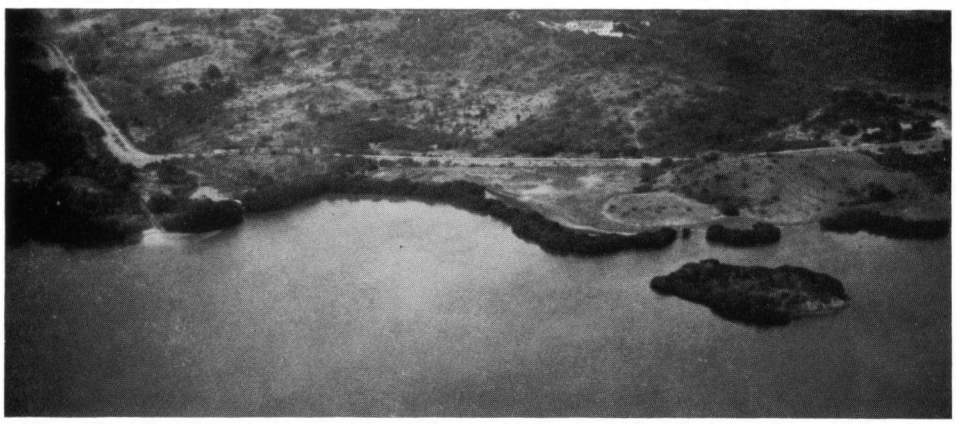
XLa. When the author first visited Boca Grandi, some forty years ago, Curaçao women were strenuously beating the laundry. (Sta. 1016; Apr. 1930, phot. M. G. RUTTEN)

XLb. When dr. H. A. TEN HOVE first visited the same place, he did not know of the domestic significance of Boca Grandi's beachrock layer in former times. (Sta. 1016a; Mar. 1970)



XLIa. Lagoen St. Jan, Curaçao. The original shallow coastal rim has been turned into a lagoon by a narrow wall of coral shingle, which still has an opening at its remotest part. (Sta. 1326 foreground, 1325–A background; Mar. 1955)
XLIb. Lagoen St. Jan has an unstable rampart, which at this place is flooded at high tide and forms the entrance to the lagoon. Photograph is taken in opposite direction to XLIa. (Sta. 1324; Mar. 1955)



