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Reef Corals and Coral Reefs in the Vicinity of Port Moresby, South Coast of Papua New Guinea[1]

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ACCORDING TO FAIRBRIDGE (1967), "the barrier reef off the southeast coast of Papua, and running all around the Louisiade Archipelago in the Tagula Barrier Reef, is extraordinarily little-known despite its impressive size." Not only the reefs themselves but the reef corals also have not been studied. Papua New Guinea appears to lie near the center of generic diversity for the Indo-Pacific hermatypic scleractinian corals, yet few reef coral records have been reported for the region. Stehli and Wells (1971) evaluated the generic data for stations around the world which they considered reasonably well sampled in terms of hermatypic corals. Conspicuous in the global distribution of the 63 sampling stations is the large gap centered on Papua New Guinea. In fact, the nearest stations to the one reported on in this paper are Palau, the Caroline Islands, and the Marshall Islands to the NW, N, and NE, respectively; Fiji and New Caledonia to the E and SE, respectively; and Moreton Bay, Australia, and Celebes to the S and W, respectively (Stehli and Wells 1971). None of the adjacent localities where the genera of reef corals are considered reasonably well known are closer than 2,000 km to Port Moresby on the south coast of Papua.

Between 1968 and 1972 inclusive, about 60 km of the impressive coral reef complex along the south Papuan coast were explored. Reef slope environments were investigated by both skin diving and SCUBA diving, whereas deeper parts of the lagoon were sampled with a modified Van Veen sediment grab. Full color aerial photographs, taken with a Polaroid filter to reduce light reflected from the water surface and thus to enhance the visibility of underwater reef structures, were used to survey about 75 km of coastline.

Coral specimens were collected in 1968–1972 from all of the different reef environments except the fore-reef slope of the large barrier reefs where high seas and inclement weather precluded exploration. The collection made in 1972 is especially noteworthy in terms of generic diversity and is reported upon here. Sediment samples from one transect extending from the outer barrier reef, across the lagoon, to the fringing reefs on the mainland, were examined to estimate the influence of reef formation on sedimentation patterns of the region. The Port Moresby area is unusual in having such well-developed reef structures, especially large coastal fringing reefs, in close proximity to a high, rugged continental landmass subject to conditions of vigorous, tropical rock weathering.

TYPES OF CORAL REEF DEVELOPMENT

Barrier Reefs

Most impressive among the different reef types in the vicinity of Port Moresby and to the east is the offshore barrier form. Reefs of this variety, arrayed in undulating chainlike fashion, extend along the coast in a southeasterly direction to the eastern tip of Papua (Fig. 1). Sinavi Reef (09° 32′ S, 147° 5′ E), the western terminus of this great barrier reef complex, faces the entrance to the coastal embayment along which the town of Port Moresby is located. Only 3.8 km from shore, this enormous east-west-trending reef is nearly 16 km long and as much as 2.7 km wide. The seaward margin is well defined, and consists of a steep fore-reef slope, dropping off abruptly into the deep water of the Papuan Gulf; 200-m depths are commonly found within 300 to 350 m of the reef crest. Two islands lie atop Sinavi Reef

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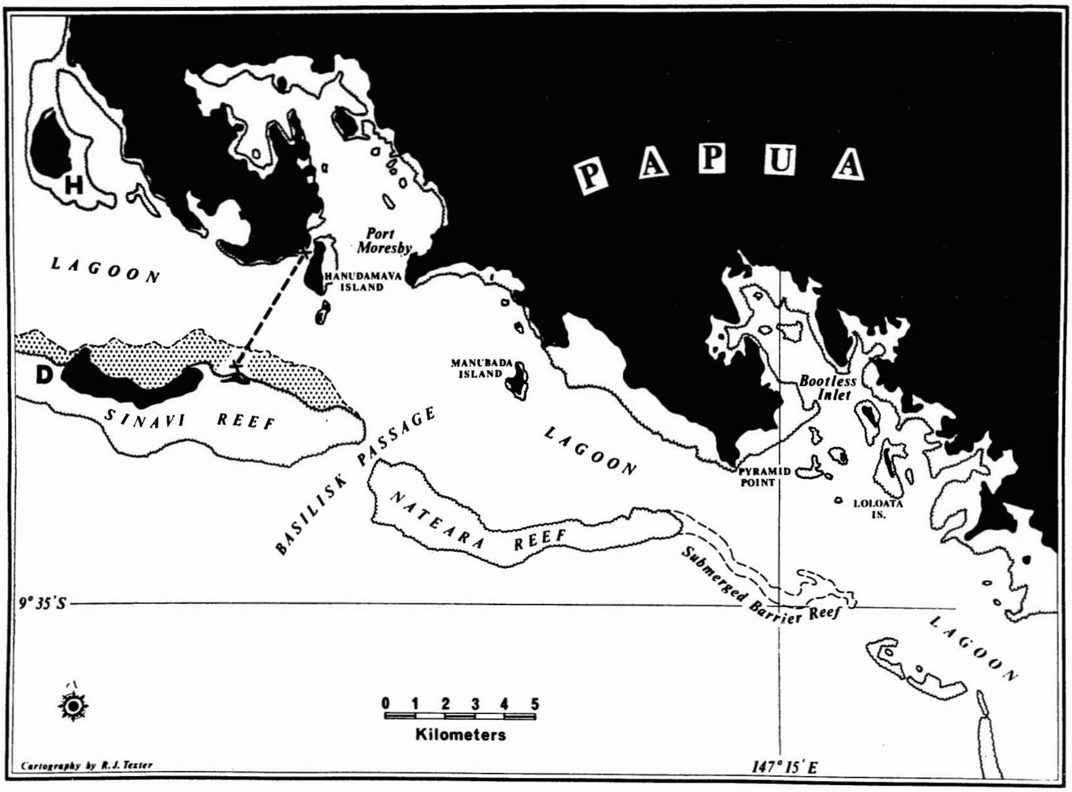

FIG. 1. South coast of Papua in the vicinity of Port Moresby. Bottom sediments were sampled along marked transect across the lagoon from Sinavi Reef to Hanudamava Island (see Fig. 8). The stippled area north of Sinavi represents the large leeward sand flat referred to in the text. D, Daugo Island; H, Haidana Island.

