

FREEPORT-LUCAYAN TOWN.



FREEPORT & LUCAYAN TOWN, GRAND BAHAMA ISLAND.

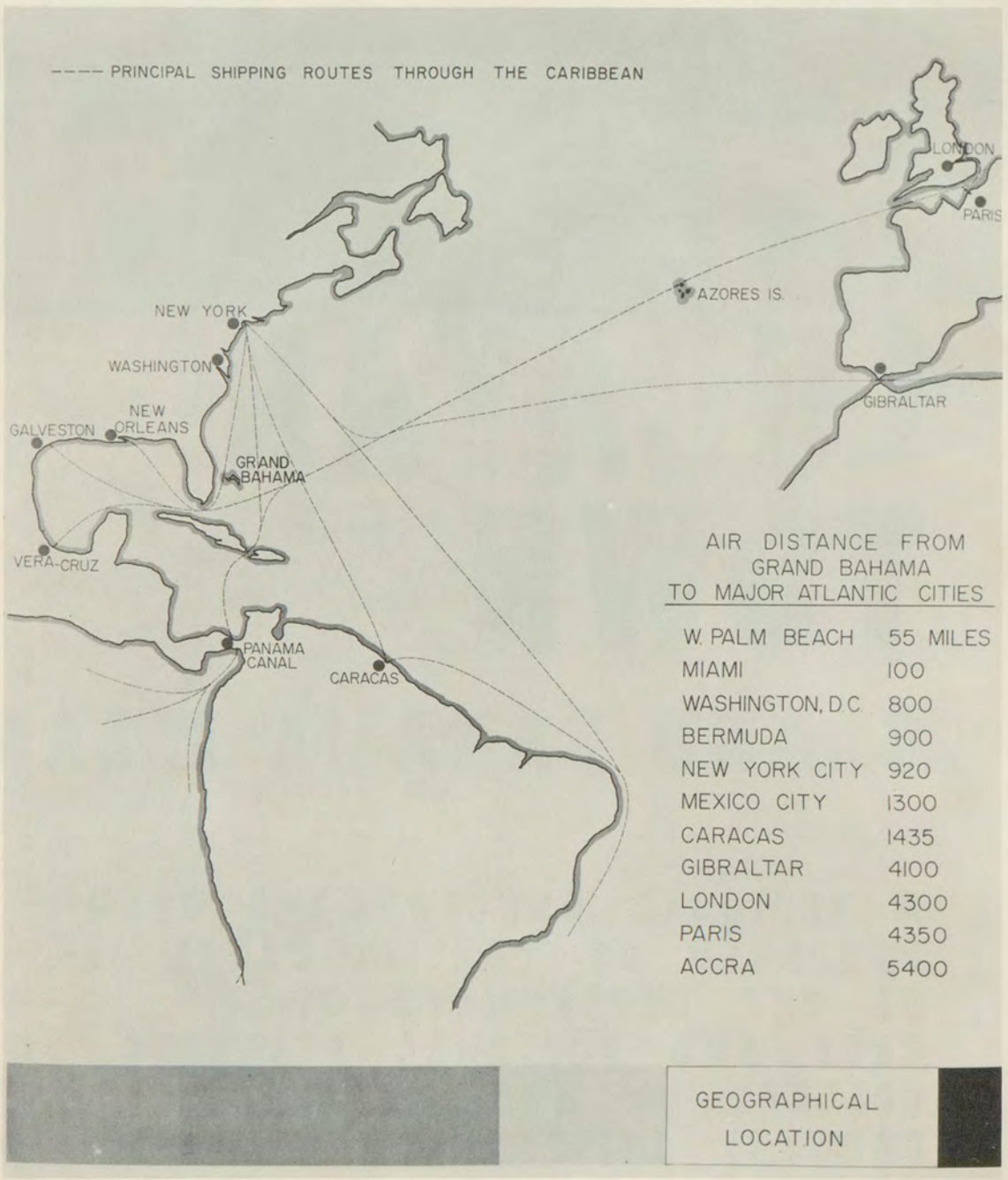
A REGIONAL DEVELOPMENT PLAN
PREPARED BY THE STUDENTS
OF THE DEPARTMENT OF
CITY AND REGIONAL PLANNING,
COLLEGE OF ARCHITECTURE,
CORNELL UNIVERSITY.....FALL 1960

FOREWORD

In 1955, when the idea of a free port in the British Colony of the Bahamas was first given concrete support, Mr. Wallace Groves, an American businessman who had long been interested in the Bahama Islands, persuaded the then Governor, The Earl of Ranfurly, and certain others to back the creation of an industrial complex on the Island of Grand Bahama. A Port Authority, with Mr. Groves as Chairman, was established to guide the development of the Island and 50,000 acres were leased for a term of 99 years from the Bahamian Government, thus beginning a new era of challenge and expansion in the Bahama Islands.

The agreement between the Grand Bahama Port Authority Ltd. and the Government of the Bahamas was ratified in "The Hawksbill Creek, Grand Bahama (Deep Water Harbour and Industrial Area) Act of 1955", an Act written to allow for maximum development possibilities. Originally, the Port Authority was granted 50,000 acres for development, with an option on an additional 50,000 acres, plus the opportunity to purchase another 1,500 acres which, at the time of the enactment, were privately owned. Since then the Bahamian Government has granted the Port Authority an option on a further 30,000 acres and the area of the free port can be again enlarged at any time with the consent of the Government.

The port itself is 71 miles from the Florida coast and the location of Grand Bahama Island relative to surrounding territories may be seen on the accompanying map.



The Freeport Authority has dredged and constructed a deep-water harbour at Freeport. The basin is 30' deep which is large enough to handle the world's largest ocean-going vessels and it is slightly larger than the natural harbour now located at Nassau. Dredging and enlarging of the harbour will be necessary in the future to accommodate anticipated traffic. In conjunction with the harbour, Gulf Oil has established and is now operating an off-shore refuelling station with a capacity of 7,500 barrels per hour.

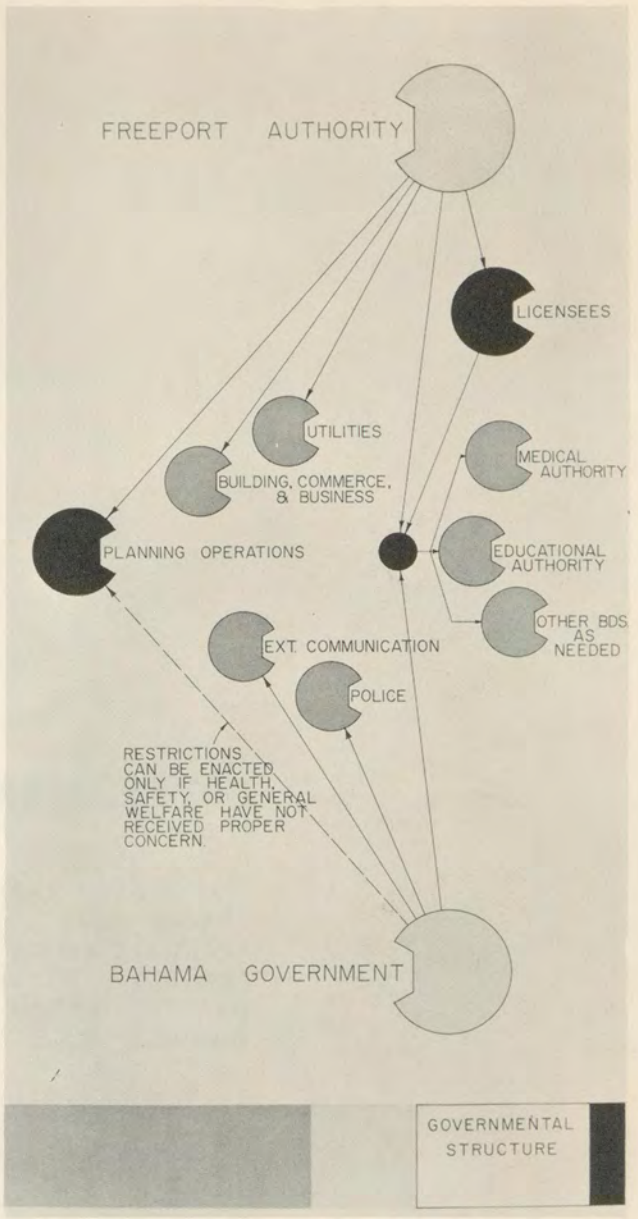
The demand for bunkering facilities has caused the Company to increase storage and mooring facilities considerably. The changes will enable the company to handle the largest vessels afloat. A 15 year oil supply contract has been signed with the Gulf Oil Company and with the bunkering terminal only in its beginnings, it can be well anticipated that in the future it will be handling much more oil than at present. In fact, the possibility exists that Freeport may become the largest bunkering terminal in the Western Hemisphere. (It probably has the largest throughput of any single bunkering installation in the Western Hemisphere at present.) The supply of cheap fuel now available will also be a major factor in ensuring the industrial development of Freeport.

TABLE OF CONTENTS

	PAGE
FOREWORD	2
PART 1.	
ADMINISTRATION	5
GOVERNMENT ORGANIZATION AND LAW	6
HISTORICAL BACKGROUND	7
PART 2.	
GEOGRAPHY AND GEOLOGY	13
CLIMATOLOGY AND METEOROLOGY	14
BIOLOGY AND NATURAL RESOURCES	16
ECONOMIC BASE	19
INDUSTRIAL DEVELOPMENT	20
TRANSPORTATION AND COMMUNICATIONS	24
SOCIOLOGY	27
PART 3.	
PHILOSOPHY	29
GROUP 1, PROPOSAL 1	30
GROUP 2, PROPOSAL 1	31
GROUP 1, PROPOSAL 2	32
GROUP 2, PROPOSAL 2	33
PART 4.	
REGIONAL PLAN	36
AGED POPULATION	38
TOURIST ACCOMMODATION	41
CENTRAL BUSINESS DISTRICT	42
INDUSTRIAL PARK	43
RESIDENTIAL AREAS	44
RECREATIONAL AND COMMUNITY FACILITIES	46
UTILITIES AND SERVICES	49
PROPOSED MUNICIPAL GOVERNMENT	50
CONCLUSION	51
BIBLIOGRAPHY	52
ACKNOWLEDGMENTS AND CREDITS	53



PART 1 - CONDITIONS & CIRCUMSTANCES



ADMINISTRATION

The Port Authority

General development rights, covering the construction of roads, buildings, housing, commercial areas, schools, utilities, etc., were granted to the Port Authority. The Authority has also been empowered to license private individuals who wish to participate in the development of Freeport, the Port Authority or a licensee having the right to bring trained or skilled personnel into Freeport as needed in the operation of business although the Government maintains the right to deny entry to anyone on the grounds of personal undesirability. Unskilled labor, however, is to be recruited from Bahamian persons. If the Authority or its licensees should be unable to recruit adequate unskilled labor, they must ask the Colonial Secretary of the Bahamas to recruit such workers within 30 days and, if such workers can then not be obtained in the Bahamas, they may be imported from anywhere.

The original agreement between the Port Authority and the Bahamas, except in certain particularly specified circumstances, was to remain in force for 99 years from the effective date, August, 1955, (later the term of contract was extended 5 years) and the area granted under the Act included the land surrounding Hawksbill Creek on the island of Grand Bahama with rights also to adequate seabed underlying the Creek, this seabed being given on condition that the area was dredged and a deep-water harbour constructed. In 1957, the Port Authority agreed to undertake the construction of the port and the harbour to the specifications set forth in the original act.

The Bahamian Government is responsible for maintaining law and order and for providing police protection and external telephone, telegraph and postal services. Telephone service within the Freeport area will be provided by the Port Authority, as well as metered electricity and water and other utilities. (Details of the provisions of the Act referring to communications and utilities will be discussed in later sections.)

The Port Authority and its licensees have been granted the sole right to plan the development of the area and there is no need, therefore, for applications of any kind to be made to the Bahamian Government in connection with works carried out there. The Government, likewise, cannot impose any restriction on development provided proper concern by the Authority and its licensees for health, safety, education, and general welfare has been manifested. Furthermore, if the Government should desire to change the basic agreement between itself and the Port Authority before the date of expiration, it would have to consult the Authority and each licensee so that, by this stipulation, any one licensed to operate a business or to practice professionally within the Freeport area is protected from any future changes which might prove detrimental to his interests. An additional advantage to this stipulation is that it ensures the stability of long-term planning proposals.

The Port Authority has control over all the port facilities and business operations conducted within the port area are limited exclusively to the Port Authority and its licensees. Industrial restrictions and conditions are made only by agreement between the Port Authority, its licensees and individuals concerned. Furthermore, the Port Authority and its licensees have the right to carry on and engage in all kinds of business.

According to the original terms of the Act, as long as the agreement is in effect, no customs duties or taxes of any kind normally imposed on imports (other than items imported for personal use)shall be levied. In addition, no taxes of any kind (income or corporate) shall be levied for at least 30 years from the amended effective date.

GOVERNMENT ORGANIZATION & LAW

The Bahama Islands is a crown colony in the British Commonwealth of Nations. As a result of a liberal British policy, the Bahamas largely conduct their own affairs and the Government of the Islands is patterned after that of England. The Governor, as the official representative of the Queen, is the executive head of state and is appointed by the Crown for a renewable 3-year term. He is advised by a nine-man Executive Council which is staffed by the Attorney-General, Colonial Secretary, Receiver-General and Treasurer (who serve as "ex officio" members) and five non-official members, the latter group being members of the House of Assembly. The five non-official members are, thus, official spokesmen for the Governor and the Executive Council in the House of Assembly and vice versa.

The House of Assembly is an elected body of a representative assembly, in that the members represent the seventeen districts of the Bahama Islands. The members of the House are elected for 7-year terms, although the Governor may dissolve the House at any time and call for new elections. Suffrage is granted to males only and voting is conducted by secret ballot. In practice, the Out Islands seldom return members of their own community and the members of the House are generally residents of New Providence. The House introduces all financial legislation in the Bahamas, although the Governor may suggest financial legislation he would like passed. The Speaker of the House is its presiding officer. He is elected by the members of the House and votes only in case of a tie.

The Legislative Council (an upper house similar to the House of Lords) contains nine members, who are appointed by the Governor and confirmed by the Crown. Members of this body serve 10-year terms. The Legislative Council cannot amend financial legislation; they can only accept or reject it. (This shows the real power of the House, because rather than taking the responsibility for rejecting financial legislation, the Legislative Council will normally pass the measure "under protest".) On all legislation other than money bills, the Legislative Council can amend, as well as accept or reject, the legislation. The President of the Legislative Council is appointed by the Queen upon the recommendation of the Governor. Although members of both the House and Legislative Council introduce bills, a substantial amount of legislation is also introduced by the Executive branch.

The various departments of the Government are under the administration of the Governor and Executive Council. Many of the departments are controlled by boards appointed by the Governor and are fairly autonomous in nature.

The Out Islands are administered by an Out Island Department, headed by a Chief Out Island Commissioner. Each of the seventeen districts has a Commissioner who is a minor government official and the chief administrative officer of his district, which often includes being the local magistrate.

The judiciary operates completely independently of the executive and legislative branches of government. It is divided into two parts: the law offices, headed by the Attorney-General, and the Supreme Court, headed by the Chief Justice. The law enforced in the colony consists of: 1. the Common Law of England, 2. Acts of the English Parliament extended to the colony, and, 3. statutes of the Bahamas Legislature.

The jurisdiction of the Supreme Court of the Bahamas is equivalent to that of a High Court of England. An appeal, in civil matters, goes from the Supreme Court to the Judicial Committee of the Privy Council. The Supreme Court sits throughout the year as occasion requires; but sessions are held quarterly for disposal of criminal cases and civil actions listed for trial by jury.

There are two Stipendiary and Circuit Magistrates stationed in Nassau and appeals from their courts go to the Supreme Court. Magisterial powers are also exercised by Commissioners in charge of Districts in the Out Islands and by some Justices of the Peace empowered to try cases singly. Appeals from these courts go to the Stipendiary and Circuit Magistrates who conduct a circuit from time to time among the Out Islands to hear any appeals and to dispose of such cases as are triable only, in original jurisdiction, by a Circuit Justice. The Stipendiary and Circuit Magistrates, Commissioners and, where so empowered, Justices of the Peace, are also responsible for conducting preliminary inquiries into indictable offenses triable by the Supreme Court.

HISTORICAL BACKGROUND

The Bahamas is a group of islands that, historically speaking, have been of little importance but which have probably contributed more color, ribaldry and intrigue to the history of the Americas than any other country. Through its waters have passed conquistadores, pirates, slave-traders and rum-runners, creating a culture that is as complex and unique as it is exciting, but leaving islands and bays that are as unspoiled and idyllic today as they were when first discovered.

The Spanish Era

On October 12, 1492, Christopher Columbus and his crew on their maiden voyage became the first white men to glimpse the semi-tropical paradise of the Bahama Islands. According to Columbus' personal diary and to other sources, this momentous occasion seemed like stepping backwards in the pages of history to the Garden of Eden. The Spaniards were immediately surrounded by outrigger canoes filled with ignorant, unclothed, yet charmingly simple and benevolent Lucayan natives, with whom they quickly cemented relationships by exchanging gift for gift.

Taking with him a few of the inhabitants to act as interpreters, Columbus continued sailing about the Bahamian archipelago, touching the islands of Rum Cay, Long Is., Crooked Is., and the Ragged Isles, but not sighting Grand Bahama. When Columbus and subsequent Spanish conquistadores began exploiting the Indies, the Lucayans of the Bahamas were left to their native pursuits and the aboriginal islands were spared the plundering and cruelty of supposedly civilized man until 1509, when Governor Ovando of the Spanish colony of Hispanola treacherously induced the entire population of 40,000 Indians to leave their home for service in the hell of the Spanish gold mines in Haiti. The Indians believed the ships of the Spanish to be winged, ethereal creatures which would carry them off to the Happy Isles to meet those of their number already departed and by playing on these superstitions the Spaniards, within five years, tricked all but a handful into moving to Haiti, thus ending the saga of these island people.

In 1512, the Spanish explorer Ponce de Leon set out to search for the elusive Fountain of Youth of which the Indians frequently spoke and, passing amongst the western islands of the Bahamas, he met an old woman apparently marooned as an apparition upon a tiny cay. She told him of the fabulous isle of Bimini to the north where ran waters that bestowed upon their bather the gift of eternal youth and so de Leon eagerly continued northward, skirting Grand Bahama and finally landing on the east coast of Florida. (The Fountain of Youth for which de Leon was searching is probably one found on the island known today as Bimini. As to its mystical properties, bathers report that they come out cleaner, but not any younger.) On his charts he marked the island of the old woman, called in Spanish, La Vieja, and so the fable of La Vieja and Bimini spread even to the ears of the English.

Of the Lucayans taken to Haiti, only some two hundred survived the forced labor in the Spanish mines and, as a people, the Lucayans disappeared entirely. Francis Drake reported on visiting the Bahamas in 1585, that the islands were unpopulated but later reports indicate that possibly even today there are a few scattered natives living in the unexplored areas of Andros Island. The islands, which were not attractive financially to the Spanish because of their lack of natural resources, were left in a no-man's-land between the Spanish colonies to the south and the English colonies to the north.

Era of English Colonization (1629 - 1779)

It is unquestionable that the British had sighted the Bahamas prior to 1629, when they laid actual claim to them because they had lain dormant under Spanish rule for over a century. The Bahamas were to be administered together with the Carolinas under the original British charter given to Sir Robert Heath, Attorney General of England, by Charles I in 1629, covering that "Territory in America betwixt 31° and 36° North Latitude" including specifically, "The Islands of Viejus (i.e. Vieja) and Bahama, and all other islands to the south."

In 1648, because of overpopulation in Bermuda, a certain William Sayle led an expedition of seventy Puritan "Adventurers" to the island of New Providence in the Bahamas but, finding that another group of Bermudians had preceded him there, Sayle continued to the island of Eleuthera, which later became the most productive island in the Bahama colony.

At first the poor soil conditions of the islands forced many of the original Bermudian settlers, unable to live on the meagre returns of their farms, to return north and charity food and clothing were sent to the survivors from New England and Jamaica. The picture, however, was not entirely bleak. New settlers from England came and prospered in the braziletto wood trade and from the "providential wrecks" of merchant ships caught on the nearby shoals. Sayle, realizing the colony would not survive without help, asked the Proprietors of Carolina to take over the islands but they did little to rehabilitate the Colony beyond establishing a system of government. John Wentworth was appointed governor in 1671, and Nassau became the new center of activity.

The result of the ineffective government and the low level of economic development was the growth of piracy. The Bahamas soon became a center from which the pirates carried on their trade, attacking even English ships and those of the Proprietary government while the American colonies had to institute a system of convoys to protect their ships. The situation rapidly deteriorated for, by 1700, the government was under direct control of the pirates. The famous Blackbeard instituted an Assembly and a judiciary system with himself as judge and the colony was known throughout the Indies as the New Pirate Republic.

A number of governors came and went, mostly dishonest and incompetent although several were good administrators. Governor Trott, for example, built Fort Nassau, rebuilt the church, and had plans drawn for the new "Citty of Nassau." Governor Clarke, on the other hand, protected the pirates and encouraged them to prevent the Spaniards from diving for booty on the galleons sunk in the waters near New Providence. So harassed were the Spaniards that they made constant attacks on Nassau and, in 1680, they razed the town and literally burned Clarke alive on the spit. But the pirates returned after every attack.

In 1703, during the War of Spanish Succession, the French burned Nassau and the Spaniards carried off all the slaves and settlers who did not escape "to the bush." Once again the pirates returned and became so uncontrollable and brazen as to offer the Governor of Jamaica £20,000 to pardon them.

Following the sacking of 1703, Birch was appointed the next governor but, on arrival, he found no one on the islands; so after a few days lonely vigil in the woods of New Providence, he returned to England. In 1718, in answer to the many protests about piracy originating in the Bahamas, King George I appointed as governor, Captain Woodes-Rogers, a notorious pirate, on the assumption that "one theif can better catch another."

Piracy in the Bahamas

The Bahamas had for a long time remained a sanctuary for men of dubious callings, including those who responded to the thrill of flying the Jolly Roger. The reasons for piracy centering in the Bahamas were several. In the first place there were ideal harbours among the unexplored cays and ample provisions of fresh water and fruits -- all the pirates needed to provide was their own grog. In the second place there was heavy commercial traffic nearby from the Dutch, Spanish, French, and English galleons which could be easily plundered. But the real reason seemed to be that the governors of the Bahamas such as Lilburne, Clarke, and Rogers learned that piracy could be personally profitable if they cooperated and so the pirates were sheltered.

At any rate, literally thousands of pirates collected in the Bahamas during the seventeenth century for mutual defense against or out of mutual hatred for the Spaniards. Men such as Avery, Vane, Hornigold, and the celebrated Edward Teach -- better known as Blackbeard -- were local celebrities. Of all those who eventually drifted to Nassau for protection or adventure, none has a story which better reveals the lure of piracy than a female pirate named Mary Read. A female pirate is always a strange thing but, in Mary's case, it was even stranger because, as Captain Johnson's extremely delicate account in A General History of the Pyrates reveals, no one knew of her sex.

Illegitimate daughter of a London tavern-maid and left to fend for herself at an early age, Mary took ship to America and soon found herself in Nassau in the service of Woodes-Rogers as a privateer fighting the Spaniards. Later, tiring of "honest" trade, she turned to piracy to make her fortune. The evidence in her trial in Jamaica, in 1720, is truly remarkable, for it seems that none of her shipmates except one knew of her true sex. "No person amongst them were more resolute, or ready to board, or undertake anything was hazardous... She did not want Bravery, nor indeed was she less remarkable for her Modesty, according to her Notions of Virtue. Her Sex was not so much as suspected by any Person on board, till Anne Bonny (another female buccaneer) who was not altogether so reserved in point of Chastity, took a particular liking to her. In short Anne Bonny took her for a handsome young Fellow, and for some reasons best known to her self first discovered her Sex to Mary Read; Mary knowing what she would be at, and being very sensible of her own incapacity that way, was forced to come to a right Understanding with her, and so to the great disappointment of Anne Bonny, she let her know that she was a woman also, ... but this intimacy so disturbed Captain Rackam, who was the lover and gallant of Anne Bonny, that he grew furiously jealous, so that he told Anne Bonny that he would cut her new lover's throat, therefore to quiet him she let him into the secret also."

Both Mary Read and Anne Bonny were eventually captured by the British and made to stand trial in Jamaica where the former vigorously defended her trade, declaiming that, were it not for the challenge of piracy, there would be no place for the courageous person to seek adventure and, were it not for the inherent dangers of piracy, every spineless coward wishing for a life of thrills would dissipate the profession by joining their numbers. For these remarks her reprieve was annulled, and she was sentenced to death.

The Reign of Woodes-Rogers

With the coming of Captain Woodes-Rogers, law and order in the Bahamas were re-established. The Proprietors who had been unable to control the islands or realise any profit from them leased their rights to Rogers for a large sum of money and George I then gave Rogers one hundred soldiers and a royal proclamation for a pardon of all pirates. Over a thousand took advantage of the pardon but many, including "Blackbeard" and Vane, refused. The task cut out for Rogers was a sizable one. The fort required rebuilding first of all, the entire town lay in ruins and the plantations had become overgrown. Rogers wrote that "in fact there was little semblance of order about the life of the Colony in any respect." Although there was the perpetual danger of attacks by Spaniards who had surprised the town thirty-four times in fifteen years, the inhabitants could not be depended upon to do guard duty as "they would not stay up at night."

The Bahamians could not be induced to work because, as Rogers said, "...they mortally hate it." In fact, they did little but pray for wrecks of pirate ships. Although Rogers rebuilt the fort and instituted a system of land grants, the people once again turned to piracy as to work for a living seemed to make little sense to them. Finally, discouraged and having received help neither from the Bahamians nor from home, Rogers returned to England. His successor, Phenny, proved either incapable of or indisposed towards maintaining the status quo. He sold the guns with which Rogers had stocked the fort and piracy reigned. In 1629, therefore, the Bahamian Council recalled Rogers.

Upon his return, Rogers called for the election of a General Assembly of 24 and again undertook the thankless task of trying to get the island on a firm economic footing. He attempted to start sugar and cotton production but aroused little enthusiasm in the populace, despite the recent arrival of immigrants from Germany. Defense was still his major concern but again the lackadaisical attitude of the islanders provided no assistance. Also a question of sedition by the Speaker of the Assembly resulted in the group's dissolution barely two weeks after its birth. During his governorship, Rogers rid the Bahamas of the pirates but he died in 1632, broken and unrewarded, remembered only for having adopted the islands' motto, "Expulsis Piratis Restituta Commercia" -- the pirates expelled, commerce restored.

Problems in the Colony

Rogers' death was followed by a myriad of problems. The economy declined and colonists left en masse. The state of the islands can be deduced from reliable figures of 1731 (see Table 1), taken from a document in the Public Record Office, which show that the total population about the time of Woodes-Rogers' death was less than 1400 with Negroes in a minority of one third. This demonstrates that a system of extensive plantations, operated with abundant slave labor, which was a feature of the southern American colonies as well as other West Indian colonies, did not develop in the Bahamas. This is also revealed in similar figures for 1784, half a century later (given in Table 2). Worthy of passing comment is that "more than half of the white population was composed of children for whom no means of education existed."

New immigrants from Germany and from the northern American colonies brought new blood and their devout Protestantism with them to the Bahamas. Development continued despite poor administration and poor years for the planters. The islands, although they believed piracy bad, allowed themselves the not so sinful occupation of wrecking ships and the salvage of these became big business. These settlers would move the beacons set on the cays to warn ships of the dangerous shoals and "the resultant ship wrecks provided treasures to help a struggling young colony to survive."

The American revolution of 1776 brought the new American navy to Nassau in search of munitions. The sailors found a small supply of gunpowder, the Inspector General of Customs, the Governor, and a severe infection of smallpox, all of which they took with them. The American flag flew over Nassau for one day but aside from this sortie, the Bahamas were not directly involved in the revolution. The indirect results were much harsher on the islands than the direct ones for, deprived of the natural markets for their meagre crops, the islanders practically starved. "In 1779 the best bread that could be obtained (on Harbour Island) even for the blessed Sacrament was made of tree roots."

Era of Emancipation

In 1779, Spain declared war on England and, in 1782, the Spanish seized for the last time the city of Nassau. The Treaty of Versailles, in 1783, returned the Islands to England. As a result of the Revolution, many American Loyalists from the Southern states fled to the Bahamas, bringing with them their slaves. The Nassau government was eager to have these new immigrants, and gave them handsome land-grants so that, in 1784, between six and seven thousand settlers arrived. Slaves now, for the first time in local history, outnumbered free men. The Out Islands were being settled and cotton plantations, in the tradition of the South, were bursting into prosperity which lifted the Bahamas into importance in world commerce. Unfortunately, the good life was short lived for soon the soil, due to poor planting methods, was exhausted. By 1800, many of the Loyalist immigrants began to leave, taking their slaves with them until an Act of 1807, prohibiting slave trade in the British Empire, stopped the removal. The Loyalists were impatient with the unprogressive Bahamian government and they were critical of the native Bahamians' laziness. The frictions that naturally developed between the two groups, the many European wars, and the War of 1812 wrecked the small economy of the Islands.

The abolition of slave trade had its social and economic repercussions in the Bahamas. Following the act of 1807, the Bahamians again found a ready made business -- illicit slave trade -- and, with the tradition of lawlessness existing on the islands, a booming business developed. The results, however, were not favorable to the population. The British navy which enforced the non-slave trade Act dumped in Nassau most of the slaves caught on illicit ships, thus raising the number of negroes on New Providence by a considerable amount.

Due, in most part, to the poor natural agricultural conditions on the Bahama Islands, slavery was at no time important economically. The Bahamian slave had a great deal of free time to himself as there was little work to be done. It was evident that the British government was determined that slavery must be abolished, the Whig victory in 1833 in England brought the question to a head and the slaves were freed on August 1, 1834. It is indicative of the Bahamian character that it was possible to end "slavery....with greater ease than elsewhere. Relations between Blacks and Whites never became bitter."

Effects of Emancipation

Problems, however, did arise. The negroes naturally reverted to atavism, as they were not even one generation removed from Africa. Very densely populated areas sprang up outside Nassau and here dwelt the poor Africans in what became shanty towns. The Islands were not in an economic position to support themselves, much less the newly freed slaves. Governor Shea built a sisal plant to employ this new labor, but the operation was a small one.

Partly to compensate for the loss of revenue caused by the forced abolition of slavery, a large trade developed in importing Indians and Mongolians to replace the Negroes. From the year 1835 to 1876, two hundred thousand Indians passed through the port of Nassau, intensifying the problem of racial diversification, although large numbers eventually returned home.

First man-made economic disaster, and then the ravages of nature aggravated the intensified financial woes of the Islands. A desultory pineapple and citrus fruit trade developed but in 1848, Turks Islands were given to Jamaica, taking away the profitable salt industries. In 1850, there was a violent tornado, followed in two years by a cholera epidemic and four disastrous hurricanes battered the Islands in the next four years.

