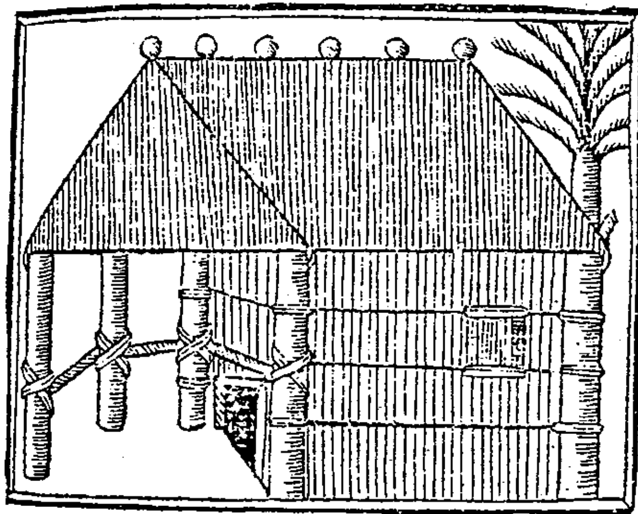

# ARCHITECTURAL HERITAGE OF THE CARIBBEAN

*An A-Z of Historic Buildings*

16 Colour plates and 120 Line Drawings

**ANDREW GRAVETTE**

*Line Drawings by Andrew Gravette and Pamela Gosner*

Ian Randle Publishers *Kingston*

Signal Books *Oxford*

Markus Wiener Publishers *Princeton*

HARVARD UNIVERSITY
JAN 0 5 2001
Frances Loeb Library
Graduate School of Design
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2000

First published in Jamaica 2000 by
Ian Randle Publishers, 206 Old Hope Road, Kingston 6
ISBN 976-8123-91-5 paperback
A catalogue record for this book is available from the National Library of Jamaica.

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First published 2000 in the UK and Europe
by Signal Books Ltd, 9 Park End Street, Oxford OX1 1HH, United Kingdom

ISBN 1-902669-08-8 Hardback
ISBN 1-902669-09-6 Paperback

A British Library Cataloguing in Publication Data record is available for this book.

First published in the United States of America 2000 by
Markus Wiener Publishers Inc., 231 Nassau St., Princeton, NJ 08540

Library of Congress Cataloging-in-Publication Data
Gravette, A. G. (Andrew Gerald)
Architectural heritage of the Caribbean: an A-Z of historic buildings /
Andrew Gravette ; line drawings by Andrew Gravette and Pamela Gosner.
p. cm.
Includes bibliographical references and index.
ISBN 1-55876-237-X (hardcover) — ISBN 1-55876-238-8 (alk. paper)
1. Architecture—Caribbean Area. 2. Historic buildings—Caribbean Area. I. Title
NA791 .G73 2000
720'.9729—dc21 00-021293

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Book and cover design by Prodesign Ltd., Red Gal Ring, Kingston, Jamaica
Cover artwork by Elizabeth Manson-Bahr

Printed in the USA

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# *Acknowledgments*

The author and publishers would like to extend their thanks to all those Tourist Boards, National Trusts, local agencies and others, which have assisted in the research for this book and contributed pictures and other material. In particular, thanks are due to the Bahamas Tourist Office, Jamaica Tourist Board, Puerto Rico Tourism Co., Saba Tourist Office and US Virgin Islands Division of Tourism, as well as Manning, Selvage & Lee on behalf of the Barbados Tourism Authority. The publishers' gratitude is also extended to Catriona Davidson for her photographs. All reasonable efforts have been made to trace the sources of those illustrations and diagrams not originated by the author. The publishers are also grateful to Passeggiata Press for permission to reproduce the drawings by Pamela Gosner from *Caribbean Georgian* on pages 23, 34, 40, 42, 43, 52, 77, 81, 111, 116, 158, 163, 189, 194, 198, 206, 213, 218, 221, 229, 233, 235, 241, 242, 244, 251, 269, 273, 303, 304, 306, 308, 310, and 312. The publishers would also like to thank John Murray (Publishers) Ltd for permission to use the extract by Patrick Leigh Fermor on page 105; and A. P. Wall Ltd for permission to reproduce the extract by Jan Morris on page 296.



*Part One*

# History and Development

## Climate and Geography

The first consideration when addressing the architecture of the Caribbean region is its weather and the prevailing conditions which affect all who live in the area. Being tropical, and ranging across 15 degrees of Latitude, the Caribbean Sea covers an area of almost 750,000 square miles, subject to strong winds and high tides, often brought about by hurricanes, when rainfall can be extremely heavy. Several of the islands are also currently volcanically active, and earthquakes periodically strike on some islands. Many Caribbean islands have both large, low-lying areas, and high peaks or mountain ranges. Some are of entirely volcanic origin, and others are comprised of ancient limestone and fossilized coral, providing a mixture of natural building materials, including wood, which once covered most of the Caribbean islands. In past days, before colonization by the Europeans, the islands in the Caribbean were carpeted in dense, high forests, consisting of ancient hardwoods and rain forest. On many islands, mangrove swamps protected the coastlines, which were often fine, sandy beaches, built up over many millions of years by the erosion of coral reefs and rocky shorelines.

The temperature and rainfall of a region are naturally vital in determining styles of habitation. The islands lie in the Tropics between ten degrees south and the Tropic of Cancer, and temperatures seldom exceed 30 degrees C (86F) or drop much below 20 degrees C (68F). The conservation of warmth is hence not a priority in Caribbean architecture, while the encouragement of ventilation

most definitely is. The low-lying islands of the region are usually the driest, with the higher terrain catching rain-laden winds, and rainfall can vary dramatically from 12 inches per month down to almost zero precipitation. This results in a marked difference in habitation styles between the drier and wetter islands as well as between the hotter islands to the south and those in the cooler north.

Another factor that features prominently in the design of shelter is wind velocity. The Caribbean is one of those regions which experiences periods of high winds. In pre-Columbian times the indigenous peoples of the Caribbean recognized the awesome power of these winds, naming the all-powerful storm *huracan*. Today, we continue to call these cyclonic winds hurricanes, often baptizing the most destructive with human names for the record. Some island architecture has evolved in a way that minimizes the damage hurricanes can cause. Often the simplest wooden houses survive most effectively, since they can be reconstructed relatively easily. And the sold stone structures built by European colonists several centuries ago continue to show their remarkable resilience, where more modern buildings prove vulnerable. Despite this, some formidable hurricanes in the course of the 1980s and 1990s caused considerable structural damage to many Caribbean islands, even where buildings were designed to withstand most onslaughts.

Two further natural phenomena are even less predictable than hurricanes and are even more difficult to protect against. Earthquakes in the Caribbean are mercifully few and far between and are mostly confined to seabed seismic activity. Yet one such quake completely engulfed the 'pirate capital' of Port Royal, Jamaica, in 1692, while Santiago de Cuba has intermittently been subject to earth tremors. More destructive perhaps have been volcanic eruptions. Two eruptions, at either end of the 20th century, have marked Caribbean history, the first at St Pierre in Martinique destroying an entire city and its population in 1902. More recently, the eruption of Montserrat's Soufrière Hills volcano from 1995 onwards has caused loss of life and enormous disruption, putting the future of this tiny British colony in doubt.

Fire, too, has been the scourge of Caribbean architecture. There is hardly a town or city in the region that has not at one time been engulfed by fire, encouraged by strong winds and primarily wooden buildings. Towns such as Castries in St Lucia have been repeatedly razed to the ground, sometimes quite deliberately in the course of conflict. Haiti lost much of its 17th- and 18th- century architecture in the tumultuous civil war between 1791 and 1804.