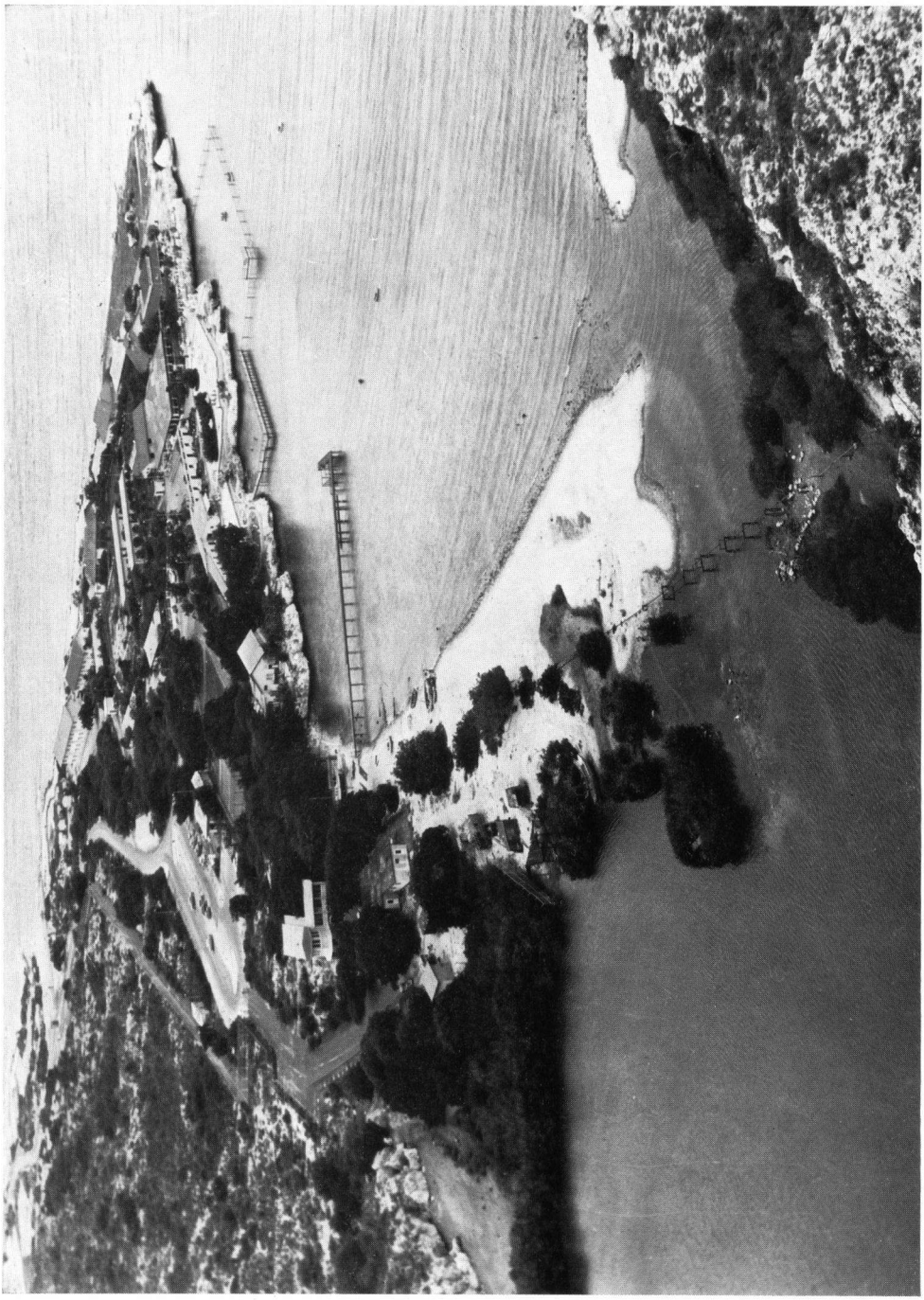


XLIIa. Piscaderabaai from the air, almost hidden by the smoke of the C.P.I.M. (Shell) refinery situated at the Schottegat (top r). The bay intersects the coastal limestones between Evertszberg (l, 119 m) and Veerisberg (r, 132 m), and is almost closed by a barrier of sand and coral debris. (1936)

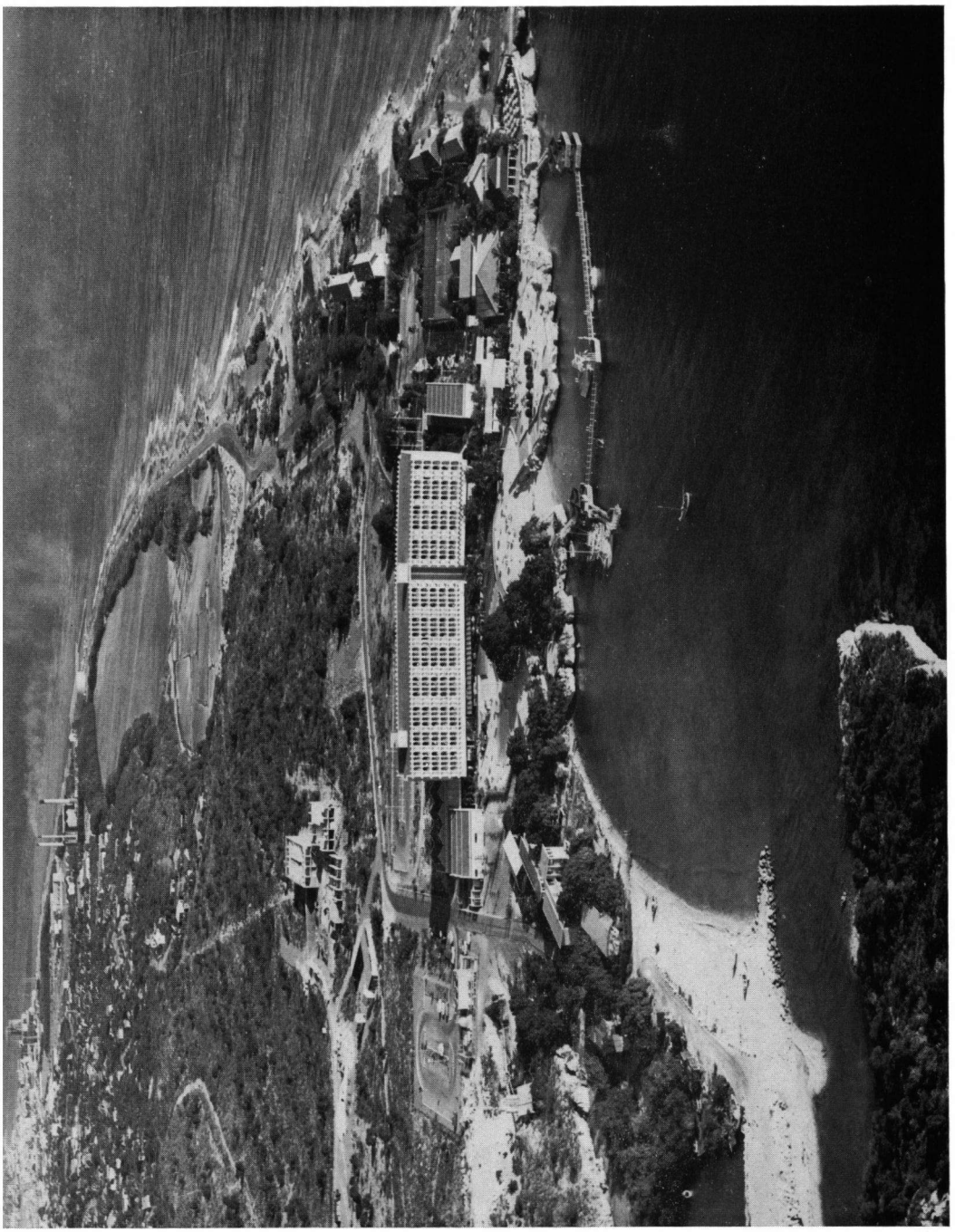
XLIIb. The mangrove-lined shore of Piscadera inner-bay at Klein Hoffie with the Julianadorp sewer (removed since 1960) and Isla Raphaël. (1957, phot. C.P.I.M.)