Civil War Era

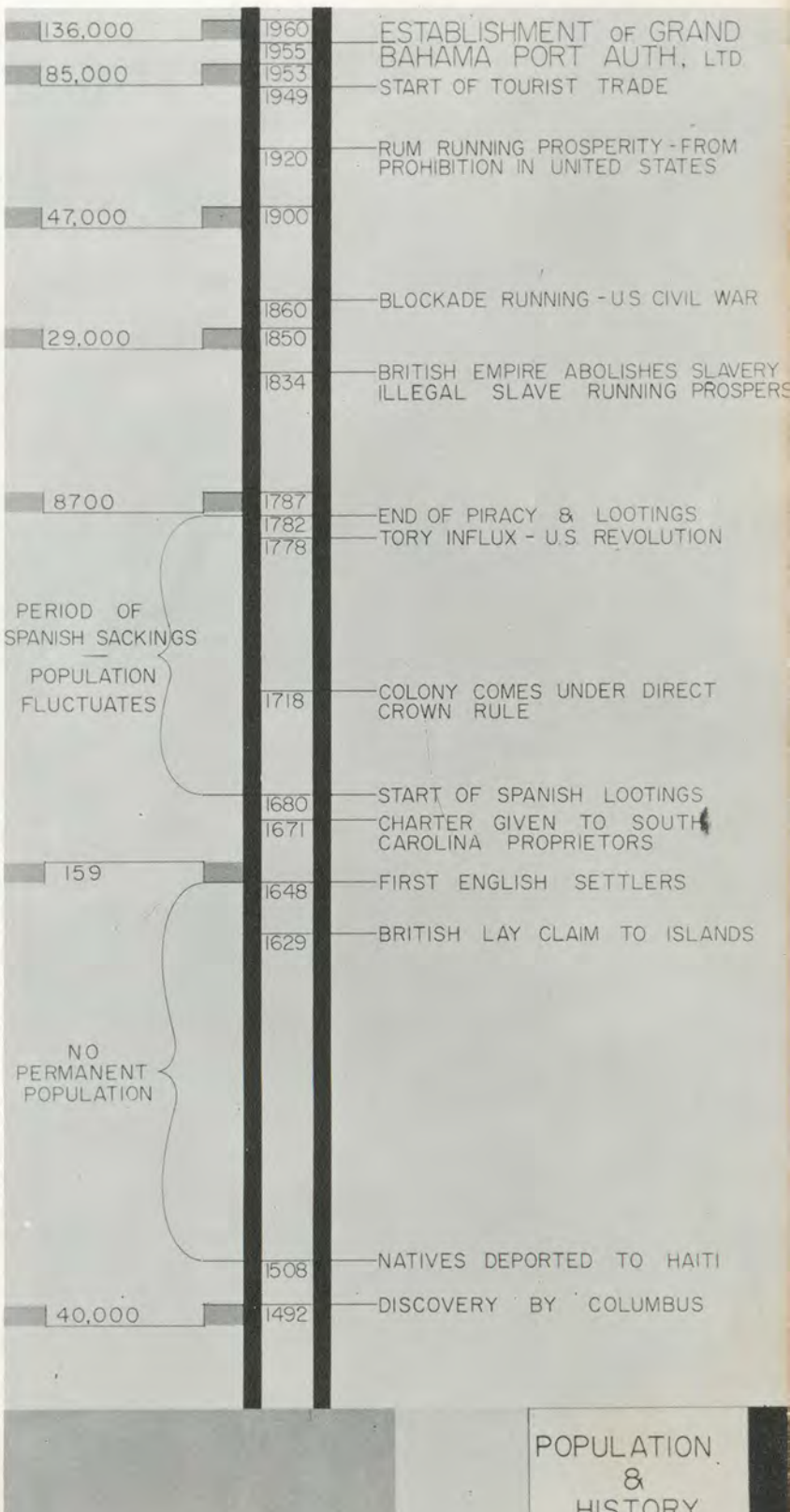
The Civil War era much resembles the earlier chapters of Bahamian history. When the South seceded from the Union it was inevitable that the Bahamas, by their proximity and sympathies, would aid the Southern cause. The North blockaded all Southern ports from the European trade upon which they so much depended and Nassau became the center of blockade running. An epidemic of yellow fever was the only thing which checked the flood of prosperity in the islands. Great Britain proclaimed her neutrality and Bahamians admirably responded to the challenge of supplying the Confederacy with the vitally needed war materials plus moral and monetary support. Nassau harbour reports indicate that,

TABLE 1: POPULATION IN 1731

	White			Negro		
	Men	Women	Chn.	Men & Women	Chn.	
	246	190	489	275	178	
totals	925			453		1378

TABLE 2: POPULATION IN 1784

	White	Negro	
totals	1700	2300	4000



in the year 1861, 397 vessels, entered the port and some 428 steamers sailed from the harbour. The treasure overflowed, the national debt was wiped out, and a hotel, the Royal Victoria, was built in the latest fashion and was filled constantly with dashing Confederates. One historiographer says that "not since the days of the buccaneers and the pirates had there been such times in the Bahamas. Success paid larger premiums than were ever attained by any legitimate business in the world's commercial history." The only discordant note is that the Bahamians were, as usual, unscrupulous in that they were, in reality, acting as liason for Northern manufacturers, selling Northern goods and weapons at a substantial profit to the South via the "neutral" ports of Halifax and Nassau.

However, even in 1864, one of the prosperous war years, it is reported (though not authenticated) that two thirds of the total imports of the Bahamas consisted of plundered goods from wrecks along the cays. As the War ended, good times and the Confederates disappeared and the question of how to maintain any sort of permanent economic stability again became a paramount issue. Several voiced the desirability of being annexed to the United States but this possibility was dismissed by those who felt that the newly emancipated negroes would gain control and thereby further unbalance the already unstable economic condition, since many whites would consequently leave.

Rum-Running

During the blockade-running days of the American Civil War, the Bahamas were a well-known center of international intrigue. Nassau was filled with Confederate soldiers who added to the "eat, drink and be merry for tomorrow we die" atmosphere. It was not until the United States, in 1920, put the Prohbitiion Amendment into effect that the islands once more flourished in illicit trade. The islanders were quick to capitalise on the new business opportunities and "it is said that a Nassau minister and a police officer gave up their land-based professions to traffic in the more lucrative rum-running game."

Bahama merchants, being virtually invulnerable to the devices of Federal agents and the U. S. Coast Guard, realized a handsome 50% profit on their operations. It was not illegal to manufacture liquor in the States provided it was for medicinal purposes and the American distilleries, therefore, stayed in business selling only to prescription customers in the Bahamas. The liquor, including that which came from England, Scotland and Canada, was unloaded in bucket-brigade fashion by the Negroes on the wharves of Nassau where the government levied six dollars duty per case. The cargoes were then disposed of by the merchants to the "runners" within Bahamian territorial waters, thereby absolving either the Bahamas or the merchants of guilt. What the merchants could buy, for example, for $170,000 they sold to the runners for $242,000. The runners in turn sold their cargoes to their stateside contacts for $684,000 and the unfortunate consumer in the end paid about $2,000,000 for the same quantity which, after suffering considerable adulteration and mishandling, was of far less superior quality.

One of the haunts of the merchants in Nassau was a place called the "Bucket of Blood" which name was not without significance. The proprietor conducted his rum-running business on a schooner less realistically named the "Message of Peace."

The merchants were clearly bandits who continued the islands' tradition of piracy in a slightly more sophisticated manner than their predecessors but the runners who ran the risks of peddling the "stuff" were another breed. They had to face the difficulties of evading the federal agents and of crossing seven hundred miles of open sea in their small launches to "Rum Row" where their contacts waited. Crossings were rough at times and the rum-runners, driven by their greed, often swamped, paying their debt to society with crew and liquor alike sent to the bottom. These were calculated risks taken by men whose country had lived by gambles since its inception.

The Out Islands

The events of history in the Bahamas are such that the islands have bred a certain type of person during the years of isolation and economic instability with an ingrained stoicism and a distrust fomented during centuries of enduring dangers and hardships peculiar only to these islands. The Nassau-bred Bahamian has a sophistication and an awareness of the world around him which does not apply to the Out Islander who is a man of a different breed.

Rosita Forbes, in her amusing novel A Unicorn in the Bahamas, tells of a trip she took with the local priest in one of the two cars on the island of Exuma. One of the planters that the author visited recounted a tale of the time in 1910, when he went up the coast to the town of Farmer's Hill to buy a mast. It was the first time the people there had seen a stranger and they all ran away and hid, thinking the Spanish had returned to capture them.

Later, bouncing along toward the harbour on the return trip with native islanders hanging on to the car like chicken crates, they passed an old man who looked as if he had been lost for years and they stopped and asked him if he wanted a ride. After looking the car over, he answered in all seriousness that he hadn't much time so he thought he would go on his feet. The author's curiosity prodded her to ask the old man what he did for a living.

He replied that he was a preacher. She then asked, "Well, where do you preach?" "Mos' anywhere, where dere's some people." Still bewildered, she went on and asked, "What denomination do you belong to?" to which he replied, "I'm one of the Go Ye's." "De Lawd will provide," he added. They drove on. Time moves slowly on the Out Islands.

Grand Bahama Island

The generalities contained in the first sections of this history apply to Grand Bahama Island with the same validity as they do to the other Out Islands. The entire history of the Bahamas is shrouded by mysterious fictions and all that is known factually about Grand Bahama prior to the nineteenth century is that it was uninhabited.

In 1806, Grand Bahama was settled at Eight Mile Rock, although it had been lumbered annually from an earlier date. Subsequent settlements include West End Settlement, High Rock, McLeans, Carrion Crow Harbor, Freetown and Golden Grave. Stark, a government official, tells us that seven wrecking vessels were owned by Grand Bahama and that work was in progress in the 1880's near a place called Sandy Cay. Also, he adds, on the north side of the island which was still unsettled were sponging activities.

As little is known specifically about Grand Bahama, it can only be presumed that she experienced much the same development as the other more important islands. Her population in 1943 was 2333: 27 White, 2300 Negro, 2 Mixed and 4 Other. By 1958, the total population had grown to 5500.

Modern Era

The Bahamas represent a fabric woven of instability and economic chaos, but through it all can be traced a pattern of steady growth and an ability to recuperate from the most devastating setbacks and still look stoically forward, while maintaining the unique atmosphere which has taken almost five hundred years to create. Their history has been lurid, the government unscrupulous, the economy erratic, the people courageous and opportunist. In the early years of the colony, there were tremendous population fluctuations directly correspondent to the state of the economy and to the brutal sackings of the Spaniards. In 1848, they lost the Turks Islands and, subsequently, the salt-racking and sponging industries which had depended on them. Around 1900, the islanders had to import the pineapple from Hawaii where it had been transplanted originally from the Bahamas. There had long been a log-wood industry for manufacturing dyes but Germany, during the First World War, developed a synthetic process which doomed the small island industry. At one point, the islands exported large amounts of citrus fruit to the United States but the orchards became insect-infested and, eventually, the Bahamas also had to import oranges. However, the islands bounced back and are now self-sustaining in both the pineapple and citrus fruit industries. The sisal which had been successfully introduced earlier by Gov. Shea also became an important export during the 1890's.

Isolation, slow communications and almost a complete lack of local transportation have further hampered the islands' growth. It was not until 1892, that the first Florida-Nassau cable went into operation and boat service between the Out Islands has been neither dependable nor frequent. The automobile arrived late and still is far from being in common usage.

The history of the islands from the end of the Civil War until the 1940's is discouraging except for a brief period of unexpected prosperity during the Prohibition days in the States from 1920 until 1933. World War I, especially, hit the Out Islands; food was short, prices rose and labor emigrated to the States, precipitating a 5½% population decrease. The 1930's witnessed a general decline as the last of the large plantations disappeared leaving the negroes without work. Since the average wage on the Out Islands was 1½¢ an hour, the large majority of the people there were impoverished but, throughout, the islanders remained unconcerned about their plight.

Efforts to Bolster the Economy

Gradually, however, businessmen in Nassau did become concerned about the economic status of the colony. The British government obviously did not intend to help them so these merchants realised that they would have to take matters into their own hands. H. M. Flagler, the American real estate tycoon who developed the east coast of Florida, invested in the Bahamas in the early years of the twentieth century and in 1940, another stroke of luck befell the islands -- the Duke of Windsor was appointed governor to protect him from Nazi plots. The islands again became a place of refuge, this time for wealthy Britons fleeing from the uncertainty of Hitler's Europe. Since World War II had brought about the collapse of the island's tourist trade, the Duke decided to reorganize the economic structure of the islands so that the Out Islands could become self-supporting but wartime prosperity soon eclipsed anything since the Rum-Running days; however an awareness of the drastic need for sound economic reformation had been inculcated in the minds of the islands' merchants and the wealthy men who had sought asylum there during the war.

Bahamian merchants had long indulged in the little known sport of trapping foreign investors, deluding them by the lure of a perfect climate and tax-free business possibilities, into dropping thousands of dollars into various operations only to coyly ensnare them with the net of legal red-tape, thereby forcing them to sell out at substantial losses. The islands have, historically, been a closed corporation and islanders have, traditionally, done business only with fellow islanders. On the small islands and cays which are privately owned, guests come only by invitation and for an outsider it was, and still is today, virtually impossible to capitalize on the vast opportunities that await the enlightened investor without the cooperation of the islanders themselves. After the war, with growing concern as to what the Islands should do to revitalize their economy, the climate, from the business point of view, became right for foreign investors for the first time in Bahamian history.

In view of the problem which had historically beset them, two ideas were put forward by the Bahamians as possible solutions to their troubles. The first was the often thought of idea of annexation to the United States. This idea was discarded as impractical for two reasons: first, the old fear that the negroes, being in the majority, would gain the upper hand and, second, that the islands would become a territory like Puerto Rico and, not having a large enough population to ever hope to gain statehood, would be subject to a series of colonial governors which would be, understandably, distasteful in light of some of the charlatans who had administered their affairs as a crown colony. The other solution to their problems was to have the islands encourage vigorous foreign investors, to free the economy from strangling local monopolies and thereby gain their ends without diminishing their sovereignty.

The latter course was adopted with the understanding that foreigners were to have all the advantages available to locals and that a full degree of cooperation would be forthcoming from government officials and merchants.

Conclusion

It was with the creation of this atmosphere of cooperation that investors became seriously interested in the Bahamas from a business standpoint. In 1949, the Bahamas went all out to develop the tourist trade and publicity and advertising for the islands were increased. Comfortable air connections were established, hotels and inns were built, not only on New Providence, but also on the Out Islands and fishermen and tourists alike flocked to the Bahamas in increasing numbers. Tourism boomed, tourists outnumbering residents by two-to-one by 1957. Business began an unprecedented growth and many businessmen, such as Mr. William Butlin, the British hotel "king" who a few years ago founded the Butlin Vacation Village at West End, Grand Bahama, and Mr. Wallace Groves who had long been interested in the Bahamas were attracted by the historic charm and appeal of the islands plus the ripe financial opportunities.

The investigation into the legal and administrative character of the Freeport Authority and the historical background of the Bahamas confirmed the fact that the opportunities presented for development are truly staggering. Opportunities, though, have existed before and the exploitation of these to the detriment of all is largely responsible for the emergence of planning as a guide to development. Coincident with these opportunities then is a responsibility both to the principals involved and to ourselves as planners; and it is that responsibility which both the Freeport Authority and this class accepted.

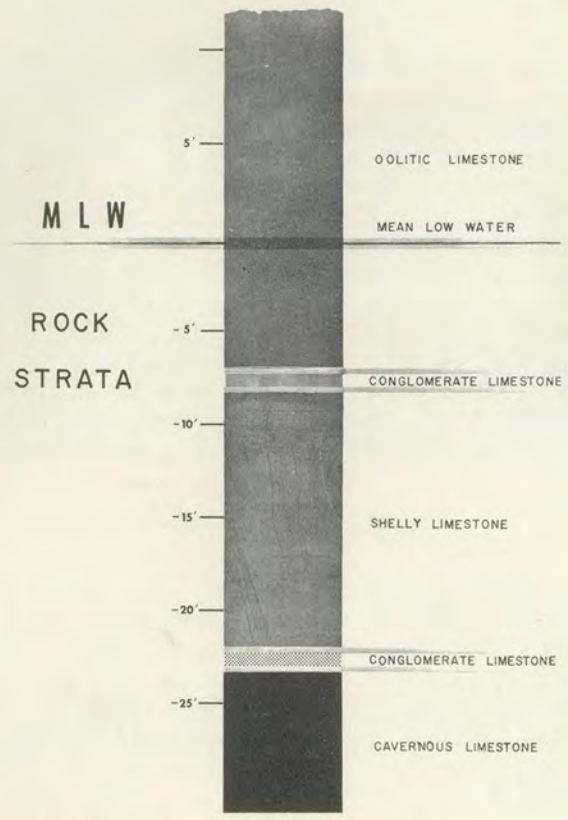
Long-range concepts of development, though, must be based upon an intelligent evaluation and a detailed study of all aspects of the subject. The next step, therefore, was study and research into all areas pertinent to future development...

PART 2 - BASIC RESEARCH

GEOGRAPHY & GEOLOGY

Geography

Grand Bahama Island lies on the northern edge of the Bahama group and, with Great and Little Abaco, makes up the Little Bahama Bank, along with many other cays and rocks. The western tip is 55 miles due east of Palm Beach, Florida. The island is about 430 square miles in area and is oriented in an E-W direction, being about 60 miles long and 7 miles wide. It is of coralline formation with a slight lowland backed ridge along the southern (windward) side tapering out to the sea on the northern (leeward) edge. For the most part, the island is flat. In fact, the foremost structural criterion is the result of this lack of great topographical differences. It influences the effect of hurricanes by giving very little resistance to their force and the hurricane, therefore, dictates the primary building considerations instead of allowable bearing pressures. In the range of building heights to which we are limited the soil, or rather limestone bearing, should prove to be adequate.





Geology

The large, inner, northern banks of the Bahamian Archipelago along with the Florida Peninsula and its continental shelf act as a submarine barrier between the Atlantic Ocean and the Gulf of Mexico. From the shelf has arisen a string of volcanic islands, part of which forms the Archipelago of the Bahama Islands. The surficial rocks of the islands are a product of buildup consisting almost entirely of recent (Pleistocene) oolitic limestone made of shell detritus and other oolites formed by sea action. The coral growths and the lime secreting plants which they support thrive best in zones washed by the breakers and they are pounded by the waves, ground into detritus, and deposited on the shore. Exposure to the air produces a chemical reaction which hardens these deposits and forms limestone. Areas which have not received any recent deposits have developed a case hardening along the surface.

Grand Bahama Island has a steep (southern) slope towards the direction of the prevailing winds and currents and a long flat slope from the crest of the island far out into the sea on the leeward (northern) side where the water is extremely shallow and extensive marl (broken limestone) beaches have formed. The marls are calcareous muds, limes and clays which are continually washed by tidal action. They are organic and can be leeched to support plant life.

The inner area of the island is generally flat except for beach ridges on the southern shore and low hills up to a height of forty feet. Most of this area is pocked with karst holes formed in the limestone. Organic soils form in the bottoms of these holes which support most of the vegetation on the island. Organic soils can also be found in wooded areas as a product of biological decay. Winds permitting, top soil from 4-6 inches deep may form above the rock bed.

Beneath the surface are several layers of rock, indicating that at one time the sea level was much lower. Beneath the oolitic stones, which are washed by vertical action of the water table, is a layer of cavities which permit lateral permeability. Although these subsurface rocks are stable, there is active erosion throughout.

The geologic nature of the surface and immediate subsurface rocks indicate that excavation could conceivably become a major construction problem. Special attention must be given to the water table which is universally high throughout the island and to landscaping, because the surface texture is not conducive to conventional landscaping methods. Careful study must also be given to the use of paved areas in the bright sunlight and the possible advantageous uses of water and waterways. The existing stone may have certain applications as a building material.

Geology in Relation to Ground Water

The oldest surface sediments on the Grand Bahama Island are the remnant hills composed of cross-bedded oolitic limestones of Pleistocene age which were originally deposited as oolitic sand dunes. The youngest surface sediments are unconsolidated sands composed of oolites and beach worn shell fragments. The surficial oolitic limestones throughout the area are of low or moderate permeability and are weathered irregularly. They are also highly fractured but generally free from faults and all the hard limestones show evidence of solution by ground water followed by filling of the cavities by oolitic sediments. Zones of cavity filling may range in thickness from one foot to seven or eight feet. The top of the hard limestone marks a general downward transition from limestone of relatively low permeability to limestone of moderate or high permeability. Limestones at depths greater than 15 feet below Mean Low Water show the effects of general and widespread ground water solution as they contain open cavities ranging in size from thin cracks to cavities one foot in diameter, the larger cavities being, generally speaking, found in the deeper zones. Many of the larger cavities are lined with pure calcite (calcium carbonate) crystals deposited by the ground water in its percolation route. The solution cavities in the zones of high permeability are both horizontal and vertical which probably indicates that both the lateral and vertical permeabilities are high.

CLIMATOLOGY & METEOROLOGY

Temperature

As a general rule, in regions where a marine climate prevails, there is relatively little variation in temperature conditions from month to month or from one year to another and the Bahamas are no exception to the rule. The hot, Summer season begins in May and ends in October, the remaining months of the year constituting the Winter season. Summer temperatures range from a maximum range of 83° F. to 91° F. to a minimum range of 68° F. to 78° F., and the average monthly temperature is extremely constant through the Summer months, particularly from June to September. The mean of the early morning temperatures in Winter is about 62-65° F., whilst the mean for the warmest part of the day may vary from 75-78° F. The day temperatures are fairly uniform throughout the Bahamas but the night or minimum temperatures increase a little from North to South. Winter temperatures vary from a maximum range of 75° F. to 85° F. to a minimum range of 56° F. to 65° F. on Grand Bahama. These figures are average seasonal values and do not show the absolute limits of variation. The absolute extremes of temperature, though showing a much greater dispersion, are still small enough to demonstrate the marine character of the climate.

Relative Humidity

The amount of water vapor present in the atmosphere is a factor of the utmost importance, especially in its bearing on personal comfort. Apart from records at Nassau, New Providence, statistical information regarding relative humidity in the Bahamas is not precise enough to warrant giving detailed data. Broadly speaking, relative humidity on Grand Bahama may attain a maximum of about 85% at 0700 hours EST and a minimum of about 65% at 1300 hours EST. These values demonstrate the presence throughout the year of a high moisture content in the atmosphere. The amount of moisture in the atmosphere is also remarkably constant within the year whilst the daily range is small, not differing very much from 15%. Such humidities as these, combined with the fairly high temperature in Summer, could be extremely oppressive, were it not for the almost invariable presence of a breeze. The presence of such a high moisture content is also doubtless responsible for reducing the power of the direct rays of the sun.

Clouds and Sunshine

There is plenty of bright sunshine throughout the year, the island being within the westward extension of the high barometric pressure region over the Atlantic Ocean, and overcast skies are not persistent. The average amount of cloudiness is fairly uniform from month to month, the Summer and Fall months being slightly cloudier than the Winter months. On an average, cloudiness is maximum in October and minimum in January and February.

Rainfall

The mean annual rainfall on the Grand Bahama Island approximates 50 inches, and decreases gradually as we move south towards other Bahama Islands but the total magnitude of rainfall shows considerable variation from year to year. About 80% of the total annual precipitation occurs in the Summer months (May to October), leaving only about one-fifth for the Winter and early Spring months. Rainfall ranges from 2"-2½" per month in November and December and from 1"-2" per month during the period, January to April. During this dry season the precipitation occurs in infrequent but heavy downpours which drain away very rapidly. The dry season breaks in early May. The wet season continues and generally reaches a peak in October. During these Summer months the rainfall is frequently intense but, as a rule, the duration is short. Showers in June and July have been reported to be of very brief duration, without exception. The maximum duration during these months seldom exceeds one hour and the average duration is about ten minutes. Monthly rainfalls shown on the chart have been averaged for a period of eight years at Nassau, New Providence.

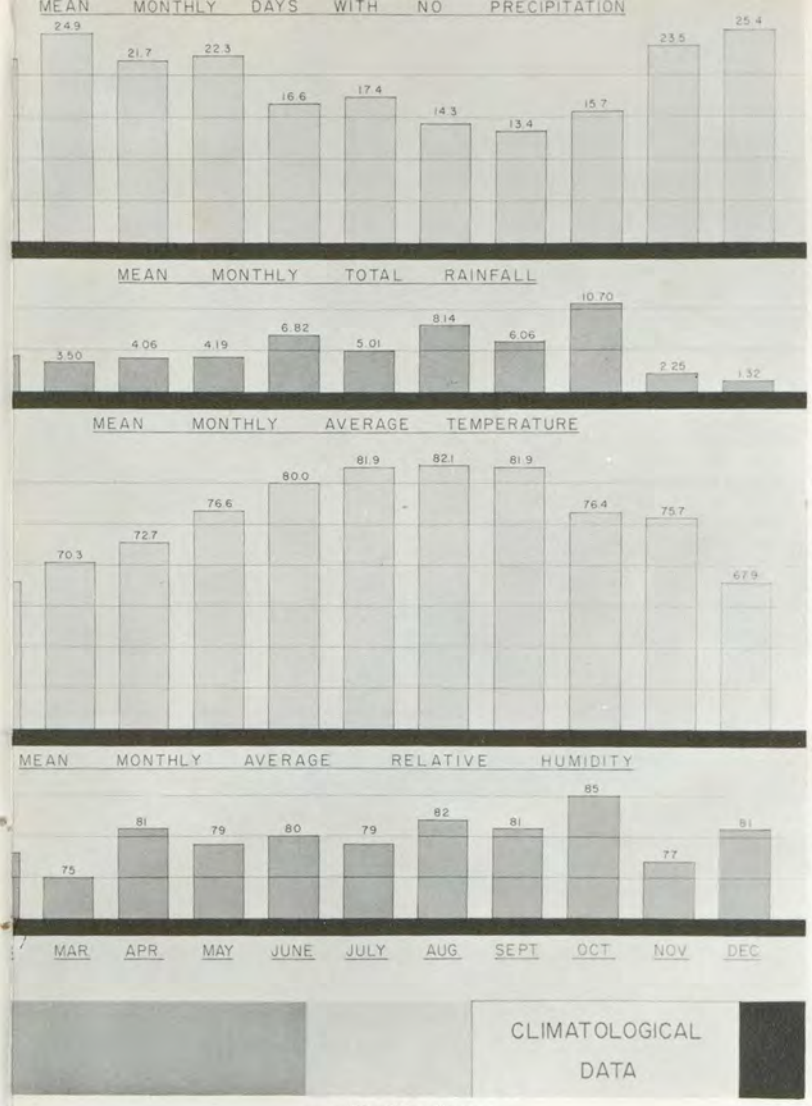
Both rainfall and run-off frequency form distributions that are skewed to the right. This skewness is induced by the constraint imposed by a lower limit of annual rainfall or run-off. This limit is generally greater than zero but smaller than the recorded minimum. It stands to reason that there must be an upper limit as well but its value is less well circumscribed than that of the lower limit and, from the viewpoint of water supply, less important also. In spite of these acknowledged facts, most records of rainfall and run-off can be generalized with fair success as arithmetically normal sines and somewhat better as geometrically normal sines. Reasonably accurate comparisons can be made therefore in terms of the arithmetic Mean M and standard deviation σ or the geometric Mean Mg and the standard deviation σg. Still closer fits between observed and calculated values can be secured by including a parameter of skewness. For ordinary purposes however, mean annual values and coefficients of variation $C_V = \frac{\sigma}{M}$ will determine the comparative safe yields of water supplies that are developed with and without storage.

This means that a deficiency or negative deviations from the mean equal to or greater than $C_V M = \sigma$ are to be expected 15.9 percentum of the time, or once in 6.3 years since $x/\sigma = 1.0$. These calculations are, however, only approximately true because normality of the data is assumed where skewness in reality exists.

Winds

Prevailing easterly winds exist on Grand Bahama since it is located on the southwest edge of a usual high pressure area and on the northern edge of the regular trade wind belt, which brings a steady flow of atmosphere from the east. Shattuck's account for the nineteenth century showed that 30% of the time, the Bahamas experienced wind from the east. The USAF report from 1951 shows winds from the northeast 11.9% of the time, 8.9% from the east, and 9.6% from the southeast. It also says that calm periods existed 13.2% of the time. Usual wind velocities range from 4 to 10 knots (5 to 12 mph) and occur from 9 a.m. to noon, the time of the highest temperature.





Storms

The Grand Bahama Island is free from violent atmospheric disturbances for the major portion of the year and, although a relatively mild form of thunderstorm accompanied by intense showers occurs in all months of the year, it is rare in Winter and is usually of short duration. However, from June until October, there occur in the West Indies a great many tropical storms. Most of these storms originate in a belt of equatorial calm about 6^{o} north of the equator called the doldrums, and are caused by the prevailing winds from the northeast in the northern hemisphere. Therefore, all of these storms occur in the West Indies.

The storms in the northern hemisphere rotate in a counter clockwise direction and an average path of 130 hurricanes, as shown by Fassig, goes through Miami and West Palm Beach. In other words, the average hurricane will come within 100 miles of Grand Bahama.

This seems quite a distance but it must be remembered that, though the average tropical storm of hurricane size may be only a little over a mile in height, most storms exceed two hundred miles in diameter and in many cases, exceed 500 miles. Obviously, many of the storms of the West Indies will have effects on Grand Bahama.

A hurricane which passes near Grand Bahama would produce winds of 200 mph, as was recorded in 1926 when Nassau was devastated. In October of that same year, Grand Bahama was crossed by a hurricane which precipitated 20 inches of rain on Havana, Cuba, in one day. It is very difficult to find any actual reports on damage at Grand Bahama, since the population was so small, but we can assume that similar damage to that reported in Nassau undoubtedly occurred in Grand Bahama.

Dr. Bernard Dethier of Cornell estimates that winds above 100 miles an hour would cause waves in excess of 10 feet, and if the storm should reach the island at high tide, the water level may be raised by as much as 20 feet.

Hydrology

The average yearly rainfall in the island, as already stated, is about 50 inches. About 30% of this, or roughly 15 inches, is recharged to the aquifer. This would be equivalent to 15/12x500x 1760 x 9 = 18,000 million cubic feet of fresh water, taking the area of Grand Bahama Island to be roughly 500 square miles. However, about 50% of this water would be contaminated due to salt water encroachment of the ocean and adjacency of the sloughs and, hence, of too high a chloride content to be suitable as a potable drinking water source. Therefore, 50% of 18,000 million cubic feet or 9,000 million cubic feet are available as fresh low chloride content potable water.

9,000 million cubic feet ≡ (9x7.48x1000) million cft.
≡ 67000 million gallons, or 184 million gpd.

Taking a per capita consumption of 125 gpd, this reserve is sufficient for the water supply needs of a population of roughly 1.5 million. It, therefore, is clear that the fresh ground water reserves in the area are adequate. Klein, Hoy, and Sherwood have made an interesting, if not a very accurate, comparison of the estimates of recharge to the aquifer with estimates of total discharge from the aquifer. They considered a portion of the area in the vicinity of the Grand Bahama air base and estimated the total recharge to this area at 400 million gallons per year. The average gradient of the water table is about 0.2 feet in 600 feet and the length of the section of outflow along the coast (for this area) is about 12,000 feet.

Applying the well known Darcy Formula (modified)

$Q = TIW$, where Q=discharge(gpd)
T=coefficient of transmissibility (gpd/ft)
I=Hydraulic gradient (ft/ft)
W=Length of cross section (ft)

The coefficient of transmissibility was estimated from drawdown tests on test wells in the area at 130,000 gpd/ft.

Using the Theis Formula $T = 114.6 \frac{Q\,W(u)}{S}$,

Where Q= rate of pumping in gpm.
S= drawdown or recovery of water level in feet at any point in the vicinity of the well, and
W(u)= the "well function" of u.
also $u = \frac{1.87r^2S}{Tt}$, in which
r= distance in feet from the pumping well to the observation well, and
t= time in days since pumping started or stopped.
therefore $S = \frac{uTt}{1.87r^2}$

Substituting these values
$Q = 130,000 \times \frac{0.2}{600} \times 12,000 = 500,000$ gpd.