Past geological action and the varied vegetation of the Caribbean have hence contributed to the style of architecture on each island. Building materials include different sorts of wood according to what is – and has been – available, including local hardwoods and palms. Stone ranges from soft coral limestone to extremely hard igneous rock, while fossil coral rock is also used as a building material in the larger islands of the Greater Antilles and Barbados. Imported materials have added variety to local resources, and the region's architectural repertoire encompasses iron, bricks, tiles, marble and granite.

The biggest influence, of course, is man, and human activity, social and economic, has reshaped the original wilderness of the Caribbean into what we know today. It remains a primarily agricultural region, as it was from within a few decades of European colonization, and industrial development has been restricted to a few larger islands, such as Cuba, Jamaica and Trinidad. There are fewer than twenty towns or cities with any significant population in the whole of the Caribbean, and many people continue to inhabit small villages or towns. The largest city is Havana, with over two million inhabitants. Conversely, on Haiti, less than a quarter of the population live in an urban area.

## Before Columbus

The mainland of South America has been occupied by humans since 30,000 BC, from which time the first evidence of human settlement dates. Wooden stakes, lashed together and found in Monte Verde, 500 miles south of Santiago de Chile, are considered to be the remnants of America's first settled habitations. The first arrivals on the southerly islands of the Caribbean came from the Orinoco River region of what is now Venezuela. Unrest in the social structure of the tribal make-up there precipitated a northerly migration of forest-dwelling tribes into the Caribbean Sea.

For over 6,000 years, the indigenous peoples of South America had lived in comparative harmony with nature, undisturbed and unaware of the worlds and civilizations beyond the great seas to the east and west. In pre-Columbian times, to the east of the forest

regions of tropical South America, Arawak tribes inhabited the river basins of the Orinoco and the northern Amazon. In appearance, these dark-haired, cinnamon-coloured jungle-dwellers, were comparatively short, with round faces and almond-shaped eyes. They lived in thatched huts, made of bent branches, covered in leafy boughs; they slept in hammocks, cultivated certain plants for food and medicine, created clay ceramics, and travelled in canoes made from deftly carved tree trunks. Their slash-and-burn agricultural practices meant that their villages were relocated at regular intervals as the forest soil fertility had a limited time-span. Edible roots and tubers like cassava, wild beans, groundnuts, wild fruit and vegetables, supplemented their varied diet, including those plants that they cultivated. The Arawaks lived off the land, stunning parrots from the trees by burning pepper under their roosts, shooting wild game-birds, peccaries, tapir, forest deer, monkeys, iguana, snakes and fish with powerful bows and arrows, using natural poisons. These forest tribes had few enemies; the word Taino (a sub-division of the Arawak people) meant 'men of the good'. Their only fears were of their gods of nature, forest snakes and the panther, until the advent of the most dangerous of all animals – man, in the image of the Carib.

It was from the forests to the south-east of the Orinoco, in the depths of Amazonia, that the warlike tribes of the Warru and Caribs emerged. The Caribs were shorter than the Arawaks, copper-coloured, with wiry black hair cut in a fringe-style around the head. Their homes were temporary, leaf-covered frameworks of rounded branches. They settled only briefly in jungle clearings and generally followed the trails of the animals which they hunted with blowpipe darts and bows and arrows, using the poison curare to kill their prey. This people allegedly engaged in cannibalism – the word is derived from their name – but evidence suggests that this was a purely ceremonial practice, intended to pass on to victorious warriors their dead victims' qualities of bravery.

It is not known what prompted the tribes to infringe on each other's territory. However, a time came when the aggressive Caribs, driving north from the Amazonian floodwaters, began turning their weapons on their neighbours. Eventually the unwanted attentions of the Caribs forced the forest-dwellers to drift north from their homelands.

For many generations, the Arawaks slowly moved north, until around the same time as the Romans began subduing the English, in about 100 AD, the Arawaks reached the Caribbean coast of South America. These peaceful tribes, pursued by the Caribs, then began a saga of island-hopping from the south to the north. The transportation they used was the Amerindian canoe, often containing up to 200 paddlers. For two centuries, the Caribs relentlessly harassed the fleeing Arawaks, pursuing them through the island chain, until, around the third century AD, the first of the hunter-gatherer tribes reached the islands of the Greater Antilles, now Puerto Rico, Hispaniola, Jamaica and Cuba. It was here that the Arawaks, followed by the Tainos (a people of Arawak extraction), found the vast forests of the islands, ideal refuges from the warring Caribs. A wave of Tainos reached the larger islands in around 700 AD, with another group arriving in 1250 and yet another in around 1450. By the end of the 15th century, the Caribs were beginning to make raids on Puerto Rico and Jamaica, although they never established a permanent footing in either island.

The Arawaks having brought with them their hunting, fishing, and gathering skills, and the Tainos their ceramic expertise, the two peoples settled down to recreating their lifestyles from their South American homeland. With them came the basics of survival, including their foodstuffs, cooking methods and living styles, which adapted ideally to the conditions which they found in the Caribbean islands. They discovered, however, that they were sharing the islands with two much more primitive groups of cave-dwellers who had arrived more than 4,500 years before. These were known as the Ciboney and Gunahatabey Amerindians, a people who dwelt mostly in caves and coastal caverns, living off shellfish. The Tainos co-existed in harmony with the Ciboney on each of the larger islands of Puerto Rico, Hispaniola and Cuba, both always wary of the predatory Caribs. On the Bahamian archipelago lived the Lucayans, another people belonging to the Arawak group, who were peaceful and skilled at fishing and boat-building.

Even with the advent of a number of migrating peoples, from both the Central American mainland and particularly from the Arawak river cultures of South America, little changed on the Caribbean islands. Almost impenetrable forest clad every island with soil enough to support it, and many islands were ringed with a protective barrier of mangrove. Early human occupation did little to alter the forested nature of the Caribbean islands.

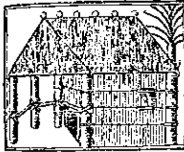
The end of the 15th century saw the Caribbean islands divided between the Lucayans living on the Bahamas, the Taino, Arawak, Ciboney and Guanahatabey occupying those islands in the far north of the Caribbean – Cuba, Hispaniola and Puerto Rico – and the ferocious Caribs living in the Lesser Antilles and close to conquering some of the larger islands. When Europeans arrived in the region, they discovered a variety of peoples living in an assortment of habitations, all designed and adapted to the special conditions of the Caribbean.

We have mostly cursory descriptions of how indigenous communities lived from contemporary reports by the earliest Europeans explorers. On his first voyage to the New World, in 1492, Christopher Columbus sent two of his men on a brief excursion into the interior of Cuba, meeting with Arawak tribespeople and noting their particular style of housing. Columbus was also the first European to visit the coast of South America on his third voyage in 1498. Although he did not land on that coast, his companion, the Spanish navigator Alonso de Ojeda explored the coastline extensively the following year. Probably the most accurate description of Amerindian dwellings was made by Sir Francis Drake, when, in the late 1500s he made several expeditions to the north coast of South America, detailing the indigenous way of life. His diarist recorded in words and pictures leaf-thatched, woven cane-walled huts, with conical roofs.

Over several thousand years, indigenous Amerindian domestic buildings had evolved very slowly. In an area in the north of South America, the Paraujano tribes lived in *barbacoas*, or stilt houses, built over the water. It was during the 1499 excursion by Ojeda's Italian navigator, Amerigo Vespucci, that he remarked on these dwellings that apparently (and improbably) reminded him of Venice and led him to name the area Venezuela or 'little Venice'. A related Arawak society also existed on neighbouring Aruba and had evolved communities of similar communal stilt-houses, known as *ajoupas*. There were also the *caneyes*, or conical, pointed-roofed, thatched family huts, favoured by forest-dwellers, and *carbets*, or large, round, palm-thatched communal huts, used by more sedentary peoples. The *kabays*, or *mouina*, tent-shaped, thatched dwellings without windows, but with a single, small entrance, easy and quick to erect, were the preference of forest tribes such as the Caribs who were constantly on the move.