(Fig. 2), each elongated east-west and situated along the leeward periphery of the reef. Unlike most of the other islands in the region, which are composed of highly elevated, metamorphic rocks of continental origin, the islands on Sinavi are erosional remnants of an emergent platform of fossil reef-rock. The largest (Daugo Island) is 4.7 km long, between 400 and 1,100 m wide, and between 3 and 4 m above mean sea level. The reef flat disappears in the leeward (northerly) direction under an extensive sand apron which is up to 1.2 km wide and covered by between 2 and 4 m of water. Separating Sinavi Reef from the coastal mainland is Port Moresby Lagoon, which is generally 20 to 24 m deep in this area.

East of Sinavi the characteristics of the barrier reefs gradually change. They become narrower, lack islands, have less extensive leeward sand flats, and they become separated from land by an increasingly deeper lagoon. Nateara Reef (09° 33′ S, 147° 10′ E), for example, is only 0.8 to 1.7 km wide throughout its 10.5 km length (Fig. 1). The leeward sand apron is poorly developed, typically only 100 to 300 m wide and completely absent in places (Fig. 3). Although this barrier reef continues to follow the general east-west trend, the western terminus is 6 km from shore whereas only 3 km of lagoon separate its eastern tip from the mainland. Separating Nateara and Sinavi barrier reefs is a narrow passage about 800 m wide, 50 to 60 m deep, through which strong tidal currents are channeled. Nateara continues eastward for an additional 6 km as a submergent barrier reef 200 to 300 m wide (Fig. 4) whose surface is from 4 to 6 m below mean sea level. The lagoon at this point deepens to 36 to 42

FIG. 2. Sinavi Barrier Reef looking east, showing the extraordinarily wide reef flat; the unnamed island next to Daugo Island cut from elevated reef limestone; the vast sand apron extending lagoonward from the leeward margin of the reef top; and Basilisk Passage, a deep, narrow channel separating Sinavi from Nateara Barrier Reef which is visible in the distant background.

meters, and in places the leeward reef margin faces relatively deep water, i.e., as much as 30 m within 200 m of the reef edge.

Barrier reefs farther southeast along the chain are mostly of the "ribbon" variety, long (up to 26 km), narrow (300 to 600 m), and between 5 and 12 km from shore.

The reef tops tend to be remarkably flat, and large areas are exposed during low spring tides (maximum tidal range 1.7 m). Living coral is present but the cover is generally sparse. Molluscs, starfish, holothurians, echinoids, and algae are abundant on the reef tops. Leeward sand flats typically support dense growths of seaweeds, sea grasses, and algae, with scattered clumps of coral and numerous sea stars, sea urchins, and molluscs. The knobby starfish, *Protoreaster nodosus*, is particularly conspicuous in these environments. Where the talus sand apron is absent, as in places along the leeward margin of Nateara, the reef drops off abruptly into deep lagoon water. Here the reef slope is frequently vertical, occasionally overhanging, but the gradient is often interrupted by narrow, sand-covered terraces and ledges. A rich and diverse coral fauna is found on the steeply sloping surfaces in these back-reef environments. Heavy seas break along the fore-reef slope, and consequently this zone of the barrier reef system was not explored. Aerial photographs, however, reveal well-developed spur and groove structures extending seaward (Fig. 5).

Reefs Associated with Lagoonal Islands

The Port Moresby region is unusual in that lagoonal patch and table reefs are virtually absent behind the main line of offshore barrier reefs. Patch and pinnacle reefs do appear in the eastern part of the reef system, but none are present within 60 km of Port Moresby. Near-