The estimated loss due to outflow from the aquifer is thus, about 500,000 gpd through the 12,000 foot coastal section or roughly 200 million gallons yearly.

The mean ground water level in the area is about 2 to 3 feet above MLW. Under these circumstances, according to Ghyben-Herzberg method of determining the depth to salt water, the contact between fresh and salt water should be at about 30-50 feet below mean tidal level.

In April, 1955, Klein, Hoy and Sherwood conducted complete chemical analyses on water samples from different test wells in the Grand Bahama Island. The analyses showed similar concentrations of chemical constituents. The greatest differences were noted in the concentrations of sodium and chloride ions, in dissolved solids and in specific conductance (used as an indicator of dissolved solids). Most of the alkalinity in the water is of the bicarbonate type and the hardness is relatively low for ground water, ranging from 200-300 ppm. The analyses showed that the ground water supply is within the range of potability, color being very low (3-8 standard color units) and PH varying between 7.2 and 7.6 as expected. The United States Public Health Service Drinking Water Quality Standards lay down the upper limit of chloride ion concentration as 250 ppm. It would, thus, appear that costly demineralisation techniques would not have to be resorted to for water treatment as the chloride content is well within this limit for 30 feet or more below MLW.

BIOLOGY & NATURAL RESOURCES

The vegetation of the Bahamas is similar to that found in other tropical and subtropical islands but many of the principal crops and plants found there have been imported and are not indigenous to the colony. Visitors to New Providence are struck by the wealth of color provided by the flowering trees, shrubs, and creepers and by the variety of fresh fruits and vegetables. There is a good deal of forested land on some of the larger islands (Abaco, Andros, and Grand Bahama), the principal forms of commercial timber being pine, lignum vitae, braziletto, logwood, cedar, madeira, sabica and satinwood.

Bahamian Fauna

The Bahamas are far poorer in fauna than in flora. There are, however, some 250 species of birds to be found in the Bahamas, the pride of the islands being the flamingos for which Andros and Inagua are the principal breeding grounds. Despite government efforts to preserve these birds, they have diminished in numbers rapidly and, in 1952, the Society for the Protection of the Flamingo was established.

Marine life abounds on the Bahama banks and in the surrounding ocean and fishing is both a popular sport (most of the world's top game fish are found in Bahamian waters) and a means of livelihood for fishermen and craftsmen alike. Fish and conchs form a high percentage of the native diet on most of the islands, the turtles in the Bahamas are particularly fine and sponges, crawfish and shellwork are all important items in the colony's export trade.

Bahamian Flora

Most Bahamian vegetation comes from the South but a colony of northern continent plants has a foothold on the west side of Andros. The prevailing southerly winds and currents have assisted the spread of plants from the southern continent but many seed-eating birds from the North spend their winters in the Bahamas or stop there in migration, depositing the seeds carried in flight. Therefore, although the bulk of the flora has come from the South, there is some plant life on Grand Bahama that owes its origin to the North. The Bahama Pine is confined entirely to Abaco and Grand Bahama, where it is found in abundance. Specific listings of flora and fauna found in the Bahamas may be found in Dr. John Northrop's book, A Naturalist in the Bahamas.

Soil Conditions

Due to the hard, limestone surface which covers most of the island, and the resultant rough karst-hole topography, there is very little soil cover; soil, however, does form in the karst holes where plants with thick roots find nourishment. The rainfall is adequate for eight months of the year so the rocks contribute to the nourishment of the plants growing upon them during the four remaining months of the year by absorbing and holding moisture. Plants receive their minerals through direct contact with the air.

The following soil types may be found on the island:-

a) Coral Sands. These are the debris of coral reefs, generally loose sand, but inland becoming more loamy. The soil has a good percentage of phosphates and potash and a fair proportion of organic matter. Islanders cultivate this type of soil for vegetable-growing for, where it is not wet or salty, it produces good crops of corn, sweet potatos, cabbage, tomatoes, etc., and the coconut palm flourishes.

b) Bahama Black Loam. This is the principal soil type found in the pot-holes, accounting for 75% of the pot-hole soil on the islands. It is shallow, generally only a few inches deep, depending on the depth of the pot-hole and it has abundant organic materials and a good supply of phosphates, potash and nitrates. Very little fertilizer is necessary to make vegetables and fruit grow abundantly on this soil and experiments in the cultivation of citrus, sisal and cotton have been tried.

c) Bahama Stony Loam. This consists of a large proportion of rock fragments mixed with fine loam and is also known as pine barren' land. It occupies low-level positions, becoming swampy in places in the wet season. The characteristic vegetation is pine and, agriculturally, the pine barren land is of little value.



d) Bahama Marl or 'Scrubland' occurs in lowlands but a little above water level. The areas are in the vicinity of brackish swamps but not swampy and the soil occurs in pockets, being of yellow, clay-like material, 2-3 inches in depth. Under this lies loamy material. It contains a fairly large percentage of lime and potash and pineapples are grown on this type of soil.

e) Brackish Swamp covers large areas of the island. This soil is of little agricultural value and is covered with swamp vegetation.

f) Bahama White Marl is low-lying and swampy soil of no agricultural value. There are two types of grasses which grow in marl, however, and the marls mixed with other materials can be used as a topsoil base.

Mineral Resources

The sole mineral resource that could be exploited on the island is the limestone occurring in marl deposits which could form the basis of a cement industry. However, clay would have to be imported from another area. Limestone rock forms admirable building stone which hardens upon exposure and can be cut in blocks of any size.

Forestry

Grand Bahama Island has a fair supply of timber, particularly pine, and this will support a small but important aspect of the island's economy, although forests are not extensive enough to sustain a large population. An important factor to consider is that, if lumbering is allowed to continue as a major industry on the island, the clearing of the trees will detract from the island's attractiveness to tourists.

The main trees on the island may be divided into three categories:-

a) Palm trees.
b) Hardwoods.
c) Pines.

On the coral sands the palms grow while the pines and hardwoods begin about one mile inland, and, on Grand Bahama, the pines diminish north of Hawk's Bill Creek, giving way to scrub vegetation.

a) Palm Trees. The main varieties are Palmetto, Goat-palm, Coconut and Silver Thatch. Apart from the provision of food, these palms provide the basis of the cottage industry in straw products. Twelve hundred people are employed throughout the islands in stripping palmetto and coconut bark from trees, plaiting and weaving them into strips and making hats, purses and baskets which are sold, mainly to tourists.

b) Hardwoods or Broadleafs. These are braziletto, logwood, horseflesh, mahogany, lignum vitae, madeira, sapico and satinwood. Broadleaf forests are generally not exploited commercially but provide the wood for the boat-building industry on Abaco and for cabinet-making, building, etc.

c) Pines (Pinus Bahamensis). The Bahama pine which is the most abundant form of tree in the islands, does not, as a rule, exceed 8 inches in diameter and seldom reaches a height of more than 35 feet. Pines grow in abundance on Grand Bahama but the colonial government has imposed limitations on felling of pines in order to keep the industry going. A sawmill and wood processing plant has been built on Grand Bahama Island and, in recent years, a pulpwood manufacturing plant has been installed thus enabling economic use of scrub as well as forests.

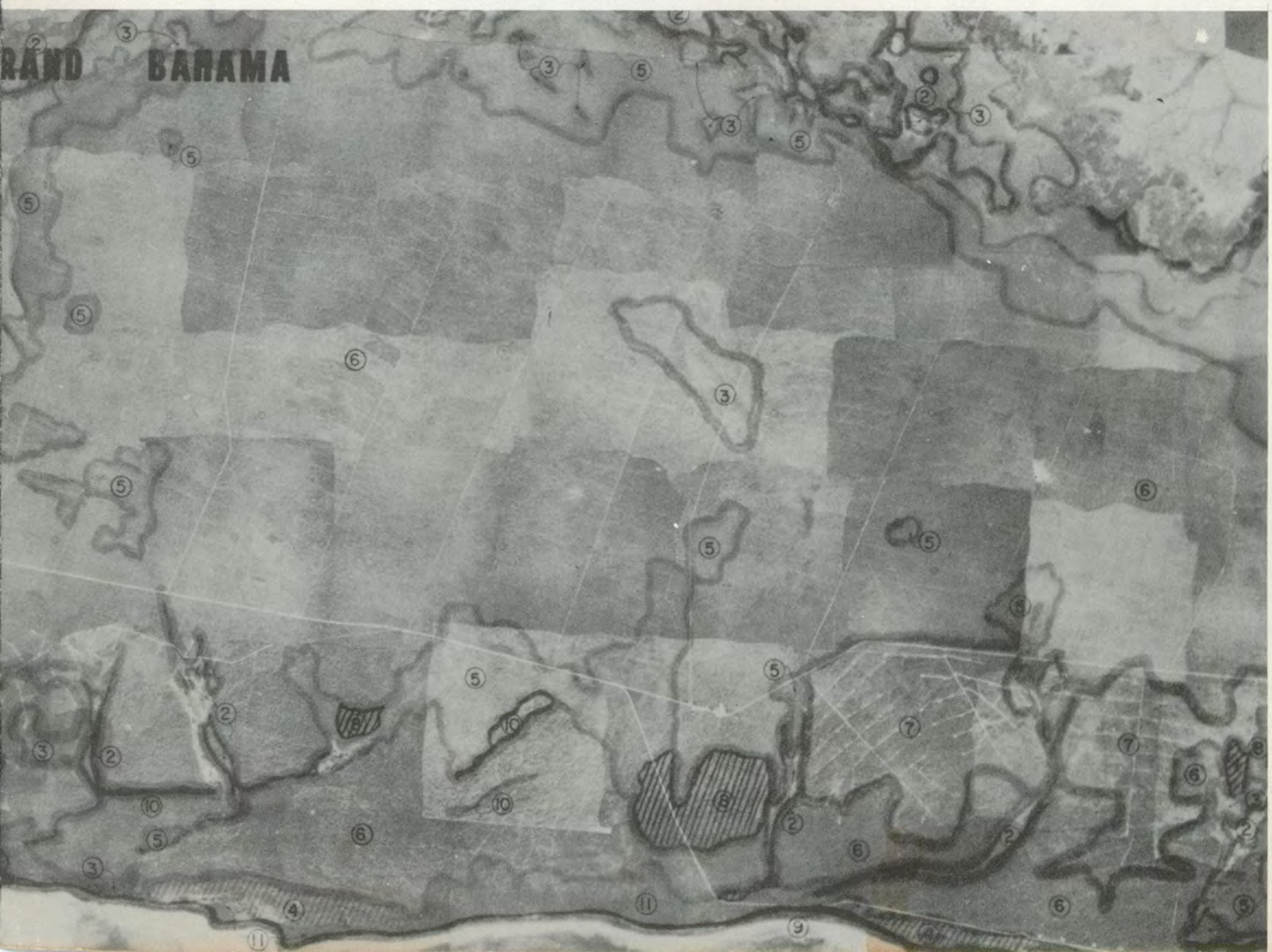
Agriculture

As in the past, the bulk of the farming throughout the Bahamas is carried out by peasant farmers who produce largely on a subsistence basis. As explained earlier, most farming is done on the coral sands or in the loamy soil formed in the karst hollows.

The main crops grown in the Bahamas are:-

Fruit Akee, Avocado Pears, Bananas, Citrus, Guavas, Mangoes, Papaya, Pineapples.
Cereals Coloured Bean, Corn, Lima Bean, Pigeon Pea, Sorghum, White Bean.
Vegetables Beets, Cabbage, Carrots, Cucumbers, Lettuce, Egg Plant, Melons, Okra, Onions, Sweet Peppers, Sweet Potatoes, Tomatoes.

The major agricultural export for the year 1958-1959, was tomatoes which brought in $166,035. The export of other agricultural products was negligible.



It is worthy of note that at various times experiments were made in the growing of various crops. Some flourished for a time but, in the long run, agriculture has always fulfilled a secondary function in the economy. Crops which, at one time, were in great evidence on the islands include cotton, sisal, citrus and pineapples. All these crops have dwindled considerably and in some cases have disappeared.

Grand Bahama is not known as an island that has had extensive agricultural development, but the probability exists that cultivation could, at least, supply the needs of the island's inhabitants. The vegetation does best in well-drained soils but in swampy or marsh areas the soil may be reclaimed by leeching, the rainfall being adequate to cleanse the soils for cultivation within a year. The usable soils have convex slopes which means they are exposed to the best breezes. In order to plant trees, the limestone must be dynamited, fruit trees, for example, requiring a hole four feet wide and two and one half feet deep. To cultivate an acre would cost approximately $1500. Such items as cucumbers would cost only $300 per acre but any form of cultivation would require extensive irrigation so that the availability of cheap water (10¢ - 15¢ per 1,000 gallons) is imperative. Ordinary road-building machinery can be used for scraping the crust of the limestone to get to the usable soils and the limestone, when crushed and spread over the soils, causes a chemical change and acts as a fertilizer. This process should be investigated as it would greatly facilitate gardening and growing lawns.

There is a hydroponic research station on the island and, although costs would be great, it is possible that hydroponic cultivation for a specialised market would be economically feasible. From the climatic point of view, conditions are more suited to hydroponic cultivation than conditions in Florida.

Marine Resources

The Little Bahamas Bank and Great Bahamas Bank are the chief fishing grounds and the growing population of the colony tends to emphasize more and more the importance of the fisheries, so that the Bahamas Government has introduced conservation measures to protect the fisheries for the fishermen. Two thousand men are engaged in fishing and all craft and equipment are owned by the fishermen themselves.

Crawfish. This is the major fish export. The fishing season is from October to March. During 1959, 23,944 cwt. of crawfish were exported, principally to the U.S.A. to a value of £225,231.

Sponge. This industry was once the basis of the island's economy but it was devastated by disease in 1936 and the fisheries were closed for 20 years in other that the sponges could recover. It was only reopened for three months in both 1956 and 1957, and has been closed since. The advent of the plastic sponge industry has reduced the demand for natural sponges and the chances for revival of the large-scale sponge industry are small.

Turtles. There are three main types of turtle -- green turtle, loggerhead turtle and Hawksbill turtle and all are caught in creek and shoal water off all the islands. Turtles provide both meat and shell, some of which is exported.

Conch. This is a univalve marine shell which is part of the staple diet of the islanders. It is estimated that an average of 250 tons of conch are now sold annually on the Nassau Market.

Scalefish. The types of fish which abound in the seas surrounding the Bahama Islands can be divided into categories of:-

a) Pelagic fish (the fish of the Gulf Stream.)
b) Reef fish (colorful but smaller fish of the Bahama Banks)

Of the 183 varieties of fish which abound in the Bahamian waters, 42 are of primary importance as food fishes, while 24 may be regarded as of secondary importance as edible fish. The main edible varieties are:

snapper, grouper, pompano, grunt, jack, runner, porgie, mullet, hogfish, muttonfish, tang turbot, shellfish, tuna.

Fish are caught according to the manner which best suits their habitat and other characteristics. Both surface nets and dip nets are used while varieties such as grouper and grunt are best caught by hand lines.

The waters of the Bahama Islands and, in particular, those off Grand Bahama and Bimini are the fishing grounds of the big game fishermen. They are particularly interested in tarpon jack, marlin, tuna and barracuda.

It would appear that, in view of the fact that the waters in the vicinity of Grand Bahama Island, both Gulf Stream and reef, abound in marine life, some attention should be given to this aspect of the economy. The annual report of the British Colonial Research Council 1948-1949., P.13, stated that 'There appear to be possibilities of developing marine fisheries in the Bahamas.' Although the Bahamas are very much affected by the seas, they are not as yet the center of a large commercial fishing industry. For various reasons such as lack of economic necessity or lack of Government and private initiative, the resources have not been fully exploited to date but the indications are that a fishing industry could be started, centered on Grand Bahama, for the purpose of the production of both fresh and canned fish.

General

Although it is not strictly considered a natural resource, the extremely pleasant climate and natural beauty of the islands are, undoubtedly, their most advantageous resource and the one on which Grand Bahama can capitalise most in the long run.

Conclusion

In summation, it could be said that the natural resources of Grand Bahama Island are limited and the following seem the most promising lines of investigation in determining future development:

The limestone available may be useful for the erection of buildings but, more importantly, the potential does exist for the development of a cement industry.

Agriculturally, the island is not highly developed and does not appear to have much potential for large-scale agriculture but a field to be thoroughly explored is the hydroponic cultivation of specialised items for export to the U.S.A.

Although the island has pine forests, there is only the possibility of maintaining forestry as a secondary industry. The wholesale felling of the pine forests that exist may well have an adverse effect on the tourist industry.

The richest natural resource is, undoubtedly, the abundant marine life. However, it is extremely important to weigh the large-scale commercial exploitation of this marine life with the effect it may have on the retirement industry, tourism and sports fishing.

ECONOMIC BASE

Agricultural Products.

Bananas - An increase in the meagre banana acreage still does not satisfy local demand.
Citrus - Small portion of total production, but expansion is being encouraged.
Tomatoes - Primary agricultural product and main export. 900 acres under cultivation.
Livestock - Limited activity: 3,550 horses, 3,600 horned cattle, 22,300 sheep, 14,300 goats, 10,350 swine and 407,000 poultry.

Marine Products.

Crawfish - Largest dollar volume of exports from islands.
Sponges - Over-supply of sponges forced a cut in exports in 1954 and 1955. Recovery has been slow, due to increased production of synthetic sponges.

Industries.

Lumber - Important in the islands as a whole but on Grand Bahama lumbering has been recently discontinued. The production of pulpwood however has become a major industry ($193,000 in 1957). Controls have been established now to provide a program of conservation of existing timber.
Salt - Second highest (dollar volume) export from the islands.



Imports - Exports

As stated previously, the dollar volume of exports is a very small fraction of the volume of imports and the ratio of imports to exports, actually, is almost 16 to 1. The extent of the islands' dependence on outside economies is obvious. Principal imports in 1957 were beer and liquor, boots and shoes, butter, electrical apparatus, flour, furniture, lumber, machinery, milk, cars and trucks and provisions. Principal exports were tomatoes, okra, crayfish, sponges and salt. The U. S. A. is the principal export market.

Labor Force

The population of the islands in 1958 was 136,229. The composition of this population is outlined below for 1956, 1957 and 1958.

Population	1956	1957	1958
Male	54,896	57,809	60,152
Female	41,140	72,889	76,007
Total	96,036	130,698	136,229

These figures show a growing predominance of female population. While the male population increased only 10%, the female population almost doubled. The effect of the population distribution noted above is seen in the composition of the total labor force of the islands. In 1957, the total labor force had increased to 47,500 and, of this total, almost half were females.

A breakdown on the labor force shows the influence of tourism as the only real economic activity on the islands. Over 1/3 was employed in domestic service. Comparative census figures are not available but the Labor Department has estimated that almost half of the total population is represented on the labor force. This ratio of working force to total population of almost 50% higher than in the U.S.

Wages and Salaries

In 1959, the Labour Department originated a scale of rates and wages. Although these standard rates are chiefly operative only in government jobs, it is easy to see that for all practical purposes they set a universal standard. Despite this acceptance of government minimum rates for employment, the wage scales fall far below that of the U.S. in every category. However, the Labour Department envisions a higher standard of living for the islands in their annual report in 1959, which says, in part, "Accepting that full employment exists in the Bahamas, the rates of pay now negotiated for a number of industries provide a higher standard of living than that of any other territory in the Caribbean area, even when taking into account the higher cost of food, clothing, fuel, rent and other necessities." During the past, a fairly large number of Bahamian workers (2396 in Dec. 1959) have been recruited to work on the continent (U.S.). This figure has been declining recently due to an abundance of work in the Bahamas, where there is now little unemployment.

Bunkering at Freeport

Bunkering operations are conducted at Freeport by the Freeport Bunkering Company Ltd. which is a wholly owned subsidiary of the Grand Bahama Port Authority Ltd.

The excellent location of the bunkering terminal is an important factor in the measure of success already achieved and the even greater success anticipated. Freeport is situated on the edge of one of the most heavily travelled sea lanes of the world and shipping through the Panama Canal from the Far East and from Gulf Ports and shipping to and from the U.S.A. and Canada and to and from Central and South America pass within 20 miles of the terminal.

According to a memorandum issued by the Freeport Bunkering Company Limited to the Governor of the Bahama Islands the annual throughput is currently estimated to be in excess of 7,424,400 barrels (1 barrel = 42 U.S. gallons). Only 3 ports in the U.S.A. have done a greater bunkering business than this in the year 1959.

Port	Barrels Bunker Oil Laden on Foreign Going Vessels for year 1959
New York	20,984,426
Los Angeles	16,946,153
Galveston	8,938,469

For the six months ending 30th November 1960, 556 ships (not considering craft) of a deadweight tonnage totalling 11,340,000 tons cleared H.M. Customs at Freeport and the indirect benefits of such a large volume of shipping calling at Freeport are many. It is inevitable that a large ship-supplying business will eventually arise.

INDUSTRIAL DEVELOPMENT

There is no natural sound economic base within these islands which has been proven by history. Agriculture is faced with the dilemma of no soil and, although steps have been taken to find some means of cultivating the small amount of tillable soil available, usable natural resources are few. Indigenous limestone rock is used in building and fish abound in the surrounding waters but no important attempt has been made to tap these potentialities. Adequate water supply is available from natural rainfall and electric power can be furnished only at a price which in unattractive to industry. So, the island's infant economy is supported mostly by tourism. Business Week stated "...Islanders don't want to become completely dependent on tourism..." and it also states that there is a hesitancy about accepting all this economic "boom" for reasons of possible overdemand on the islands' resources and utilities. "There is a special question about the possibility that Freeport may change the fundamental "character" of the islands."

Recent economic development in the Bahamas has been characterized by lethargic growth in all areas except the tourist industry. In 1958 some 180,000 visitors came to the islands, spending an average of 18 dollars per day per person and in the same year almost $1.5 million was spent on the promotion of tourism. This is clear evidence that tourism forms a major part of the economic base but, to appreciate the lack of significant economic development in other fields, it is necessary to examine the physical and political development of the islands (see sections on history, etc.). Politically the islands have long been unstable and economically, due to the lack of natural resources and to a combination of social and cultural forces, they have never experienced any substantial growth. The volume of exports is only a fraction of imports and the bulk of economic activity has been in tourism, which does not alone provide a sound base for steady economic growth.

Estimating the number of tourists that can be expected annually to come to Grand Bahama can be done by analysing trends now apparent in Nassau and Miami. Because of overcrowding of facilities in Nassau and growing dissatisfaction with Miami as a tourist resort, Freeport reasonably can expect to attract within the next few years some 400,000 tourists annually. As the average tourist in Nassau stays 11 days and since at no time during the year do daily entries in Nassau more than double those at any other time, we can assume that there will be a daily average of 12,000 tourists at Freeport throughout the year, with the peak of no more than 16,000 and a low of 8,000. It can thus be seen that tourism will still form a substantial part of any income- producing activities in the Islands, although it will be desirable to establish supplementary industries to broaden the employment base of the community.

Effect of Tax-exemption on Industrialization

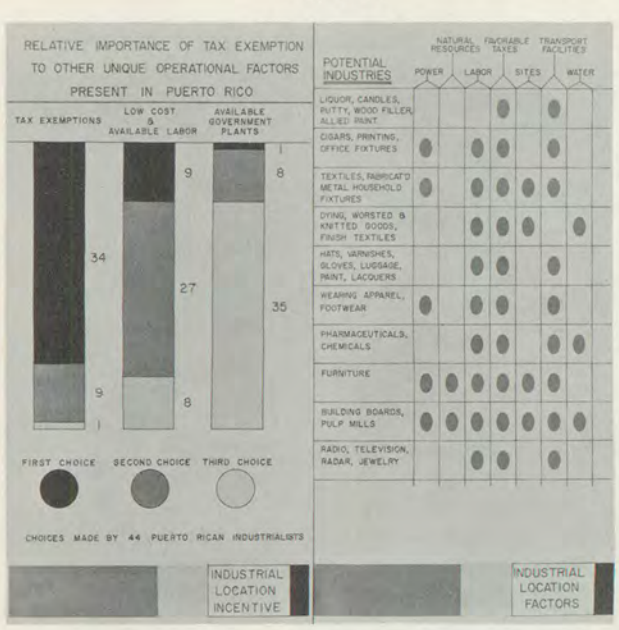
Possibly the only important parallel to the situation encountered in our development is the industrialization of the area of San Juan, Puerto Rico. Only recently (since 1948) government organizations on this small island have instigated programs of tax-exemption in efforts to stimulate some degree of economic or industrial growth.

The merits of this program or the results of the exemptions have been dwelt on at great length statistically and one author has even isolated several items of production in Puerto Rico and compared their costs with similar costs incurred by Mainland production. In this detailed statistical report, he reaches the conclusion that all the isolated products he studied could be produced on Puerto Rico more favorably than on the Mainland.

As stated, though, these studies were of an isolated nature and trends or general benefits for a group of industries in a separate location could not be ascertained from the deductions he made. This is the nature of the study itself. The question of industrialization of an economy in an environment such as that on Grand Bahama is fraught with consideration of excises, international supply and demand, untested mobility of labor forces, and fluctuation of values and practices on an international scale.

During the month of January, 1953, fourty-four firms in Puerto Rico were interviewed by a team of research men on the question of location of their respective plants. Of these fourty-four, all were new tax-exempted industries picked from a list of 200 all-inclusive industries on the island.

Each firm was asked to rate three factors of location as to the most important, second important and third important. These factors were chosen as the ones unique to the area of Puerto Rico -- tax exemption, low cost and availability of labor and availability of government plants. 77% of these firms listed tax-exemption as the most important factor in their choice to locate in Puerto Rico.



Locational Factors of Industry

In the wake of discussion of the general opportunities offered in Freeport must come a more comprehensive analysis of the factors which most influence certain industries in their location. The chart shows a number of selected industries and their particular important locational factors as compiled by the Office of Domestic Commerce of the U.S. Department of Commerce. In the selection of certain industries to illustrate in this graph, particular attention was paid to industries rumored to be negotiating with the Port Authority and industries already established and operating in areas of approximately similar conditions.

Inasmuch as the information in this graph is a compendium of average conditions for an enormous number of industries, one must be careful not to place too much emphasis on the validity of the conclusions in regard to a particular industry with its own set of locational factors. However, this could very well establish a jumping-off point from which an estimate of the size and type of industry likely to find Freeport an ideal location could be obtained.

Those types of industries found on Puerto Rico which would be suitable for location on Grand Bahama could be categorized as follows:

1. Industries which process either natural resources or semi-finished products of the island.
2. Industries which process materials for local consumption.
3. Industries where the labor cost was a substantial element in the total cost of operations.
4. Industries which produced articles with a high ratio of value to bulk.

Investigation into the Feasibility of the Establishment of a Cement Industry on Grand Bahama Island

To consider the feasibility of the establishment of a cement industry on Grand Bahama Island, the following factors must be taken into consideration;

1. Raw Materials

The main materials required for the production of cement in all its processes are:

a) Calcareous Material. The source of calcareous material suitable for a cement industry on the island is the marl deposits. Possibly the limestone could also be used for this purpose.

b) Argillaceous Material. The argillaceous materials generally used in cement production are clays or shales. The calcareous material would be mixed with the argillaceous material in such a way as to obtain the correct proportion of lime, contained in the former, to alumina and silica, contained in the latter. Since there are no argillaceous deposits on the island or on any of the other of the Bahama Islands, the raw material will have to be brought from another source, possibly Cuba, Haiti, the Dominican Republic or Florida depending on the cheapest cost involved.

c) Gypsum. 11 lbs. per barrel of cement are required. This will have to be imported. (A barrel of cement is equivalent to 4 bags each weighing 94 lbs. a bag, i.e. 376 lbs.) The gypsum influences the hardening properties of the cement.

d) Water. 400 lbs. or 48 gallons per barrel are required for the wet process of manufacture and the dry process of manufacture requires somewhat less. Water can be conserved by recondensation but that will add to the cost of manufacture and as the amount of water required is not excessive and the water supplies of the island are adequate, there is no obstacle in this connection.

e) Fuel. Either coal dust, oil or gas can be used. These would have to be imported and choice of fuel would depend on cheapest cost. .32 lbs. of coal are required for every lb. of cement produced.

2. Adequate Markets

An analysis of figures for the year 1956 of import and export of cement in countries within easy shipping distance of Grand Bahama Island reveals the following:-

COUNTRY	EXPORT Barrels.	IMPORT Barrels.
United States of America	1,250,000	
Trinidad	350,000	
Salvador	25,000	100,000
British West Indies		300,000
British Honduras*		10,000
British Guiana*		125,000
Brazil		180,000
Costa Rica*		320,000
Cuba		1,250,000
Dominican Republic	375,000	
Guadeloupe*		140,000
Guatemala		100,000
Haiti		25,000
Honduras*		125,000
Martinique*		135,000
Mexico	35,000	10
Netherlands Guiana		105,000
Netherlands West Indies*		175,000
Panama Canal Zone		125,000
Puerto Rico (excluding exports to U.S.A.)	500,000	
Venezuela		80,000
Colombia	300,000	
Total	2,835,000	3,295,000

* Indicates countries with no domestic cement manufacturing industry. In countries in the area that are not listed, domestic production sufficed but there was no surplus for export purposes.

Thus, it is seen that, in the area under consideration, imports of cement exceeded exports by 460,000 barrels. It must be borne in mind that the table was for the year 1956. In the interim, the cement manufacturing capacity of various countries in the area has increased. However, the demand is constantly growing as the countries develop.

In the U.S.A. the price of cement used to be determined by use of a basing point system developed by the cement industry as a whole. Cement was thus charged for at a basic price plus freight charges from the nearest basic point. Thus an identical price was always charged for cement delivered to any destination no matter which cement company executed the order. However, in April 1948, the United States Supreme Court ruled that the collusive use of the basing point system violated America's Anti-Trust Law. Thus the basing point system was broken down and the possibility exists of exporting to various parts of the United States where a large demand for cement exists not satisfied by the local cement industry (e.g., Florida). It may thus be possible to market cement more cheaply in some parts even though duty may have to be paid.

The Bahama Islands with population of some 100,000 (assuming a per capita demand of 1.6 barrels as it was in the U.S.A. in 1952) will require 160,000 barrels of cement annually. If a big building program is begun on Grand Bahama, the domestic consumption may even be greater.

3. Size of Industry

Whereas the market would indicate that there is room for a cement industry on the Bahama Islands, the experience of other cement industries in the U.S.A. indicates that the minimum economic size for a cement industry is a capacity of 1,500,000 barrels. Most new mills constructed during the post-war period have been installed with a capacity of 1,500,000 barrels or moderately less. Officials of cement companies, when questioned, have suggested that the bulk of production economies are reached in mills of 1,500,000 or, at most 2,000,000 barrels of annual capacity. Cement plants usually expand by building a parallel plant, both plants using common services, certain processes being in common. Thus, until it can be established what the demand will actually be, it would be advisable not to contemplate a cement industry larger than 1,500,000 barrels a year initially.

4. Capital Requirements

The estimated cost of capital investment in the U.S.A. is $7 - $10 for every barrel produced annually. Thus, initial capital resources required for an industry producing 1,500,000 barrels would be between $10,500,000 and $15,000,000. It would be safe to assume that these figures would also be true for the Bahama Islands.