XLIIc. Most inland part of Piscaderabaai as seen from Veerisberg. In the foreground Baai Vers with adjacent quarry; in the centre the light-coloured limestones of Punta Rafäel and Isla Raphaël. (cf. Fig. 12; Dec. 1963)

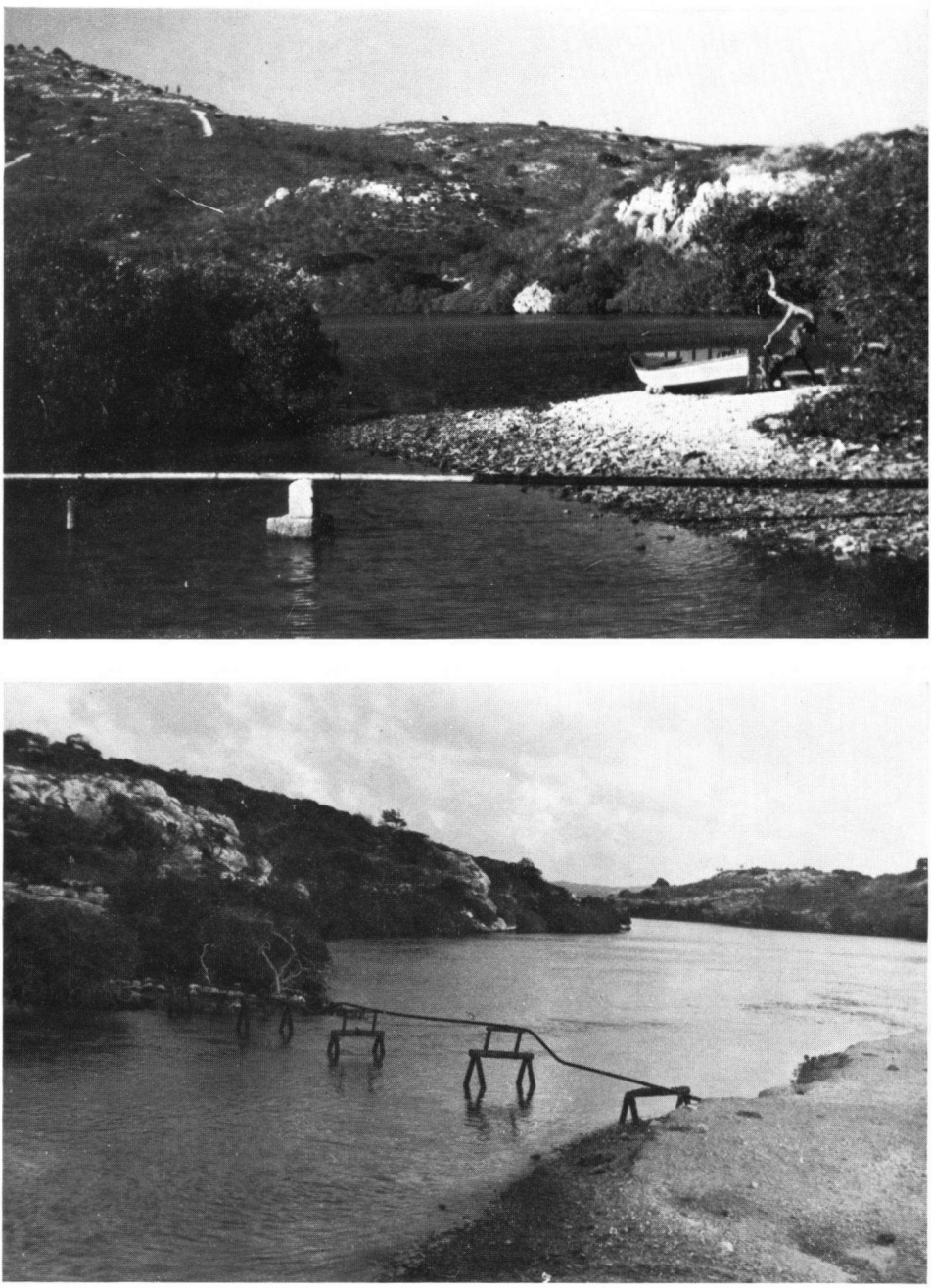
XLIIIa. The sewer of Klein Hoffie which – since October 1960 – greatly contributed to the eutrophication of Piscadera inner-bay. (Sta. 1502; Oct. 1963)
XLIIIb–c. As a result of this eutrophication the clumps of *Crassostrea* on the mangrove roots (c) became in places overgrown by *Didemnum* (b) and other ascidians. (b, Sta. 1464, Nov. 1963; r. 1487b, July 1973)