## The Bohío



The most distinctive dwelling of the Amerindians was the *bohío*, a rudimentary hut, but so perfectly compatible with the Caribbean climate that the basic design was to influence Spanish Caribbean architecture for the next 500 years. Arriving in the islands, the Arawaks had found the terrain and flora to be markedly different from the dense jungles which encroached on their original habitat. Mountains, hills, and open plateaux replaced the monotony of South America's flat riverside jungles. The materials available for constructing houses were also different to those to be found on the mainland. Even the sixty species of palm tree differed substantially from the trees of the Arawaks' South American homeland. Dominating much of the Caribbean landscape, was the stately Royal Palm (*Roystonea regia*). It was around this magnificent tree that the Amerindians' distinctive architecture was woven.

The groups of houses which Columbus and his band found on Cuba and Hispaniola, the second large island on which he landed on his first voyage, were bohíos, made entirely from parts of the Royal Palm and providing all the raw materials from which the perfect shelter could be constructed. The collection of indigenous constructions had a design evolved over many centuries and as ideally suited to the Caribbean climate as the Spaniards' own *haciendas* were to the European climate. The Royal Palm has a straight, silvery trunk which can grow to 100 ft, culminating in an exuberant burst of green fronds, or *pencas*, which sprout with every new moon from their thick green bases, known as *yaguas*. The palm's trunk was found to be resistant to insect attack and rotting, yet was easy to carve and shape.

Primitive bohíos were initially rounded huts formed of posts, with either woven walls or walls made of reeds or straight sticks, lashed or sewn together between the posts. The roofs were conical, formed of palm frond thatch or reeds. As it evolved, the basic design of the indigenous houses resembled the traditional tent shape. A rude ridge framework was initially constructed out of strips of the palm's trunk, a dense, fibrous material which has enormously supple qualities. Open at both ends, this framework was thatched with the palm fronds. The triangular open ends of the tent-shaped hut were then filled with walls made from strips of the yaguas, the thick palm frond bases, which are elastic and waterproof. These were woven

*The Bohío*

together with lengths of fibre, stripped from the centre of the palm frond and from strips of the palm's bark. The front wall of the bohío included a doorway which could be closed with a square frame made in the same way as the walls.

Some of the migrating Arawaks brought with them their design for stilt houses built over the water on lakesides. These communities found that the Royal Palm also provided excellent materials for this house design, the barbacoa. Even the stilts were fashioned out of the Royal Palm trunk, a wood which became stronger as it absorbed water and was resistant to rot. These barbacoas were two-storey structures, with the living quarters on the top platform and another platform at water level, used during the day for working and preparing food. This lower platform also served as a canoe mooring and a place for fabricating fishing nets and weaving fish traps, and ladders connected the two levels. The stilt-based barbacoas were linked to each other and to the land by wooden walkways and woven bridges. More than 500 years later, when some Cuban families were dividing the high-ceilinged rooms of Havana's early colonial mansions into two levels because of overcrowding they named the family units barbacoas.

In a climate where fierce sun necessitated cool shade, tropical downpours of torrential rain made shelter vital, and the uniquely Caribbean hurricane made protection from high winds essential, the Amerindian bohío proved ideal. It was as cool, dry and almost as wind-proof as those caves and grottoes which the early Ciboney Amerindian tribes had originally inhabited. It took a short time to construct, and all the building material came from just one source. So perfectly adapted to the Caribbean climate was the design of the Amerindian bohío and the materials from which the primitive structure was made, that, many years after the indigenous population had been exterminated, the bohío remained a feature of the landscape of the Greater Antilles.

## First European Settlement

The first European settlers were mostly, but not exclusively, Spanish. They had come with Columbus in 1492 from such diverse European locations and environments as Catalonia, Estremadura, the Basque region, Galicia, Andalusia, France and Italy. From the high plateau of Spain to the Mediterranean coastlands, from the mountains of the Sierra Nevada to the low estuaries of the Atlantic coast, the new settlers were used to their regional house styles, which all differed according to the local climate. Once in the Caribbean, they were faced with an architectural challenge.

Confronted with the rigours of a tropical climate, but, most importantly, with a potentially antagonistic indigenous people, the colonists were forced to make immediate decisions. How would they structure their first settlement in the New World? Would it be modelled on the villages in their homeland Spain, or designed to adapt to the pressures of the local environment? Here, the workforce – and the natural resources available – took precedence. Their predicament, in any case, was dire. One of their three ships had been wrecked; they had landed off a sandy beach, on a reef-bound shore on the north coast of what Columbus had named Hispaniola, (the part now known as Haiti). The local Arawaks, seemed peaceful (they were later provoked into violent hostility), and the building force and materials were both limited.

The coastal area to be built on was wooded, with dense forest down to the sea. The builders were shipwrights and indigenous villagers, the area to be developed needed possible fortification, and not one of the new arrivals had any experience in construction. Columbus decided to commandeer a small Amerindian village, close to a river, as the area was already cleared and could be easily defended. The first solution was to retrieve, with the assistance of the Arawaks, the timbers of the wrecked *Santa Maria*, Columbus's flagship. With the timbers from the small ship, the Spaniards were able to construct a basic stockade. This consisted of a palisade of wooden stakes as a defensive ring around a small area of ground near the river, with a square, timbered structure forming a fort. Columbus grandly called the first Spanish settlement in the New World, La Navidad, or Christmas, as it was founded on the day the settlers first said Mass, Christmas Day. However, most of the dwellings, except for the small fort, were native bohíos.

La Navidad survived for just a few months after Columbus had sailed back to Spain. The 39 European defenders of the little settlement were soon killed by warriors from the indigenous communities whom they had abused and provoked beyond endurance, and when Columbus arrived back the following year, he found the village burned and razed to the ground. Columbus then selected a new location on which to build a stronger and more permanent

township, a short distance to the east, on a little bay. The Spaniards on Columbus's second voyage in 1493 numbered some 1,200 sailors, soldiers, builders, farmers and specialists in numerous other trades, a contingent designed for colonization. It was decided to build this second settlement from stone. Within a few weeks, the new town of La Isabela had a church, a storehouse, and a public meeting place, or town hall, all built of stone. There is no remaining evidence of the design of these first European buildings in the New World, but it is documented that the living quarters were all made of wood and thatched with palm leaves and grass. Unusually, the settlers did not wall in their town or build any defensive structures.

A hurricane devastated La Isabela in 1495, and the Spanish colonists decided to abandon the site, which was found to be unhealthy and mosquito-ridden, and establish a new town on the south coast of Hispaniola, on the banks of the Ozama River. Bartolomé Columbus, the Admiral's brother, moved the entire Spanish contingent to a place he named Nueva Isabela, later to be called Santo Domingo, in 1496.

## Adapting the Bohío

As the process of colonization gathered pace, Spanish homesteaders adapted the traditional Amerindian bohío to their own designs. Settlements spread outwards from Santo Domingo and into the other islands of the Greater Antilles. In Cuba, the Spanish conquistador Diego de Velázquez established the first seven European townships of Baracoa, Santiago de Cuba, Bayamo, Puerto Principe (now Camagüey), Sancti Spritus, Trinidad and Havana. Around these centres, settlers began to cultivate the land, while others prospected for precious metals.