5. Labor Supply

The Lehigh Cement Company estimates that there is $27,000 invested in capital equipment for every worker employed. This would imply a total of 400 - 550 workers in a plant producing 1,500,000 barrels a year. The usual employee ratio in the cement industry is 5 unskilled: 2 semiskilled:

1 skilled. It can be anticipated that if a cement industry were established on Grand Bahama Island, more labor would probably be used than is customarily used in the United States, due to lower wage rates.

6. Manufacturing Process

Without entering into details, the main processes used in the manufacture of cement are:-

1) Wet Process. This requires more fuel for burning and less power for grinding. It is the more popular process in Europe.

2) Dry Process. This requires less fuel for burning but more power for grinding. Although the wet process is the usual one for cement manufacture from a marl base, the dry process could be used and may be preferable if water consumption is a cause for concern.

7. Location of Industry and Area Needed

The location of a cement industry 2 miles from a residential area is a sufficient distance for it not to interfere with life in the residential area. On Grand Bahama Island, since the prevailing winds are easterly it is possible to locate the cement industry on the western side of the island in order that it will not interfere with the residential area, the wind blowing the dust, smells and noise away from the Freeport area. It would probably be impossible for the industry to be situated close enough to the port area to avoid the necessity of some form of rail transport. Because the difference in cost between rail shipments for 1 mile and 5 miles on a company owned railroad is of no great consequence, the distance of the plant from the port area is not of great importance.

The area required for the plant is between 1/2 - 1 mile square. An additional area will be required for quarrying and dredging purposes. The size of this latter area is impossible to determine without knowledge of thickness and quality of deposits.

8. Transport

It is obvious that the bulk of cement produced will have to be transported by ship. This is not of itself a disadvantage since, as a rule, bulk transport by ship is cheaper than bulk transport by rail. The disadvantage lies in the necessity of bringing the argillaceous deposits and fuel by ship from other sources. 1% of United States cement is currently shipped by boat and the use of pumping systems has led to development of the self-loading and unloading type of boats and barges.

Conclusion

In conclusion, it is possible to summarise the advisability of the establishment of a cement industry on the island as follows:-

PROS:
1) Availability of abundant supply of marl.
2) Availability of a comparatively cheap labor supply.
3) Existence of market in area, a market that will tend to grow with development of the various countries. The possibility exists of entering the United States market as well.

CONS:
1) Necessity of bringing argillaceous material to the island from another source.
2) Necessity of bringing fuel to the island from another source. However, the island is conveniently placed from this point of view and a cement industry may be able to take advantage of the oil storage tanks on the island.

It is not possible at this stage to come to a definite conclusion without information concerning costs, possible sources of argillaceous materials and definite markets. Whereas it may be possible for cement industries on Cuba, Haiti or Puerto Rico to produce cement more cheaply if they have the argillaceous material available without the necessity of having to import it, the existence of a free port may swing the industry in Grand Bahama's favour.

Labor Force

The industries tabulated below, with probable employment and areas required, are therefore possibilities on Grand Bahama.

INDUSTRY	No. of Employees	Area Required
Cement	500	640 acres
Boat-building	80- 90	
Water skis	10- 20	10 - 15 acres
Oil bunkering	50	300 acres
Fishing - turtle conch lobsters	400	Small
Fertilizer		
Ship repairs	50	Requires dry dock
Port facilities - cranes railroad warehouses cold storage	300	25 - 50 acres
Assembly industries - electronic	100	4 acres
camera	50	2 acres
watches	50	2 acres
Manufacturing - shoes	75	5 - 10 acres
	1575	1000 acres

Assuming an average-sized family of 4, a population of 6,400 industrial workers or dependants of industrial workers is anticipated. It may safely be assumed that numerous wives of industrial workers will be engaged in cottage type straw industries.

Should the opportunity or demand arise, the following industries are possibilities:-

	Possible No. Workers
Hardboard	200
Rope	50-100
Magnesium	500-1000
Shipbuilding	

Investigation into the Feasibility of Hydroponic Cultivation on Grand Bahama Island

The hydroponic cultivation of plants is still a very new phenomenon and consequently, the method is still at the stage of having both fervent adherents and fervent opponents. Whereas some authorities are optimistic about the possibilities of hydroponic cultivation and, for certain crops, maintain they will always have better results, others are more wary. However, virtually all would support hydroponic cultivation as economically worthwhile where:-

1) Absence of soil or other conditions make normal practice or agriculture impossible.
2) Certain crops can be produced by hydroponic culture which can be sold at high prices off-season.

The following facts will be of interest in our final determination:-

a) Hydroponics is the cultivation of plants under controlled conditions in an aggregate base which can be sand, gravel or vermiculite. It is worthy of note that limestone gravel has produced fairly good results when used in hydroponic experiments.

b) Water. Hydroponic cultivation requires a fair water supply but less than ordinary agriculture. On Aruba in Dutch Guiana, a sea water evaporation plant is economically used for hydroponic cultivation. With vermiculite 1/20 of the amount of water used in ordinary farming is used.

c) Crop Results. The following is an indication of results obtained for various crops compared with normal agricultural crops on same area:-

	Agriculture	Hydroponics
Potatoes	3 tons	62 1/2 tons
Tomatoes	5 tons	60 - 300 tons
Oats	1000 lbs.	2500 lbs.
Rice	1000 lbs.	5000 lbs.
Beet	4 tons	12 tons
Peas	1 ton	9 tons
Beans	5 tons	21 tons
Cucumbers	3 1/2 tons	15 tons

Hydroponic cultivation is considered suitable for the following crops:-

1) Vegetables. Tomatoes, onions, potatoes, spinach, beetroot, cucumber, horseradish, lettuce.
2) Flowers. Carnations, gladioli, chrysanthemum.

Results in some cases are 20 times the results attained in ordinary agriculture. Good 'out of season' crops are:- carnations, gladioli, chrysanthemum, lettuce, tomato, cucumber.

d) Labor. It is possible for retired people to maintain a backyard hydroponicum or to do certain work in a commercial large-scale hydroponicum. For average hydroponic cultivation, 2 men and a foreman are sufficient to maintain an acre, for tomato cultivation, the ratio is 4 men / acre and for carnation cultivation, 8 men / acre. Additional help is required for harvesting and, as a rule, laborers require more technical knowledge than the average agricultural laborer.

e) Costs. These are obviously variable depending on the area. The following are costs of erecting installations in various places:-

Aruba (Dutch West Indies). Here installations were built in the open and provided with windbreaks at a cost of $25,000 per acre.
Puerto Rico. Here installations were erected at a cost of $15,000 per acre. In Puerto Rico, the sales income in commercial hydroponic organizations is divided as follows: Labor 38%, Administration 20%, Operating Costs 18%, Profit 24%.
U.S.A. The costs of installations vary from $25,000 to $100,000 an acre, the big difference being due to the variation in cost with or without glass covering for the hydroponicum.
South Africa. The cost quoted is $20,000 per acre for a covered hydroponicum. In a case quoted, an income of $15,000 a year was obtained for $20,000 invested.

f) General.

i) No labor is required for such processes as weeding.
ii) Pests and diseases are easily overcome.
iii) Quality is good, generally above the average grown in soil.
iv) Crop rotation is not necessary.
v) Crops are clean.
vi) Any deficiencies in plant can be made up for by adjusting the nutrient mixture.

g) Conclusion. The chances for successful hydroponic cultivation on Grand Bahama Island are good. The climate will enable the cultivator to grow crops throughout the year and it is worth recording that in Florida, an area with comparable conditions, hydroponic cultivation takes place throughout the year mainly on gravel culture. Tomatoes and cucumbers are the main crops. The cost of installations cannot be determined without the knowledge whether open or closed beds will be required but it is possible that open beds, as are sometimes used in Florida, with covers for rain would be sufficient. The determination of the most suitable crops for the island and the most economical form of installations will have to be determined by the Hydroponic Research Station, already in existence on the island.

h) An alternative to hydroponic cultivation is the preparation of suitable soil on the island by the crushing of rock and about 1000 acres have been so prepared in a million dollar investment. The soil is prepared to a depth of 8 - 10 inches, with chemical fertilizers being added. The investors are hopeful about the economic feasibility of the project and its success will certainly be the signal for further agricultural development of this nature.

TRANSPORTATION & COMMUNICATIONS

Air Transportation

Research into air transportation served to indicate primarily that the existing facilities both at West End and at Freeport are adequate for most commercial aircraft presently in operation. West End, with a runway length of 5-6,000 feet, currently handles BOAC Viscounts and Freeport International has a length of 5,000 feet. Because of the imminent possibility of jet traffic to Freeport, it is recommended that the runway there be lengthened to 10,000 feet and this should not be a costly operation because of the geologic formation of the island surface which is level and composed of native limestone which can be easily crushed and graded.

Data pertaining to operational costs of airports is scarce and more research must be done in this area but, generally, landing fees constitute 1/3 of an airport's income. Large present-day aircraft have a gross weight of 180,000 pounds, but since a large number of smaller aircraft will be using Freeport International, an average weight of 100,000 pounds per landing seems reasonable. Landing fees are normally 9.5¢ per 1,000 pounds and a return, therefore, of $9.50 per landing may be anticipated. At this rate 10,000 landings a year, or 30 landings per day, are needed to economically operate the airport.

There may also be considerable scope for the use of steep-take-off-and-landing aircraft in shuttle services to the mainland. A number of designs for craft of this type are now in prototype or drawing stages and the over-water distance is roughly what most authorities consider the optimum distance for economy in competition with conventional aircraft. Facilities required for s.t.o.l. flights are very much simpler and cheaper than those for normal airports and their provision would pose no problem on the island.

Another vehicle in an advanced stage of development is the hovercraft which rides over both sea and land with virtually no prepared facilities required at all. Should an adequately sized hovercraft be put into production in the near future it could well revolutionise travel to Grand Bahama and like places.

Ocean Transport

Freeport is located quite advantageously with regard to ocean trade routes, being 'on the corner' of the main southeastern United States Coastal Route and the northwestern New Providence Channel. It is within a hundred air miles of three major Florida ports.

These routes are traveled by many shipping lines which serve the Bahamas. Some of the regular freight lines are: Furness Bermuda Line, Incres Nassau Line, Grace Line Inc., and United Fruit Co., all from New York; Norgulf Lines; Buccaneer Lines, from Jacksonville, Fla.; and Church Bay N. V., from Miami. Among the regular passenger lines are: Furness, Grace, and Incres Nassau, mentioned above; Home Lines, also from New York; Peninsular and Occidental SS Co., from Palm Beach; and Eastern Shipping Co., from Miami. Eastern's Bahama Star serves West End, and P & O's Florida lists Freeport as a stop, though it is most likely that it uses at present only the bunkering facilities.

Freeport's harbour facilities are adequate for a fair amount of traffic, with its 30 foot deep channel and turning basin, and 600 foot long slips. Bunkering is adequate, though outside the harbour, and water is available. The mechanical facilities are perhaps most lacking at present, as there seems to be only one crane available.

Nearby ports are, of course, much more developed. Within a short time and distance of Freeport, there are approximately eight large U. S. ports, two large Cuban ports, and one large port in the Dominican Republic; there are a couple of medium-sized U. S. ports, eight of medium size in Cuba, and one each in Haiti and the Dominican Republic; and there are as many as twenty smaller ports in the general area. Bunkering facilities are available at many of these ports. Three of the larger U. S. ports within a hundred miles of Freeport are Palm Beach, Miami, and Port Everglades, at Fort Lauderdale. Each of these is larger than Freeport and better equipped with facilities and machinery. The three of them together do a far greater percentage of trade than any three other, combined, of Florida's many ports.

The harbour at Nassau is shallower than that at Freeport, and lacks bunkering facilities, but is well equipped with other facilities and has an excellent anchorage just outside the entrance from which passengers and freight may be ferried to shore at extra expense.

Expenses incurred in operation are affecting the shipping trade deeply at present, with the probability of resultant rises in shipping rates. Efficiency of the world's cargo fleet has dropped some 20% since the beginning of World War II, despite the rise in tonnage shipped and the increase in average speed of the ships. This loss of efficiency may be mainly laid to the amount of time spent by ships in port, coping with antiquated, inadequate, or completely non-existent facilities. Since the beginning of the war, average time in port per ship has risen an estimated 30% because port facilities have not kept stride with the increased pace set by new packages, unified goods, heavy loads and larger ships and, in consequence, port expenses now total two thirds of the total operating expenses incurred by shipping lines.

For example, docking charges run from one to three cents per gross ton in most ports. If a large vessel were held in port an extra day due to lack of necessary facilities, it would incur quite a considerable extra expense. If it were required to shift from one wharf to another, it would usually require the aid of one or more tugs, resulting in a possible extra of many hundreds of dollars.

To point up this rise in expenses, it may be noted that even U. S. operated tramp shipping is feeling the pinch for, though it operates on a much smaller margin of profit and loss than does commercial shipping, it finds it difficult to compete with foreign operated tramps which base their rates on cheap labor and cheaper operating supplies.

Passenger lines, too, are affected by increased expenses, though in a somewhat different way. They are not so much affected by loss of time in port, for supplies can be handled at the same time as the passengers are moving, as they are affected by the costs of supplies. Consider, for example, that the average 15,000 ton U. S. passenger liner consumes $1500 worth of flashlight batteries and $7000 worth of rags annually; expenses which are in the main foreign to freighters. Passenger liners use the same materials, supplies and services that hotels and institutions do and these things are expensive. These expenses are reflected in and absorbed in part by the passenger fares which have risen as much as 50% of their pre-war prices. Despite this, the number of passengers is steadily rising, year by year.

In order to combat these rising costs and to attract more trade, many of the nearby ports are engaged in or planning for improving their facilities -- for instance, South Carolina has recently approved $25 million for port improvement, most of which will be spent on the Charleston harbour, already one of the largest in the area. In some cases these improvements will be effected immediately, in other cases they are part of a program.

The most exciting developments along the lines of economy and progress are coming in the freight and commercial field. Several companies are building their freighting around rollon-rolloff or lifton-liftoff transport ships. These ships are designed to provide space for a maximum number of truck trailers, railroad cars or cargo containers, which are either towed aboard or carried by lift trucks in the case of rollon-rolloff ships or lifted aboard by cranes in the case of lifton-liftoff ships. There are presently several rollon or lifton operations carrying between East and Gulf coasts ports and to various West Indian ports.

These trailer- or trainships are regarded as one answer to rising freight-handling costs. They eliminate goods handling between point of origin and point of destination except the transfer of container to ship, a relatively quick and inexpensive operation. It is estimated that loading expenses for an ordinary C 3 type cargo ship run to $8.50/ton, while expenses for loading a similar size rollon ship might be as little as 6¢ a ton and, instead of the operation taking days, it might take four hours to unload and turn around.

The sizes of these ships vary widely with design, ranging from a rollon trailership 316 feet long, 50 feet beam and 12 feet draft, carrying 52 trailers, to a projected 800 foot, 21 foot draft, 453 trailer capacity. It is estimated that a conversion of a C 3 cargoship to a rollon trailership, 350 feet long, with a 14 foot 6 inch draft and a 52 trailer capacity, would cost $3,250,000; and that to build the projected 800 footer would cost $22 million.

Terminals for these operations would be relatively inexpensive as they need consist only of space in which to store the containers and the necessary wharf and equipment, whether ramps or cranes, with which to load the ship. A 52-trailer rollon terminal might cost $1,100,000; a rollon trainship terminal for the same number of cars might cost $2,200,000.

In default of these somewhat specialised ships being available it is quite possible that a system of freight barges plying between Grand Bahama and the mainland could be made use of. Since they must cross open sea these vessels would, of necessity, be somewhat more seaworthy than normal river or lake barges and a design similar to military carrying vessels which were developed during the Second World War may well prove feasible. Developments such as these would naturally take place if and when the demand justified them.

Ocean transport, and its costs, will have a definite effect on business and pleasure at Freeport. Thus, the harbour should be developed in such a manner as to take fullest advantage of the business it will receive. This means it will have to be provided with the necessary types and optimum amount of facilities and equipment which should be provided with an eye toward expansion of the boat basin and docking facilities, its basic components.

Surface Mail

In connection with surface transportation it is necessary also to consider surface communication. Grand Bahama has only one weekly connection for surface mail, and that with Nassau, from whence it goes daily to Miami and New York.

The rates are: for letters, two ounces for 1d on the island, two ounces for 1½d in the Bahamas, fivepence for the first ounce and threepence for additional ounce or fraction thereof within the Commonwealth, sixpence for the first ounce and fourpence per additional ounce or fraction thereof elsewhere.

Parcel post rates are: to British possessions in the Western Hemisphere, 1/- per lb. sent via Jamaica or Bermuda, otherwise 1/3 per lb. plus U. S. Customs charges if sent via U. S., and if sent to U. S. 1/6 per lb.

U. S. rates to the Bahamas are: for letters, 8¢/first ounce, 3¢/additional ounce or fraction thereof.

Parcel post rates are: 45¢/first lb., 22¢/additional lb.

Railway express rates, for parcels over 22 lb. are: 75¢/cu. ft. plus marine insurance, 60¢, and handling charges, $4.50.

Parcel post and Railway Express must be accompanied by a U. S. Customs declaration slip. All mail goes through Miami.

Telecommunications

This subject must be considered in the light of two considerations: first, the extent of existing facilities on Grand Bahama for both internal and external communications and, second, the legal arrangements entered into by the Port Authority with the Colony of Bahama Islands with respect to the establishment of such telecommunications as may be necessary.

Telecommunication systems may be thought of as consisting of the following component parts: telegraph, teletype, radio, television and cablegraph. These components in the case of Grand Bahama Island may be discussed in terms of intra-island, inter-island and extra-island systems.

Intra-Island Communications

Considering the size and present development of Grand Bahama Island, the discussion of intra-island communications is limited to the telephone. Among the Out Islands of the Bahamas communications are still primitive and are certainly not designed to provide for the exigencies of a modern industrial or other type community. Briefly communication now consists of ham radio-telephone receiver and transmitter sets and, beyond this, of informal delivering of messages by 'phone calls to a third person's set.

The Telecommunications Department of the Colony, furthermore, reports that private and business telephone receiving sets still are not available for the Out Islands and that demands on their resources are rapidly increasing. Even on New Providence the demand for personal receiver units is such that the Telecommunications Department advises those wishing to be assured of obtaining sets to order them prior to arrival.

Inter-Island Communications

As the Colony has recently become aware of the necessity of an up-to-date communication system between the islands, especially in view of their expanding economy and tourist trade, inter-island facilities are of the most modern type. In 1959, the International Telephone and Telegraph Communications Commission authorised the establishment of a new forward-scatter type VHF (very high frequency) radio station on Nassau powered by a 10,000 watt transformer which replaced a 5,000 watt one. At the same time International Telephone and Telegraph authorised the station to expand their collateral wireless telephone system from nine channels to a maximum of seventy-two. Presently, however, only twenty-four channels are in use but, since on each of the seventy-two channels

a separate telephone call can be monitored, the new installation would make it possible to conduct a total of seventy-two calls at any one time.

The VHF rating as opposed to the old one within the HF spectrum permits much clearer static-free reception -- although one of the properties of VHF is that it has a shorter wave length than HF -- because the frequency of the waves is faster and the power output is double. The Nassau broadcasting station is at 1540 megacycles on the dial.

As a consequence of the construction of the new radio station, the island of Eleuthera has been hooked up with a VHF radio-telephone network which greatly reduces static and improves reception on that island. Presently there are, on Eleuthera, two special VHF receiving sets which connect with an expanding domestic network there. Because of the vast improvement to communications with Eleuthera, plans are currently in progress to expand the same radio-telephone system to Hog Island and other settlements in the vicinity of Nassau. The new station has sufficient range and power to reach Grand Bahama but nothing seems to have been directly proposed for improving her inter-island communications system.

The Bahamas at present do not have their own television station. Nevertheless, it is an indication of the expanding business possibilities within the Colony that Associated Television of London, Ltd., during the last session of the Bahamas Assembly, applied for permission to introduce a Nassau-based TV station.

Extra-Island Communications

The word telecommunication implies a two-way system but a distinction is made between one-way communication (communication as a form of entertainment, i.e. radio and television) and two-way as such. Grand Bahama is favorably situated to monitor numerous radio and television programs from the east coast of the United States and, according to reports, television broadcasts from Florida are usually clear.

It is the sphere of two-way extra-island communications which is of primary concern. Within this area rudimentary facilities have only recently been established. At present almost all communications have to be monitored through Nassau by two-way radio and are thus a part of the inter-island system. Although emergency contact may be established with Nassau twenty-four hours a day, normal reception is only permitted with any of the Out Islands (with the exception of those mentioned with regard to the new VHF system) for a twelve-hour period daily. Grand Bahama has but one direct radio connection besides Nassau; one with Miami, Florida. Both West End Settlement and Freeport have receiving sets with a direct channel open daily from 7:45 A.M. until 6:00 P.M. to Marine Operator #74 in Miami. Outside of these hours it is impossible to contact Grand Bahama except through Nassau and then only in case of emergency.

Regulations Regarding Telecommunications

Relevent to the establishment of a communications system, or components thereof, by the Freeport Port Authority on their holding is a section from the Act which authorised the incorporation of the said Freeport Port Authority.

Briefly the import of the relevant passage from the Hawksbill Creek (Freeport) Act 1955 is this -- that the Port Authority can build any wireless sytem: the Port Authority must pay for the construction of whatever they want to build, then turn all facilities over to the Colony and pay the Colony for the maintenance of the same: revenue from such a system would be credit towards the payment of the operating costs. There is no mention in the Act of authorisation to build a non-wireless (cable) system. It is our opinion that the Act could be expanded to include a clause which would cover non-wireless extra-island facilities.

Recommendations and Conclusion

Such a system as presently exists on Grand Bahama could be considered adequate to handle the future telecommunication needs of the island only if it were to remain an undeveloped Out Island. However, since the projected population for 1985 of about 135,000 will almost equal the present population of the entire Colony, Freeport will require facilities at least equal to those presently serving the entire Colony. And if Freeport is to be an industrial or commercial complex, her demands for telecommunications will be considerably greater than those of the Colony. At any rate there will certainly be a need for more than one direct channel to the U. S. mainland and for reliable twenty-four-hour two-way telegraph and telephone service.

Furthermore, as modern as some of the facilities for the Bahamas are, the Telecommunications Department of the Colony is not equipped to supply the current demand, much less the demand for a doubled population. The HF and VHF transmissions referred to above are unusually static-free but the electro-magnetic waves are affected by the weather and/or by sun-spots. Thus there are periods when communications with the Out Islands is impossible.

We advocate the concurrent establishment of telecommunication facilities on Grand Bahama which are not dependent upon Nassau. Radio and television reception is adequate, teletype is not an immediate necessity but continuous telegraph and telephone transmission is imperative. To assure weather-resistant transmission then, we strongly recommend the laying of a submarine cable from the East coast of Florida to West End Settlement, Grand Bahama. Such a cable would provide for both the telephone and cablegraph, would free Freeport from dependence on the weather and Nassau, could possibly be the most economical means of supplying Freeport with electricity and would altogether be an attractive prospect whether or not it would be more economical than maintaining the present system.

The laying of a cable is a complex operation requiring highly specialised knowledge and the cost of such a cable and the resultant costs of telegraph and telephone transmission are beyond the scope of this report. It is evident that the present cost structure, however, is excessively high. For example, a weekday telephone call from Ithaca, New York, to Freeport, Grand Bahama, via the Overseas Operator #74 in Miami costs $7.50 for the first three minutes and $5.25 for each additional minute, plus 10% tax. Ithaca to Miami only costs $2.75 for the first three minutes and $1.90 for each additional minute. On Sundays the rates to Freeport are $4.50 and $3.00, to Miami $1.65 and $1.10. To call Freeport via Nassau (which one has to do when the direct channel is occupied or out of commission) is even more expensive. To the above charges must be added the cost of Station ZNS, Nassau transmission -- 4/5 (63¢) for the first three minutes and 1/6 (20¢) for each additional minute plus 1/-(14¢) for an extension connection within the island.

In conclusion, officials of the Bell Telephone Laboratories in Syracuse advise us that, because of recent advances in telecommunications research, no long-range planning should be done without considering the very real possibility of satellite communication at an operational cost within the next few years. As to the cost of a telephone network on the island of Grand Bahama, they advise us that the cost of designing such a network alone would cost in excess of $1,000,000.

SOCIOLOGY

General Characteristics of the Population

The total population of Grand Bahama was, as of December 1953, 4095, but it is reasonable to assume that the figure quoted has gone up considerably in the intervening eight years. 2186 of these 4095 people were male, 1909 females.

Grand Bahama has one of the lowest population densities in the Bahama group, with 9.52 persons per square mile. (Contrast this with the 790.78 persons per square mile on New Providence.)

A plurality of the men are unskilled laborers, another large percentage is employed in sea-faring industry and others in carpentry. Women frequently find employment as housemaids or are planters.

Approximately two-thirds of the people are able to read and write. School attendance is compulsory until the age of 15 but, as the government is quite lax in the enforcement of this statute, a number of children simply do not attend school at all. There is free public schooling beyond 15 but children of the wealthy are customarily sent away to school in Canada, the United States or the United Kingdom at this age.

305 (or about 7%) of the Grand Bahama population are white. Of the remainder, 3343 are Negro and 447 mixed.

A substantial portion of population growth in Grand Bahama (as in all her sister islands) is due to immigration. The largest source of this inflow is the West Indies and particularly Haiti, where great poverty and want to the point of starvation sends many inhabitants in search of other homes and work. The government prohibits this traffic but still it manages to seep through legal barriers at a high rate. Another fairly large source of new Bahamian population is the United States. The causes are varied in this instance, with the major factors influencing emigration being poor health -- for which the climate of the Bahamas might be a good remedy -- and the possibility of a pleasant and, in some cases, sumptuous retirement. The next most significant source of immigrants is Great Britain whose people come primarily to escape income tax or to make a good deal of money much more quickly than would be possible in the British Isles (partly because of the Bahamians' exemption from income tax). Some of the latter group return to the motherland with their "nest-eggs" after a few years, whereas others are sufficiently fond of the Bahamas to stay on.

Social Differentiation

Although there is complete integration of public facilities and functions, there is virtually no intermixture of racial groups on the personal, social level. On the other hand, anyone can move up in his own racial group, either by education or by the accumulation of wealth or (ideally) by both. Everyone desires to move upward but there is even a stronger attractive force in the direction of whiteness. There is a certain degree of mingling between the high status members of one color group and the low status group of the next whitest color.

The top sections of all the social groups are occupied by government officials, professional men and successful businessmen. The small merchants, skilled laborers and foremen tend to occupy the next berth. Lastly are found the unskilled day-laborers whose existence is generally hand-to-mouth.

A side-note on employment which might be of interest to developers doing considerable construction work on Grand Bahama (or any of the other islands, for that matter) is that the Abaconians, a particularly interesting sub-group of whites, who are customarily middle class (status) people, and also the high-status, light Negroes, make very good foremen on construction jobs.

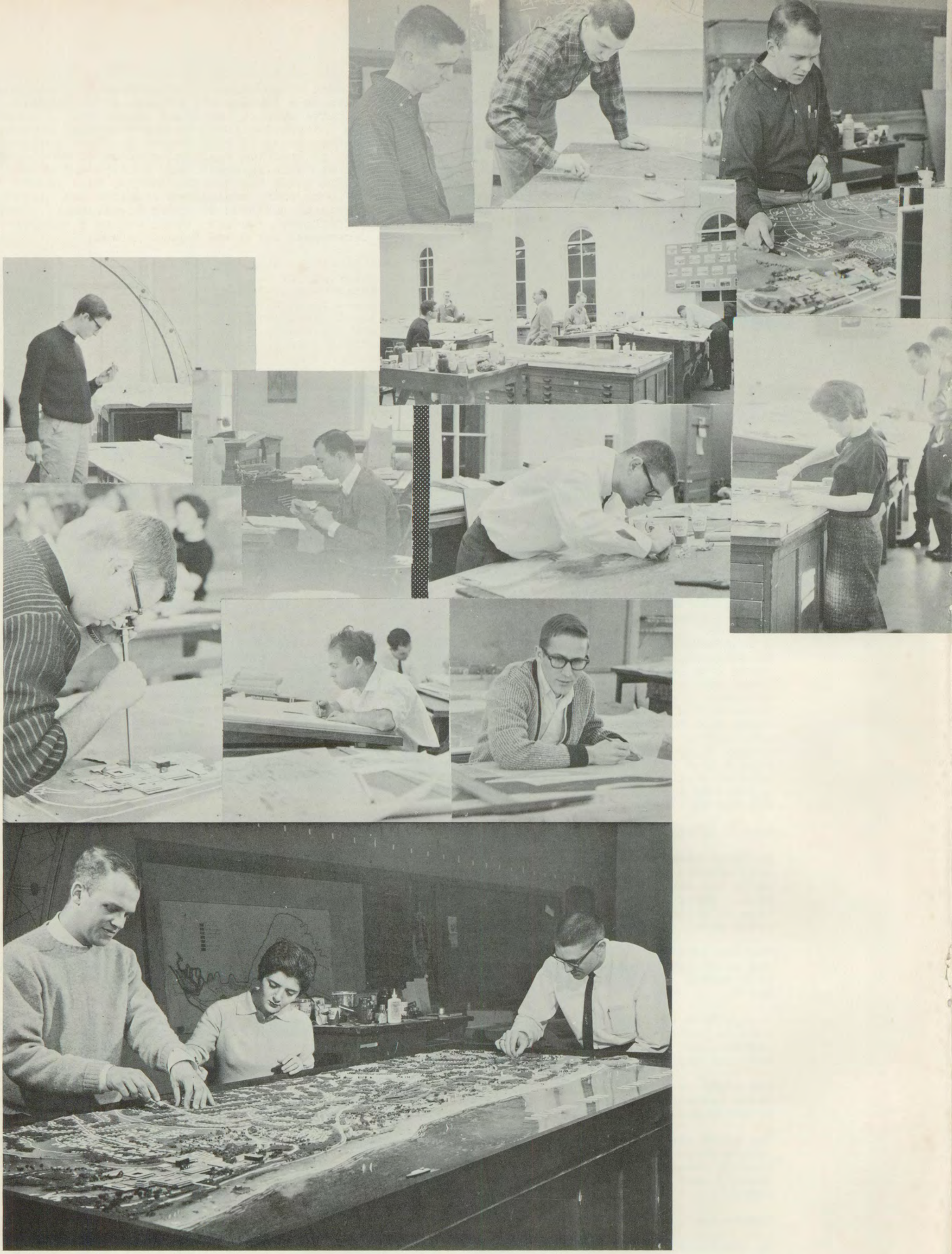
One might reasonably ask what would be the consequences of social intermingling of the races. Under present conditions, for the darker person, greater stature in the eyes of his peers would probably accrue. The lighter person, however, would meet with social ostracism.

One might also wonder how Negroes of low-status parents rise "to the top". The government grants scholarships to Negro students who have done well in public school to study in the United States. Usually these scholars are motivated to take full advantage of this opportunity so they very frequently earn honours in college and are immediately raised to very great stature by their racial peers.

Conclusion

In conclusion, it is relevant to note one piece of information pertaining to tourists. Although Freeport is fast becoming a major tourist attraction in the Bahamas -- second only to Nassau, it is said -- still the variety of types of tourists who go there is somewhat restricted. Although an increasing number of "Upper-middle" and "Lower-upper" economic class Americans spend from two days to three weeks enjoying Freeport's hotel accommodations, the main bulk of tourists still are the very, very wealthy -- usually men who come from Florida or New York or Pennsylvania on their private yachts, alone except for a skipper and crew to cater to their wishes, and who stay right on the yacht, using Grand Bahama's fertile waters for game fishing and none of her other facilities.

