

## Cultural Relationships to Coastline Forms on Caribbean Islands<sup>1</sup>

ARTHUR H. DOERR, University of Oklahoma, Norman

No part of any Caribbean Island is far from the sea, and insularity is a significant theme in human activities within the region. Caribbean coasts strongly influence the distribution and anatomy of adjacent settlements and associated cultural forms.<sup>2</sup> Coastline form apparently has more influence upon rural and urban settlement patterns, transportation and communication routes, and land use patterns than does any other facet of the physical or cultural environment in coastal regions.

The purpose of this study is to: 1) isolate, catalogue, and briefly describe the most significant coastline forms encountered in the Caribbean which are definitely related to cultural patterns, 2) to enumerate and describe settlement forms and associated cultural features extant, 3) to accentuate and account for existing relationships between cultural features and coastline characteristics. In order to accomplish these objectives it will be necessary to describe relevant Caribbean coastlines in as much pertinent detail as primary and secondary evidence merits. Since classic orogenic coastline classification is not completely satisfactory for the purposes of the study, more emphasis will be placed upon present terrain appearance. No arbitrary cultural features classification will be attempted. Each settlement form will be described in terms of its relationship to the coast and its hinterland.

### SIGNIFICANT COASTAL FORMS

Practically every island in the Caribbean possesses a multiplicity of coastal forms. A *complete* description of every coastline type in the Caribbean area is beyond the bounds of practicality, and perhaps outside the research scope of one man's lifetime. A certain selectivity is, then, obviously essential. Only those coastal features which extend for substantial linear distance are enumerated and described. Research indicates that the following coastal forms occupy enough beach frontage to merit separate consideration: 1) mangrove swamp, 2) ocean terraces, 3) continuous offshore coral barriers, 4) interrupted offshore coral barriers, 5) sand beach fringes, 6) river deltas, 7) cliffed coasts with narrow low-lying coastal fringe, and 8) cliffed coasts. A brief landscape description of each of these coastal forms follows.

*Mangrove swamps*<sup>3</sup> are quite common on most Caribbean islands.

<sup>1</sup> Presented at Weatherford, Dec. 11, 1959.

<sup>2</sup> Mr. Harold Imus of Larry Smith Associated, Washington, D.C. and the author recognized the relationships in the field in Puerto Rico. Subsequent map and field research by Mr. Imus and the author validated original hypothesis. I am indebted to Mr. Imus for assistance in the germination of an idea, but accept responsibility for errors in this article.

A useful series of references and interesting descriptive sections about mangrove swamps appear in Robert C. West, 1956, "Mangrove Swamps of the Pacific Coast of Colombia," *Ann. Assn. Am. Geog.* 46: 98-121.

<sup>3</sup> A description of some of the coastal forms found on Puerto Rico may be gleaned from chapters 5 to 10 (incl.) of Clarence F. Jones and Rafael Pico (eds.) 1955 *Symposium Geog. Puerto Rico*, Univ. Puerto Rico Press, Rio Piedras, Puerto Rico. Map resources of considerable utility are the Army Map Service series at a scale of 1:125,000 and 1:62,500 of Jamaica, Trinidad, and Puerto Rico. Additional maps of the Greater and Lesser Antilles by the American Geographical Society and Army Map Service are particularly useful.

These swamps are absent only in those areas where shallow water in protected inlets is wholly or largely absent. Swamps vary tremendously in size. Some, such as those along the south coast of Cuba, cover many square miles, while other patches may have a maximum extent of less than a hundred yards in any direction. Similar wide variations in physiognomic classification of the trees is evident. Some are large specimens over 50 feet high, while other forms are only six-eight feet tall. In spite of areal or physiognomic differences, however, mangrove swamps apparently exert comparable influences upon the cultural landscape.

Mangrove swamps occur in low-lying coastal sections, which are covered, at least at high tide, with brackish water. The soil material is mucky and usually laden with marsh gases. Stilt roots support tree trunks of modest size in most of the Caribbean, and the tree trunks are spaced from quite close (six-eight feet apart) to widely separated (50-75 feet apart). Small animals, particularly crabs, are abundant in and about the stilt roots. The limiting effects of mangrove swamps upon human settlement within, on the landward side, and on the seaward side<sup>4</sup> should be obvious.