With a shortage of building materials in the countryside with which to construct stone or adobe houses like those in Spain, farmers or *campesinos* adopted the design techniques of the Amerindians. As the Spanish were more used to houses with walls, they first imbedded four corner posts in the planned rectangle of their house. Four walls were then constructed between these corner posts in the same way, and of the same material, as that which the Amerindians had used to construct the walls of their bohíos. A framework of lathes made from strips of the Royal Palm trunk was erected above the walls, with sides sloping outwards from a central

*Adaptations of the basic Bohío*

ridge. From the ridge downwards, the palm fronds or pencas provided an excellent thatch, proven over centuries by the Amerindians. The ridge was then neatly finished by interweaving with fibres from the centre of the palm's pencas. A doorway was naturally left in one side of the oblong bohío and a door fitted which hinged on loops made from the same material.

As time passed, this mud-floored, one-roomed hut was stylized to include a rude window, and the walls were sometimes daubed with mud or clay. In some cases, the walls were composed of a latticework of twigs and branches, covered in wattle and daub and then whitewashed to resemble more closely the style of house that the Spanish settlers were used to in their homeland. Some bohíos were made large enough to incorporate divisions, making two or more rooms. However, the basic design of the one-roomed bohío predominated. These can still be seen in more remote rural areas of Cuba, Hispaniola and Puerto Rico. They have no sanitation, and many still have only a packed earthen floor. But some campesino bohíos are now fully fitted out and some even have air-conditioning and television.

The demand for more space and comfort gradually produced a further modification to the original bohío design. The next major architectural refinement was the addition of a verandah or porch to the front of the structure, giving shelter above the doorway and single window, if any. This was made by erecting two or more poles a few feet out from the front wall of the hut, and extending the thatched roof out to the supports, strengthened by the framework of palm lathes and lined underneath by lengths of yaguas. Usually this addition to the roof had a much shallower pitch than that of the main roof. Soon, the Amerindian bohío became Hispanicized, looking very similar to basic farm buildings in the remote countryside of Spain.

The more ingenious small farmers added a low wooden platform under the porch, sometimes creating a small enclosure around the

*Shingled* case

front of the bohío with railings. Some homesteaders built low walls around the verandah, creating a small area in which they could sit in the cool of the evening after a day's work on the land. Nevertheless, the basic style remained, the roof still being thatched with palm fronds. Yet even this gradually changed as some carpenters fashioned roofing tiles from the trunk wood of the Royal Palm. The more wealthy, and those who had access to imported tiles, built their roof extensions from ceramic tiles. In some places, where clay was available, these tiles were replaced by locally-made Spanish-style interlocking tiles. In some cases, wooden slates or rough shingles were used as a cheaper tiling material for the verandah overhang. But many owners kept the thatched main roofs, finding the insulation more comfortable, efficient and economical than covering the entire roof with tiles.

In other parts of the Caribbean, the basic bohío walls were later replaced by wooden planking or shingles, and often a wooden floor would be added, usually raised off the ground. Raised floors were particularly important in those islands where vermin, and especially snakes, were prevalent. Thus, the original bohío became the standard blueprint for the basic home or *case* throughout the region. Moreover, the design was found to stand up to quite high winds, whereas the modernized version, with wooden walls and tiled or corrugated iron roofs, was less resistant to Caribbean squalls and hurricanes. It was soon discovered that during high winds the airier style of the early bohío allowed the air pressures on the outside and inside to equalize, whereas the closed construction of the newer case could disintegrate in a hurricane.

On the outskirts of townships, where there was access to more sophisticated building materials, farm workers built their own particular version of the bohío. Constructed in much the same way as the indigenous dwelling, the workers used wooden planking to build the walls of their houses, incorporating a railed porch. With board planks forming the walls, it was also much easier to incorporate windows and also a more conventional doorway. These buildings were often divided internally into two or more rooms during their construction. Wooden-planked flooring was also added, sometimes even incorporating a rear, as well as a front, porch. With the advent of corrugated iron, some builders used this material for roofing, even though palm fronds and tiling remain popular roof materials to this day.

Settlement of the Lesser Antilles was piecemeal, beginning with the arrival of the English, French and Dutch in the mid-17th century. Small, European-style buildings were built in the little trading or farming communities which sprang up. Most of these structures were timber-framed, wattle and daub, or tapia-walled dwellings. Most were single-storey with windows and doors, and a small window under the ridged roof at both ends. The main difference between these European dwellings and the bohío was that indigenous builders used unfinished boughs for their home's framework, where the Europeans cut and shaped their timber with metal tools. The walls, in the case of the bohío, were also formed from vegetation, whereas the walls of the Europeans' buildings were more solid, with mud and stone infill. Many European homes were thatched in the same way as the bohío, although some were roofed with tiles imported as ship's ballast.

## Building in Stone

Back in Columbus's first permanent settlement of Santo Domingo on Hispaniola, the experience of fire damage and the vulnerability of wooden structures turned Spanish architects to consider stronger structures. They also wanted to recreate the familiar buildings of Spain in their new lands. By the early 1500s, the Spanish also had recruited a large number of slaves, mostly indigenous men, who could be instructed to quarry local stone building blocks. The first stone structure in this town was the Church of the Virgin of the Rosary, erected in the original location of Nueva Isabela, across the river from the present city. The second important building was the military Tower of Homage, begun in 1502 after the settlement was shifted to the west bank of the Ozama. In 1507, the first brick-built building in the Americas was constructed from ballast brought over on trading galleons. This edifice, La Atarazana, was built as an arsenal and a customs house, and the following year, the first hospital, the St Nicolás de Bari hospice was built.

However, it was not until 1510 that the first stone house was built in the New World, proving that the Spanish adaptation of the traditional local building style proved adequate and comfortable for at least the first twenty years of European occupation. The Alcázar, America's first European palace, was completed in 1514 from massive blocks of coral limestone. It took 1,500 Amerindian and

*Building Santo Domingo*

Spanish worker almost four years to build the Alcázar, Don Diego Columbus's house, which was designed in a mixture of Gothic, Mudéjar and Italian Renaissance styles, with 22 rooms and 72 doors and windows.

## Three Architectural Styles Evolve

The early Spanish preponderance for constructing towns in their new colonies in the Caribbean originated from the need to defend their settlers, firstly from the indigenous population, and later from itinerant raiders, pirates and hostile navies. The main towns of all the colonial islands were built around a military or religious centre, with the administrative buildings ranged around a square or plaza. The houses of the rich faced into a cathedral or church square, with lesser buildings occupying a characteristic grid system of streets branching out from these squares. Almost all were built in a coastal location, usually with the advantage of a harbour and port. One topographical feature which figured in the selection of a harbour settlement was a protective promontory. The promontory, usually with a high headland known as a *morro*, was ideal for defensive structures such as those of San Juan and Havana. Havana was a classic natural location, with a deep, wide bay to one side of the town and a narrow entrance that could be easily defended. Bays of this nature were known as *bolsas* or bags, because of their narrow mouths.

The architecture of the Caribbean's colonial towns and cities varies considerably. From the earliest Spanish settlements on the three main islands of Cuba, Hispaniola and Puerto Rico, to the British, French, Dutch and Danish occupancies in the smaller islands, architecture generally reflected the European mode of the time. Some of the earliest architectural styles can be seen in the Dominican Republic, with Gothic, Romanesque and Plateresque influences dating from the early 1500s. Spanish Baroque of the late 17th and early 18th century is also well represented on the larger Caribbean islands. The British, for their part, brought their stately Georgian and Victorian architecture to many of the smaller islands, while the French, Dutch and Danish imported elements of their homelands, ranging from French roof styles to traditional Dutch and Danish gables.

Outside the Caribbean's towns and cities, the very nature of the islands dictated rural architectural development. Being predominantly agricultural economies, two separate styles of building development emerged. As the demand for natural and raised products like logwood dyes, hides, tallow and timber overtook the initial gold-rush of the 16th century, the population not involved in the exploration and exploitation of Central and South America, turned to the land. Peasant farming saw a growth in isolated housing and an infrastructure of small villages. These buildings took their architectural style from elements of indigenous building combining them with imported techniques.