It will certainly be necessary to encourage a larger volume of tourist traffic to the island to develop its full potential and this essentially will mean tapping the supply of lower-income tourists who are becoming increasingly mobile and will provide the major proportion of any boost in visitors' numbers.



PART 3 - DESIGNS & DISCUSSIONS



PHILOSOPHY

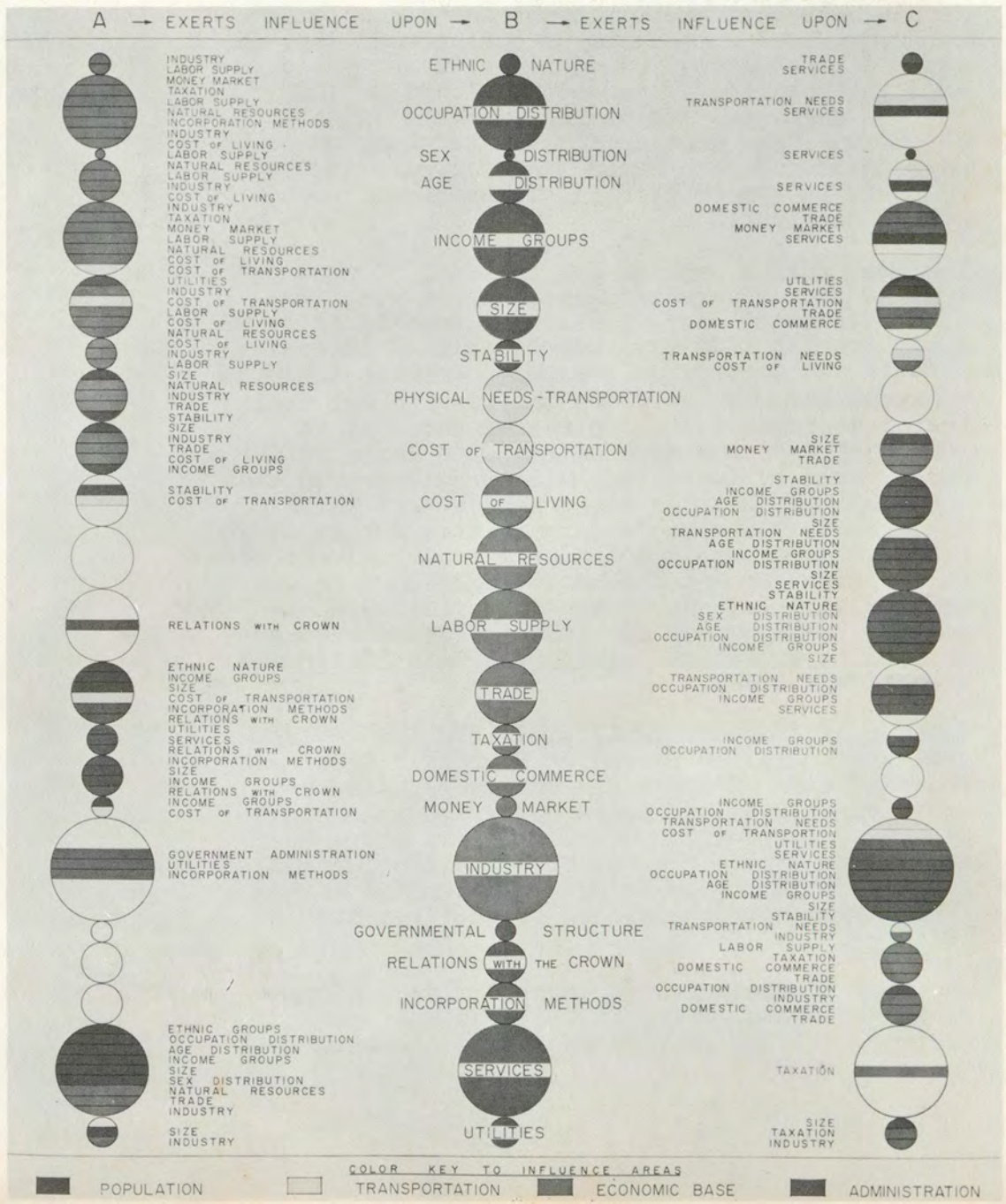
The first task had been to do exhaustive research into all areas of study which relate to a development project in an attempt to assimilate the entire body of knowledge pertaining to Grand Bahama Island. The information found in the preceding section of the brochure is the result of this research. Then follows the problem not only of applying this information to development plans but also of learning how a city evolves and grows, the natural laws which guide its growth, and how this growth can be regulated. To do this, additional research was necessary into the traditional patterns of urban development, plans for ideal cities, locational factors, etc., before a suitable scheme could be determined for Grand Bahama Island.

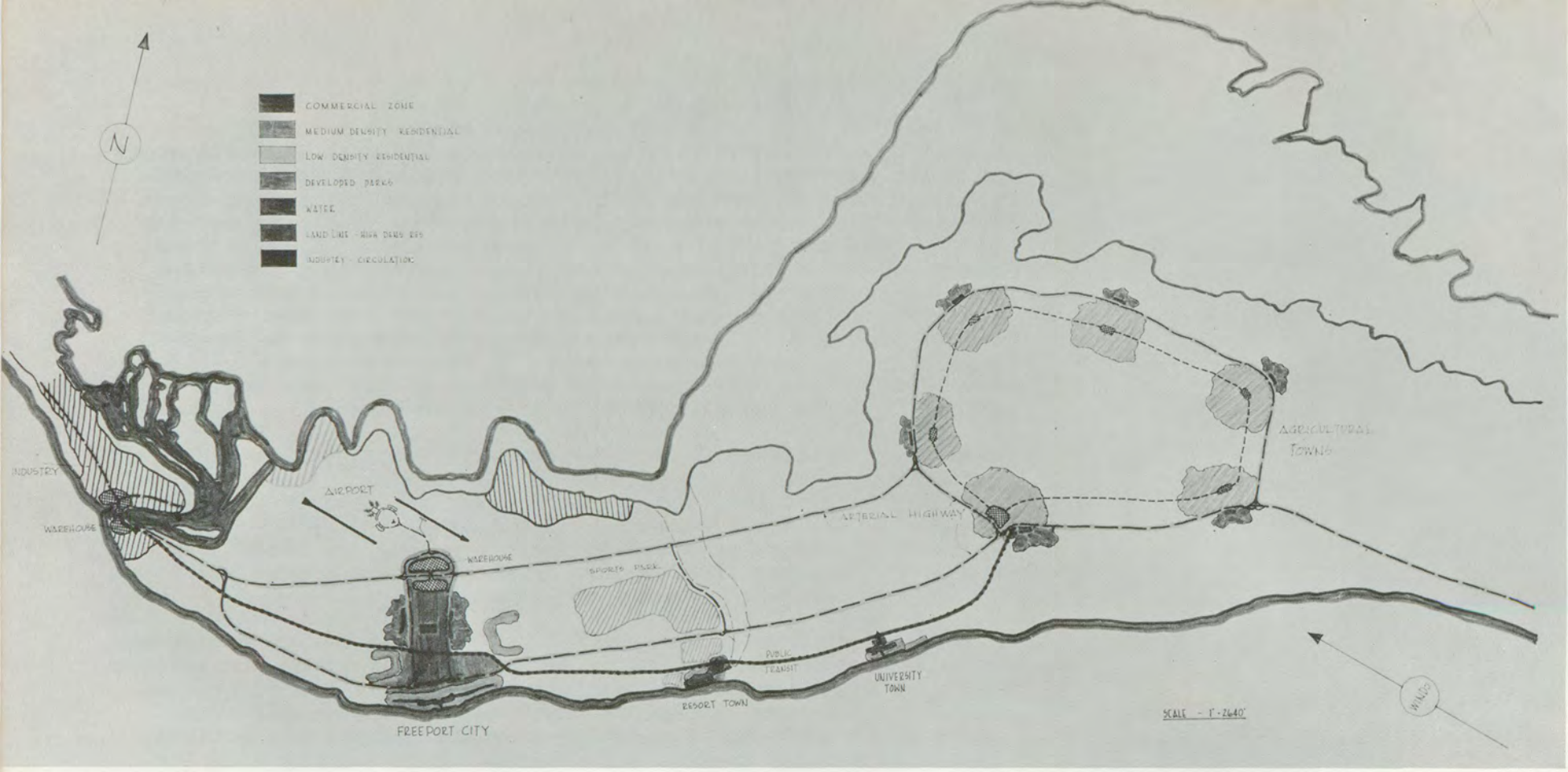
Even after this, though, and before any finite plans could be formulated, a philosophy of design was needed to guide the work. The temptation was to become overly idealistic, yet any planner would have a responsibility to the principals of the Freeport Authority to evaluate their concepts and ideas. Further, to disregard the economic aspects of development would be to neglect a vital aspect of planning.

Beauty and climate are unquestionably the island's most valuable resources so any design must recognize these natural attractions and work with them rather than superimpose an alien concept of development on the indigenous character of the island. Our basic philosophy then was to preserve the natural attractions of the island and to keep our development in harmony with its surroundings. We further decided that to be a success, Grand Bahama must offer a way of life not found in the United States and that, since we were building a city from the ground up, we had an opportunity to plan a community where the advantages of modern technology were combined with the kind of life that is found on other Caribbean Islands where the inhabitants can find a retreat from the high-pressured living of the rest of the world.

One of the first decisions that had to be made was whether or not it would be feasible to plan an industrial complex and whether such a complex would negate the possibility of creating a resort area on the island. These and other questions led to a quick realization that an evaluation of the influence of all these considerations upon each other was necessary if we were to evolve a picture of the relative importance of the various factors which could be brought to bear on development plans. A list of major aspects of planning was drawn up and each heading subdivided into as many categories as possible. Then the relative influence of each upon the others was charted to determine which were static and which were variable, which causative and which resultant. The accompanying chart is a modified graph of the findings, but nevertheless serves to show the complexity of such interrelationships.

With an awareness of these complexities and agreement on an initial philosophy of design, two groups were formed to produce pilot plans. Each group presented its plans to the other which criticised them. The results of our group efforts follow.





GROUP ONE, PROPOSAL ONE

Bearing in mind the tenets of our philosophy of design (and armed with the knowledge gained through our secondary research) we decided that a lineal development would best provide for a separation of the various components of our scheme (i.e. industrial & tourist). Additional investigations into the question of industrial location (the noxious elements) and resort planning (with an estimate of the number of tourists which could be expected to come to Grand Bahama), with special emphasis on the conflicting interests of each, proved necessary.

The most urgent problem was deciding to what extent we should industrialise. Large scale industrialisation would negate the possibilities of a big tourist industry but, because of levels of anticipated demand for commodities which could be produced from native resources, we did not feel that industrialisation to the extent that it would preclude the development of a large resort area, would be feasible. Also we discovered that there was ample space for a resort area which could readily provide the facilities for as many tourists as the most optimistic of us felt could be attracted to Grand Bahama. Therefore it was decided that (within foreseeable limits) there would be enough room for industry and a resort area, without either interfering with the operation of the other.

Because of the port facilities, the industrial area was logically placed at Hawksbill Creek and the west side of the creek was preferable because the prevailing south-easterly winds would blow away the noxious odors, noises, etc. We decided to center the resort activities around a marina which could be dredged from the low-lying areas near the middle of the Freeport holdings.

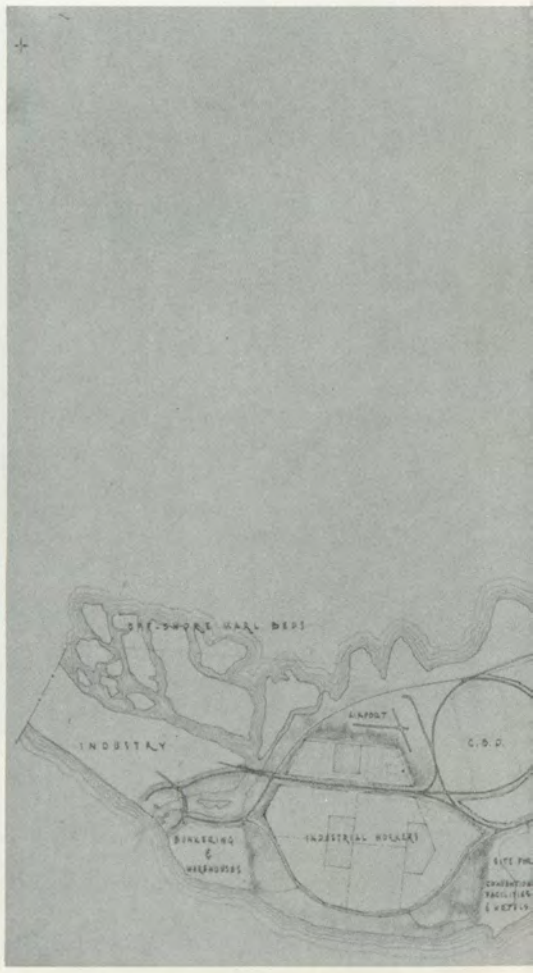
The City of Freeport was located midway between these two areas, where it would be most convenient to both, as well as to the airport.

Because of the abundance of unusual marine life and the clarity of the water in the ocean surrounding Grand Bahama, we felt that it would be an ideal location for a university, or technical school, specialising in oceanography and other marine sciences. As an additional attraction, an aquarium would be constructed within the university.

To avoid needless congestion at the port, and overdependence upon service traffic, we suggested a "piggy-back" transportation system to transport commodities directly from the ships to a distribution centre which is lying on the northern edge of Freeport city. The distribution centre was divided into two areas, one for commodities which must be retailed, the other for commodities sold in bulk, such as construction materials. The first area is served by a conveyor belt which passes through the commercial district of the city and, thus, there will be little need for service traffic in the central business district. Because many commodities will be imported by air, the airport is also connected to the distribution centre.

Most of the inland areas of the island were left as a water reserve or devoted to recreation and, as the climate is very favorable for hydroponic cultivation, a large area was set aside for farming. This and other areas can be seen on the accompanying map.





GROUP TWO, PROPOSAL ONE

In this plan the attempt was made to achieve three basic things. Firstly, to use the natural advantages of the island; secondly, to retain the indigenous qualities of the island; and thirdly, to create a feeling of kinship with the outdoors. To do this has meant creating a dispersed and spacious city in which no one need feel confined to his "cubby-hole" but, on the contrary, is encouraged at every side to go out and enjoy the island. With very little difficulty or expenditure of time the resident may be golfing, swimming or afloat after sport fish.

There is, to be sure, an economic base for the existence of the city but even this has been chosen with the three basic goals in mind. Many industries could have been brought to the island to take advantage of the location and tax structure of Freeport but these advantages are found elsewhere. On the other hand, where can such a climate and natural beauty be found outside of the Bahamas? Places that are as accessible as Freeport have, with few exceptions, been exploited to the extent that they have defeated their own ends and other areas are either rare or so far off the beaten path as to be uneconomical to develop. In view of the increasing leisure time in our modern civilisation, and the increased mobility of our population, why should such an area be literally ruined by heavy industrialisation? Such a use seems reprehensible and, while there is some industry on the island which does fit in with our goals, our main emphasis by far is on the tourist trade with its related services. This then is the jumping off point for population limits and space allocations.

To start with, in an earlier report on hydrology, we had an upper limit on population of 1,500,000. This was hardly practical as it involved using the entire island for water supply with no room for the people. On a half and half basis, a maximum figure of 750,000 seemed more likely. Even this is too large however, when one considers the goals. A study of existing resort areas shows them to be in the neighborhood of 100,000, with Miami as one of the largest at about 300,000 and, even at this size, Miami has been criticised as being too crowded and is becoming somewhat unattractive to tourists. In order to preserve the natural attractions then, a population of 180,000 was selected with an absolute maximum of 200,000. A study of tourist-resident ratios indicates that this could be achieved with a resident population of 150,000 and an annual tourist flow of 500,000. This gives a peak tourist population of 30,000 at any one time for the 180,000 figure.



In this spacious and dispersed city the planned density is in fact 4,000 persons to the square mile or about 6.3 persons per acre. This is compact enough to enjoy the advantage of community living, yet enables one to spread out in a semi-rural atmosphere, even though convenient to the Central Business District.

Since the economic focus is on tourism, it is logical to set aside for this use the land which would attract tourists. The main reasons for going to Freeport will be the sun and the sea and accordingly, some 12 miles of beachfront have been allocated for hotels and resort development. It also is in line with the concept of spaciousness. There is also a convention site on the only high hill on the island affording a beautiful view of the public marina and the ocean from one side and the heart of the city from the other.

Visitors to the city will arrive by air or boat. In either event, access to the city is by tree-lined arterial parkways on which they will see only small foreign cars or quaint jitneys which will be the island's main mode of mass transportation. The "foreignness" of the island will be accentuated and, in the case of those arriving by ship for a one-day stop, native shops and peddlers will beset him from the moment he steps off the gangplank. In the shops nearby he will purchase native items and take advantage of the tax-free luxuries in addition. Unless he goes out of his way, the tourist will never come into contact with the everyday routine of life that gives the impression that this is just like "back home", only transplanted a little.



Inasmuch as the residents are also entitled to prime ocean-front beaches, approximately 10 miles of the deep-water south shore is made available for public use. These beaches are scattered throughout the island and are easily accessible. In addition, the low-lying and often-flooded areas are dredged to create lakes around which natural parks are situated. The civic centre is literally surrounded by water in another of these park-like developments.

Since there is actually little to bind a civic centre and the Central Business District together, the division of these two as separate areas was suggested from the start. The final scheme was arrived at through the consideration that, were the two combined, the complex would have to be accessible to the port or else heavy commercial traffic would help ruin some of the residential elements of the island. This would leave the entire eastern area of Freeport (Lucayan) as a rather dull repetition of neighborhoods. To break this up, a second focal point was needed and the civic centre was the answer. Here, in what is almost the geographical centre of the island, are the government offices, museums, art galleries, the library and the legitimate theatre. It is also located near the resort area where it is bound to be a tourist attraction to those who stay more than a short time. On the other hand, our one-day stoppers who are seeking the bazaar-like atmosphere of the native market do not interfere with this type of traffic.

GROUP ONE, PROPOSAL TWO

The philosophy and concepts succienctly stated are as follows: tourism will form the major part of our economic base and, thus, much importance should be placed on enhancing the natural qualities of the island. The pace of life should be slow; one should be aware of contact with nature, the sun and sea and natural vegetation; large areas should be preserved in their natural state.

One should feel that the island was planned for the human being and not for the automobile; the incorporation of the human scale should be a primary consideration. We want to create an atmosphere in which all are encouraged to participate instead of being spectators; where life is rich and varied and where the pressures that force people to live in accordance with needless social and economic dictums are non-existant.

The key word that we have found to convey our concepts is PLAYGROUND.

Location of the City

The first attempts at developing Grand Bahama were admittedly without order or well-thought out motivation but these efforts were not in vain. Rather they served to give a new and stronger sense of direction and, more importantly, confidence in the feasibility and cohesiveness of this scheme. The pointless fear of making mistakes and the fear that whatever is designed cannot be great because of the limits of our knowledge as planners was overcome by the realization that what was needed was a start, good or bad, and, with the designs as this beginning, a critical and analytical application of our basic philosophical concepts in light of the previous research could be undertaken.

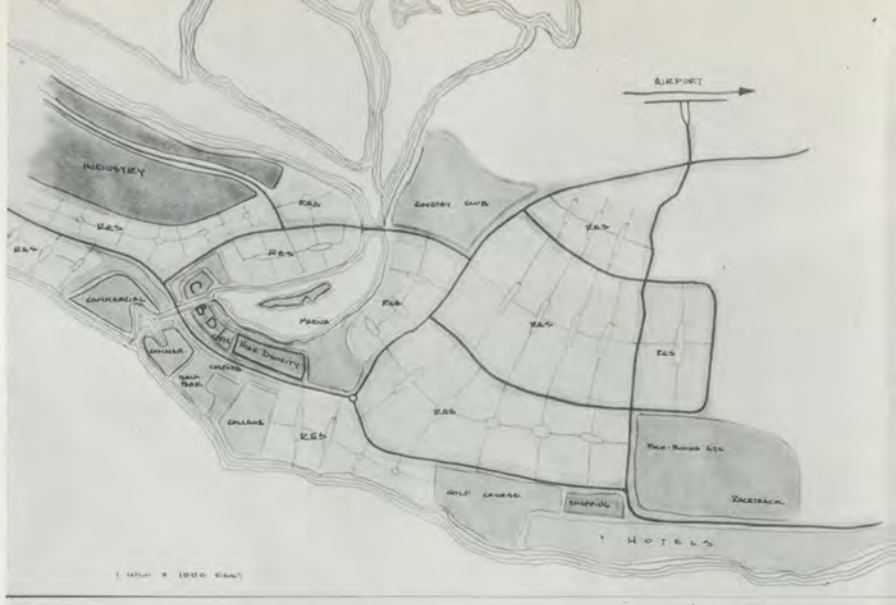
Invariably to justify the location of our primary development we time and again went back to the port as the primary cause and initial economic base for any development on Grand Bahama.

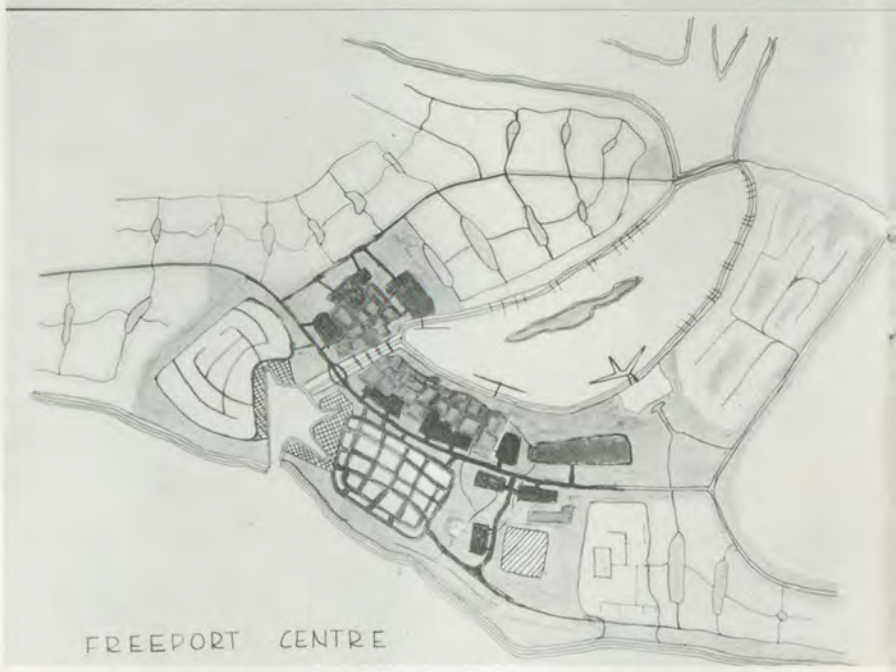
Harbours, historically, have given rise to cities great and small and a major transportation break between sea and overland commerce, such as we have, has triggered the phenomenal growth of many of the great cities in the world. The word port itself, with its varied connotations, indelibly evokes a picture of sailors or fishing fleets, of contact with far-off places, of bars and cafes, of a diverse and throbbing life, of industry by day, of the market place and the warehouses and of entertainment by night. What could a port city be without these? A port city removed from the port, sterilised, orderly, symmetrical, clean, devoid of the activity and complexity that make the very life that is a port, removed from those elements which connive to frustrate the best plans -- what would such a city be like? Rather than attempt to circumvent such developments with the vision of those who dream of building castles in the desert, this scheme realistically confronts the problems to control them.

No town has ever been built for eternity and no planner could in honesty attest to designing a town in which problems will not arise or where the decay of time will not necessitate change. Therefore, it would be foolish to pretend that all problems have been avoided by our site selection. In fact, it is recognized that this location created some problems which could easily have been avoided if the city had been located elsewhere. But, it is not until a city has matured and the problems of growth and decay have been woven into her fabric that she can exhibit the unpretentious charm that we all picture in connection with idyllic, island life. A satellite town may eventually have to be built away from the port and the port itself will certainly have to be enlarged.

There are many questions which we as planners cannot answer: what will be the ultimate population of our island? This scheme allows for 200,000. What volume of commercial activity will it generate? Will the economic base be sound enough to sustain healthy economic growth? And will the varied attractions of Grand Bahama be compelling enough to attract and contain a population of 200,000? These and other more finite things can be predicted in part but without more definite answers only a tentative plan can be made. It is reasonable to predict a flow of high-cost housing eastward, along the coast and the establishment, quite logically, of recreational activities in the unspoiled eastern part of the island and of a resultant overflow of services to supply the needs of such outlying developments, which will result in a new town, not just a community centre. How fast such a town will grow; how large it will eventually be; whether its growth will be accompanied by a deterioration (drop in population) of Freeport; where such a town logically should be, cannot be said. The more or less complete development of Freeport up to a population of 100,000 is the first step of the program. The population centre of the island is expected gradually to move eastward but the bulk of the development will remain clustered around Hawksbill Creek.

The scheme has thus been confined to the development of the town and port of Freeport. Being a port will be the most important characteristic of the city.





Freeport, will thereby gain a certain international flavor as it will borrow from counterparts around the world but again it will have its own unique flavor -- be a town which has borrowed from the past and the foreign, yet is in harmony with its environment and its times. It will be an urban, cosmopolitan centre, have a sophistication, and a luring character which is a blend of the qualities of the idyllic island with an intriguing, lurid past, and an uncertain yet promising future.

Economic Base Considerations

It is necessary to acknowledge the dual economic base of our island -- the tourist industry on one hand and extractive and manufacturing industries on the other -- and also that these two components have conflicting demands. The demands of each could best be met by a marked delineation between the areas of each and for this reason the resortand industrial areas should be on opposite sides of the port, with the industrial and commercial area the closer of the two, since the primary responsibility is to serve the needs of the residents whose daily lives and comforts depend upon their city, its efficiency and proximity, even though the tourist industry will constitute the major proportion of the island's economic base.

The proportion of the economic base which will be made up by the various industries cannot be accurately predicted. It can be predicted, however, that 400,000 tourists annually should be attracted in the near future. These tourists will stay an average of eleven days apiece (thereby assuring an average of 12,000 tourists being on Grand Bahama at any given time) and will spend an average of $18 per day per person, or a total of more than $75,000,000 annually.

Resort Area

The resort area will be a strip development along the south shore, equidistant from the port and the airport. Within the area are accommodations ranging from house-keeping cottages to luxury hotels with their own championship golf courses. Near the centre of the area will be a speciality shopping district designed to relieve the necessity of luring the tourist into the city to help him spend his holiday dollars. In so far as is possible, there will be no duplication of services and commodities supplied here and in the city. Even entertainment facilities will not be duplicated as the character of those in each area will differ as much as the areas themselves. Just north of the resort area is a preserve for riding horseback with facilities for polo and a racetrack. To the north of this is to be provided an area for worker housing within walking distance of their places of employment. Near the tourist development the pace of life will be slow, leisure will be a dominant note and advantage will be taken of the sea, sand, surf and sun which combine to make Grand Bahama the attraction it is.

The City of Freeport

In Freeport another atmosphere will prevail -- one which still maintains the intimate, personal scale which is characteristic of the island and where the pedestrian is king, but yet a modern, efficient atmosphere where the throb of twentieth century life is felt, where the excitement of the people rather than the noise of the car is sensed and where the variety of life which we wish to encourage can be experienced.

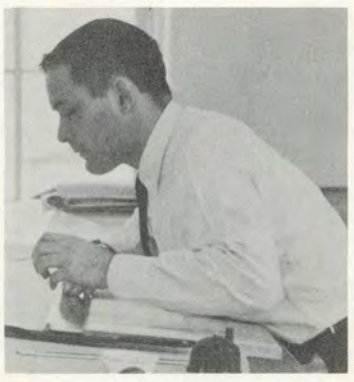
The attempt has been made to concentrate activity around the port and to have the presence of water a vital factor in the character of our city. Hawksbill Creek has become our marina so the city has water frontage on two sides. Furthermore, we have placed the components of our city in such a way as to produce an urban area (with densities up to 100 people per acre downtown), to permit and enhance interdependence between the components of our city, to minimize the problems of servicing the island, to reduce the cost of providing utilities, to permit workers with fixed incomes to live within walking distance of their places of employment and to encourage an active participation of the population in the life of the island by not engulfing them in suburbia where neither town nor country exists.

The plan of the city defines the area of pedestrian supremacy. Ample parking is provided and the distribution system for commodities has been designed to minimize service traffic. The central business district combines the advantages of a waterfront location with the visual excitement of an assymetrical medieval city. Our order might thus be called a planned assymetry. There are no empty vistas and space is not squandered on streets and parking; the streets are narrow enough to enable one to feel the presence of buildings on either side; the squares are small enough to allow one to feel the activity of others and, because of the regulated heights of buildings, large enough to permit sunlight, grass and flowers. The whole Central Business District is compact enough to provide the gamut of stores, banks, churches, hospitals, offices and schools within easy walking distance -- in fact within four blocks square.

A Community College is south of the Central Business District, just a ten-minute walk from the centre of town. Industrial and commercial areas straddle the port. Worker housing is provided to the west of the city, within sight of Hawksbill Creek. The local markets and shops of native handicraft are across the canal from the Central Business District, easily accessible to worker housing and their places of employment. Adjacent to the local markets is the "fishermen's wharf" with restaurants, etc. Public sports facilities such as tennis courts and cricket fields are located in the college. A public beach stretches along the south shore of the college, about fifteen minutes by foot from town. A public golf course is at the south-east end of the beach. A public marina is on the east shore of Hawksbill Creek. A ball park is placed near the bunkering station to assure activity in town at night.



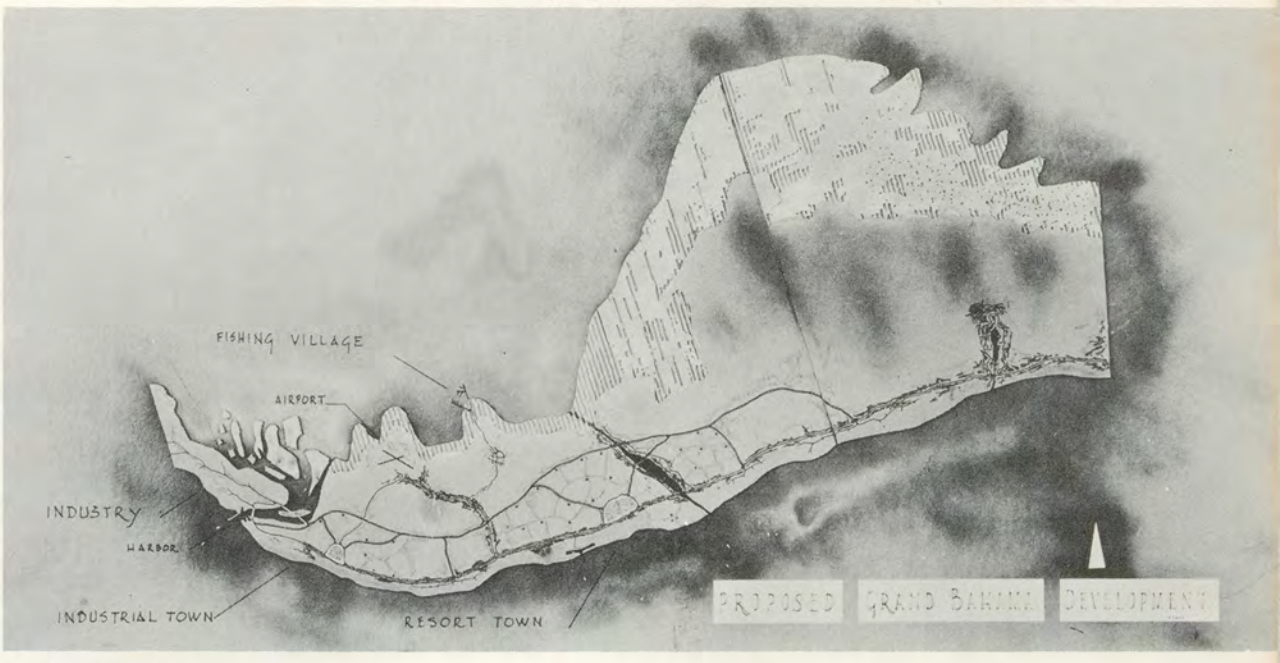




GROUP TWO, PROPOSAL TWO

In this proposal, one notes a more realistic scale of development and there is a definite two-city concept emerging; one, an industrial port-oriented city, the other, a resort city. A great deal of emphasis is placed on tourism, as well as on public parks, open spaces and beaches and the cross-island inlet is more fully developed. The system of ring roads, airport and industrial area west of the port, among other things, are maintained.