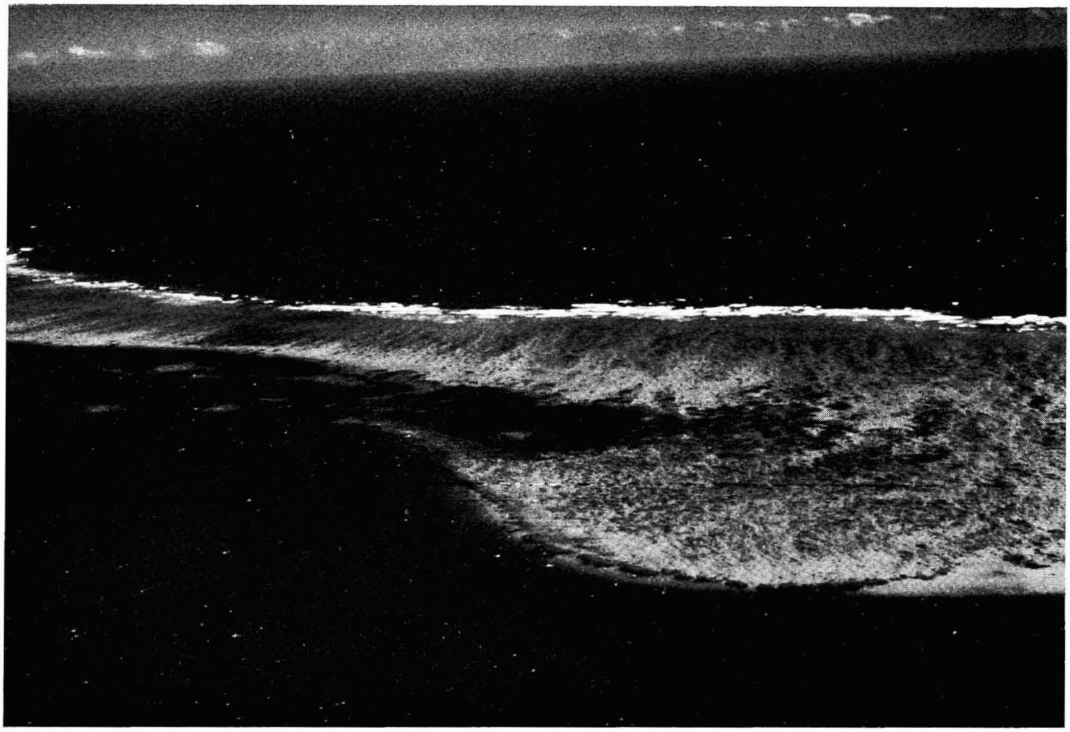

FIG. 3. Nateara Barrier Reef looking seaward (south) showing the characteristic absence of leeward sand aprons, the near vertical gradient of the back-reef zone, and the narrow width of the reef top.

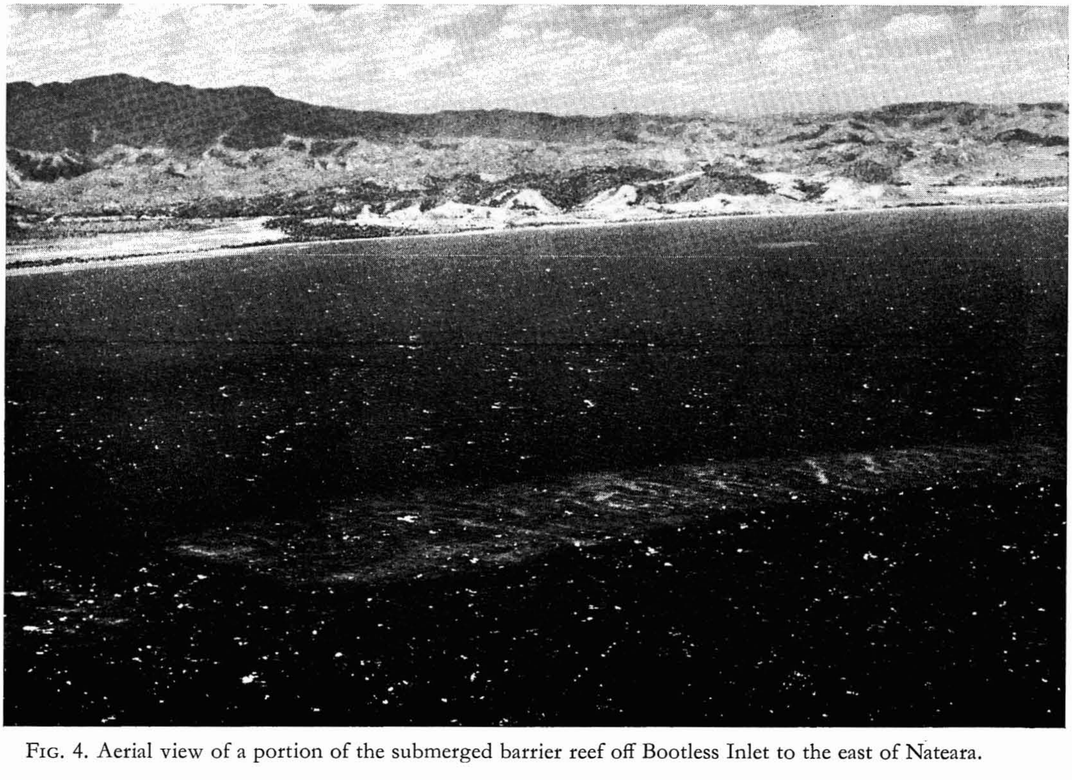

FIG. 4. Aerial view of a portion of the submerged barrier reef off Bootless Inlet to the east of Nateara.

FIG. 5. Well-developed spur and groove structures along the seaward, fore-reef slope of a barrier reef southeast of Nateara.

FIG. 6. Loloata Island looking southeast, showing extensive fringing reef development around offshore islands. Motupore Island is in the foreground. Waves breaking along the chain of barrier reefs are visible in the distance.

FIG. 7. Elevated reef limestone which forms Haidana Island. Fossil reef-rock scarps encircle the island. In the background, beyond the broad fringing reef, is a vast shoal area.

shore islands, however, are numerous and invariably they are encircled by wide, well-developed, fringing reefs (Fig. 6). Although usually less than a kilometer in diameter, these islands typically rise 30 to 60 m above the water. They are drowned hilltops whose more or less north-south elongation parallels the orientation of similar structures on the adjacent mainland. Fringing reef growth, with profuse coral formations along the outer reef margins, extends up to 600 m from shore.