Within the first century of European occupation, the fertile soil and ideal climatic conditions of the Caribbean islands were found to be perfect for the raising of sugar cane. Because of the extensive way sugar cane is cultivated and its labour-intensive harvesting, enormous swaths of forest were cleared to provide space for the plantations. Many thousands of square miles of forest gave way to cane fields on Hispaniola, Puerto Rico and Cuba, spreading in the course of the 17th century to almost every cultivable island of the Caribbean archipelago. The massive encroachment of the sugar industry throughout the Caribbean brought with it a peculiar architectural style unique to the crop. The sugar plantation was to influence the entire development of the Caribbean islands and its population.

During the 16th and 17th centuries settlers in the Spanish islands had been concentrating on raising herds of cattle, cultivating tobacco and producing timber. However, the growing market in sugar, as well as the burgeoning trade in supplying molasses to the newly established colonies in North America, brought a new interest in the potential of the four largest Caribbean islands. The small sugar estates were quickly enlarged, and more forest was felled to make way for the cane fields. In the early 18th century, European financiers ploughed money into the development of vast sugar cane plantations throughout Cuba, Hispaniola and Puerto Rico. In return, many *peninsulares*, or Spanish-born colonists, became extremely rich. By the middle of the 18th century, sugar plantations had spread to every island of the Caribbean and sugar became 'King' in the region. The sugar baron hierarchy was established and was to rule the land for the next three hundred years.

Planters also developed other cash crops, such as coffee, cacao, cotton, citrus fruits, dyes, spices, herbs, and pharmaceutical products. Every crop was accompanied by its own specialized architecture, housing the processing machinery as well as the workers, estate owner or manager. No crop, however, had such an impact, architecturally, as sugar.

By the end of the 16th century, then, there were three distinctive architectural trends in the Caribbean. The colonial towns and cities had styles derived from the European trends of the time. The plantation introduced the first industrial-scale architecture, concerned with mass production and technology. And the peasant style of building was established, owing its origins to the indigenous inhabitants of the region. From these three areas evolved a new, Caribbean, style of architecture, drawing on a vast gamut of influences. Spanish, British, French, Dutch, Danish, Swedish, Italian, African, Asian, and American styles all lent something of their own to the new synthesis. In some cases, buildings almost identical to those of the immigrants' homes were constructed in the Caribbean. In others, domestic style was modified to suit the tropical climate and environment. Occasionally buildings evolved independently from any influence outside the Caribbean.

It is difficult, therefore, to discriminate, and say that the architecture of the Caribbean either begins with the advent of Europeans or with the introduction of Africans, or that Caribbean style evolved entirely from indigenous building and construction methods. The Caribbean is as much a melting pot of architectural styles as it is a meeting of the cultures, beliefs, languages, habits and social structure of the Caribbean peoples themselves. It is a pot-pourri of architectural styles, evolved by the close juxtaposition of cultures from around the world and with a piquancy of its own, the Caribbean touch, making it unique in the world.

Rock, but the better preserved great house here dates from 1815. Eden Brown Estate was built in about 1740, but was never occupied and is reputed to be haunted. Its grand mansion and sugar mill are now in ruins. At New River village there is a sugar factory dating from 1800, and there are a string of other mills on the island, like Dasents and the windmill at the Zetlands plantation. Three more windmills were built at the end of 19th century: Dunbars, Hanely and Powells. There are also eight steam engines, used in the sugar business, at Hamiltons, Prospect, Cane Garden, Hardtimes, Fothergills, Maddens, Farm Estate and at Round Hill.

Many of the shingle walled cabins or *cases* stand on stilts made from blocks of volcanic stone, with shuttered openings for windows and shingle roofs sporting low peaks. Each peak represented the addition of a new room to the original dwelling. Thought to be one of the oldest wooden house in the Caribbean, the wood-shingled Hermitage plantation house dates from 1740. The original lignum vitae hardwood frame of the central living space can still be seen. Later additions include the square, pavilion-like kitchen building. Four, square-cut pillars support the roof of the tiny porch of this two-storey structure, which is approached by stone steps, leading up to a wide, double, glazed door, and twin windows. A little gingerbread fretwork embellishes the porch, and an upper-floor sash window is set under the gables of the shingled house front. Side windows have lattice covers and storm shutters. The internal ceilings are timber-beamed, and the upper-floor ceilings are open to the roof, with intricate cross beaming. Louvred doors open onto a side gallery. The many additions to the original house have created a complex of structures in various styles. In front of the house is a large, round, water cistern, fed by pipe from the guttering, and an ancient water filter.

Elsewhere on the island, the few other points of architectural interest include the ruins of the Cottle Church, built in 1824, the first chapel where slaves were allowed to worship with their masters. St James's Windward, near Hick's Village was built in 1679 and contains one of the only three crucifixes with a black Christ in the entire Caribbean. St George's Church at Gingerland was originally built in 1670. Near the airport in the north of the island, the little village of Newcastle contains some picturesque houses. Nearby is the Redoubt, a fort built to withstand Carib attacks in the early 17th century.



## PUERTO RICO

There are few places in the world which can rival Puerto Rico's Spanish colonial architectural heritage, and in the Caribbean, the Dominican Republic and Cuba have lacked the resources to renovate their buildings to the same extent. Benefiting from its 'free and associated state' (some say colonial) connection with the US, this third largest island in the Greater Antilles has the best preserved Spanish colonial sites in the Caribbean. The influx of tourist income has also contributed to maintaining not only the capital's historic quarters, but to the conservation of architectural heritage throughout the island. Evidence of Amerindian construction can be seen at Caguana. Colonized by the conquistador Juan Ponce de León in 1508, the island was first named San Juan Bautista, and the bay on which the island's capital was founded was called Puerto Rico, or Rich Port, reflecting the founder's anticipation of the island's wealth. Later, the island's name was exchanged for that of the bay, and the capital became known as San Juan.

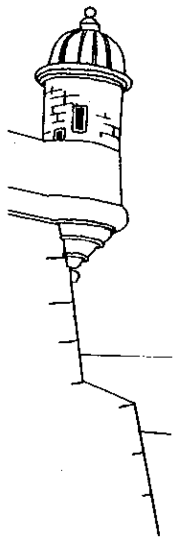
### San Juan

The old city of San Juan is a UNESCO World Heritage Site, recognized in 1983. UNESCO has named six historic monuments of importance in the old city, which contains around 800 Spanish colonial buildings, of which more than 400 have been restored in recent years. The colonial centre is located on a narrow peninsula and some streets are paved with blue-grey *adoquines* or cobble stones which came to the New World as ballast in Spanish galleons. From its founding in 1510, San Juan was constantly a target for attacks by Caribs, pirates, privateers and various navies. The city was relocated to its present position after the original settlement was abandoned. The old city is situated on a small island and was connected to the mainland by a causeway, the Puenta de San Antonio, for security.

From its inception until the early 1800s, San Juan was first and foremost a military town. Military architects designed the fortifications and city walls, which embraced a seven-square-block area of the islet. Churches, residences and official buildings also grew up here until, in the mid-1800s, space ran out. This part of San Juan was laid out around fine plazas, and virtually all of its earlier architecture remains. As this was a military sector, the central square was the Plaza de Armas.

This was the most easterly of Spain's settlements in the Caribbean and therefore the most vulnerable, although it was protected by La Fortaleza, dating from 1520, and a later, stone-built fort, begun in 1532. The tower and gate date from 1540, when the fort was completed, but most of the architecture dates from the 1800s. The Fortaleza, one of six UNESCO sites, is San Juan's oldest fort, once known as Santa Carolina. It has a mosaic- and marble-lined chapel, medieval towers and stained glass galleries, and contains a mahogany staircase. Once used as a bullion store but primarily the Governor's Palace, the structure was a failure as a fort, and construction of the larger San Felipe del Morro fortification began as soon as the Fortaleza was completed. Drawn by the rumour of two million ducats worth of gold stored in the fort, Sir Francis Drake stormed the Fortaleza from the sea in November 1595. The 25-cannon firepower of the Morro, however, proved too much for Drake's fleet, and it was left to the Duke of Cumberland to take the prize from the landward side in 1598.