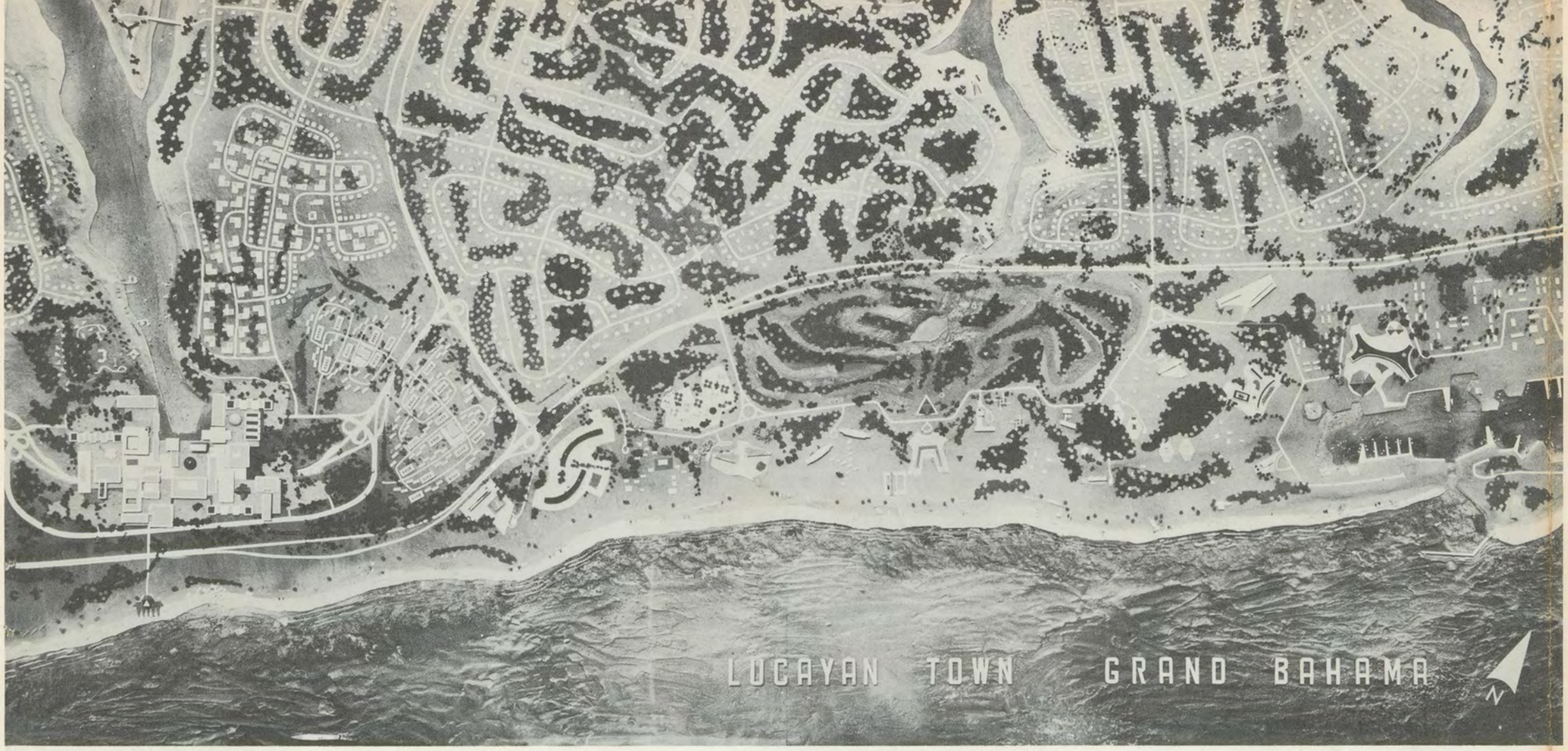
Since this scheme closely parallelled the final proposal, it would be redundant to consider many of its features at this point and they will be further discussed in later sections.



Little need be said on the location of the industrial portion of the island. With the prevailing winds, a western location is dictated so that the noxious odors of those plants located there will be carried away. It is adjacent to the port for handling of both imports and exports and is connected to the city with fine arterial highways.

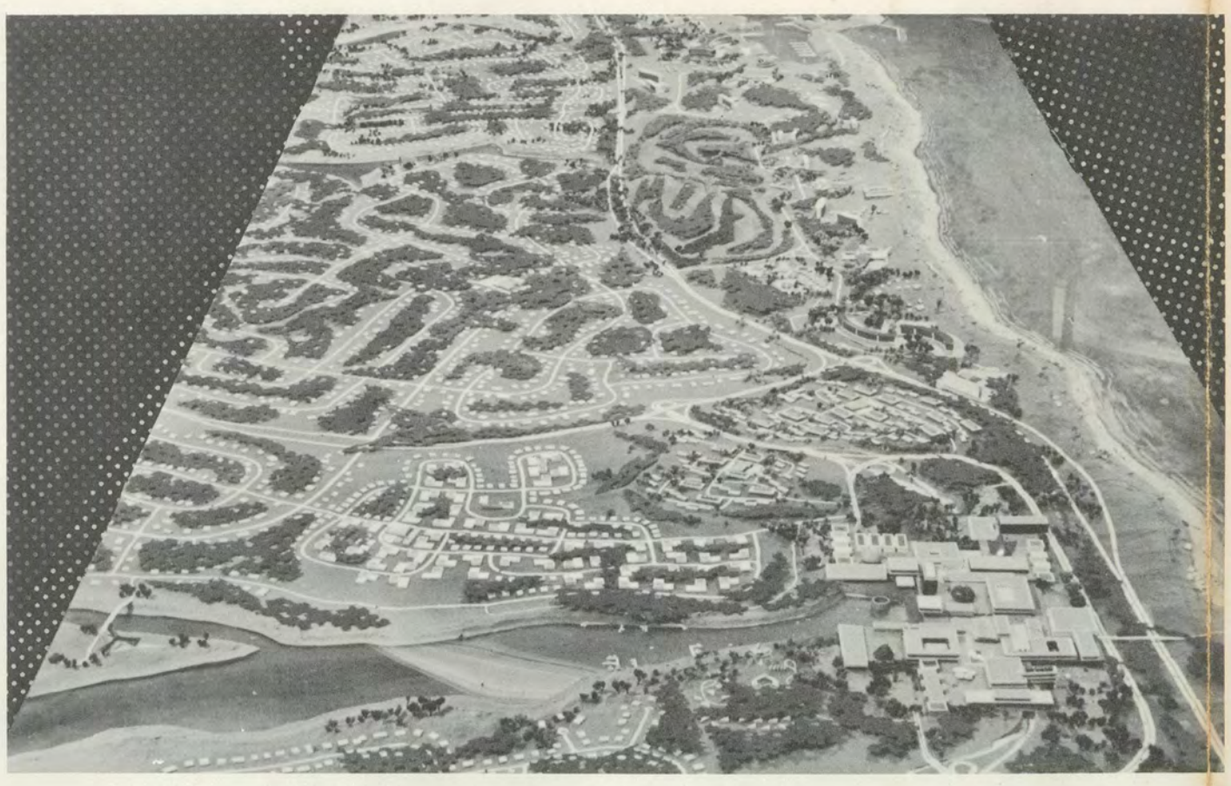
In deciding on the airport location, two things were considered. Firstly, there was the nuisance problem to the community. Since the majority of the traffic is from the north and west, a northwesterly location would minimize flying over residences and the inherent noise problem. Secondly, there was the fact that there is an existing airport and the expense of changing locations must be justified. As the present location satisfies the first requirement and there is adequate room for expansion, the retention of this location is strongly advocated.

PART 4 - FINAL SCHEME

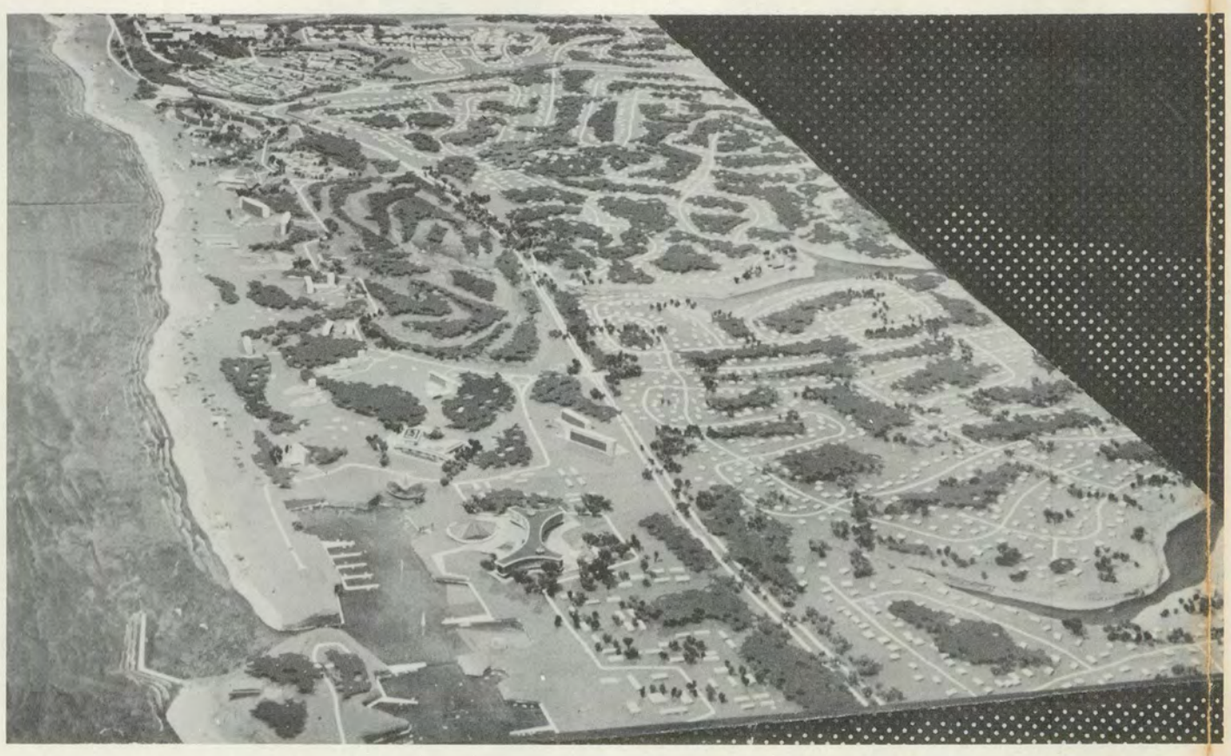


Plan of business district and tourist area.

REGIONAL PLAN



Aerial view from west showing central business district and high density housing in foreground.



Aerial view from east showing yacht basin and convention center in foreground.

The first consideration in arriving at a final plan was to establish the probable population of the island on a more accurate basis than the previous calculation. It had already been calculated that the mean average tourist population for a twelve months' period will be about 12,000 persons and, allowing for a 100% fluctuation from trough to peak, a maximum tourist demand is 16,000 persons. To service these tourists would require a total of 8,000 hotel employees and 8,000 miscellaneous workers in sales, entertainment, industries, etc. Adopting the figures for workers in manufacturing and allied industries set out in the section on the Economic Base and adding a further 2,000 persons for agriculture (including hydroponics), we therefore, have a total of 19,500 base industry workers.

It is difficult to extrapolate on existing data, but it was judged reasonable on available information to assign to this segment of the population a 2.5:1 family to worker ratio; and on this basis a total of 30,000 dependents appeared a justifiable figure.

The next group to be considered was retired persons and here again there were few criteria on which to base a projection. Finally, after considering all the known factors, a conservative figure of 5,000 persons was settled on.

The final group consisted of professional workers and their dependents. To estimate their numbers, it was necessary to modify available figures on a somewhat arbitrary basis in adapting them to the situation on Grand Bahama Island. Taking the total of base industry and agricultural workers at 19,500 persons and adding 2,500 persons from the retired sector gave a total of 22,000 income-earners to be served and for these 22,000 professional, commercial and service workers were allocated. Having allowed in this sector a 3:1 family to worker ratio gave an additional 44,000 dependent persons.

Thus, a total population of 136,500 persons distributed roughly into three categories -- 16,000 tourists, 49,500 low to low-medium income earners and their families and 71,000 high-medium to high income earners and their families was arrived at. The next step was to allocate space for them in a coherent land use pattern.

An area of low-cost housing was first set aside for manual workers in industry, laborers in port-oriented activities, agricultural field-workers and unskilled employees in the tourist business. It was anticipated that the number in this category, with families, would total about 23,000 persons and, allowing for an overall community density of 20 persons to the acre, would require 1,150 acres for their accommodation.

A second allocation was made for high-density, high income housing. Since it was expected that a perhaps higher than usual percentage of the population would be in the upper income brackets but would be in small family units, housing of this type was allowed for 3,500 persons who, at an overall density of 30 persons to the acre, would require an area of 100 acres. Furthermore, it could be anticipated that a number of people in upper income brackets but with a preference for slightly less urban housing would require medium density accommodation; so an anticipated demand of 11,000 persons was considered reasonable occupying, at 15 persons to the acre, some 730 acres.

The remaining 26,500 persons with low-medium incomes, accommodated at 6 persons to the acre, would occupy some 4,400 acres and, subtracting 5,000 high-income persons who would live on acreages outside the zoned residential areas, the remaining 51,500 persons with high-medium and high incomes, accommodated at 4 persons to the acre, would require about 13,000 acres of land.

It can therefore be seen that the total land requirement for permanent residential settlement alone is in the vicinity of 20,000 acres and when to this is added commercial, industrial, recreational and tourist requirements, it forms a substantial built-up area.

Land use planning is central to the word of the regional planner. Locational requirements for different types of activity are relatively static and bear direct relationships to each other, and to the health, convenience, economy, and the general amenities of any urbanized environment. Thus, keeping in mind the objectives of our philosophy of design -- to preserve the indigenous qualities of the island, to plan for the individual, and to separate the "noxious" industrial community of the island from the resort community -- and the fact that some 20,000 acres have been allocated for residential purposes, the acreage needed to fulfill the other land use requirements can be fairly accurately calculated.

The commercial areas were calculated on the basis of retail floor space needed per consumer. In order to create an urbane atmosphere -- as opposed to one of a suburban shopping center -- in the central business districts of Freeport, the industrial-commercial city, and Lucayan Town, the resort town, we have used higher densities than otherwise would have been the case. As a result, Freeport covers only 70 acres and Lucayan Town 100 acres. There are also disposed throughout the residential neighborhoods seven shopping centers of some twelve acres apiece, plus a small commercial area at the port of the same size. These centers are located to most economically serve their consumers, a balance between driving time required to reach the centers and the size of the stores within them having been arrived at. As we envisage the same ratio of automobiles to residents as exists in the United States, these centers include from 2 to 3 sq. ft. of parking space per sq. ft. of retail space. The total acreage allotted to commercial activities is 270 acres.



Although at this point, it is impossible to predict the industrial land use needs, we have been optomistic and allocated 3,500 acres for them. Space has been included for port oriented activities, planned industrial districts, wholesale and warehouse space requirements, plus ample room for expansion. As can be see on the land use map (page 36), the industrial area has been separated from the worker residential area by a "green belt" of parks.

As with the residential acreage allocations, we have been generous in supplying for recreational requirements. In all, a total of more than 3,200 acres has been set aside for planned recreational areas, which includes seven golf courses of over 200 acres apiece and a sports park of 600 acres. Within these areas are found riding stables, a polo field and race track, a baseball field (which could be used as a spring training camp for one of our major league teams), and botanical and zoological gardens. In addition eight miles of ocean front, three quarters of which is beach, has been preserved in its natural state; and by dredging naturally low areas 800 acres or 5 sq. miles of inland (fresh) water can be created.

Almost 2,000 acres have been allocated for the tourist and resort community center around Lucayan Town (apart from the residential areas mentioned previously) forming a lineal development along the ocean front. This acreage allows ample space for the full range of tourist activities, plus contact with nature. Interspersed throughout the development are parks and golf courses, whose acreage has been included in the discussion of recreational land uses. Although virtually all the tourist accommodations have beach frontage, most are also close enough to the inland freshwater lakes to them to be easily accessible to their patrons.

Except for part of the land devoted to industrial uses, all the development discussed above lies within the original 50,000 acreages granted to the Freeport Authority. The developed land totals something just under 30,000 acres, so almost two-fifths of it has been left in its natural state.

It is anticipated that some of this area will be devoted to agriculture, which will effectively preserve it from urban encroachment. Also a specific area of 1,200 acres has been preserved for an airplane take-off strip at the S.E. end of the runway, so that airplanes will not be flying over built-up areas. Most of the allotments previously mentioned are gross acreages and thus include the highway and road system, so there is no development to detract from these open areas. Furthermore, except for the airport, all the land north of the original 50,000 acres and east of Hawksbill Creek has been left untouched.

From the outset, it was plain that the antagonistic interests of a port-oriented industrial centre and a tourist supported resort city were almost irreconcilable; and, in the final scheme, this conflict was resolved by creating two separate complexes -- a port city of 50,000 persons and a resort city of 87,000 persons (including tourists). The logic of the island's configuration and topography, the location of the port, the position of the desirable tourist areas and the existing road layout dictated a linear pattern to the plan and this was adopted. The industrial area was clustered around the port and the adjoining port city was arranged about a central shopping and business district of which the existing development forms the nucleus; a low area in the center of the Freeport holdings was scooped out to form a water feature with the shopping and cultural district at its base and the residential area of the resort city was extended laterally on either side between the inland and coast roads. In the larger city, the bulk of the waterfront is reserved for tourist activities with public access provided to the beaches at strategic points but between the industrial area and the sea the whole strip is set aside for the public use of the inhabitants of the port town. The land between the two cities is conceived as an open separating wedge to assist the areas in retaining their distinctive character and it will be used for recreational and agricultural pursuits with the possibility of institutional uses, such as the proposed radio transmitter, being located here.

The existing city retains the name of Freeport and the new resort was dubbed Lucayan Town.



AGED POPULATION

One of the most significant social developments in the U.S.A. and Canada has been the increase in absolute size and relative importance of the population aged 65 years and over in these countries. This group has been increasing rapidly since the turn of the century. In 1900, there were only 3,000,000 persons of these ages in the U.S.A.; by 1950, there were more than 12,000,000 persons aged 65 years and older. During the same period, the aged increased from about 4% to 8% of the total population. Looking to the future, no reversal is anticipated in these trends. On the contrary, all evidence suggests a continuance of the rising trend in both the absolute size and relative share of total population accounted for by elderly persons.

Viewing our anticipated population for Freeport-Lucayan in light of these facts, we must ask: how mobile are these people? An important factor in determining the relative mobility of this group would be the net immigration per thousand population for the individual states in each age-group. In other words, we would want to know how many more people came to live in a state than left it for each thousand people living in that state. In 1949-1950, the only year for which such data is available, fifteen of the then forty-eight states experienced a net immigration (the other thirty-three states lost more population to other states than they gained from them) among the people 65 years and over. On the whole, these same states were "gainers" or "losers" in all age brackets -- not just the one we are examining -- suggesting that the most elderly segment of our population is approximately as mobile, at least from state to state, as the younger generations.

But it is very significant that three of these "gaining" states had large proportions of their newcomers in the oldest age bracket: Arizona (with a net immigration of 11/1,000, 65 and over), California (7/1,000), and Florida (33/1,000). All three of these states, it must be noted, are famous for healthful climate and relative ease of living.

An influx of 1,000,000 retired people to the Florida area is anticipated in the period 1960-1985. It is conceivable that factors such as tax advantages, the benefit of living in a designed community and island luxury will attract some to the Freeport area. In an average population, 7 1/2% of the population is over 65. In the retirement areas of Florida, e.g. St. Petersburg, about 15% of the population is over 65 years of age.

It is only natural that Grand Bahama's superiority in these matters would make the island a magnet for retired population, once development gets under way. This tendency is to be encouraged for several reasons, not the least of which is the desirability of the retired population as a maturing influence in the infant development and as a reservoir of skilled, experienced workers. We can reasonably expect to attract retired persons in greater numbers than would be found in a general population of normal proportions. Some of them will be sufficiently wealthy to provide lavishly for all their needs and desires -- custom-built home, domestic servants and nursing care, if necessary. But most of the newcomers aged 60 and up, though not indigent, will be retired on modest incomes derived from Social Security, pension funds or personal savings. For the welfare of these persons who may easily comprise up to 10% of the total projected population certain provisions should be made requiring very little extra cost but deserving great thought and care on the part of those designing housing.

It is not possible to make broad generalisations about a homogeneous "retirement group", since there are as many different types of retired people as there are types of people in the population at large. But these people do represent the oldest segment of the population and, as such, have two significant characteristics in common. One is that, having already raised their families, they have a household size of only one or two persons and thus need fewer rooms per dwelling unit than the average family for whom housing is built.

The other characteristic is that, with increasing age, a certain degree of physical and emotional deterioration can be expected to take place. Facilities are, therefore, urged which will be equipped to give specialized attention to these needs while allowing the people so afflicted to retain a maximum of independence and mobility.

With respect to dwelling size, units consisting of a living-dining room, bedroom, bathroom and kitchenette will usually be found to give retired persons all the benefits of convenience and economy. However, this applies to, chiefly, retired couples: a single person might prefer a unit having a studio room (living-bedroom), kitchen (with a compact eating space) and bathroom. Dwellings of these specifications can be incorporated easily enough in any community. In fact, because of their small size, these homes can often serve to fill in spaces that are otherwise awkward and unusable.

Nursing homes and geriatric units in the hospitals are desirable for the seriously ill, convalescent or disabled persons. A program of preventive medicine, which urges an annual health check-up for all, but particularly for elderly persons, would do much to reduce the incidence of costly chronic diseases.

The general design and planning principles which should be followed with respect to housing accommodations for the retired group are summed up by Alexander Kira in his article, "Housing Needs of the Aged". Besides compactness, which has already been discussed, he mentions:

a. fireproof construction and planning for maximum safety;
b. minimizing the problems and effort of housekeeping and daily activities;
c. "livability", pleasantness and the effect of spaciousness;
d. a high degree of privacy; and
e. careful avoidance of an institutional look.

Actually, these principles are no different from those which should be followed in designing any type of housing. They are just that much more important when the housing is being designed for elderly persons.

Specific considerations which should be observed are: 1. adequate lighting and ventilation and enough space around the bed or beds for ease of bed-making in the bedroom, studio-room or bedroom alcove; a convenient night-light is also a bedroom "must"; 2. bathrooms should have adequate lighting and ventilation; a large enough area to accommodate a wheel chair; light switches outside the bathroom door; securely-mounted towel rods (often used for support); extra large, recessed medicine cabinets; and showers with mixing controls; 3. kitchens should be well ventilated; excessive reaches, either up or down, should be avoided in the placement of equipment; electric ranges are preferable to gas ranges (because of the diminished sense of smell which comes with age); sliding cabinet doors are more desirable than swinging doors; and garbage disposal should be made very convenient; 4. slippery floor surfaces should be avoided, outside as well as inside the dwelling unit; 5. doors ought to be wide enough to accommodate the passage of wheel chairs; here, again, sliding doors are preferable to swinging doors when feasible; 6. windows should, if at all possible, look out on an interesting view; sills should be low to enable a person to look out while seated; insect screens and storm sashes should be provided for all windows; window coverings (venetian blinds, shades, draperies) ought to be easy to manipulate; 7. illumination levels ought to be approximately double those normally used; 8. proper insulation for acoustical privacy is very important; and 9. in buildings without elevators, one flight is the maximum that elderly persons should be expected to walk; where stairs are necessary, every precaution should be taken to make them as safe as possible.

For retired people who prefer congregate living, units should be built in small residential centres where housekeeping services are provided.

It would be simple to design such a residential unit for retired persons which would be in keeping with the general philosophy which applies to the development of Freeport. Keynotes of this approach are the utilisation of the particular natural attractions and recreational opportunities which Grand Bahama offers and the establishment of a situation whereby the island itself and its atmosphere form an integral part of every home. It will be necessary for us to plan carefully for this element in our population, so that such individuals will fit smoothly into our general scheme and their particular needs -- those associated with advanced age -- will be properly fulfilled.

The requirement concerned with bringing the island closer to the home and encouraging people to spend a good deal of time out of doors can be complied with by designing homes which harmonize with the general feeling of the island in the choice of construction materials, colors and architectural expression. The use of pastel-tinted stucco and the existence of large window areas which overlook a friendly, inviting outdoor scene are only two of many devices which might be employed in this connection. Certainly these remarks apply no less -- and perhaps more -- to a dwelling for retired persons than to any other dwelling.

The suggested retirement unit -- housing approximately 350 persons and occupying perhaps 40 acres -- providing the facilities set out above would probably contain a heterogeneous scattering of 2 to 3-room row house (apartments) units, 3 to 4-room single family dwellings, 2 to 3-room apartments in small, two-story apartment buildings, 1½-room efficiency apartments in moderate-sized apartment buildings, all-service or old-people's homes supplying the needs of those who are no longer capable of maintaining homes, nursing homes for the chronically ill and those requiring some sort of convalescent care and, perhaps, smallish boarding house facilities where a retired couple might live and rent out rooms. This diversity of facilities seems to maximize comfort, economy of scale and financial economy.

Homes would centre on a small-scale focal area -- a pleasantly-landscaped area where residents could sit and talk or play cards or shuffleboard (to mention only a few possible activities). A very few small convenience shops (e.g. grocer, laundry pick-up station and dry cleaner) might be located on the ground floor of one or more of the larger apartment buildings. Additional common halls or recreation rooms might also be located there.

Somewhat away from the unit itself would be found more extensive shopping facilities which would probably be shared with other segments of the neighborhood and which would thus provide the opportunity for more intimate association between persons of retirement age and status and other elements of the community. In the shopping center, we might expect to find -- in addition to the usual stores and offices -- outdoor cafes and "local pubs" with a European flavor.

Another area separate from but near to the retirement unit would be a recreation and religious center. Ideally, this would include a vocational rehabilitation institute, specializing in bringing retired persons to more productive positions in the community according to their individual preferences. These new "positions" would include everything from passive participation in a more-or-less impersonal activity, up through crafts and similar hobbies, through "cottage-type" industries to actual employment either in a voluntary capacity or for financial gain. There is a definite need for such centers, especially for retired people. In any case, the recreational opportunities offered in this area would be more extensive and elaborate than those found in the immediate retirement unit.

Still another specialized facility near the retirement unit (presumably to be supported by 3 or 4 retirement units) is a geriatric clinic, incorporating both in-patient and out-patient care; strongly promoting preventive medicine through frequent, periodic check-ups on the health of elderly individuals and providing a special ward for patients suffering from the mental disorders of senility.

If at all possible, retirement units in Freeport would be located near the hydroponicums where, presumably, several inhabitants would be employed and/or near the water inlets at the far east side of Grand Bahama where fishing enthusiasts would be sure to enjoy themselves.

Community facilities, especially those concerned with adult recreation, should take particular care to provide interesting and stimulating programs or projects for the senior citizens of the community.

In employment policies throughout the area, it should be recognized that many retired people are very much able to give additional years of service in nearly all phases of industry and commerce. Their very stability makes them good employment "risks" and the fact that they may well have had years of experience in the fields from which they retired, gives the potential employer a real premium in hiring them.

Cost of Living

Lacking the means or ability to predict the cost of living on Grand Bahama because we are still in the early stages of development and cannot predict what commodities will be imported and which will be domestically produced, we have included that data which we feel is of importance to the planner.

According to Bahamian Government figures, newcomers to Nassau should estimate their minimum expenses as follows:

single man or woman	$2,800	--	$3,640
married couple	$3,920	--	$4,480
couple with two children	$4,760	--	$5,600

These figures take into account reasonably comfortable quarters with modern conveniences but savings and entertainment are not included.

Rent, building costs and foodstuffs in comparison with the U.S.A. are expensive. In 1959, a 1-bedroom apt. rented for $140-$168 and a 2-bedroom apt. for $196 and up per month. A minimum for construction costs in $14 per sq. ft.

In comparison with the cost of living index in other areas in the Carribean, the Bahamas stand as follows:

	Composite Index
Bahamas	100
Jamaica	74
Trinidad	77
Cuba	133
Haita	85

It should be noted, however, that in these countries, about 50% of the imports come from the U.S.A. and, due to the proximity of the Bahamas to the United States, our transport costs will be less and this difference should serve to offset the higher cost of labor sufficient to lower the cost of living considerably on Grand Bahama.

To give an indication of the cost of living spiral which may have some predictive value, we have included an index for the years 1954-1958 with 1949 as the base year.

1954	1955	1956	1957	1958	1959
145	147	145	160	161	up

Another consideration which should be kept in mind is that, due to the favorable climate, expenditures on heat, clothing etc. will be much lower than in most parts of the United States.

One relevant section of the Freeport Act bears on the indirect cost of living -- articles imported for personal consumption are taxable so that it would be an error to imagine that the "free port" provisions of the legislation will result in lower day-to-day living costs.

Executive Center

Another activity for which Freeport-Lucayan would provide a magnificent setting is a physical-cultural program for executives. It is envisioned that this program be similar to the executive program under the Institute for Humanistic Studies which has convened at Aspen, Colorado, each summer since 1950. Large corporations send their top men for two weeks of what is sometimes referred to as a "physical and mental shaking up".

A health center offers European calisthenics, rub-downs and steam-baths, while daily lectures and forums, under the direction of prominent university educators from widely-scattered backgrounds, stimulate the businessmen's minds with such offerings as Plato, Karl Marx and Alexis de Tocqueville. Fly-fishing in Colorado's streams lures the participants in leisure hours. Wives are welcome but they are not allowed to participate in the forums.

It follows quite naturally that Grand Bahama, with its superiority of sun and surf and the year-round stability of its attractive natural resources, is an ideal spot for the wedding of the world's cultural treasures with facilities for physical revitalization to the benefit of American and British industrial and political leaders.

In the words of Walter P. Paepcke, board chairman of Container Corporation of America and founder of the executive program at Aspen, this adventure "turns executives away from the urgent to the important".

TOURIST ACCOMMODATION

As stated earlier, a yearly flow of 400,000 tourists to Grand Bahama was assumed with an average daily population of 12,000. In that our maximum tourist flow is expected to be 16,000 tourists at any one time, accommodations have been planned for the peak.