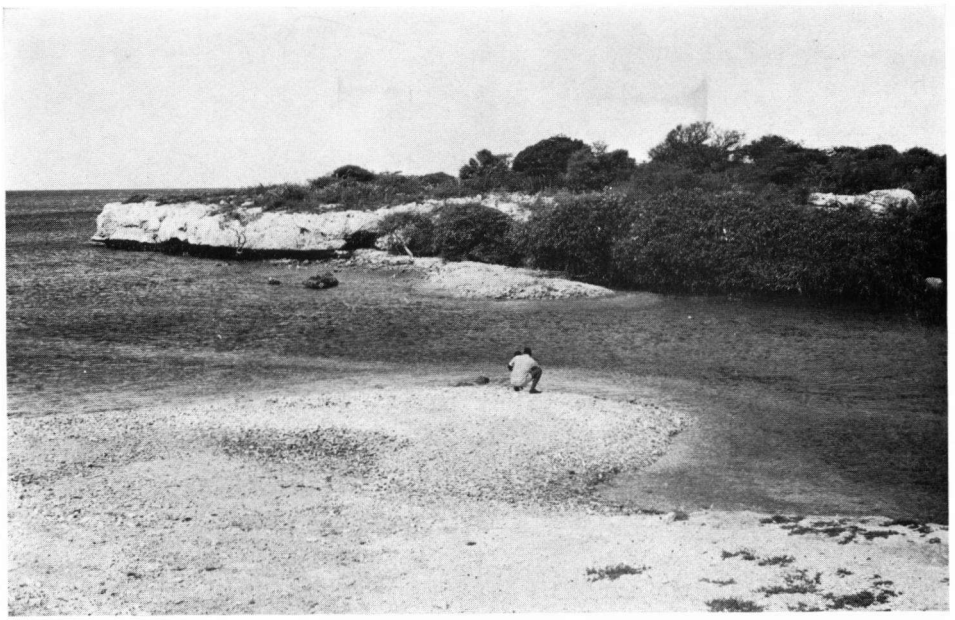
XLIV. Entrance of Piscaderabaai from the air, showing the original building of the Caribbean Marine Biological Institute (1955) and its guest house (1957) among manchioneel trees, its jetty, and the buildings of the Piscadera Bay Club on the adjacent limestone terrace. Note the shape of the entrance and the water-pipe across it. (1960; phot. Fischer)

