

DRAFT

ANNEX I

INTERPRETIVE PLANS

SOUFRIERE VICINITY



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INTRODUCTION

These interpretative plans were prepared as part of an Organization of American States project to assist the government of St. Lucia in developing resources in and near Soufriere. The programs identified are done so under the guidelines that they will enhance the attractiveness of resources for tourism while preserving their scenic, scientific and historical values. The programs should also gain national understanding and support for the development and preservation of the resources.

Because the resources in question are thematically and physically distinct, each is addressed separately: the Sulphur Springs Area, the Rain Forest, Soufriere Estate, Diamond Mineral Baths and Botanical Garden, and the Pitons.

SULPHUR SPRINGS COMPLEXThe Resource

An area of violently boiling acid springs and steam vents, Sulphur Springs is the surface manifestation of a volcano that once existed immediately southeast of the town of Soufriere. It is a reminder of the tremendous energy of the volcano that still remains, a heat source that lies perhaps two kilometers below the surface.

The Sulphur Springs inspire awe. Pools are filled with boiling black water. Fumes fill the air. Steam is ejected from the earth to the accompaniment of intimidating roars and hisses. Solid rock is decomposed and redeposited in bright mounds of such minerals as kaolinite. Iron oxides streak the altered deposits with orange and red stains, adding to the brilliant landscape. This world is both exhilarating and intimidating. Travelers half expect earthquakes to shake their knees and see the volcano surge to life. To professional geologists, the acid springs and fumeroles are among the most impressive in the world.

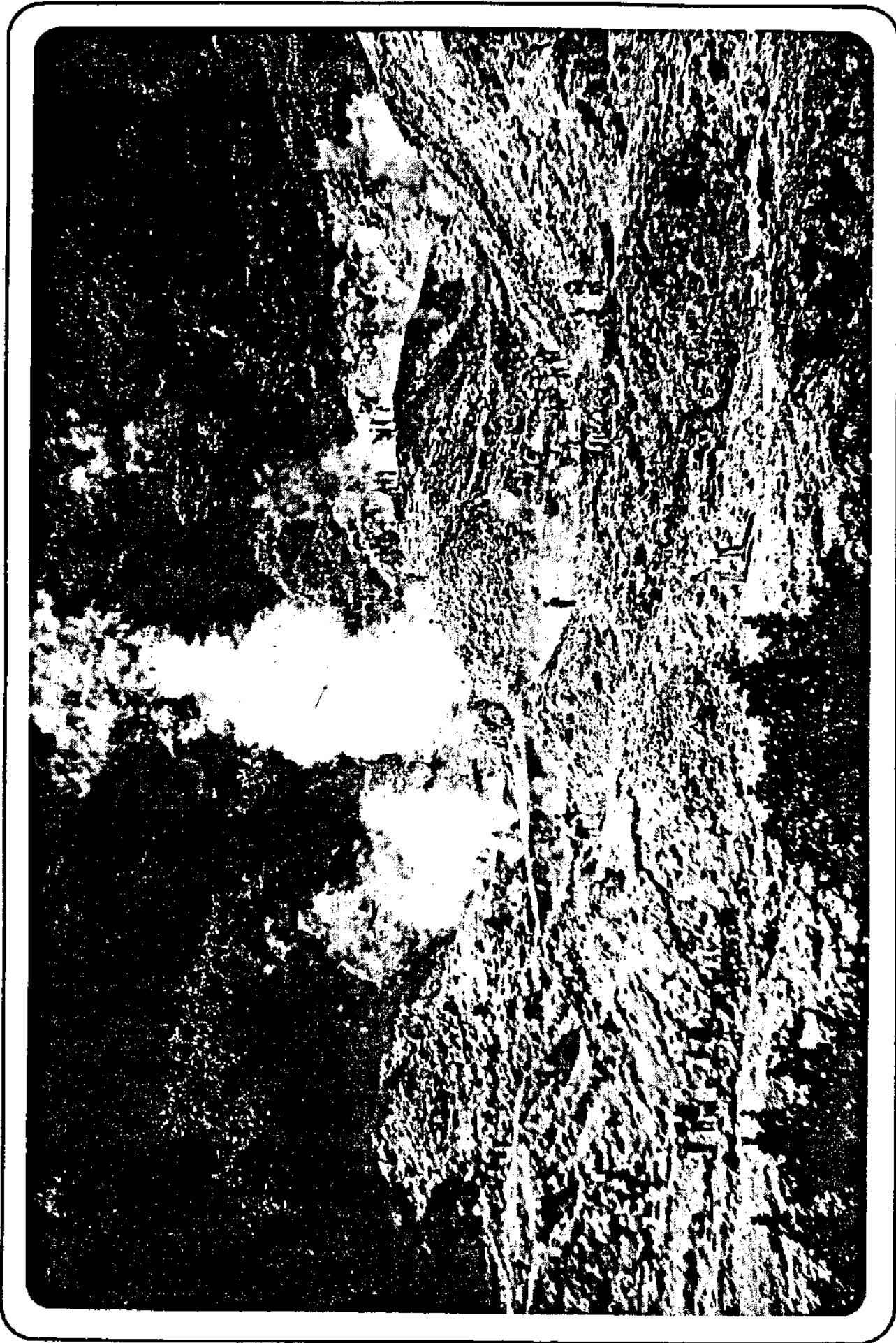
The attraction of the Sulphur Springs is enhanced by an understanding of the larger geologic story into which they fit. All of St. Lucia, other than its coral reefs, are of volcanic origin. All of the Lesser Antilles are of volcanic origin. The islands are the result of movement of large portions of the earth's crust and ensuing volcanism where the great Atlantic Plate pushes beneath the slower moving Caribbean Plate. Volcanoes arose where structural weaknesses allowed magma to rise from the mantle of the earth.