According to informed sources, an oceanfront location is of prime importance to all tourists and this is especially true in a setting like Grand Bahama, where the beaches and climate are so ideal. Certainly, as many hotels as possible should be located on the oceanfront and, if any are inland, they must have easy access to the sea. The resort area was chosen along the southern shore of Grand Bahama, as it is ideal for development, the northern shore being difficult to build upon with no natural beaches. The resort area begins several miles east of the port and is, for the most part, linear.

For hotels, a general size limitation of 350-450 units (1.8 persons/unit) was set due to the fact that no hotels in the Caribbean area are larger than this. This maximum size was also set because of the building height limitation of 70 feet and because larger hotel units would seem out of place in this setting, i.e., it would not retain the "outdoors" feeling so desirable in this area. In that labor is inexpensive, a figure can be assumed of 0.9 employees per guest room, as is the case in Puerto Rico. Where demands for service may be high (as in a residential hotel catering to older people or an expensive hotel) this figure may be slightly higher.

The percentage of tourists accommodated by each type of facility was based upon the trend towards the smaller, lanai-type unit and the fact that the average tourist visit is expected to be about 11 days. In such a short period of time as an 11 day stay, the cottage type unit would not be of great importance as this unit is more oriented to lengthy visits.

Still another sort of accommodation is the residential hotel in which there is generally a longer period of occupancy, or even permanent residence, and where light housekeeping is often done by guests. Hotels in this category appeal largely to older persons and do not necessarily require beachfront location, although each has access to the beach.

The plan includes, on a ridge overlooking the yacht basin, a convention site containing the island's largest hotel (900 units) and related convention facilities, as well as a private waterfront and boat area. Grand Bahama will obviously be an excellent convention center due to its favorable climate and its proximity to the mainland.

Several hotels will be scattered throughout the port area and the Central Business District and one will be situated at the airport.

The acreage allowed for each type of hotel unit was quite generous. In keeping with the character of the island and the building height limitation, plus the magnificent beaches, hotels will tend to be low and long with plenty of open space. Although the residential and lanai-type hotels are approximately the same size, more acreage was allotted to the residential unit because these hotels will not surround a larger hotel, as is the case with the lanai-type unit, and hence more land may be needed for additional facilities normally supplied by the larger hotels. The cottage groups were given more land than necessary to allow room for a couple of small parks, swimming pool and the like. Nearly all hotels will have their own swimming pools, tennis facilities, etc.

The following is a breakdown of the various areas required for hotel siting:

Accommodation for Tourist Peak (Approx. 16,000)

Type of hotel	% of tourist pop. served	No. of tourists	No. of units per hotel	No. of bldgs.	No. of persons/hotel	Total Accomm.	Acres /hotel	Total Acres
large	40 %	6,400	400	9	720	6480	30	270
lanai-type	45 %	7,200	100	40	180	7200	10	400
residential	10 %	1,600	100	9	180	1620	12	108
cottage	5 %	800	1	200	4	800	¼	50
	100 %	16,000		258		16100		828

Golf courses

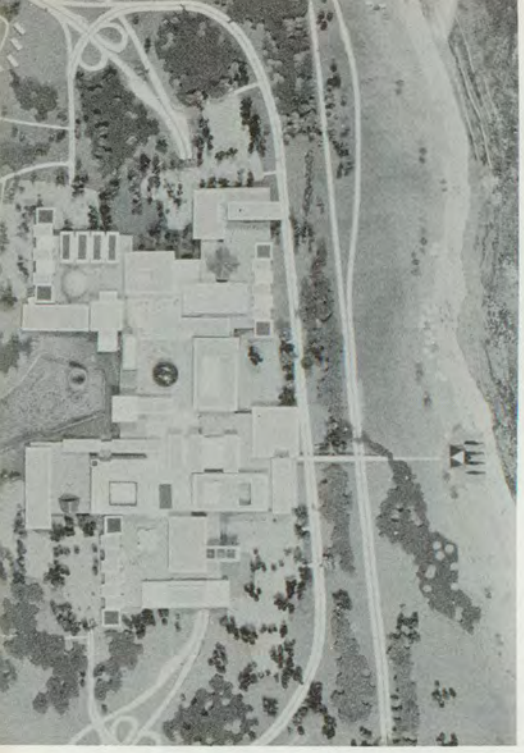
220 acres each
6 golf courses
1320 acres

828 hotels & grounds
1320 golf courses
2148 acres total

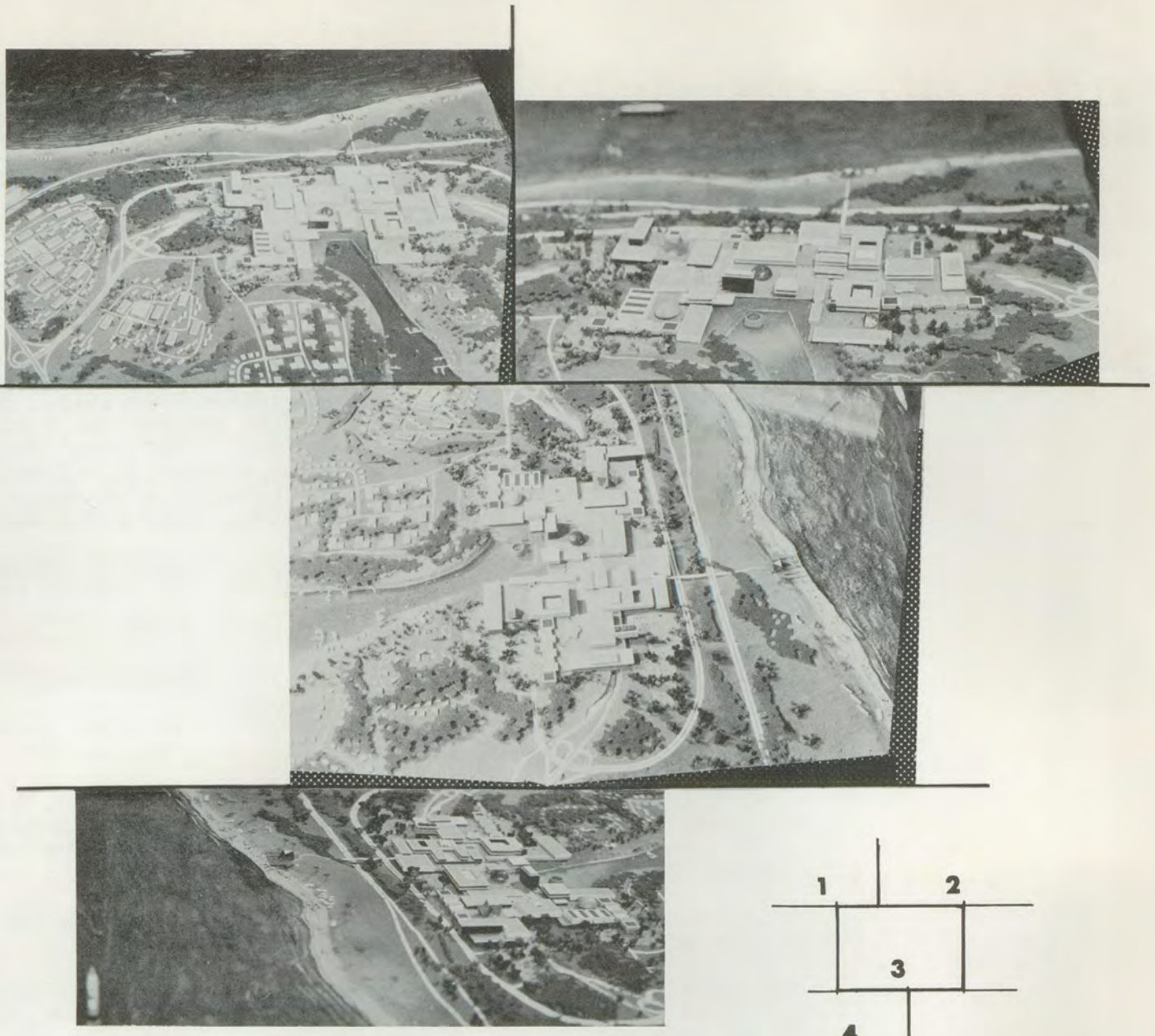
Golf courses will be spaced in between the various hotels. According to authorities in the Cornell Hotel School, about six 18-hole golf-courses are required for the number of tourists expected. Each golf-course is approximately 220 acres so that a total area of 1320 acres would be required. Adding this to the area previously calculated for hotels gives a total resort zone area of about 2150 acres.

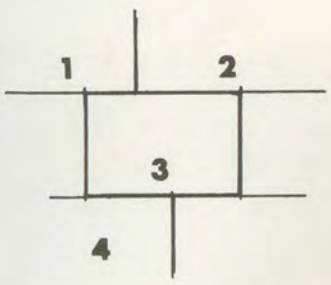


Lanai-type hotel



Plan of central business district





1. View from north.
2. View from north-west.
3. View from south-west.
4. View from east.

CENTRAL BUSINESS DISTRICT

In essence, the central business district here proposed for Lucayan Town is a commercial and professional island in a residential sea. The key word in its design is "integrated-separation." As a part of the entire development, as a meeting point for multi-mode traffic and as a complex of buildings and spaces, the C.B.D. has been made to portray this "integrated-separation" feeling.

As a unit unto itself, it is a large regional shopping center, housing no one, but designed to serve the needs of a population of 70,000 permanent residents and an average of 12,000 tourists. It is separated from the super-neighborhoods by a road system which sets it off with large open spaces on all sides. Some of this land is to be utilized for surface parking and some has been envisaged as expansion zone but most of it will be left open permanently. The entire area has been designed to be set on sub-surface storage facilities, which rise above the ground level to a height of between three and twelve feet. This serves to isolate the C.B.D. by giving it an identifying characteristic but, on the other hand, ties it visually to the rest of the city for it will be visible for miles across the flat surface. It also makes it possible to view the ocean from most places on the platform.

The underground storage facilities are an integral part of the pattern proposed for the separation of service, shopper, and pedestrian circulation. All service to the buildings will be afforded by a transverse feeder tunnel which gives access to sub-surface warehouses. Three one thousand-car mechanized garages provide parking within the C.B.D. and will be served by both the tunnel and the ring road which serves an additional three thousand parking spaces in peripheral surface lots. Access to the centre by bus will be through the use of rampways from the shore parkway terminal.

The actual commercial, professional, administrative and cultural centre is a 100% pedestrian area, no part of which is over one thousand feet from a parking facility. Formally, it is a series of interlocking pedestrian precincts, plazas and squares linked by the buildings which form them. There are no streets as such and the shopper is presented with an ever-changing vista as he moves from plaza to plaza (and shop to shop.) There is a major axis to the city connecting the ocean and the lake but it is implied rather than stated. Starting at the limestone obelisk in the lake, it moves past the administrative centre, through Serpentine Square (a location guide in the form of a depressed plaza with undulating bench-walls at the heart of the city), through the proposed department store and out to the public beach club on the dunes.

Statistically, within the ring road, the complex occupies 107 acres of which approximately 60 acres is to be developed initially. Lucayan's C.B.D. is far smaller than the U.S. average for a city of this population due to the elimination of surface storage, streets and residences. 34 acres are covered by buildings and the remainder is left open to the sky. In addition to shops, stores and offices, there will be theatres, a museum, facilities for higher education, restaurants, night clubs, an opera-concert hall, band shell and other such facilities to "keep the city alive after five."

The breakdown of floor spaces shows approx. 1,000,000 sq. ft. devoted to commercial uses, 1,250,000 to professional and office uses, 600,000 for cultural facilities, 150,000 for administrative offices, etc., and 1,000,000 to parking; a total of four million square feet of usable floor space, 3,250,000 of which are rentable.

INDUSTRIAL PARK

Unplanned development would inevitably be the result if those who wish to build in the industrial area do not conform to some overall plan; of course, no legal pressure can force anyone to comply with the plans set forth here, but it is believed that the benefits which would accrue from locating within an area (such as designed) are obvious.

To assure the success of the plan, some method of land disposition must be formulated. For example, the Authority, or one of its licensees, could control the area, improve it as desired and then require anyone wishing to locate within it to conform to whatever regulations are felt desirable. A land corporation could also construct standard units which they could, in turn, rent to interested parties. These units would be expandable and could either be leased or purchased, in the latter event, the purchaser becoming a stockholder in the corporation. Leasing arrangements would be related to the size of the plant and amount of services required, i.e. parking space etc.

An additional advantage of the area planned here would be that, because of its proximity to worker housing, the acreage allotted to parking would be reduced from 20% in standard industrial parks to 11% of total land acreage and street coverage would therefore be slightly reduced because of diminished traffic. The percentage of land coverage in the buildings could be established at will.

After the completion of development of one such area, the corporation could sell its rights to individual firms. This would free capital for investment in similar projects elsewhere and the firms located in the first plot would then assume the operation and maintenance of that area themselves or through an organization empowered to do so.

Details of the scheme shown are as follows:

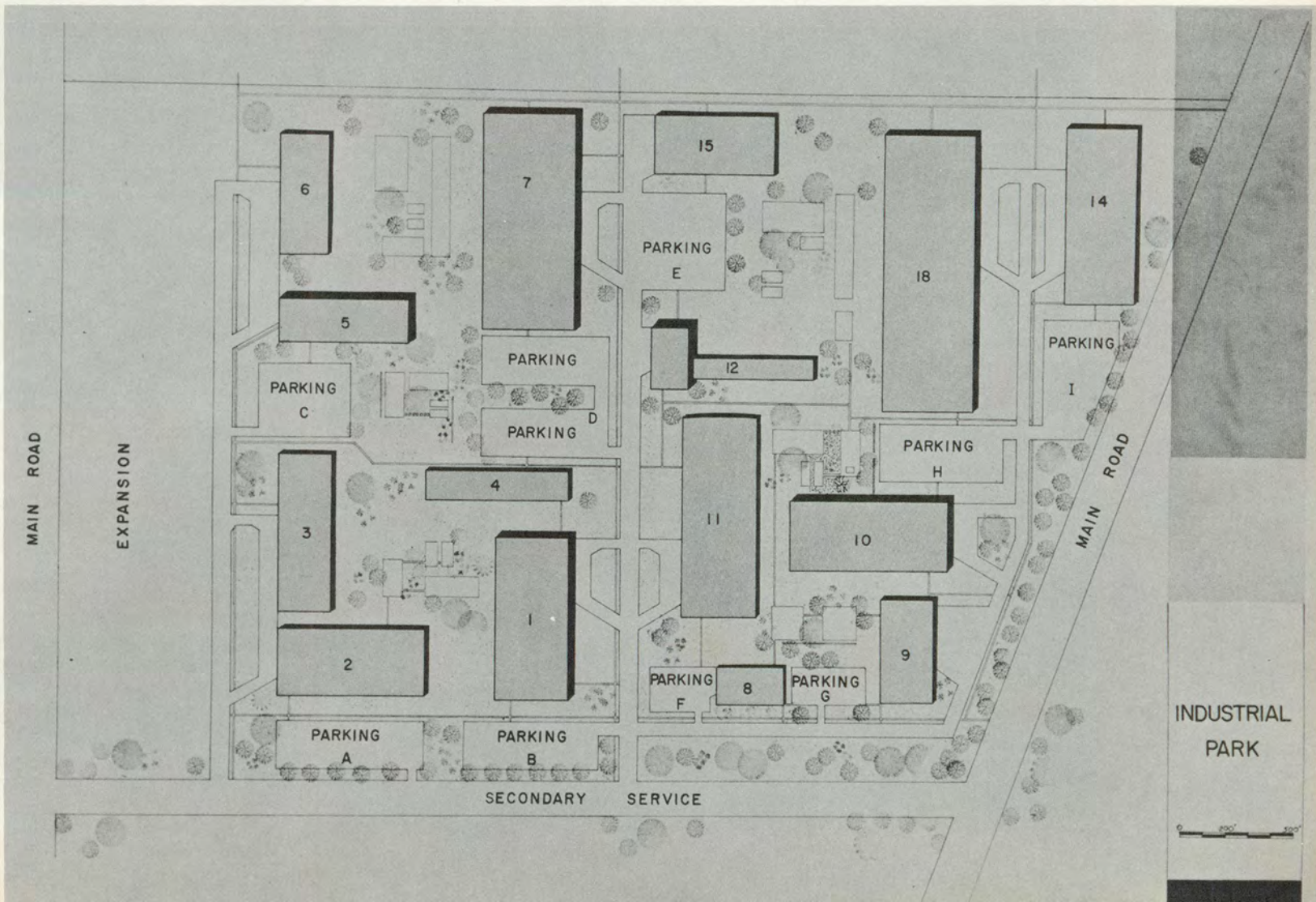
	Actual Building		Parking	
1.	210,000	ft.	A.	130,000
2.	195,000	"	B.	130,000
3.	154,000	"	C.	140,000
4.	78,000	"	D.	200,000
5.	120,000	"	E.	140,000
6.	100,000	"	F.	60,000
7.	360,000	"	G.	60,000
8.	45,000	"	H.	165,000
9.	112,500	"	I.	150,000
10.	210,000	"		
11.	297,500	"	Total	1,175,000 ft.
12.	100,000	"		
13.	480,000	"		
14.	225,000	"		
15.	125,000	"		
Total	2,812,000	"		

Total Area of Site: 10,800,000 ft.

Bldg. Coverage	27%
Parking	11%
Roads	9%

Aesthetically, the beauty of this scheme is that it eliminates the usual untidy clutter of small buildings inevitably associated with a group of minor industries when each provides its own accommodation. Here a small business commencing operations could lease space in the large buildings provided and expand as required by further leasing until it reaches a size warranting a building of its own.

Typical of such activities in the heavy industrial category would be shoe-making, bottling plants and fibre board manufacture while light industries would include various assembly operations, electronics, photographic processing, printing, textiles, tobacco and cigarette packaging, candy-making, drug manufacture and sporting goods production.



RESIDENTIAL AREAS

Low-Density Housing

Within the area of low-density housing is a mixture of single and row houses, ranging in price from $8,000 to $30,000. They are grouped in neighborhoods of from 2300 to 4000 persons, each neighborhood having its own elementary school. The majority of the houses lie within 1/2 mile of a school and can be reached by foot. The gross density in this area is four persons per acre and the net density seven persons or two families per acre. Housing of this type is provided for about 50,000 people.

The houses themselves are constructed of indigenous materials such as concrete and wood and are designed to withstand earthquakes, tidal waves and hurricanes. Retirement housing units are interspersed throughout the area but are generally less expensive and are located nearer the neighborhood centers where there are gas stations, grocery stores, barber shops etc.

The roads have been laid out to discourage through traffic: buses use the feeder roads and the highways but never use the local neighborhood roads. Open space within the neighborhoods has generally been laid out to form a continuous grid, inter-meshing with the road pattern, so that shopping centers, schools and recreation areas can be reached on foot with the minimum contact with vehicular trafficways.

Medium-Density Housing

Medium-density housing is provided for about 11,000 people at a gross density of 15 persons to the acre. Designs will be varied, of course, but a typical area would contain a mixture of one and two story buildings with up to three apartments at ground level opening onto private terraces and community spaces and perhaps a single larger apartment on the upper floor using the lower roof as a deck.



These areas would be grouped closely about the central business district and features of outstanding amenity such as lakes and parks so that a larger number than usual may enjoy contact with these and a form of more closely integrated living conditions than is found in suburban development would result. Arrangements similar to these appear to be gaining popularity and are therefore considered a sound investment.

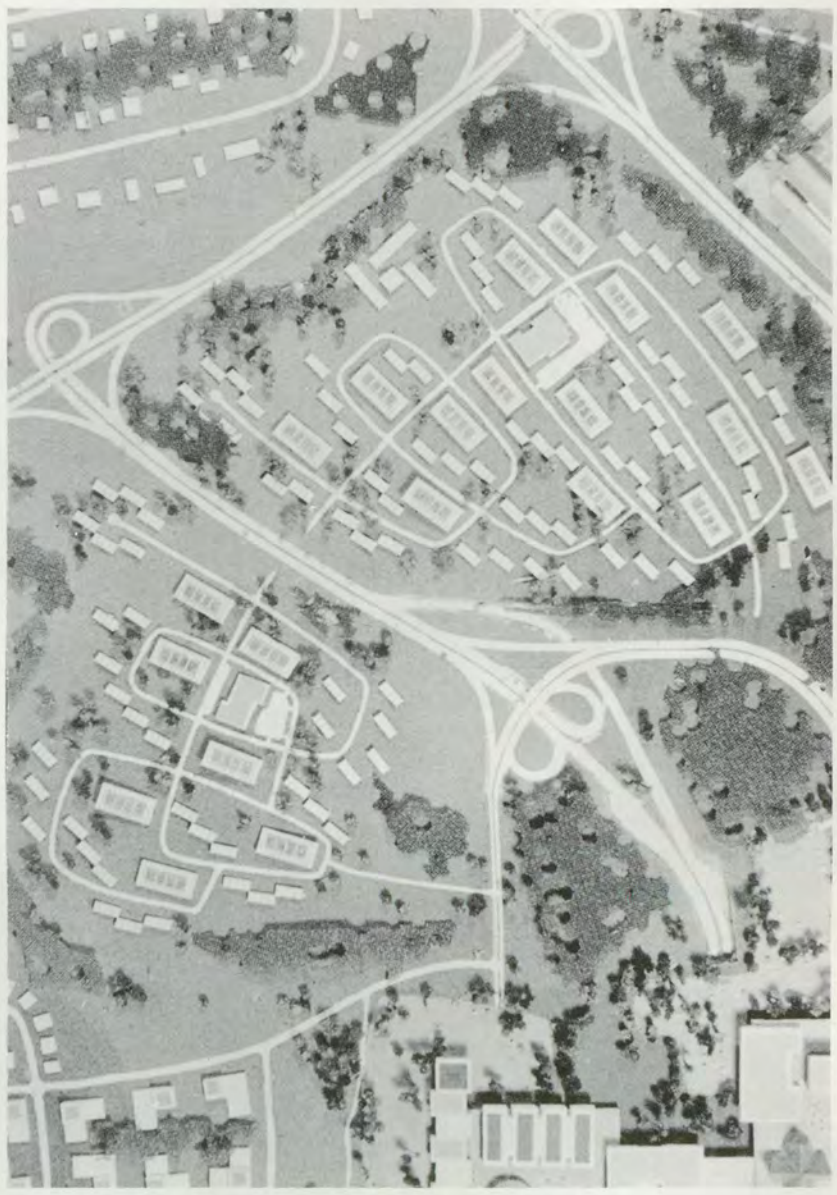




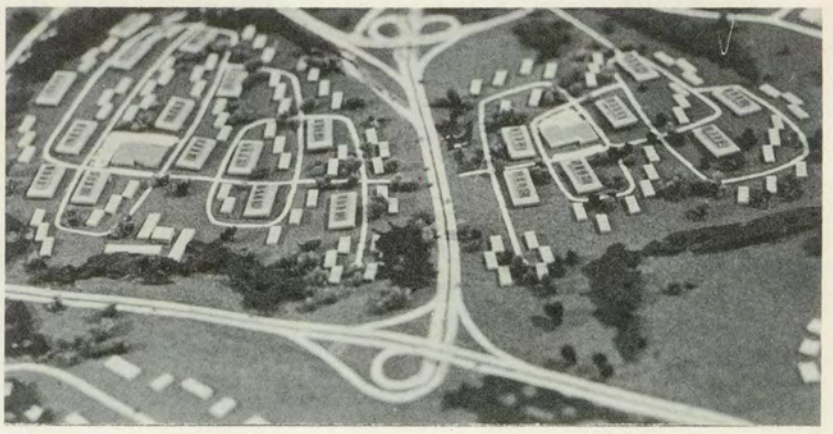
Such a density of population would warrant the provision of district shopping centers and schools for the exclusive use of persons in the neighborhood and these, together with neighborhood open space, have therefore been incorporated in the layout.

High-Density Housing

The persons interested in high-density accommodation will perhaps form only a small proportion of the total population but they will not by any means be insignificant and, considering the number of persons who can be accommodated on a given piece of land at 35 persons to the acre, it is only logical to give such development a highly strategic location. Accordingly it has been placed immediately adjacent to the central business district and with easy access to swimming and boating facilities.



Accommodation takes the form of single story row houses and three story apartment blocks with approximately 60% of the accommodation in the row houses which would be grouped in units of four. The apartment blocks, each containing twelve units, would have parking, service and entrances on the ground floor and the upper floors would provide the living space which could, of course, be arranged in a variety of ways. Basically, the first floor would contain two bedroom apartments and the lower level of two level three bedroom apartments while the top floor would provide studio apartments, the upper level of the three bedroom apartments and private roof terraces.

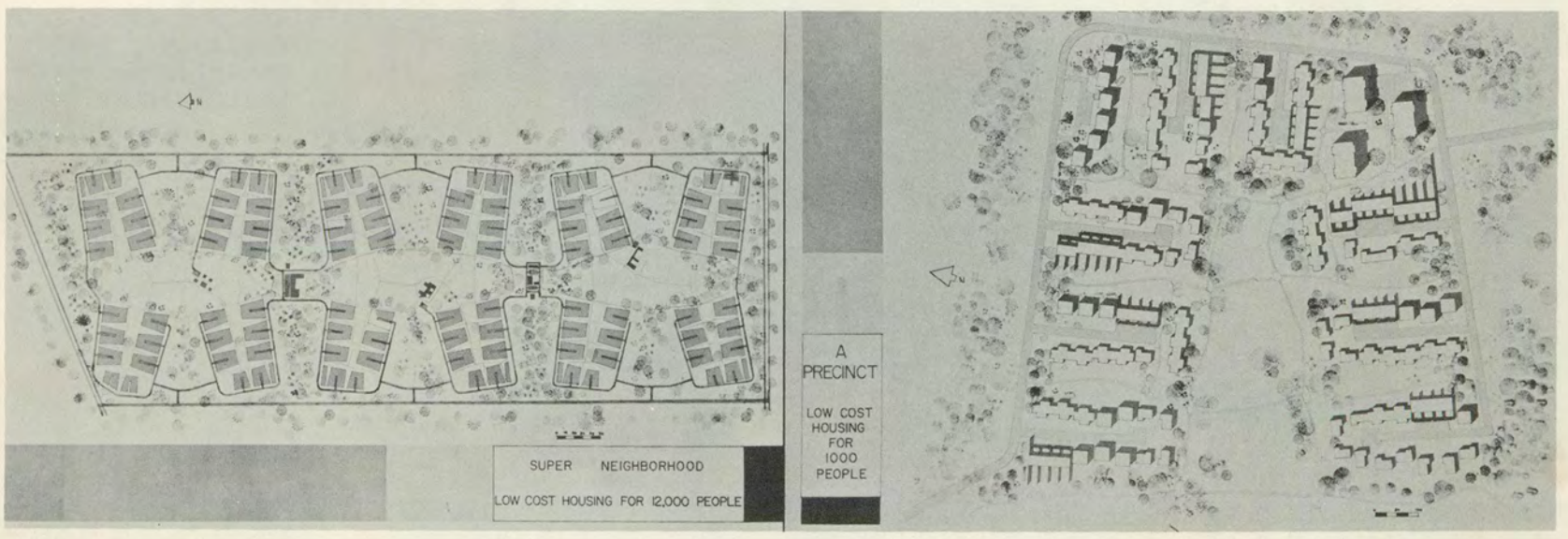


As in the medium-density housing there would be shopping, school and recreational facilities to meet the needs of the families in the area.

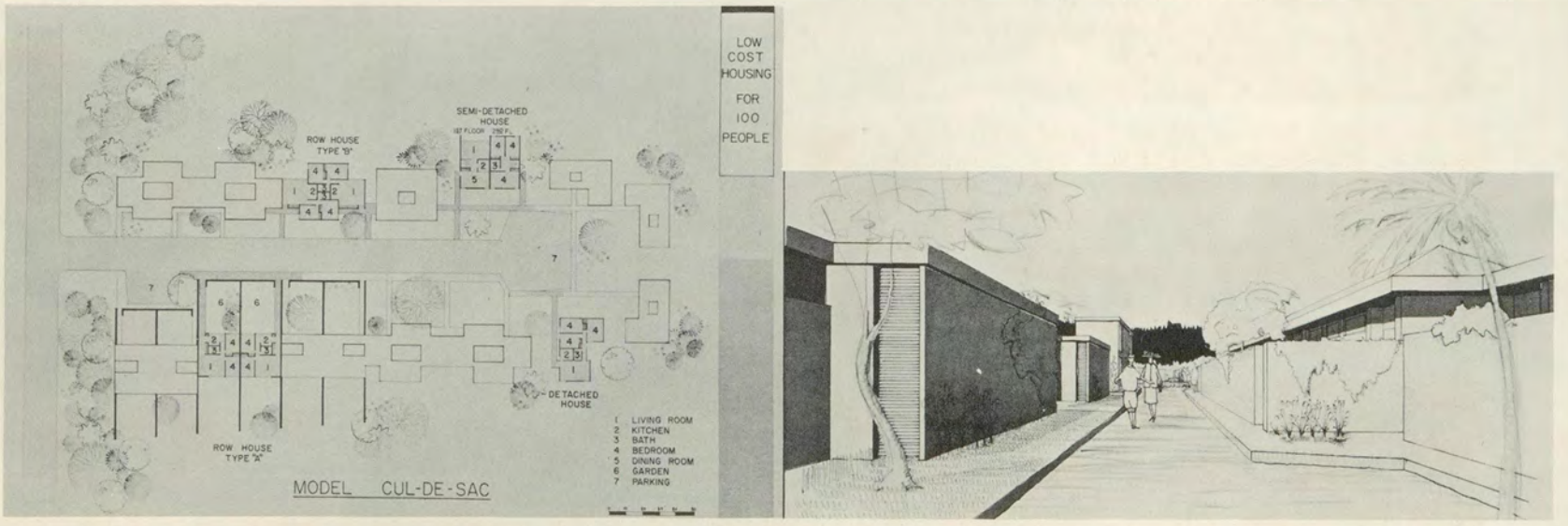
Low-cost Housing

Low-cost housing would be arranged in super-neighborhoods at a density of 20 persons / acre, each super-neighborhood covering an area of about one square mile and designed for a population of 12,000 persons. It would be divided into three neighborhoods of 4,000 persons each, coinciding with three school districts so that no house is more than ¼ mile from the nearest primary school. In addition, two shopping centres are contained in the super-neighborhood. Each of the neighborhoods is further divided into 4 precincts which consist of:

29 single family units
46 semi-detached units
42 row houses (type A)
76 row houses (type B)
72 apartment units



The single family units are single story houses with a floor area of 756 sq. ft., each on a lot of 4,000 sq. ft. and each with 3 bedrooms, one living-dining room, one bathroom and a kitchen. The semi-detached units are two story, have a floor area of 1,062 sq. ft. and a lot area of 2,000 sq. ft. They have 3 bedrooms, a dining room, kitchen, bathroom and living room. Row houses, type A, are single story, have 650 sq. ft. of floor area with a lot area of 2,000 sq. ft. and each has 2 bedrooms, one living-dining combination room, a bathroom and a kitchen. Row houses, type B, are the same as type A, except that they are 750 sq. ft. in floor area. The apartment buildings are three-storied with 4 one-bedroom and 4 two-bedroom apartments on each floor and a ground coverage of 4,872 sq. ft. The one-bedroom apartments have 485 sq. ft. of floor area and the two-bedroom apartments, 594 sq. ft., each apartment having its own balcony.



The houses are served by 25 ft. wide cul de sacs opening off a peripheral circulation road and this side of the houses is, in effect, the rear. The houses front onto a series of communal open space fingers which accommodate footpaths, tot lots and other recreational facilities and lace the entire super-neighborhood with a web of green. In the middle is a common in which are located the schools and shopping centers, all accessible by foot without crossing a road.