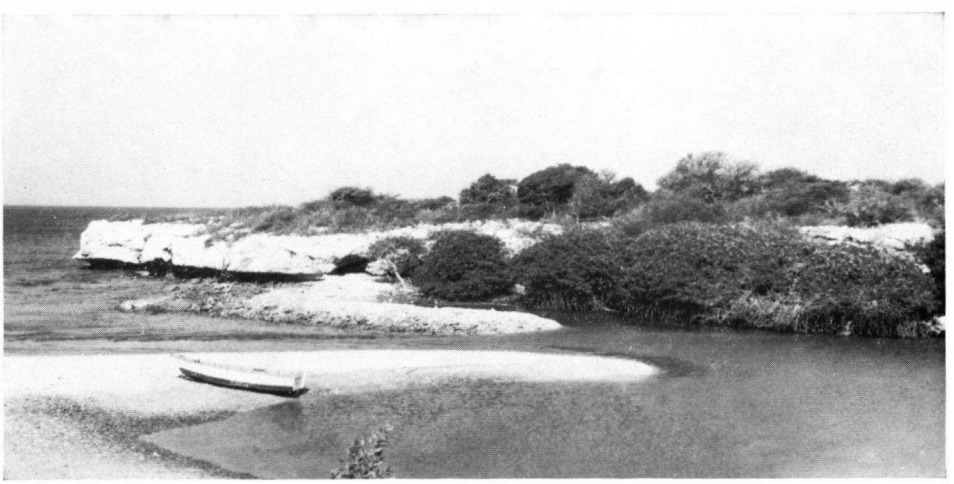


XLV. Piscadera outer-bay, 10 years later. A Hilton Hotel (1966) has incorporated Piscadera Bay Club buildings. The CARMABI has been enlarged; its (first) jetty, and the water-pipe across the inner-bay's entrance have been removed. The entrance is wider now and its shape has been modified by the construction of a groyne. Part of Willemstad with the Rifwater and the adjacent waterplant in the uppermost part of the picture; the Zaquitó lagoon is in the upper central part. (Feb. 1970; phot. Hart's Camera)



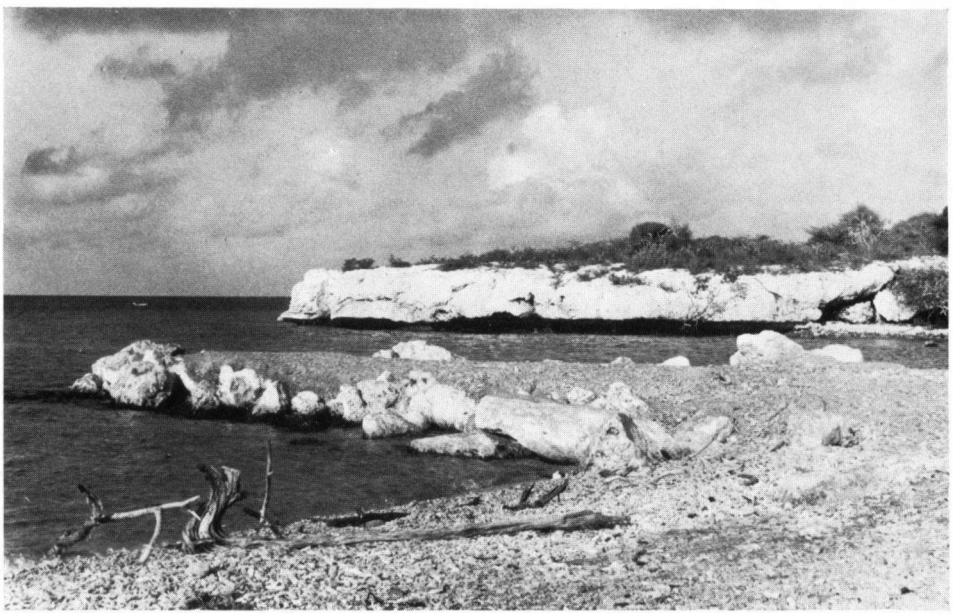
XLVIa. Before CARMABI was built, the mouth of the Piscadera inner-bay was very narrow and easy to wade through, while a water-pipe was leading across. (Aug. 1955)
XLVIb. Some eight years later the entrance was much wider and deeper, but still could be passed at dead tide. The posts supporting the water-pipe proved to be a substratum for a rich sessile fauna. (Sta. 1462; Dec. 1963)