Haidana Island (Fig. 1) is a notable exception in that it consists of a large (2.2 km long N-S, 1.3 km wide E-W) erosional platform sculptured from a block of emergent reef limestone (Fig. 7). The entire island, therefore, is little more than a few meters above mean sea level. The fringing reefs surrounding Haidana are of vast extent, up to 2 km wide in places. Beyond the reef edge is a broad, shallow (1 to 2 m deep) shoal with numerous small coral patches rising upward from the sand and mud bottom. Mangrove swamps line the northern shore of the island.

Coastline Fringing Reefs

In the vicinity of Port Moresby, the coastline is highly indented by numerous embayments which tend to be narrow (2 to 4 km wide) but long (6 to 8 km). They are oriented more or less NW-SE and have irregular shoreline margins. The region is one of rugged topography; steep hills up to 200 m high form bold promontories and coastal headlands. Nearby are powerful, complicated, offshore currents created by wave train refraction. These promontories dip steeply into the sea and are bordered by fringing reefs that are generally less than 100 m wide.

Between the headlands are smaller coastal bays lined either with sandy beaches or dense mangrove swamps. Fringing reefs associated with these bays are often wide (up to 1 or 2 km)

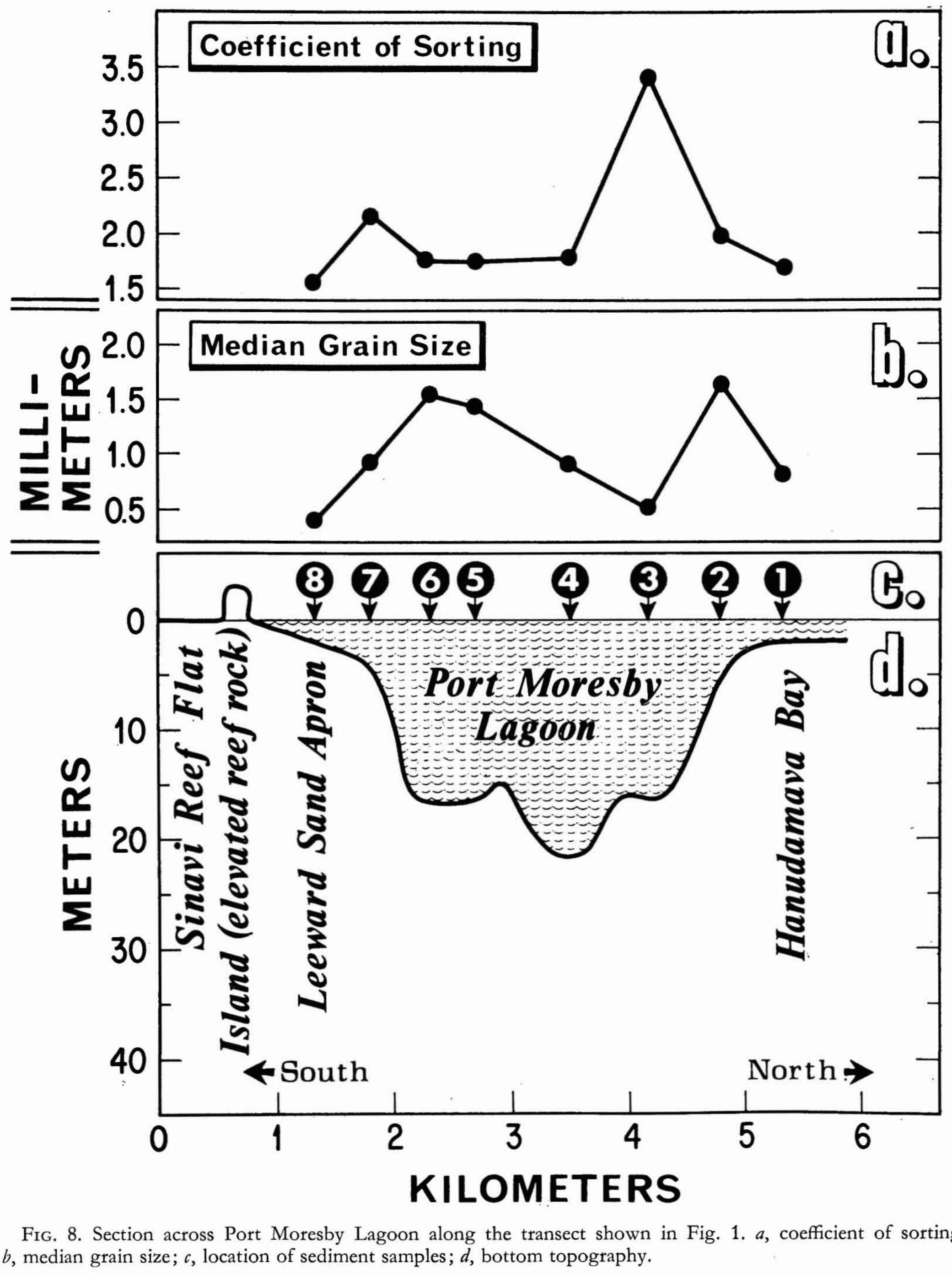

FIG. 8. Section across Port Moresby Lagoon along the transect shown in Fig. 1. *a*, coefficient of sorting; *b*, median grain size; *c*, location of sediment samples; *d*, bottom topography.