RECREATIONAL & COMMUNITY FACILITIES

Sports Center and International Exhibition Area

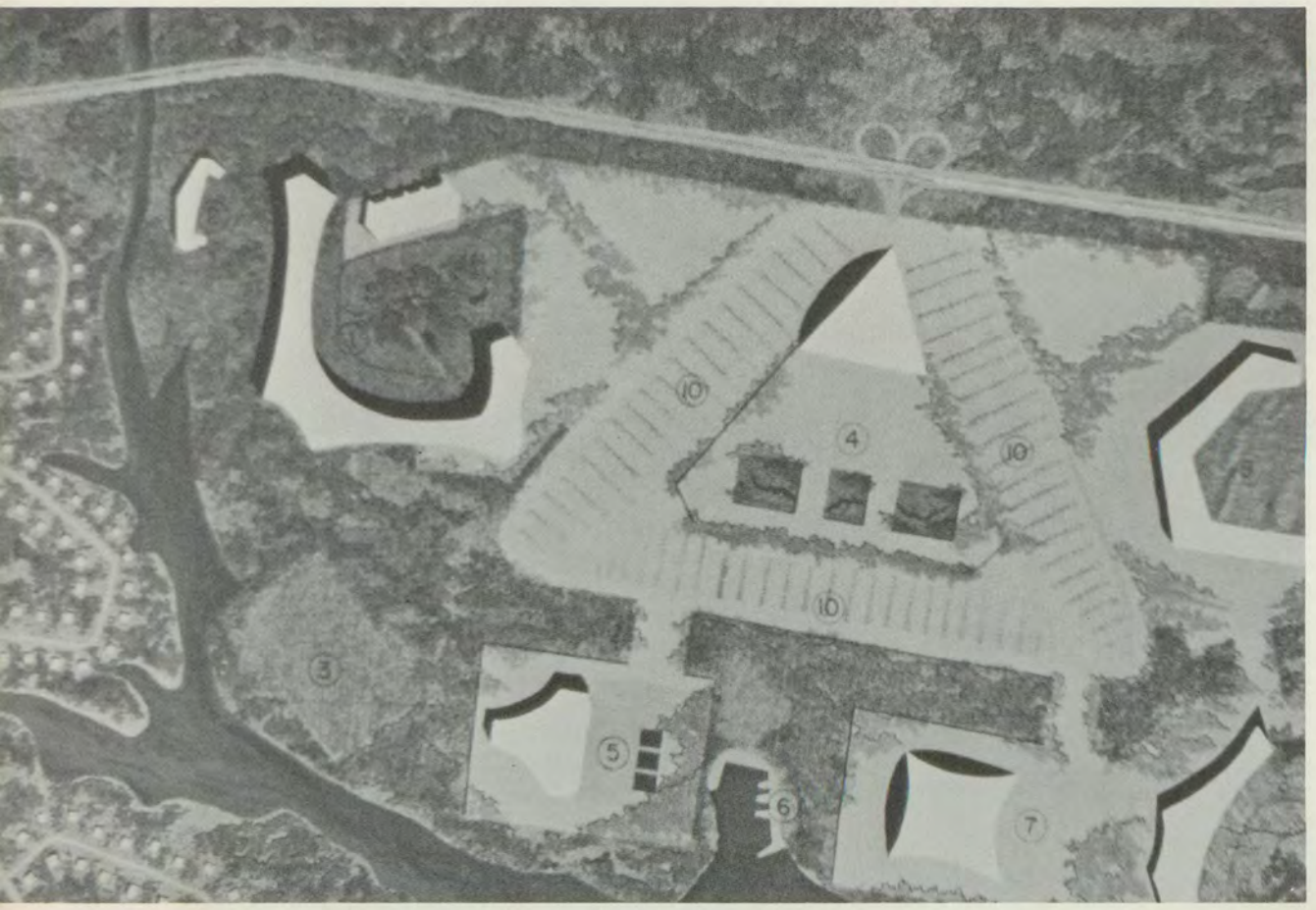
This complex has as its central feature an 86 acre area set aside for an exhibition ground with associated underground parking and service conveniences. It contains a large free-space hall and related external display spaces all set on a landscaped podium and surrounded by a sunken parking moat which separates them from the adjoining sports center and serves both.

The sports center contains all the large-scale and one-of-a-kind recreational facilities that are normally found in a city of this size -- racetrack for turf and harness racing with grandstand, clubhouse and stables which are shared in common with the polo-ground and riding schools; an arena for water sports, diving, swimming and ice hockey; a second arena for boxing, basketball and other stadium activities; a track and field ground with spectator accommodation; a baseball stadium and football field for major or minor league games; a cricket oval; tennis courts and squash, handball, badminton and other racquet and ball game courts.

This whole space will be completely landscaped and there will be spaces set aside for bridle tracks, footpaths and lakeside public enjoyment.

Zoo

Adjoining the sports center but defined individually by planting is the zoo. The formal part of this consists of a plaza on one side of which is the administrative building and natural-history museum, restaurant and observation tower and which has on the other side individual houses for animals which must be confined while in the center is the water-creatures' feeding pool. The focal point of the informal part of the group is the monkey cage and the other animals are arranged about



1. Racetrack
2. Stables
3. Polo field
4. Exhibition area
5. Swimming pool
6. Boating facilities
7. Stadium
8. Baseball field
9. Athletics ground
10. Parking
11. Arboretum
12. Herbarium
13. Botanical display
14. Horticultural display
15. Temporary displays
16. Experimental planting
17. Orchards
18. Golf course and country club
19. Picnic areas
20. Amphitheatre
21. Monkey house
22. Aviary
23. Animal houses
24. Grazing area
25. Animal pits



it in pits which are scaled to the size of the occupants. These pits would have terraced sides and observation balconies at different points so that spectators may view from varying levels and angles. There will also be two pasturage areas for animals which are neither a danger to nor in danger from human beings and where they may be viewed in natural surroundings.

In one corner of the zoo area is located an amphitheatre for outdoor concerts, plays and other performances. This will not be an architectural form, except incidentally, but will be expressed by landscaping and bounded by water and trees.

Golf Course and Country Club

On the opposite side of the lake to the zoo will be the city's main golf links, an 18-hole, 72-par, championship course which will have, in addition, country club facilities for members and tourists who may prefer this atmosphere to the beach-front resort area. The course proper has been designed to take advantage of the natural terrain and has, as far as possible, adhered to hazards indigenous to the site in its layout.

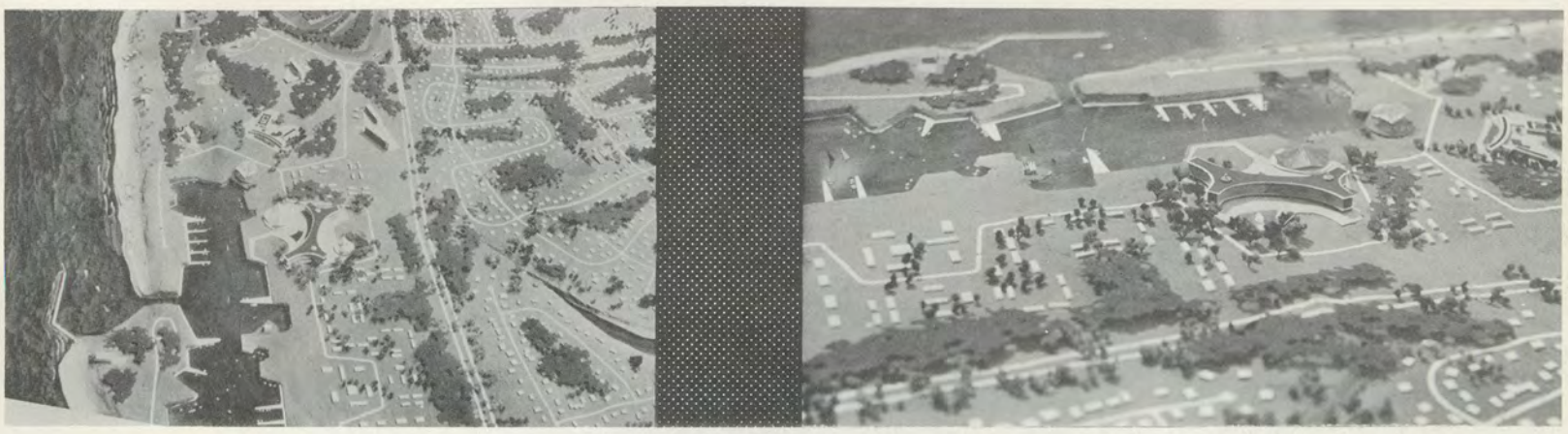
Along the lake-front, on both zoo and golf-course sides, will be provided public picnic facilities etc.

Botanical and Horticultural Gardens

Next to the golf course will be placed the botanical garden for the collection of plant species for scientific purposes and the horticultural garden for their selection for useful purposes. The main botanical area consists of the arboretum for all wooded plants in scientific combination and a systematic arrangement of herbaceous plants subdivided both into general display and a separate display for each of the six continents. There will also be a separate arrangement and placing of medical plants, two areas for ornamental plants and plant-houses for propogation and breeding studies.

The horticultural garden will consist of general display areas for vegetables, fruits etc. and there will be a small library and a museum for the preservation of dried specimens and arrangement of drawings and models.

There will also be a common space for temporary shows and an experimental section where studies of the effect of tropical climate on plants can be carried on.



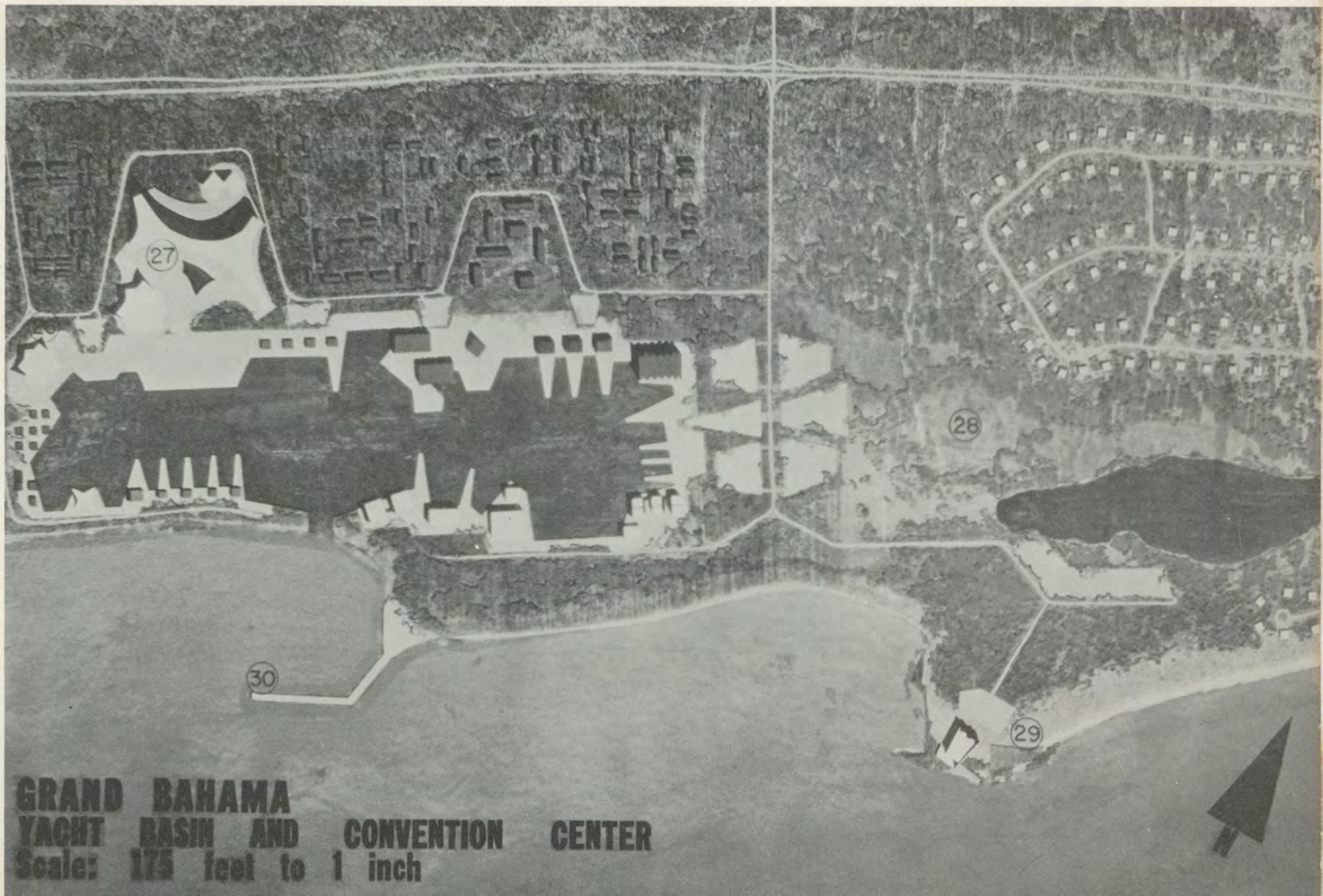
Yacht Basin

Primarily designed for tourists, a yacht basin will be scooped out of one of the low-lying areas in the middle of the resort zone and a channel cut through the sand dune to the open water. Protected by a mole and beacon, this feature will attract cruising yachtsmen from far afield and will offer boat storage, sales and service, accommodation, entertainment, restaurant and bar facilities and casino. The basin will provide ample space also for use by the general public.

On the edge of the basin is situated a 900-room convention hotel with associated auditorium and banquet facilities and related to this will be various cabana-type accommodation units.

1 2

1. View from east
2. View from north



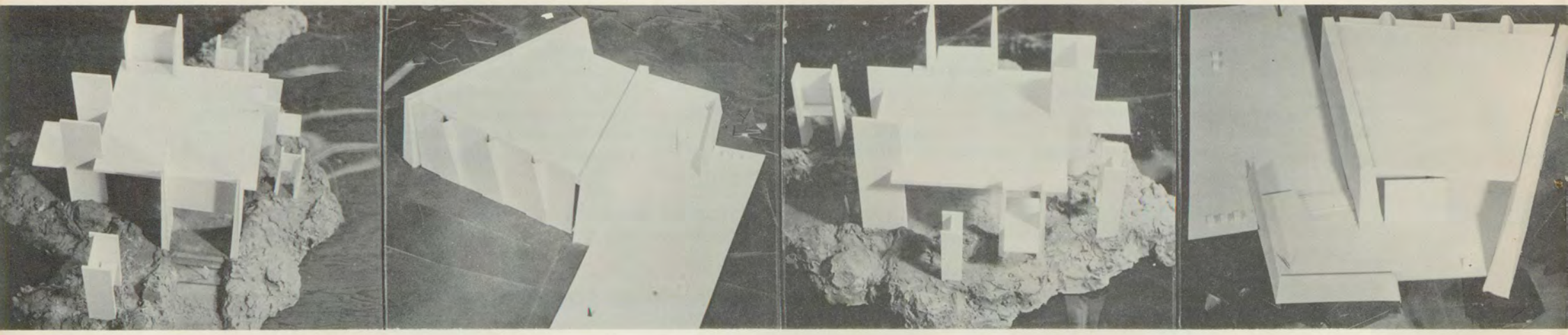
26. Casino
27. Convention center
28. Public recreation
29. Meditation chapel
30. Breakwater and lighthouse

Meditation Chapel

A site has also been set aside on a prominent, rocky point near the yacht basin and on the fringe of a public park for the construction of a non-denominational meditation chapel to be used by visitors and residents alike.

Hopefully, this building will emphasize the natural elements of the site -- the sound of the water, the brightness of the sun, the colors of the sky and the trees and the color and texture of the rock on which it stands. By controlling these factors, by contrasting light and shade in enclosed and open spaces and by using materials which harmonize with their surroundings it is anticipated that the structure will heighten the spectator's awareness of his environment and create a tangible atmosphere in sympathy with its purpose.

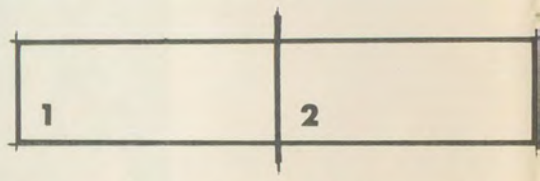
Two designs are illustrated here indicating different approaches to the question but both dramatically stimulating to the viewer.



Underwater Park

Off the coast of Florida was recently created the first underwater National Park in the United States, a portion of the Gulf Stream some 200 miles long set aside for permanent preservation and enjoyment by the public of the natural coral formations and marine life. A similar area off the island of Grand Bahama, proclaimed as a reserve by the Colonial Government, could be a strong feature in boosting the economy by attracting sightseeing tourists and underwater enthusiasts to Freeport. In the first place, Grand Bahama visitors would find its scenic attractions much more readily accessible than do would-be tourists of Florida's park since the Bahama reef is quite close to the shore compared with the 5 to 20 mile trip required to view the Gulf Stream park, and small glass-bottomed boats could easily ply between the yacht basin and the coral grounds on a regular basis. Similarly aqua-lung divers, marine photographers and similar people would find their transportation greatly simplified. Secondly, there is a strong possibility that it would provide the incentive to develop industry of an underwater-oriented or allied character, such as aqua-lung manufacture and; thirdly, there is the possibility that a mainland university might be encouraged to set up a college for marine studies to take advantage of the unique facilities a National Park would provide.

The park need not, in the first instance anyway, be extensive. The immediate reservation of even a relatively small area from which commercial and spear fishing, but not necessarily game fishing, have been excluded would effectively preserve the colorful marine life for observation and enjoyment by tourist and resident alike and the area could always be extended as the need and demand arose. The great necessity is to preserve the superb natural attractions of such a facility and not allow its commercial exploitation along lines which would detract from its income-earning power.



1. View from entrance side
2. View from ocean side



UTILITIES & SERVICES

Water Supply

The installation of the water supply system and the sewage system should be carried out simultaneously with the construction of roads. It is recommended that water and sewage mains be laid in the curb line of all main roads and collector roads. Distribution lines to neighborhoods shall not be laid in the local roads but rather in the open areas or yards between houses, thus helping to reduce costs of excavation in street beds for connections from individual homes.

It is further recommended that water and sewage pipes be located in separate trenches to prevent contamination due to leakage.

The method of water supply recommended for Grand Bahama Island is the horizontal infiltration chamber method. Two different areas, one near the ridge north of Lucayan, and one on the hill, just east of Hawksbill Creek north of Freeport, will be used to collect water from the aquifer, an area 300 ft. by 300 ft. being needed at both places for collection of water.

The infiltration chambers, each 3 feet in diameter, are placed 10 ft. below the ground water table in a rectangular grid pattern spaced at least 30 feet centre-to-centre in both directions. Along one side of the grid system shall be located sumps or collectors from which the water will be pumped to the surface to be sent to the chlorination tanks. From here the water will go to several elevated water tanks located so that the areas may be fed by gravity flow. The elevated tanks will be located in green areas such as the sports park, golf course and public open land and each tank will be made to blend in with the land.

The town of Lucayan and its surrounding area with a total estimated population of 87,000 persons will need 13 million gallons per day (at the rate of 150 gallons per person per day), and the system will be designed to supply 15 million gallons per day to provide for the peak demand. Such a water demand will require 5,000 feet of infiltration chambers, arranged in a square grid as set out previously. The industrial city of Freeport with a population 50,000 will demand a peak load of 10 million gallons per day, or about 3,500 feet of infiltration chambers arranged in any manner.

The installation of more chambers will be done when it is evident that population growth will exceed that predicted in this report.

Due to the flat topography pumping costs will be high, but maintenance and installation (trenches need be only 10 inches deep due to lack of frost) will be lower than other systems.

Sewerage

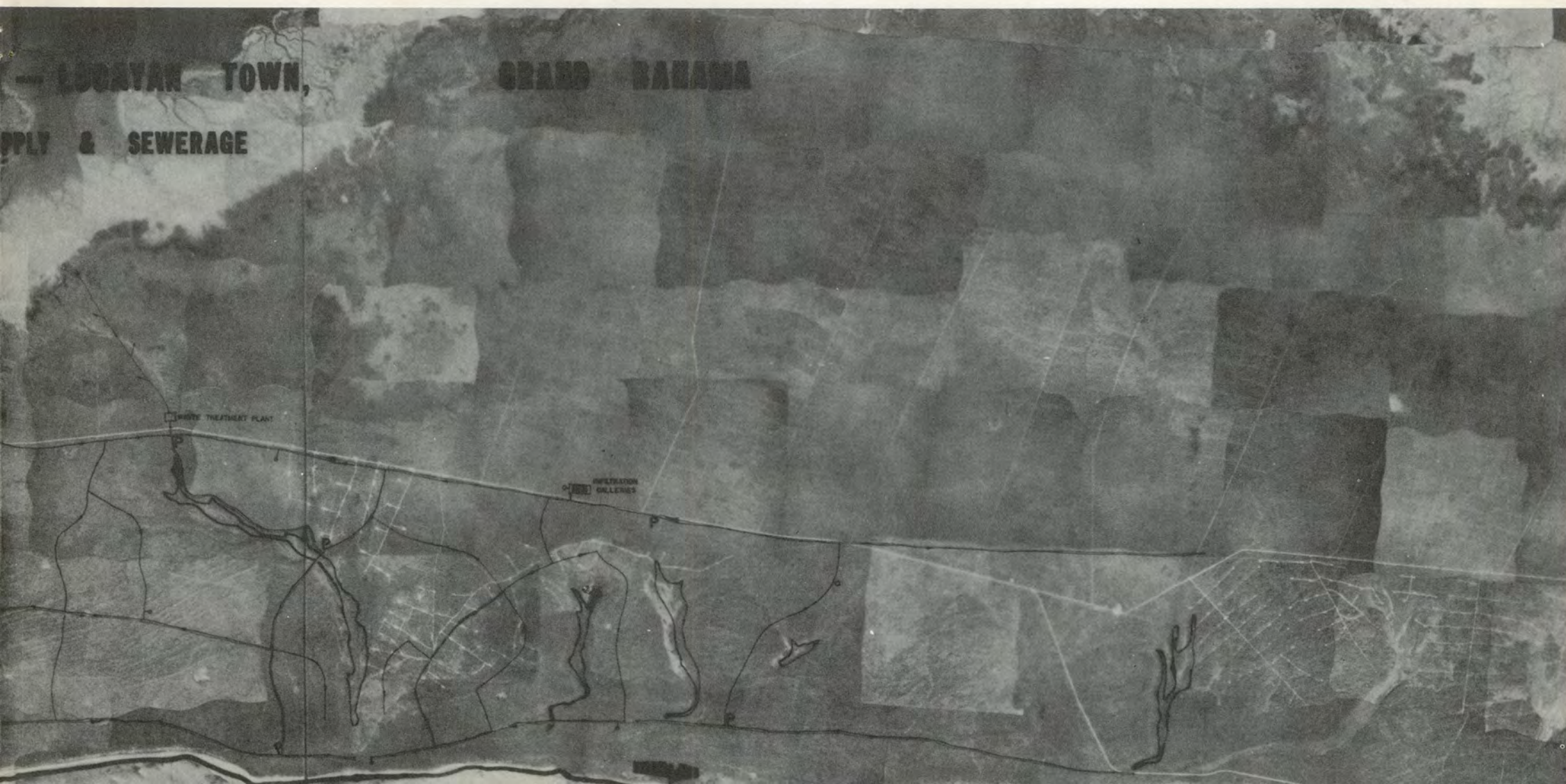
The sewage will be collected from residences through pipes located in the yard or open area and will lead to the main and collectors, running along main roads and arterials and leading to two primary treatment plants, both to the northwest of each of the cities. These plants will treat the sewage and then pump the effluent to an outfall at least one mile off the north shore of the island, although investigation should be made to determine whether it is possible that dried sludge obtained from these two plants could be sold as fertilizer for use in the agricultural industry.

Pumping costs will be necessarily high and pumping stations will be located at junctions of two or more mains.

Power.

The final completion of the 39,000 kilowatt power plant now under construction will provide enough power for a population of 40,000. Transmission lines laid in a separate trench will follow the arterial road system and connect to residences through the yard areas.

It is suggested that the possibilities of atomic or solar power be investigated so that, when a demand for more power becomes evident, a cheaper and more efficient system of power production may be made available.



PROPOSED MUNICIPAL GOVERNMENT

Administration

In order to ensure that the greatest benefits to all are reaped from the physical plan of development for the Freeport and Lucayan areas, we would like to supplement our development plans with the following proposal for organisation of the municipal government.

So that we might accentuate the British character of the area, we shall take the liberty of employing the Scottish titles for equivalent government positions where this seems appropriate. To begin with, the entire area under consideration -- Freeport and Lucayan -- would be integrated into a single administrative unit, to be called a burgh.

The legislative body governing this burgh would be a council, elected by democratic procedure and composed of several councillors, or bailies. (The term "bailie" is not exactly equivalent to "councillor" as used in Great Britain but the distinction can be discounted for our purposes.) The bailies would represent wards which could be designated at the time such municipal establishment was negotiated and they (the bailies) would further serve as magistrates of their respective wards (or bailiwicks).

Though this stipulation need not be strictly adhered to, it is recommended that -- just as in the English system -- the bailies be elected for terms of three years, one-third of their number retiring each year.

The bailies would then elect a burgh chairman (legislative), to be known as the Lord Provost. It is entirely a matter of personal predilection whether, as in England and Wales, the chairman be elected for a one-year term and be either one of the councillors or an outsider or whether the Scottish system, where he holds office for three years and must be selected from among the bailies, be selected.

The general operation of the bailies would be administered both in joint council and in a number of special committees, established when particular phases of government warrant individualized consideration. In practice, committees tend to fall into three general categories, according to the degree of permanence ascribed to their respective functions, and the three types are: 1. statutory committees required by law; 2. standing committees which, though not compulsory, are regularly appointed and; 3. special committees which are appointed as the need arises.

Each committee elects a chairman, or convener, who both presides over meetings of his group and serves as intermediary between the committee and individuals or groups desirous of having the committee in question consider a particular matter. A committee may, in most instances, coopt members from the outside when expert advice of some type is called for.

There are three general responsibilities which committees assume: considering suggestions, preparing reports and making proposals before joint council.

In addition to this elected legislature, it is recommended that an administrative network be adopted consisting of positions appointed on a basis similar to that of civil service.

First among equals in this network would be the Town Clerk, usually a lawyer who has displayed strong executive abilities. Additional members of the burgh administrative staff would include a treasurer, or Chamberlain; a Town Planner and Surveyor who would be responsible for such matters as establishing a zoning ordinance in harmony with the physical plan and for carrying out various municipal engineering operations; an Officer of Health and Sanitation, preferably a physician; a Supervisor of Education; and a Conservation and Development Officer whose domain would include programs for the conservation of fresh water and for the development of utilities and communications systems.

It is not advisable that a municipal system such as that just proposed be established until the population of Freeport-Lucayan approaches the 5,000 mark. Until this time, it is thought that a small administrative nucleus, appointed by the Port Authority, should suffice. Provision ought, however, to be made to the effect that officials so appointed might, with ease, be incorporated into the municipal government when it comes into being.

Building Code

In addition to the abovementioned servants, it is recommended that the Port Authority appoint building inspectors until such time as municipalities are formed and can assume the responsibility and it is suggested that the following outline be adopted as a guide to control of structures:

1. All residences shall be of concrete or wood but firmly anchored and keyed into limestone. The limestone shall be excavated cleanly until fractures and other weaknesses in the foundation are not present. Grouting shall be used where necessary.

2. Foundation design must take into consideration the fact that maximum winds are from the southeast, south and southwest.

3. All wooden structures must be weighted in the roof to reduce affects of high winds. Concrete houses are recommended with local pine used for finishing, etc.

4. Design Criteria

Wind: Wind loading shall be taken as 200 mph. Window construction shall allow for sudden high wind loads.
Bearing capacity: If limestone is prepared as above and fully investigated, the allowable loading shall be 3000 lbs. / sq. ft.
Concrete: All concrete design should adhere to American Concrete Institute's Ultimate Strength theory, and samples shall yield compressive strengths of at least 4000 lbs. / sq. in. Other criteria shall meet the specifications of the ACI Building Code. All concrete shall be Portland-type and shall conform to Standard Specifications for Portland Cement (A.S.T.M. designation: C150-49).
Aggregates: Aggregates may be of clean limestone of 1½ inches maximum diameter but must be approved by an authorised aggregate plant inspector.
Steel: Reinforcing steel shall be deformed bars of high grade steel with a yield point of at least 60,000 psi.
Deflections: In concrete construction (monolithic reinforced, pre-cast, pre-stressed or slab-type) the allowable deflection shall be less than L/360, where L is the unsupported span in feet.
Settlements: To provide that doors will close tightly, maximum settlements shall be less than 3/4 inch, and maximum differential settlements shall be 1 inch.

5. Maximum Building Heights

Residences -- no greater than 20 feet
Hotels and Office Buildings -- no greater than 70 feet

CONCLUSION

So often today the role of the city or regional planner is limited to replanning and the full measure of his creativity is brought to bear only indirectly. He is beset with problems of urban blight, obsolescence and deterioration caused by a lack of planning on the part of his forefathers and his job is to resurrect from this morass a semblance of livable conditions.

The development of wholesome living and working environments has lagged far behind the uncontrolled spread of urbanization and the task of catching up -- not to mention keeping up -- is of gargantuan proportions.

Then, as if by some magic conveyance, the planner's attention is transported to an island, unsullied by the scars of a civilization that advanced too rapidly for orderly, attractive development. Here he finds unparalleled opportunity; on the one hand, the island hoards vast wealth in the form of an ideal climate and a fine geographic situation; and on the other hand, its very lack of development gives the planner great latitude to produce the best possible arrangement of land uses and buildings for the benefit and enjoyment of those who come seeking the natural attractions.

This island is Grand Bahama.

Fringed with a broad border of dazzling white sand, Grand Bahama is mirrored in the jewel tones of a kaleidoscopic sea. The land surface is carpeted with a lush, sub-tropical verdure.

Located a short distance off the Florida coastline, the island is warmed year-round by the Gulf Stream, yet spared the relentless blaze of the sun by the balmy Atlantic trade winds.

Once there existed on this island a group of natives, who reputedly live a life more Elysian than any other ever known to mankind. It is our hope that, through the tools of present-day planning, we can reproduce the Elysian elements of that by-gone era and wed them to the conveniences, comforts and high level of technology present in modern Western civilization.

In this spirit, we submit our proposal for the development of Grand Bahama.

Frederic O. Block
Peter Blume, B.A.
David K. Dodes, B.A.
Ernest R. Bonner, B.S. (Arch. Eng.), B.S. (Bus.)
Albert J. Elie, B.A.E.
John S. Garment
John Vernon Morice Gibson, B.A.
Morris Hill, B.Sc., Dip.L.S.
Nathan L. Jaschik
Eddins W. McNealy Jr., B.A., B.S.
Mary Manaster, A.B.
Jonathan Meigs
Michael Newman
Alan A. Schoenegge
Bansi Lal Vaishnavi, B.Sc.

Department of City and Regional Planning, College of Architecture,
Cornell University, Fall, 1960.

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Dean of the College of Architecture - Burnham T. Kelly
Project Director - Frederick W. Edmondson
Faculty Advisors - Reeshon Feuer (Agriculture)
Ta Liang (Civil Engineering)
Maurice Perreault (Architecture)
Alexander Kira (Architecture)
K. C. Parsons (Architecture)
Graduate Assistant - Bruce Hyland

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