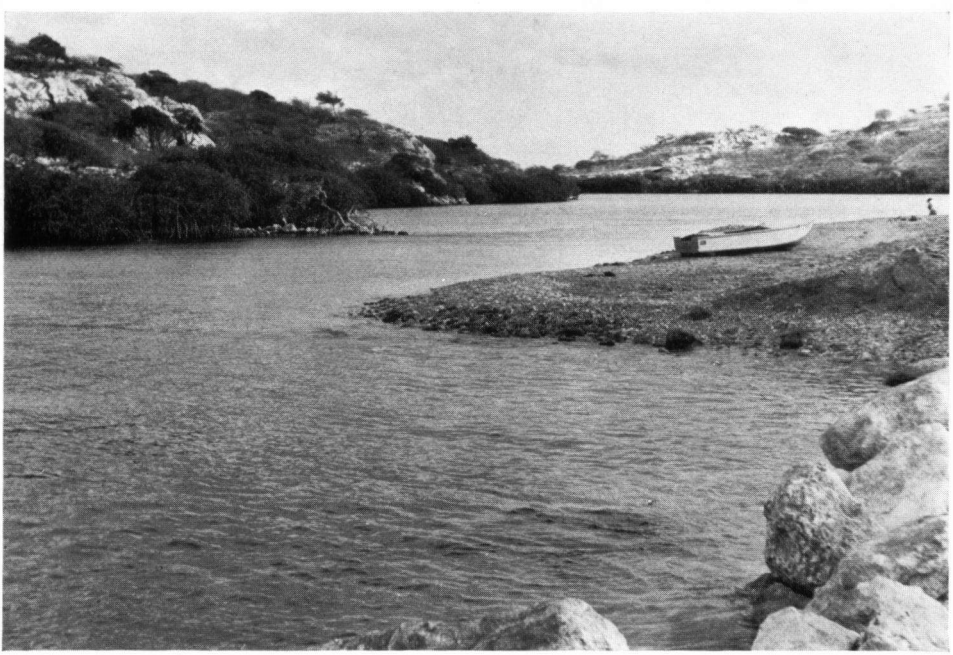




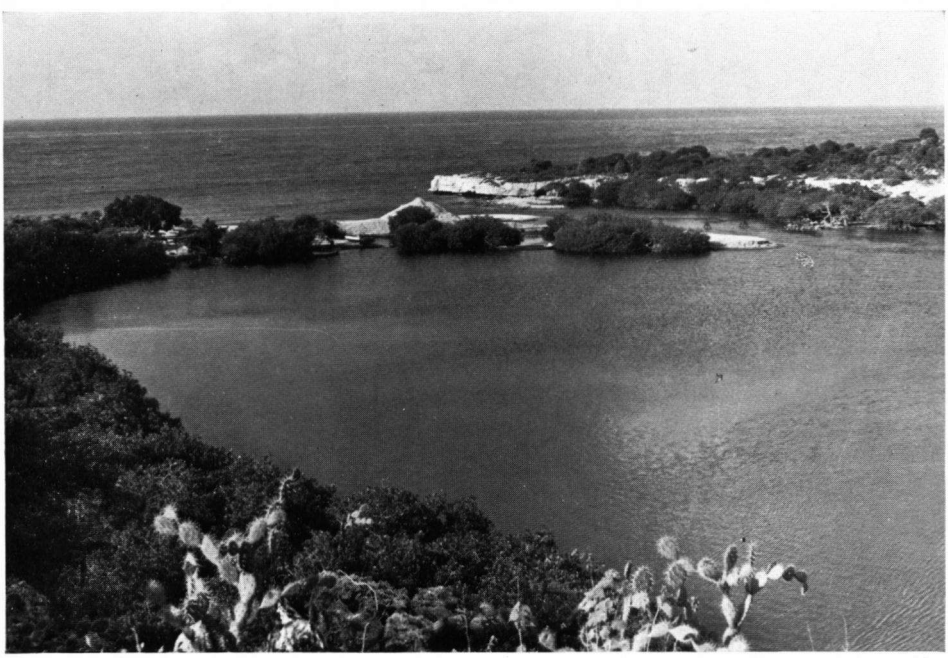
XLVIIa. The mouth of Piscadera inner-bay was continuously subjected to considerable changes; a strong tidal flow always passed through it. (cf. Sta. 1460; Aug. 1967)

XLVIIb. The same locality, looking southwest towards Punta Mahok, shortly after the preceding picture was taken. (Feb. 1970)