TABLE 1

SEDIMENT SAMPLES FROM A TRANSECT ACROSS PORT MORESBY LAGOON

ORIGIN OF SEDIMENT PARTICLES (%)*	SAMPLE NUMBER 1	2	3	4	5	6	7	8
Echinoderm	6	5	4	2	2	4	9	6
Mollusc	40	29	16	22	26	28	45	55
Halimeda	4	3	1	1	2	4	1	10
Coralline Algae	15	16	1	2	4	8	9	6
Worm Tubes	0	0	0	0	0	3	1	2
Coral	12	30	1	2	2	16	18	10
Crustacea	3	0	0	0	0	0	0	2
Foraminifera	1	2	68	58	53	20	1	1
Bryozoa	0	0	0	1	0	0	3	0
Alcyonaria	0	0	0	0	2	1	0	0
Misc. and Unidentified	19	15	9	12	9	16	13	8
Coefficient of Skewness, K_{sk}	0.89	0.85	0.83	1.17	0.95	0.97	1.12	1.11

NOTE: See Figs. 1 and 8 for map of area and section across Port Moresby Lagoon.
* Sediment particles taken from 10 to 20 mesh sieve size fraction.

but the shallow reef flats support little coral growth except along the seaward margin. Few negroheads are found anywhere on the reefs despite the strong SE winds and somewhat exposed locations. East of Bootless Inlet (Fig. 1) the coastline is smooth and embayments are lacking; sandy beaches line the shores, and both offshore islands and fringing coastline reefs are absent.

SEDIMENTS

The enormous barrier and fringing reef system of the Port Moresby area would be expected to produce large quantities of carbonate sediment, especially in view of the large tidal range and the vigorous wave and current action in the region during the summer season. To determine the extent to which these reefs supply sedimentary material to the deep lagoon, I collected eight sediment samples with a modified Van Veen grab along a 5-km transect extending from the small, unnamed island on Sinavi Barrier Reef, across the lagoon to Hanudamava Bay on the Papuan mainland (Fig. 1). Although the lagoon floor is characterized by many small topographic irregularities, the transect samples represent environments ranging from shallow-water peripheral reef flats to the deeper parts of the lagoon proper, whose floor is as much as 22 m below sea level in this area.

The sediment samples were processed using standard techniques of grain size analysis (Weber and Schmalz 1968). Fragments larger than 5 mm in diameter were excluded from size analysis; these included a few large mollusc shells, branches of coral, clumps of coralline algae, etc. The remainder of each sample was subdivided into 11 size fractions in order that curves of cumulative weight percent vs. particle diameter might be constructed. Statistics derived from these curves are: (1) median grain diameter (50 percentile); median diameter in mm; (2) Trask coefficient of sorting, which estimates the degree of dispersion in grain size; $K_{so} = \sqrt{Q_3/Q_1}$, where Q_3 and Q_1 are the 75 and 25 percentiles; (3) Trask coefficient of skewness, which estimates the degree of symmetry of the grain size distribution; $K_{sk} = Q_1Q_3/(\text{median diameter})^2$.

Despite the adjacent high landmass, sediment samples taken along the transect contain less than 3 percent of noncarbonate material.

Grain Size

The median diameter is plotted across the sampled section in Fig. 8. The sands are for the most part medium to coarse grained, with relatively little material in the silt and clay size fractions. The median diameter increases from 0.39 to 1.52 mm across the leeward sand apron behind Sinavi Reef and then decreases steadily northward across the lagoon, reaching a minimum value of 0.53 mm in 16.3 m of water near the landward margin of the lagoon. Grain size abruptly increases to 1.65 mm on the talus slope of the fringing reefs of Hanudamava Island and adjacent mainland coast. Finer sediments (median diameter = 0.81 mm) are found further landward in the shallow, relatively sheltered environment of Hanudamava Bay. Thus, the coarsest sands are found at intermediate depths along the margins of the lagoon where debris from Sinavi and Hanudamava reefs is transported lagoonward and deposited in deeper water.

Sorting

In general, the sediments are moderately well sorted, with K_{so} for the lagoon proper in the range 1.7 to 1.8 (Fig. 8). A pronounced decrease in the degree of sorting occurs in two places: at the edge of the Sinavi Reef leeward sand flat in about 4 m of water, and near the base of the Hanudamava Reef talus fan. Poorer sorting in these environments is probably due to the accumulation of reef-derived debris, with a wide range of grain size, in deeper water along the lagoon margins where sorting by wave action is less effective.

Skewness

The coefficient of skewness (Table 1) is positive for all samples, indicating that coarser admixtures exceed the fine. K_{sk} is highest in the center of the lagoon, relatively low along the lagoon margins, and intermediate in value on the leeward sand flat of Sinavi Reef.

Derivation of Sediment Components

The relative importance of the various carbonate contributors has been estimated by identifying individual sediment particles in the 10 to 20 mesh (1.68 to 0.841 mm) sieve fraction under a binocular microscope. The results are given in Table 1. Within this range of grain size, the major portion of the sediment comprises skeletal debris from molluscs, corals, foraminifera, and echinoderms. Near Sinavi Reef, the dominant contributors are molluscs, corals, coralline algae, and, to a lesser extent, echinoderms. In the lagoon proper, however, the character of the sediment is strikingly different; foraminiferal tests and molluscan debris constitute the bulk of the 10 to 20 mesh size fraction. As Hanudamava Bay is approached, foraminifera gradually become less numerous, and the coarser sediment particles are largely derived from molluscs, coral, coralline algae, and echinoderms. Skeletal calcite of echinoderm origin is found throughout the cross section across the lagoon, but the percentage is notably higher in the nearshore areas adjacent to both the barrier reef and the Papuan mainland. Molluscs are important contributors in all environments sampled along the transect, but they constitute a smaller percentage of the sediment in deeper portions of the lagoon. *Halimeda* and crustacean fragments are found in significant quantities only near shore. Coralline algae and coral detritus are most abundant in the vicinity of the shallow-water reef areas, whereas foraminiferal tests are nearly absent from these sedimentary environments. In the deeper water of the central part of the lagoon, however, up to 68 percent of the 10 to 20 mesh size sediment grains are of foraminiferal origin.