The volcanic history near Soufriere spans about 6.5 million years as determined by potassium-argon dating. The oldest rocks are basalt lavas such as those at Coubaril and Jalousie. Great stratovolcanoes that once existed in the Mt. Gimie and Mt. Tabac areas have been dated at about 900,000 years. In other words, great volcanoes dominated the St. Lucian landscape only one million years ago.

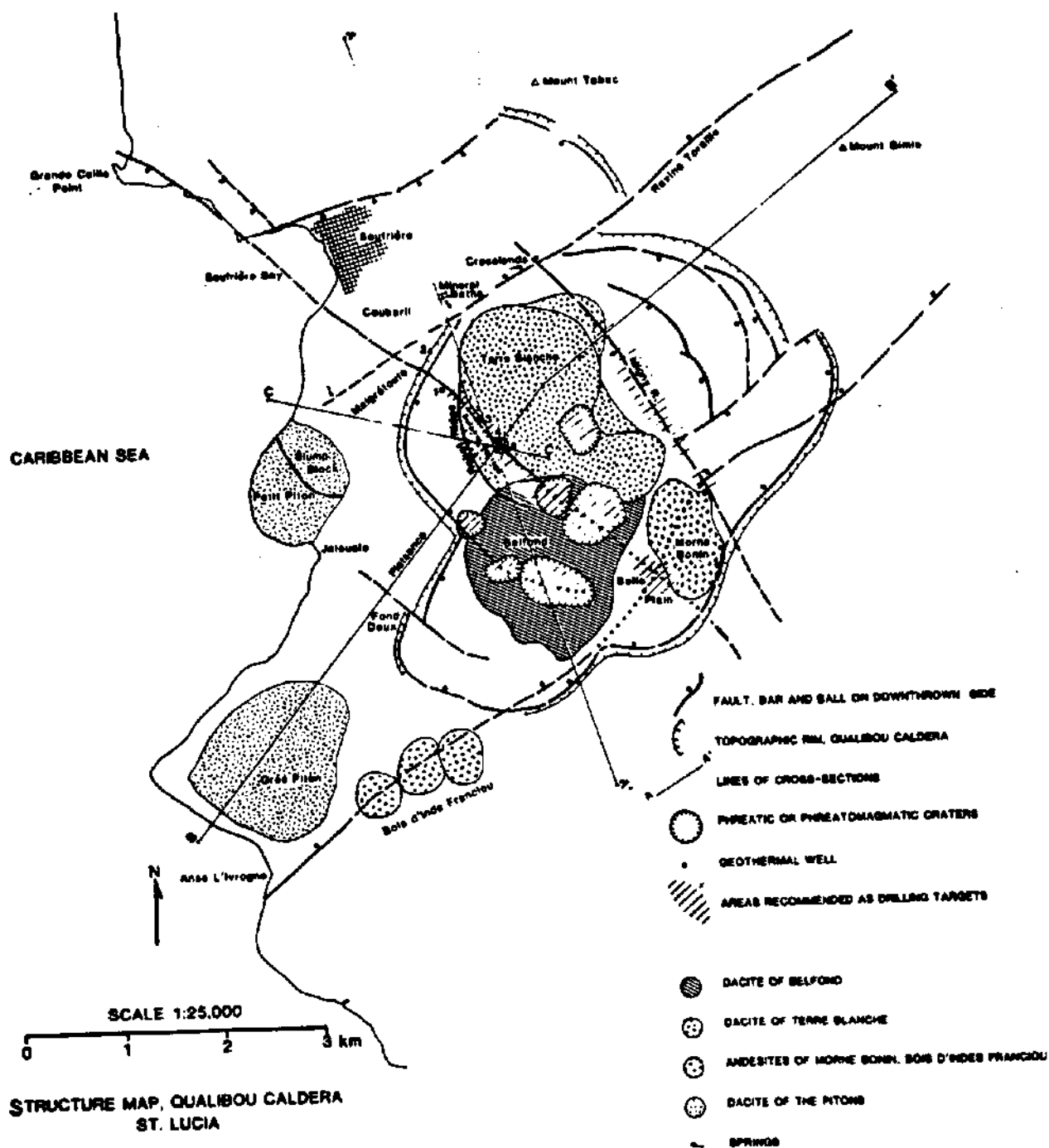
Petit Piton and Gros Piton are also of volcanic origin. These spectacular plug domes of dacite lava extruded from faults near the coast about 250,000 years ago.

The local landscape is coated with more recent pyroclastic flows and surge deposits called the Choiseul Pumice. Great volumes of pumice--perhaps equal to 6.5 cubic kilometers of dense rock--erupted from the earth between 32,000 and 39,000 years ago. This caused the collapse of an unnamed volcano, and the resulting depression is known today as Qualibou Caldera. Within this Caldera lie features of more recent volcanic activity. These include Morne Bonin Dome, Terre Blanche Dome, Belfond Dome and, of course, Sulphur Springs. Belfond was the last site to witness liquid rock--about 20,000 years ago. A steam explosion at Sulphur Springs in 1766 was reported by French settlers.

Travelers to the Sulphur Springs are startled to learn that they stand within the heart of the volcano. The surface features are not all that evident, for considerable water erosion and reforestation of the volcanic rock has altered and softened the landscape. Thus, the interpretive plan must address both the present and the past.