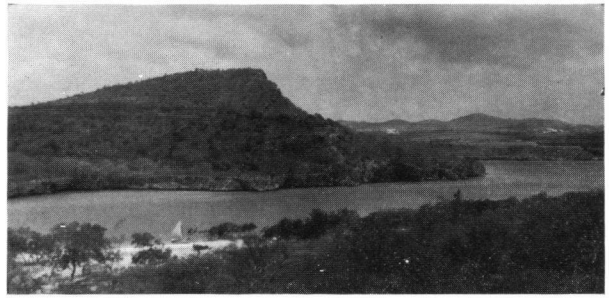


XLVIIIa. The groyne made of coral debris obtained during construction of the sand beach of Hilton Curaçao. (Oct. 1968)
XLVIIIb. The entrance of Piscadera inner-bay, five years after the picture of Pl. XLVIb was taken, looking north. (Oct. 1968)



XLIXa. Western shore of the Piscadera inner-bay, showing seaward dipping limestone deposits of the Evertszberg. The mangroves are scattered along the steep slopes of this narrow part of the bay. (Feb. 1970)

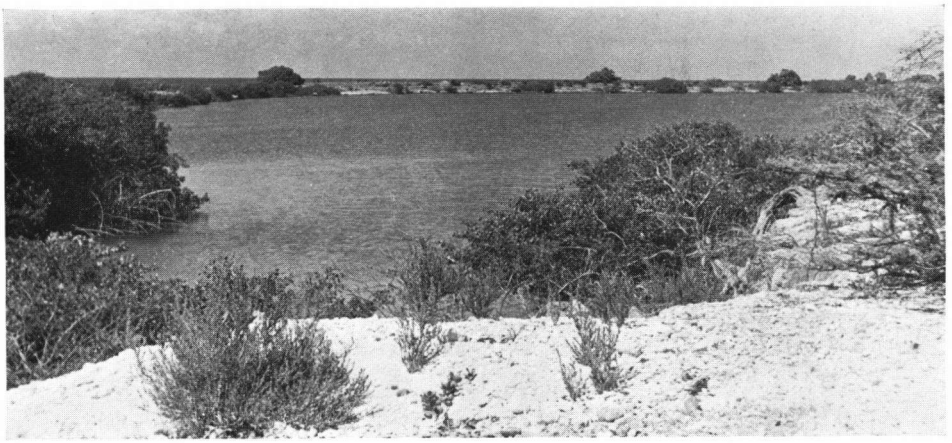
XLIXb. Overlooking that part of the Piscadera inner-bay, situated just behind CARMABI (to left of photograph), which was almost entirely filled up during the dredging operations in July 1972. On the sand spit there is a dump of rock debris removed from the construction site of the Hilton Hotel. (cf. Sta. 1028, 1466/8; Dec. 1963)



La. Spaanse Water as seen from Tafelberg Santa Barbara in westerly direction. On the left side, from bottom to top: New Haven, Seroe di Boca (80 m), Spaans Lagoen, Seroe Kabritoe (75 m) and Caracasbaai; in the centre Isla di Yerba. On the horizon the triangular Seroe Domi (centre l) and the flat hill of Ronde Klip (r). (Feb. 1970)

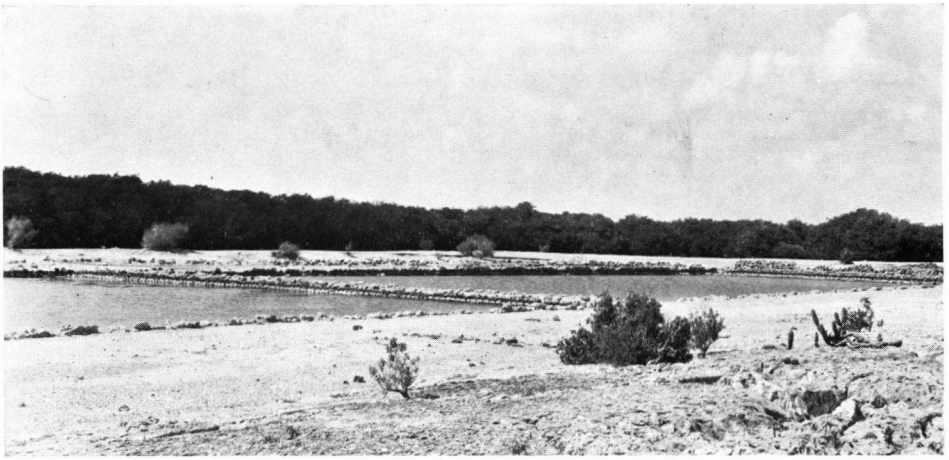
Lb. Entrance of Spaanse Water, Spaanse Baai, showing Santa Barbara Beach with *Coccoloba uvifera* trees, with Punta Cabajero and Lagoen di Venni at the opposite side. (cf. Sta. 1037, 1337; Apr. 1949)