If most of the finer grained sediment is derived from mechanical comminution and biological degradation of larger skeletal debris produced by the major carbonate-secreting organisms, it would appear that along the margins of the lagoon the bulk of the sediment is shallow-water material supplied by the nearby coral reefs. The central lagoon floor, however, is covered mostly by foraminiferal and molluscan sands produced more or less *in situ*. Thus, under present conditions, sediment transport from reef to lagoon would appear to be minimal, with little reef-derived detritus being moved lagoonward more than a kilometer from the source.

REEF CORALS

Large reef coral collections were made and despatched to The Pennsylvania State University for research on skeletal chemistry. All of the generic records reported here are based on specimens returned from the field, that is, no

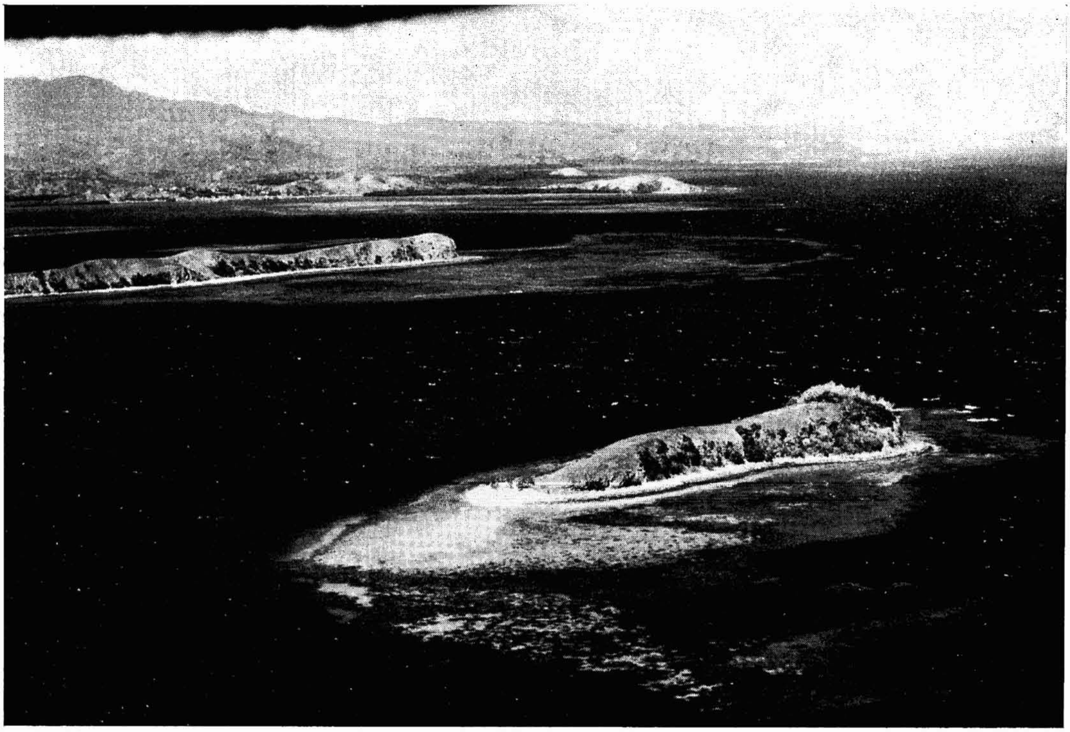

FIG. 9. Luxuriant fringing reefs surrounding Manunouha (foreground) and Loloata (background) islands, separated by a deep, narrow channel. The rugged mainland appears in the distance.

FIG. 10. Enormous colony of *Lobophyllia* off Manunouha Island, growing on the steeply inclined reef slope facing a deep channel.

TABLE 2

SCLERACTINIAN CORAL GENERA AND SUBGENERA COLLECTED FROM REEFS OF THE PORT MORESBY AREA

SUBORDER ASTROCOENIINA	
Stylocoeniella	*Stephanaria*
Acropora	*Montipora*
Plesioseris	*Psammocora*
Seriatopora	*Astreopora*
Pocillopora	*Stylophora*
SUBORDER FUNGIINA	
Pavona	*Heliofungia*
Polyastra	*Parahalomitra*
Pseudocolumnastraea	*Halomitra*
Leptoseris	*Herpolitha*
Coeloseris	*Polyphyllia*
Pachyseris	*Pleuractis*
Coscinarea	*Ctenactis*
Cycloseris	*Podabacia*
Herpetoglossa	*Porites*
Fungia	*Synaraea*
Verrillofungia	*Goniopora*
Danafungia	*Alveopora*
SUBORDER FAVIINA	
Caulastrea	*Diploastrea*
Plesiastrea	*Scapophyllia*
Favia	*Echinophyllia*
Favites	*Symphyllia*
Oulophyllia	*Leptastrea*
Merulina	*Cyphastrea*
Mycedium	*Echinopora*
Parascolymia	*Culicia*
Pectinia	*Galaxea*
Goniastrea	*Acanthastrea*
Platygyra	*Lobophyllia*
Leptoria	*Oxypora*
Hydnophora	
SUBORDER CARYOPHYLLIINA	
Euphyllia	*Physogyra*
SUBORDER DENDROPHYLLIINA	
*Heteropsammia**	*Dendrophyllia*
Tubastraea	*Turbinaria*

* From lagoon sediments only.