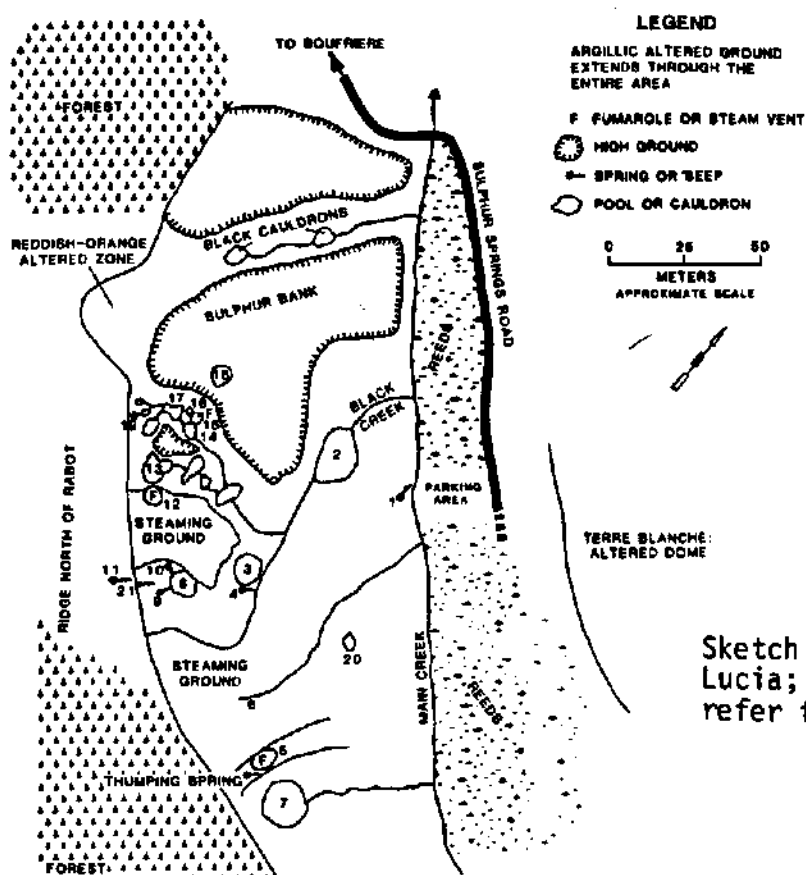


Sulphur Springs, within the heart of a volcano



Structural geologic map, Qualibou caldera.

In: Evaluation of the St. Lucia Geothermal Resource by Grant Heiken, et. al.



Sketch map of Sulphur Springs, St. Lucia; numbers by thermal features refer to Table I.

TABLE I
TEMPERATURE SURVEY OF THERMAL FEATURES AT SULPHUR SPRINGS,
ST. LUCIA, LESSER ANTILLES

Map location # (Fig. 1)	Description	Temperature (°C)
1	seep	94
2	black bubbling pool	63
3	grey bubbling pool	96
4	bubbling seep	88
5	steam vent	103
6	steaming ground	
7	boiling cauldron	90
8	clear bubbling pool	72
9	flowing clear spring	69
10	flowing clear spring	93
11	flowing clear spring	58
12	superheated steam vent	171
13	large black cauldron at edge	88
14	black cauldron	73
15	steam vents	95-98
16	light grey boiling pool	95
17	black cauldron	81
18	grey pool	96
19	bubbling pool	80
20	very small bubbling pool	80
21	flowing clear spring	56

Interpretive Objectives

1. Provide access to Sulphur Springs and adjacent volcanic features in such a way as to ensure visitor safety and minimize impact to the resources.
2. Provide visitors with an overview of local and regional volcanic history and how Sulphur Springs fits into that story.
3. Explain the physical and chemical processes visitors witness at the Sulphur Springs.
4. Motivate visitors to learn more of St. Lucia's natural history on their own.
5. Gain support for the Sulphur Springs development among visitors and local citizens to reduce vandalism.
6. Ensure the quality of guide service through a program of training, testing and certification.
7. Orient visitors to other resources planned, managed or developed by the National Trust.

Visitor Use Analysis

Visitor use is assumed to be similar to Pigeon Point National Park, with about 75% of the visitors English speaking. The remainder of visitors speak principally German, French, Swedish, and Italian.

Factors Influencing Interpretation for Foreign Visitors

Language Barrier

Most visitors to the Sulphur Springs are expected to be nationals from other countries. Some will not be able to understand English. It will be impractical to develop bilingual services to serve all visitors. However, guides conversant in German as well as English could serve an additional 12% of the visitors to the Sulphur Springs. Texts in German and French could be added later.