The English occupied the Fortaleza for just eight weeks before losses, due to an epidemic of influenza, drove them home. The Dutch, under Boudewijn Hendrikzoon managed to land their forces between the Morro and the Fortaleza in 1625, setting fire to the fort and much of San Juan, before retreating. In 1640, the Spanish began reconstruction of the fort, and, by the 1650s, San Juan became the main Presidio of Spain's New World colonies, with seven forts linked by stone walls surrounding the city. The Fortaleza was expanded in 1800 and again in 1846 and has forty rooms. This is still the Governor's residence, as it has been for more than 400 years, and is therefore the New World's longest inhabited executive residence. A total of 170 island governors have lived here.

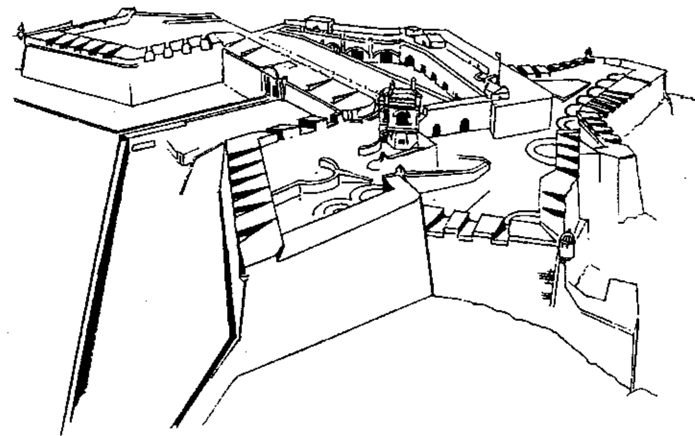


zan at the San Felipe 'orro fort, San Juan

The vast Castillo San Felipe del Morro fort on the headland dates from 1540, when the first gun battery was installed. The famous Italian military architect, Juan Bautista Antonelli, devised a six-level gun emplacement, replacing the original 25 cannon in 1589, and the fort was strengthened again in 1591. After the successful defence of the city against Drake's aggression in 1595, the Morro fortress was captured only once, three years later.

The Dutch were repelled in 1625 and the present building was given its final shape and design in 1783. It rises 140 feet above the sea and contains a complex of bastions, underground tunnels and chambers. A moat, now dry, surrounds the fort, and a massive





*San Felipe del Morro*

arched step-flanked ramp gives access to the lower ramparts. This section of the fort is called the Santa Bárbara Bastion. Dome-capped corner watch-turrets (*garitas*) are typical of Spanish military architecture and project from the steep angled stone walls, which are twenty feet thick, giving an all-round view and providing for unimpeded defensive fire. The fort was last attacked in 1898 during the Spanish-American War when the highest point of the fort was destroyed. It has been rebuilt as the Port of San Juan Lighthouse and is a national historic site, administered by the National Park Service. Between the Morro fort and the sea is the San Juan cemetery, with its 19th-century circular chapel.

The massive city walls, another UNESCO site, had six gates and encircle the old city. They were begun in 1630 and form one of the most complete examples of Spanish colonial fortifications left in the New World. Sandstone blocks, cemented together by a mortar of limestone, sand and water, went to build two parallel 42-foot high walls. The gaps between the blocks were filled with sand, and the walls were slanted as a protective measure, ranging in thickness from twenty feet at the base to twelve feet at the top. The walls surround the seven blocks of the old city and are punctuated by fortresses, garitas and city gates. The Puerta de San Juan is the oldest of the town's entrances, dating from 1520, and still protected by huge wooden gates.

The Castillo San Cristóbal, also a UNESCO heritage site, was added to the city's defences between 1766 and 1772 on the site of an older fort, built in 1678. It was then reworked in 1783, rising to

a height of 150 feet. This fort guards the eastern side of the old city and is built to a classic design, with five independent bastions, each linked by a moat and a tunnel, surrounding a main keep. Each bastion was designed to be self-sufficient. Cannon are strategically placed around its 27 acres of ramparts, tunnels and arches. The impregnable system of battlements, passages and sub-forts was reputedly devised by two 'Wild Geese' Irishmen, fleeing religious oppression in their homeland. Alejandro O'Reilly and Tomas O'Daly designed their intricate arrangement to ensure that the fort could not be taken until the ramparts were first secured. Henceforth, the fort was never attacked. The San Cristóbal Fort is the second largest Spanish fortification to be built in the New World, just five acres smaller than the Cabaña Fortress in Old Havana.

Fort San Jerónimo was added to the city's defences in 1788. Located at the islet's eastern tip, this fort was damaged in 1797 by an English attack and rebuilt in 1799. It was restored in 1983 and is now a military museum. Outside the walls to the south is the arsenal, dating from 1800, and once the old Spanish naval base. The Bastion de las Palmas on the town walls also protected the city, and the fort of El Cañuelo was built from 1608 on the Isla de Cabras opposite El Morro to command the sea channel.

San Juan's San José church was begun in 1530 and is the second oldest and finest episcopal edifice in the Western Hemisphere. This beautiful but austere building, with its plain white-plastered walls, took a century to construct. Coral stone walls and Romanesque arches support the domes and remarkable vaulted ceilings of the medieval-designed chapel, which are ochre-tiled. Once the convent chapel of the Dominican monastery, San José is one of the best examples of Gothic church architecture in the Americas. The church contains six side chapels, including the beautiful Rosary Chapel. Originally dedicated to St Thomas Aquinas, Ponce de León's family adopted the church as their place of worship, and it was later to be Ponce's last resting-place in 1559. After he died in Florida and was returned to Puerto Rico, the conquistador's remains were interred in San José church before being removed to the city's cathedral in 1908. Ponce de León's coat of arms hangs over the altar, and a 1797 statue stands in the nearby Plaza de San José, cast from English cannonballs dating from an unsuccessful attack that year.



Building of the Dominican Convent next door began in 1523, and this edifice housed the New World's second university (after Santo Domingo). In 1598 the Duke of Cumberland studied here during his brief occupation of San Juan, and the Dutch used it as officers' quarters in 1625. The interior has a spacious patio with double-columned arched cloisters, forming a gallery around the inner courtyard. The library has been restored to its original 16th-century appearance, and the building, now home to the Institute of Puerto Rican Culture, contains an ornate 18th-century altar and early artefacts. To the west stands the attractive Cuartel de Ballajá, the 1864 barracks, stone-built in Classical style with an attractive staircase and large patio. It once housed soldiers and cavalry horses.

The two-storey and balconied house next to the San José church houses the Pablo Casals museum. The famous cellist resided in Puerto Rico for the last 16 years of his life, from 1957 to 1973, and the museum is a celebration of his contribution to cello music. The Casa de los Contrafuertes (the Buttress House) is in the immediate vicinity. So called for the wide buttresses which support the wall next to the plaza, this early 18th-century building is said to be the oldest private house in San Juan. It is now a museum and includes a pharmacy. Just north of the Buttress House is the Callejón del Hospital, or Hospital Alley, one of the last two remaining stepped streets in the old city.