"visual observation only" data are included. The major sampling sites were: (1) Haidana Island and environs (09° 27′ S, 147° 2′ E); (2) mainland fringing reefs along the entire coastline from Hanudamava Island, around Port Moresby harbor, to the limit of fringing reef development east of Bootless Inlet (Fig. 1); (3) reef top and backreef slopes of Sinavi, Nateara, and other (unnamed) barrier reefs southeast of Nateara Reef; (4) numerous lagoonal islands with fringing reefs, including Manubada (09° 31′ S, 147° 10′ E), Motupore (09° 32′ S, 147° 17′ E), and Manunouha (1.5 km SW of Motupore Island). Of the many coral communities examined, the most profuse and diverse assemblages were found on the steep leeward backreef slopes of barrier reefs such as Nateara and on the nearly vertical flanks of those island fringing reefs that face deep channels and passes through which strong tidal currents are funneled. Good examples of the latter are Motupore and Manunouha islands which are situated alongside a channel 30 to 35 m deep and about 0.9 km wide (Fig. 9).

The scleractinian genera and subgenera collected are listed in Table 2, classified according to Vaughan and Wells (1943), and Wells (1956, 1964, 1966). A total of 65 scleractinians was found, of which 10 are astrocoeniids, 24 are fungiids, 25 are faviids, two are caryophylliids, and four are in the suborder Dendrophylliina. *Heteropsammia*, a free-living hermatype which prefers sandy substrates, was collected only along with lagoon floor sediments, whereas all of the others came from the coral reefs described above. Another dendrophylliid, *Duncanopsammia*, was taken by Mr. P. M. J. Woodhead (personal communication) but was not among the collections made by me.

In addition to exhibiting a high degree of faunal diversity, reef corals of the Port Moresby area are remarkable for the enormous, spectacular growth forms of some species. *Lobophyllia*, for example, was observed in heads up to 3 m across (Fig. 10). *Turbinaria*, *Acropora*, and *Dendrophyllia* also attain immense proportions, especially along the sides of deep channels where strong water currents flow (Fig. 11). In many areas within the lagoon, on the steeper reef slopes below 1 to 2 m, the coral cover is virtually 100 percent. In terms of degree of coral cover, the most spectacular growth was found at the extreme southern tip of the fringing reef surrounding Motupore Island off Bootless Inlet. Here the reef surface is characterized by prominent swell and swale topography covered by a luxuriant and diverse coral fauna. Reef growth is markedly anisotropic in this area; prolific spread of corals and

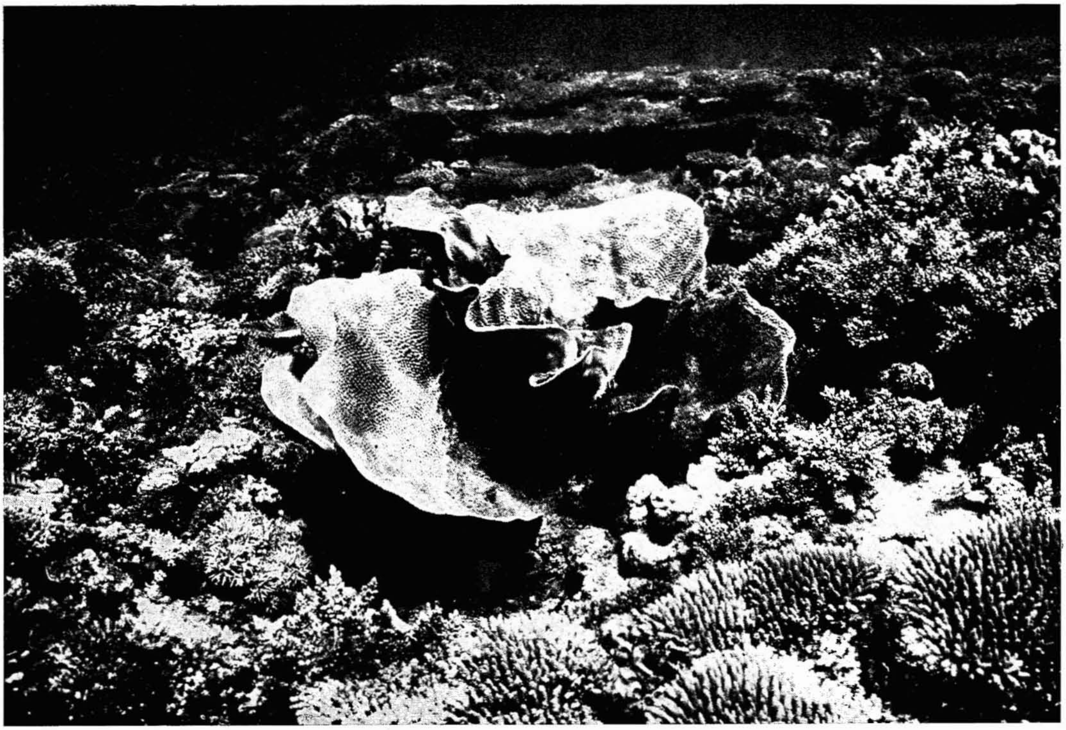

FIG. 11. Whorls of *Turbinaria* on the fringing reef at Motupore Island.

relatively rapid elongation of reefs in a southward direction is undoubtedly made possible by the strong NW- and N-flowing currents passing over these reefs.