*Ocean Terraces.* The islands in and adjacent to the Caribbean basin have been subjected to many sea level oscillations and/or subsidence-emergence. Numerous exposed ocean terraces testify to sea level vacillation within the region. Where ocean terraces stand high on the face of exposed cliffs they have little or no bearing upon cultural forms and thus are not considered. On the other hand, ocean terraces which descend in gentle step-like sequence to or near the shore are intimately related to man's utilization of the land and to settlement forms.

Flat surfaces on the top of the wave cut bench are interspersed with sharp ascents to the terrace level above. Terraces in the Caribbean, which usually exhibit a number of levels, are roughly analogous to the tread and riser on a stairway.

*Coral Barriers.* Warm water in the Caribbean area is conducive to the growth of the coral polyp. Where water is sufficiently shallow off-shore reefs have developed. These reefs are particularly numerous off many of the lesser Antilles, the Bahamas, Cuba, and Jamaica. In some sections the reefs are continuous for miles, while in others they are fragmented and discontinuous.

Continuous coral reefs enclose quiet water in a lagoon between the reef and the mainland, while tides and waves are characteristically encountered on shore behind fragmented reefs. Landforms adjacent to coasts vary from low to high and flat to rough, but cultural forms appear to be principally related to the coral reef.

*Sand Fringes.* The term sand fringe is used to apply to off-shore bars, and to old bars now an integral part of the mainland or to disintegrated rock particles lying adjacent to the shore and extending for a considerable distance along it. Narrow strips of sand of considerable length lie immediately adjacent to the sea and may be backed by a quiet lagoon, salt water marsh, or solid material. These sand fringes are usually only a few yards wide and almost never more than a quarter of a mile in width. Sand fringes are never far above sea level and may be sufficiently low as to be subject to submergences during high tide.

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<sup>4</sup> The seaward side never exhibits any cultural feature save in those areas where mangroves occupy brackish water landward of an off-shore bar.

*Deltas.* River deltas vary in form from arcuate to digitate, and in size from small to quite large. Drainage conditions in most deltas are poor, but this is not universally true. The only characteristics of deltas common to all different types are the relatively small particle size of materials deposited and the modest local relief encountered. Heterogeneity rather than homogeneity is typical of Caribbean river deltas. Obviously, then, cultural relationships to delta coasts are less well defined and far more difficult to isolate.

*Cliffed coasts* are of two principal types. Some have cliffs plunging directly into the sea, while others have a narrow sand fringe facing the sea with the cliffs backing the beach. Both types of cliffed coasts are related, but they exhibit certain unlike cultural relationships. Many cliffs represent the seaward margins of ocean terraces, while others are fault scarps or fault-line scarps.

#### CULTURAL RELATIONSHIPS TO COASTLINE FORM

That cultural patterns are apparently strongly influenced by coastline form is incontrovertible. The suggestion that extant relationships are products of a segment of the physical environment smacks of environmentalism. The author is not attempting to resurrect environmentalism, but rather to objectively present the facts, so the reader may judge for himself why heterogeneous racial groups in comparable coastal areas of the Caribbean have reacted in very similar ways. No attempt is made to distinguish between different types of construction, house type, or other individualistic traits. Principal emphasis is placed on settlement or communications orientation and associated land use phenomena.

*Mangrove Swamp Cultural Patterns.* Except for extremely rare occasions in primitive areas, settlement within a mangrove swamp is not practical. Swamp influence is discernible however, in contiguous regions. Areas immediately adjacent to mangrove swamps are sparsely peopled. Population agglomerations are usually of village size, or less. No significant rural population exists on the landward side of mangrove swamps. Homes are poor and their occupants usually poorer.

Transportation and communications facilities adjacent to mangrove swamps are meager. Such transport routes as do exist are usually restricted to trails or cart roads, which run perpendicular to the beach line or, in those instances where a barrier bar is present, immediately along the coast. Where modern surfaced roads are present, they are constructed well landward of the mangrove swamp.

In most regions of plantation agriculture the landward edges of mangrove swamps are being systematically drained, flushed, and reclaimed for crop use. Normally such reclaimed land is planted to rice or sugar cane, since these crops do well in such regions. The mangrove trees, themselves, are utilized for fuel, charcoal making or tannin manufacture. Under the impact of man, and because of the pressure of people on the land, mangrove swamps are steadily diminishing in size.