The Governor's mansion, Ponce de León's crenellated Casa Blanca, was built in 1523. The Casa Blanca is a fortress-like residence, built on the site of an earlier wooden-framed structure dating from 1521 by Ponce de León's son-in-law. The conquistador himself never lived in the stone house, as he left on the fatal expedition to search for the legendary Fountain of Youth in Florida. This is one of the city's oldest buildings and is now a museum of archaeology. Furnishings include a throne and contemporary furniture. Ponce de León's descendants lived in the house for around 250 years. Nearby, the Casa Rosa, a beautiful example of Spanish colonial architecture, was built by the military in 1812. The Casa del Cabildo or Alcaldía (the first Town Hall) on Calle Cristo was constructed between 1604 and 1789. It is designed with a double arcade and balconies, flanked by two towers, and has a grand inner courtyard. It was intended to be a reconstruction of the Alcaldía in Madrid. The building has the additions of a double-arcaded facade, coral stone arches and a staircase leading to a huge assembly room,

which opens out onto an arcaded balcony. It stands adjacent to the Plaza de Armas, one of the city's oldest squares. The Bishop's Palace, now the Diputación Provincial, dates from the 18th century and also stands on the Plaza de Armas, decorated with 19th-century bronze statues of the four seasons. Once a parade ground, the plaza now contains fountains, bandstands and stores. Also on the square is the old Royal Treasury and the 17th-century jail and barracks, now occupied by the Real Intendencia, a building in neo-Classical style erected in 1851.

The cathedral of San Juan Bautista dates originally from 1521 and had a thatched roof. Work was halted by hurricanes until its Gothic interior was built in 1540. All that remains of the original 1540 structure are its four Gothic-vaulted chapels and the beautiful circular staircase. The interior's main features are this rare wheel staircase and the marble tomb of Ponce de León, brought here from San José church in 1908. The present structure, with its high triple-stepped Classical facade, was built in 1802. Three red-and-white cupolas top the beige-and-white stuccoed edifice.

*an Juan Cathedral and El Convento*



The nearby Carmelite Convent was constructed in the 17th century and is now a hotel (El Convento), with arched balconies around the inner courtyard, checkerboard tiled flooring and a dining room in the old chapel. The Episcopal Palace originally dates from the 16th century, was burned by the Dutch in 1625 and was rebuilt in 1733. The statues in the Plazuela de la Rogativa, where the Convent stands, commemorate a British retreat of 1797 from the city. The invaders, it seems, mistook a priest and his torch-bearing followers for a band of Spanish reinforcements. The monument was donated to San Juan in 1971. The San Juan Museum of Art and History is housed in the attractive old building nearby, constructed as a marketplace in 1855.

The Capilla de Santo Cristo was built in 1753. A legend surrounds the silver altar, dedicated to the Christ of Miracles. In 1753, two suitors, competing for the love of a local beauty, raced around the city on horseback. One of the youths' horses plunged over the cliff near the site of the chapel, and the young man miraculously survived the fall, although suffering terrible injuries. A witness to the accident promised to build a chapel near the precipice, should the young man's life be saved. Opposite, the Casa del Libro, or House of Books, in an old 18th-century house, contains an exhibit of over 5,000 volumes, some printed before the 16th century. A beautiful Spanish colonial mansion next door houses the Museum of Art of Puerto Rico, while the imposing Aduana, on Plaza de Hostos, is home to the Customs Authority. Almost overpowering the Plaza de Hostos is the Banco Popular de Puerto Rico building, dating from the 1930s. The art-deco facade, complete with eagle cameos, is distinctive for its tall windows with prominent mullions. The Princesa was once a prison, but is now used by the Tourist Board, and the old Spanish hospital, built in 1877, now serves as the City Archives and General Library. It was also once used as the city jail.

The Plaza Colón has a statue of Columbus dating from 1893, faced by the 1832 Tapia Theatre, named after a local dramatist, Alejandro Tapia y Rivera (1826-1882). It was originally financed by a one-cent tax on every loaf of bread sold, but its recent restoration cost 300 times the price of the original building. On the east side of the square is the city's Old Casino, built in around 1890 in the style of a Louis XIV mansion. It has a copper cupola and an elegant ballroom, with an elaborate plasterwork ceiling and twelve-foot chande-

lier. Not far from the Casino is the Casa Olímpica, or Olympian House, a handsome neo-Classical building dating from 1914.

On Calle Fortaleza is the 18th-century house of a merchant, known as the Casa del Callejón, now a museum. Two separate exhibits occupy this building: the Colonial Architecture Museum contains much information on old San Juan's buildings, and the Museum of the Puerto Rican Family displays the lifestyle of a typical family from the 19th century.

Old San Juan is a delight to walk around. The houses in the old city's seven blocks are pastel-painted in blues and yellows, with white fenestration and doorways. Old iron gas lanterns add authenticity to the steep, narrow alleyways and plazas, paved with adoquines. Houses display decorative wrought-iron railings and balconies, with louvred and sometimes shuttered windows. Inner courtyards are a feature of most of these old town houses, many surrounded by galleries, reached by colourfully-tiled staircases. The Casa San José, now a hotel, is a typical *San Juanero* town house, with three storeys of wooden balustrades around an inner courtyard, reached by a tiled stairway. Inside, the Mudéjar ceilings set off the marble checkerboard tiled flooring and antique furniture. One of these houses, on Calle Luna, is listed as the oldest whorehouse in the New World.

Outside old San Juan, the large urban area includes expensive modern suburbs, hotel strips and sprawling low-cost housing projects. On the edge of the colonial zone, the Capitolio, modelled on the Capitol in Washington DC, with its white pillars, dome and dramatic rotunda, was built by local architect, Rafael Carmoega in 1925. East of San Juan, the cream-and white-San Patricio Church is one of the island's oldest parish churches and dates from 1645. It is the earliest church in continual use on Puerto Rico. The University of Puerto Rico was founded in 1903 in Río Piedras, and the town itself (now part of the urban conurbation) was founded in 1714 with its imposing church of Nuestra Señora del Pilar.

**Bayamón** is the site of the island's oldest sugar mill, and its interesting buildings on the Barbosa Pedestrian Mall, including the 19th-century Barbosa House, have decorated porches. The Central Park contains some distinctive historical buildings. The neo-Classical City Hall is now a museum, and the Catholic church dates from the 18th century. Shortly before Bayamón on the highway from San Juan is Caparra, the first European settlement founded by Ponce de León in 1508. There is a museum here, as well as the remains of the original fort.

On the west coast of Puerto Rico is the island's third town, **Mayagüez**, with several sites of architectural interest. The Plaza Colón was set out in 1760 with the foundation of the town and contains 17 bronze statues, including one of Columbus which originally came from Barcelona. The Classical Alcaldía or Town Hall and Roman Catholic Church face the square. Both the domed Yaguez Theatre and the old Post Office are historic buildings, and the Custom House dates from the 1920s.

Picturesque **San Germán**, south-east of Mayagüez, is the second oldest settlement on Puerto Rico. After several attempts at finding a secure location, the first as early as 1512, the town was eventually founded in the foothills of the mountain range in 1573. San Germán was named after the second wife of King Ferdinand, Germaine de Foix, and is the second city to be included in the National Register of Historic Places. Largely unspoilt, the town's charming white colonial town houses surround paved plazas. Dominican friars built the Porta Coeli Church in Spanish Baroque and Gothic style in 1606. Located on Parque Santo Domingo, this is the oldest church site under the US flag and one of the few pure neo-medieval churches existing in the New World. Brick steps lead up to the church, which contains an original palm wood Mudéjar ceiling supported by ironwood beams and an ancient balcony. The vast church doors are of timber surmounted by a pediment containing a batten skylight of the same wood. The pews and altar are all original, and the altarpiece was painted in the late 18th century. The chapel was restored in 1878.