Certain carbonate-secreting, nonscleractinian corals are also common on reefs in the region. These include *Millepora*, *Heliopora*, *Distichopora*, and *Tubipora*. The scleractinian most conspicuous by its apparent absence is *Acrhelia*. It was found nowhere in the Port Moresby area, although it is common elsewhere in New Guinea, for example along the Gazelle coast near Rabaul. In few areas can so many different genera and subgenera of scleractinian reef corals be found together; and, in terms of coral faunal diversity, the south Papuan reef complex ranks among the best in the world.

EFFECTS OF TECTONIC ACTIVITY ON REEF DEVELOPMENT

Close proximity to a high-standing, continental landmass subjected to erosion under tropical weathering conditions does not seem to have inhibited reef growth along the narrow continental shelf of south Papua. Even mainland fringing reefs are well developed around Port Moresby. A favorable environment for prolific coral reef growth is probably created by the combination of strong winds blowing mostly from the southeast, powerful tide-generated currents, and good circulation of oceanic surface water. In July the strong South Equatorial Current flows northwestward into the Papuan Gulf, whereas in January the major ocean currents flow to the east and southeast (Wyrtki 1960). As a result of these water movements, the area should be adequately supplied both with nutrients and with diverse coral planulae from the Coral Sea. Additional factors promoting reef growth might include the high mean annual water temperature (28.4° C) and the availability of hard substrate suitable for coral colonization. The ruggedness of the nearshore topography was undoubtedly enhanced by subaerial erosion during the Pleistocene stands of low sea level.

Unlike the coral reefs of the Solomon Islands and northern New Guinea (Stoddart 1969, 1972), where reef development has been inhibited in many places by tectonic movements, those along the south coast of Papua seem little affected by recent seismic activity. Port Moresby is located within the "orogenic and metamorphic belt" (Denham 1969) which experienced considerable metamorphic and volcanic activity during the Tertiary, but few earthquakes originate in the area at the present time. Immediately to the northeast, however, lies the "Papuan ultramafic belt" (Denham 1969) which contains active volcanos and is subject to repeated seismic activity and tectonic movements.

The effects of small-scale earth movements in the Port Moresby region, however, are evident from examination of present reef structures. The most conspicuous evidence of crustal warping is the tilting of a block that at least includes Haidana Island and Sinavi Reef in the northwest, and unnamed barrier reefs southeast of Bootless Inlet (Fig. 1) in the southeast. Relative to mean sea level, the area to the northwest has been elevated while that to the southeast has been depressed.

Haidana Island and the two islands along the leeward margin of Sinavi Barrier Reef are erosional features cut from platforms of elevated fossil reef limestone. The islands are between 3 and 4 m high and are relatively flat-topped. In fact small aircraft can land on Daugo Island. Nearly vertical wave-cut scarps mark the periphery of these islands. The vast shoal area surrounding Haidana Island, the unusually large width of Sinavi Barrier Reef, and the shallowness of the Port Moresby Lagoon in the vicinity of Haidana and Sinavi, probably also owe their origin to crustal uplift. Sinavi is the only barrier reef in the entire offshore chain with a wide (up to 1.2 km) leeward sand flat. The obvious source of this sediment is Sinavi reef flat which appears to have been reduced back to sea level by wave erosion following emergence; Daugo and its neighboring island are furthest removed from wave action and thus they constitute remnants of the elevated reef platform.

Submergence of the area off Bootless Inlet (Fig. 1) is indicated by the sunken barrier reef about 6 km long and 200 to 300 m wide, which appears once to have been a part of Nateara Reef. Furthermore, the barrier reefs off the coast of Bootless Inlet are quite narrow and they lack extensive sand aprons along their lagoonward margins. The greater depth of the lagoon floor near eastern Nateara Reef also suggests some degree of submergence, as does the presence of a number of small reef knolls (e.g., "North Patch," "Middle Patch," etc. near 09° 34′ S, 147° 17′ E) in the lagoon which rise to within 4 to 6 m of the surface. The time of these differential earth movements is not known, but the existence of a submerged barrier reef so close to the surface in a region where the rate of coral reef growth would appear to be high, suggests that the event was fairly recent.

SUMMARY

Coral reef development along the south coast of Papua in the vicinity of Port Moresby ranks among the most impressive in the world. These reefs, previously little known, support a rich and highly diverse scleractinian coral fauna. All of the major reef environments except the seaward, fore-reef slope of the barrier reefs were explored. Despite proximity to a rugged, highland mass, coastal fringing reefs are extensive and well developed. Patch and table reefs within the lagoon, however, are virtually absent, although luxuriant fringing reefs are associated with the many small, towering islands situated between the chain of barrier reefs and the mainland. Sediments covering the lagoon floor are composed almost entirely of carbonate skeletal detritus and are, for the most part, rather coarse-grained sands. Transport of reef-derived carbonate debris into the lagoon appears to be quite limited for both barrier reefs and coastal fringing reefs; the bulk of the sedimentary material within the lagoon proper appears to be derived *in situ*, largely from the skeletons of foraminifera and molluscs. A total of 65 genera and subgenera of scleractinian corals was collected, in addition to four non-scleractinian, carbonate-secreting corals. In terms of reef coral diversity, the Port Moresby area is among the greatest yet discovered. Some evidence for local crustal instability is found in islands sculptured from elevated reef

limestone, portions of barrier reefs which are submerged, and other geomorphological features.

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