Lc. Entrance of Spaanse Water, Spaans Lagoen, with the Seroe Kabritoe (75 m) dominating the scene. In the foreground Santa Barbara Beach with a few poor mangroves at the water line, (cf. Sta. 1037; Apr. 1949)



LIa. Easternmost corner of Fuik Baai, looking westward. A wall of coral rubble separates this lagoon from the Caribbean Sea. (Sta. 1618, cf. 1644; Oct. 1967)
LIb. Awa Blanco, looking west, with the Caribbean Sea and Lagoen Blanco in the background. (cf. Sta. 1452; Oct. 1963)

LIIa. The surf-beaten eastern point of Curaçao, showing limestone terraces at the north side of the entrance of Awa di Oostpunt (top r). (cf. Sta. 1352; Feb. 1970)
LIIb. The quiet Westpunt Baai, at the leeward side of Curaçao. (cf. Sta. 1315/6; Oct. 1963)



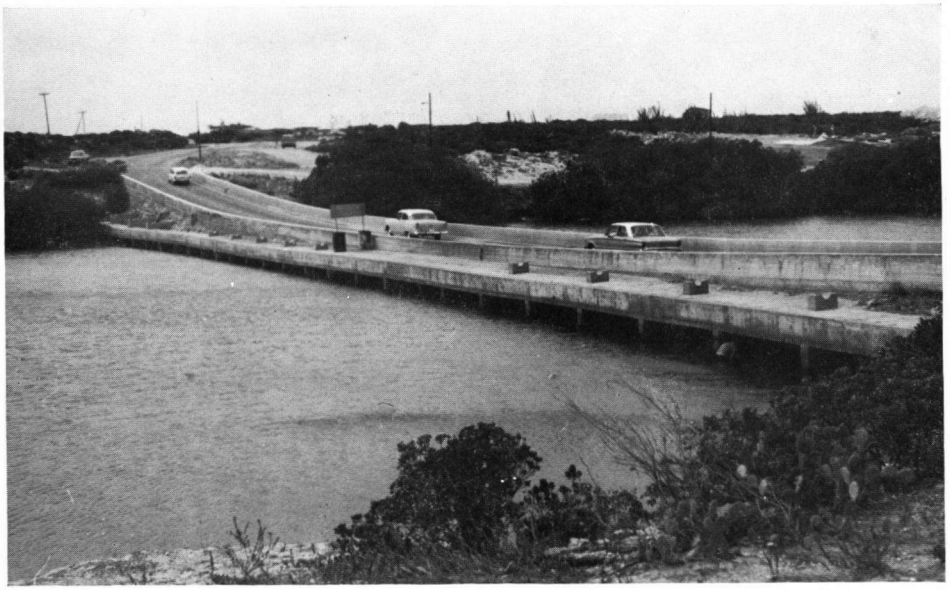
LIIIa. Salinja Master, an abandoned saltpan near Savaneta, Aruba. (Sta. 1014/5; Jan. 1949)

LIIIb. Exposed volcanic rock along the edge of a limestone terrace on the north coast of Aruba, near Andicuri. (Sta. 1301; Aug. 1955)

LIIIc. Malmok, where the metamorhpic rock shore merges into Aruba's famous sand beach stretching away towards the South along the horizon. (Sta. 1301; Aug. 1955)

LIVa. A heavily eroded mangrove key opposite the new harbour of Oranjestad, Aruba. (Sta. 1303; Apr. 1955)

LIVb. The surf-beaten limestone cliff north of Seroe Colorado, Aruba, fully exposed to the eastern trade wind. Note the projecting bench with terraced pools, each surrounded by a ridge of newly formed incrustations, situated at the level where the waves break against the coast. (cf. Sta. 1308; May 1955)



LVa. Entrance of Spaans Lagoen, Aruba, with the (old) bridge, which proved to be an extraordinary rich habitat. (Sta. 1672/3 = sea side l, 1305 = lagoon side r; Mar. 1970)

LVb. Spaans Lagoen from the air, looking south: a mangrove-lined drowned valley intersecting coastal limestone terraces, and stretching from Salinja Balashi (bottom l) towards the channel behind the fringing reef. (cf. Sta. 1013 bottom l, 1306 above bottom centre, 1008 below centre, 1395 and 1672/3 near bridge; May 1955)