In San Germán are some fine examples of 16th- to 18th-century Spanish houses, once the homes of wealthy coffee barons. They contain some of the best examples of hand-carved mediopuntas, the lacy, half-screen room dividers. There are several recognizable architectural styles: 1850s Spanish colonial, 1880s criollo style, early 20th-century neo-Classical style, 1930s art-deco, and from the 1960s, international style. Once called the two most beautiful homes on the island, the Acosta y Fores House is of traditional criollo timber construction, dating from 1917, with stencilled walls in each room, while the 1920s Juan Ortiz Perichi House, designed by Luis Pardo Fradera, contains a curved balcony and pitched roofs over its multilevel design. The Tomás Vivoni House, named after

its architect, dates from 1913 and contains Queen Anne style elements, a tower and gables.

**Ponce**, the 'Pearl of the South', is Puerto Rico's second largest city, located on the south coast. The city contains some interesting old Spanish colonial style houses and boasts no fewer than 1,000 historic buildings, 600 of which have been restored. Two monumental bronze lions by sculptor Victor Ochoa guard the entrance to the old part of the city. Ponce's central plaza is made up of the Plaza Degetau and the Plaza Muñoz Rivera, with the Spanish-influenced Cathedral of Nuestra Señora de Guadalupe on the site of the original 1670 church. The pillars are Classical, and its twin towers are surmounted by rounded silver domes.

Here there is a beautifully restored neo-Classical town house dating from 1899, the Casa Armstrong-Poventud. It is fronted by caryatid columns and contains a display of furniture through the

*Cathedral of Nuestra Señora de Guadalupe, Ponce*



ages. This is the earliest example of neo-Classical architecture in Ponce. The 1911 Casa Salazar, is an architectural gem, combining Moorish and neo-Classical styles, with porch balconies, interior patios, wood and iron columns, vitrales, fixed jalousies, mosaics and pressed-tin ceilings. It is now the Museum of the History of Ponce. The Casa Seralles, is also in neo-Classical style and dates from 1911. The Casa Wiechers-Villaronga is one of the best examples of neo-Classical house styles, crossed with Baroque embellishments such as mouldings and garlands, Ionic columns and art-nouveau railings. It was built by the architect Alfredo Wiechers in 1912. Both Calle Cristina and Calle Mayor are notable for the wrought iron work and decorative balconies of their buildings.

The old Fire Station behind the cathedral dates from 1883 and was built for an agricultural fair. Behind its striking red-and-black facade, featuring arched windows and towers, cornices and crenellations, the interior, with its beautiful staircase, has been lovingly restored. The most important modern structure is the city's two-storey Museum of Art, designed in 1965 by American architect, Edward Durrel Stone, the architect of New York's Museum of Modern Art. It features hexagonal rooms, a patio with a fine wooden central staircase and a fountain. The 19th-century criollo Bertoli Calderoni House contains the Museum of Puerto Rico Music. The neo-Classical Teatro la Perla, fronted by six classical columns, is the work of the Italian architect, Bertoli, and dates from 1864 and was reconstructed in 1940.

On the shoreline are a number of old warehouse buildings, but the wealthy of Ponce built their mansions up on El Vigía hill. A good example is the 1933 Castillo Serrallés, built in typical Spanish revival style with Mudéjar influences around a beautiful courtyard. The interior wood panelling and the unusual dining room, with its heavy carved mahogany and wrought-iron doors, add to the opulence of this classic sugar baron's villa.

Elsewhere on Puerto Rico, there are several architectural attractions, North of Ponce is the old coffee plantation of Hacienda Buena Vista established by Salvador de Vives in 1833. The two-storey estate house, with its exquisite patio, is lavishly restored. The upper floors are entirely of wood, with native *ausubo* (ironwood) beams, and are bordered on three sides by a balcony. The plantation and its machinery were renovated by the Conservation Trust of Puerto Rico in the 1980s. It is now a working museum of the coffee

industry, operated by a network of water channels which turn a system of waterwheels, powering the pulping, fermentation, rinsing and crushing machinery. A rice milling machine, cotton gin, and a corn mill were added in the mid-1800s. The entire complex consists of the estate house, corn and coffee mills, a masonry storage shed, which was used as a hurricane shelter, and slave quarters. A similar coffee plantation house, dating from the 1780s, is Hacienda Gripinas, now a *parador* or hotel located in Jayuya.

Puerto Rico contains a good many churches of interest to the architectural historian. The 19th-century Spanish colonial church at **Lares** has an unusually arched roof, and the red-roofed single-naved church of **Barranquitas** has a single campanile lodged to the left of its simple scallop-pedimented facade. The white-and-beige church of San Felipe at **Arecibo** has a single bell tower above the facade and an unusually large cupola at the far end of the nave. **Coamo**, famous for its hot springs, was founded in 1538 and has an 18th-century church with large buttresses and vaulted naves. The elegant masonry house nearby is now a museum. Nearby, the ruins of a hotel built here in 1848 as a spa resort can be seen as part of the newer parador.

In the plaza at **Cayey**, the 1813 church has an unusually long nave, a curious single square tower, and the transept is overlooked by the church's dome. The Cathedral of **Caguas** has been severely damaged by numerous hurricanes, yet its 1856 facade still stands opposite the Alcaldía. The Cathedral of Our Lady of Monserrat at **Hormigueros** is one of the most spectacular in the country. Rising above the town, its stepped, ivory-coloured towers soar up to crimson-red domes, topped with simple white wooden crosses. The sedate church at **Guayama** is perfectly proportioned, with twin, square-topped bell towers, each with four bells flanking a small-domed central portico and facing a broad walkway with its large stone fountain. Here also are some highly decorative old Spanish colonial buildings, with ornate wrought-iron terraces, decorative rejas, and fretwork mediopuntas. Some of the walls of these buildings are opulent with highly sophisticated stucco and appliqué work.

There are eleven important lighthouses around the coast of Puerto Rico and on its offshore islands. Some are of historic architectural interest. On the north-easternmost point of the island at **Las Cabezas de San Juan** is the restored neo-Classical building of El Faro lighthouse, dating from 1882. Exactly diagonally across the island, on the furthest point in the south-west, the **Cabo Rojo** lighthouse was also built in 1882. The lighthouse at Arecibo has been restored as a museum and dates from the 1890s, as does that at Punta Tuna, which is still in operation. On the tiny island of **Culebrita**, near Culebra, is one of Puerto Rico's oldest stone-built lighthouses; still operational, it dates from 1874. **Vieques**, lying some seven miles east of Puerto Rico is mostly owned by the US military, who use the island for bombing practice and other manoeuvres. Its finest building is probably the plantation great house, known as the Casa del Francés. This beautifully maintained building, with its Palladian frontage and silver roof tiles, looks like a sumptuous New England residence.

## SABA

So different from the other five islands of the Dutch Antilles, this tiny speck in the ocean is a sheer volcanic mountain surrounded by cliffs, and therefore was not settled until a party of Dutch came here from St Eustatius around 1640. The earliest buildings were destroyed in landslides and hurricanes, and although the English occupied Saba for some years, no substantial structure was built here until the foundations of the Presbyterian Church were laid in 1775. Some of the earliest buildings surviving on the island are its Dutch-built cottages.

Cottages on Saba are unique in the world. The houses are of a simple, uniform style, built on plinths of volcanic stone, with wooden plank walls and *wallaba*-wood shingled roofs. Often painted white and picked out in primary colours, with red-painted roofs, the basic design was probably initiated by shipwrights, and almost every house is built to a rigid plan. Shipbuilding was once a major industry on Saba, and much of the construction of the woodwork is typically joined with mortise and tenon joints, fitted together with wooden pegs. Often a terrace fronts the house, oblong in shape and single-storey, with a stone-walled garden. The kitchen area is usually of stone, with brick chimneys, and vaulted stone cisterns collect rainwater. The 'rock oven' is a typically Saban feature and is built outdoors for barbecuing pig. Windows are usually of the sash variety and protected by storm shutters, often painted in green and white. Decoration is usually balustrading on