*Coral Barrier Cultural Patterns.* Continuous offshore coral barriers apparently preclude dense settlement either on the reef or landward of it.<sup>5</sup> Other factors, such as poor soil or rough terrain landward of the reef may in some areas, exert an equally powerful limiting influence. Incomplete investigation of barrier beaches makes a completely positive statement unwarranted.

<sup>5</sup> Aerial observation along the north coast of Cuba along with substantiating maps and textual material in Levi Marrero. 1960. *Geografía de Cuba, La Habana, Cuba*, pp. 541-548, illustrate that this phenomenon is particularly true in Cuba.

Where a coral barrier is interrupted offshore substantially more cultural features are encountered. Small settlement clusters usually occur on the mainland adjacent to the break in the reef. Most such settlements are dependent upon the sea for livelihood. Trails or poor roads may lead from the population clusters to connect with the main insular transport system. Usually, however, such communications facilities are meager. This general lack of communications facilities indicates that the sea, not the land, is the focus of attention of people within the area.

*Ocean Terrace Cultural Patterns.* Ocean terraces are normally heavily settled. Houses are arranged in a heterogeneous fashion. Main transportation routes tend to parallel the beach upon the terrace. Where more than one terrace level is present occasional roads or trails connect different levels. Judging from the paucity of roads and trails movement is restricted between terrace levels. Considerable segments of level land on the terrace surface and soils frequently more fertile than in surrounding regions help to explain the dense settlement pattern.

*Sand Beach Ridge Cultural Patterns.* Relatively dense linear settlement patterns occur along the beach ridge. Almost without exception the houses are sheltered by rows of coconut palms which supply food, fuel, building material and shelter from the wind. Significantly, few crops other than coconuts will do well under such edaphic conditions.

Transportation routes, frequently primitive, follow the beach ridge and/or parallel the beach at the foot of the adjacent higher land. Only occasional roads or trails are found perpendicular to the beach.

*River Delta Cultural Patterns.* River deltas show almost as much heterogeneity in settlement form and cultural adaptation as in physical characteristics. If concrete relationships between environment and human use of the land exist in these delta regions they are so enmeshed and entangled that a more skillful eye and fertile brain than the author's is required to disentangle them.

Possibly one could connect the general lack of settlement adjacent to the main stream and distributaries to danger of flooding and disease. Unfortunately, even this generalization breaks down in the face of intrepid settlers who march their stilt houses up to and sometimes into the water. In short, it appears that there is a discordant, rather than an accordant relationship of delta coasts and settlement—cultural forms.

*Cliffed Coast Cultural Patterns.* Cliffed coasts with a narrow coastal plain normally have small settlements at the base of the cliffs above the tidal or storm zone. Settlement is non-existent on the slopes of the cliffs. If urban areas develop, they occur at points of good access to the interior, either at the foot of valleys or at the ends of the highlands. These urban concentrations apparently develop unless the water is shallow offshore, a mangrove swamp is present or river distributaries are apparent.

The primary transportation routes are perpendicular to the coast with access through deeply incised valleys or at the end of the cliffed region. Secondary cart roads and trails paralleling the shore are commonplace. Transportation routes are designed to pass through, not to, the cliffed area.

Cliffed coasts without a narrow sandy strip are lacking in settlement. Transportation routes, of negligible importance, traverse the slopes or the tops of the uplands.

## CONCLUSIONS

Coastline types, as a significant element in the physical landscape of Caribbean islands, apparently exert a major influence upon human use of land within and adjacent to a particular type of coast. No suggestion of determinism is intended, but extant relationships can not be ignored. While none of the coastline types and suggested cultural relationships are 100 per cent correlative, the high incidence of correlation is well beyond chance probability.

This paper re-demonstrates that in certain types of environments, one element of the physical landscape may assume extraordinary significance in suggesting human use. The Caribbean Island coasts have been settled for a sufficiently lengthy period to allow the inference that present human adjustment to/of the environment is essentially complete.

Whether comparable coastline-human use relationships suggested earlier in this paper exist in similar latitudes where population density and cultural backgrounds differ is problematical.<sup>6</sup> Such a problem should prove interesting and profitable to investigate.

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<sup>6</sup> Preliminary investigation in certain Southeast Asian islands in similar environments suggests comparable human adjustments to coastline forms.

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