Elements of Discomfort

Sulfur fumes, heat, humidity and rain may all deter travelers from visiting the Sulphur Springs. Physical impairments may prevent them from using the related sources.

Transportation as a Barrier

Sulphur Springs is now accessible by automobile, only minutes from Soufriere. However, there is extremely limited parking until the road access is repaired. There is presently no way to dismiss a taxi and call another later.

Lack of Food and Drink

With full development this may be a factor for those wishing to hike to the summit of Terre Blanche. Snacks and drinks would be popular with hikers.

Language for Interpretation

The basic language for use in visitor interpretation is to be English: for exhibits, publications and speaking. However, directional, regulatory and safety signs should be in English, French and German.

Interpretive Development

Interpretive Material for St. Lucian School Groups

It is important to provide materials that cultivate an understanding and appreciation of the Sulphur Springs resources among St. Lucians. An educational resource packet should be developed to include pre-site, on-site and post-site activity material. In this way, school field trips to the site can retain their learning value and less likely become "off days". Separate materials, such as question and answer sheets, fact sheets and glossary, should be developed for both teachers and students.

The Sulphur Springs Entrance

The short trail from the parking area to Sulphur Springs provides an opportunity to build anticipation of the forthcoming experience. An interpretive sign can advise visitors they are now within the heart of a volcano; the Sulphur Springs are 200 yards ahead.

Each existing shelter near the proposed parking area can serve a purpose: one as rain shelter for visitors and one as fee collection booth for those entering the area.

Sulphur Springs Boardwalk

A visit to the Sulphur Springs is largely a sensory experience. The sights, the sounds, the odors are very powerful indeed. The visceral impression they create lasts long after the facts about the volcano are forgotten.

A boardwalk across the Sulphur Springs can promote the volcano experience while providing safe access. The boardwalk can cross the Diamond Creek where a bridge now exists and lead east and west to permit viewing of the principal features, including "Thumping Springs", "Boiling Cauldron", "Steam Vent", "Light Gray Boiling Pool", "Black Cauldron" and the "Sulphur Bank". The names are for reference only, as they relate to geologic data acquired in geothermal research and are, therefore, useful for interpretation. The names are otherwise trivia in the public eye and are to be avoided.

Given the area's varying topography, a loop trail is not possible. Spur trails can lead to some features; steps will be necessary in places. The beginning portion of the boardwalk, however, will not exceed a 6% grade to permit easy access for the disabled.

Interpretive signs, with graphics, can be placed at intervals to explain several processes that are going on before the visitors' eyes or beneath their feet. The concepts to impart with signs are:

1. A magma chamber, the heat source, lies two kilometers beneath this site.
2. The features of Sulphur Springs are the result of acids, water and heat. The products of this conversion of dacite lava include cristobalite, natroalunite and kaolinite. Iron oxides form brilliant orange and red stains.

3. Sulfur, gypsum and pyrite are precipitates concentrated near fumaroles and steaming ground.
4. The nature of the Sulphur Springs plumbing system (stylized): why some vents are "dry", why some are "drowned".

Where appropriate, two or more concepts may be developed on a single sign.

As with all outdoor interpretive signs, fiberglass-imbedded texts and artwork should be used; the materials are weatherproof and will not peel, crack or fade. They are unaffected by water and corrosion. Spare sets can be made for ready replacement of damaged signs.

Visitor Reception Center

This complex opposite the Sulphur Springs can offer visitors an opportunity to complement their boardwalk experience by viewing exhibits that elaborate upon the geologic concepts presented in boardwalk signs.

It should include:

- a staffed information desk;
- a display area and counter for the sale of publications and objects related to the natural history of St. Lucia;
- restrooms;
- limited seating to serve as a rest area and protection from rain and sun;
- a viewing area overlooking the Sulphur Springs; and
- exhibits that develop the following concepts:
 - (a) caldera versus crater
 - (b) regional geologic history--plate tectonics and island volcanism
 - (c) post-caldera volcanic landforms
 - (d) Sulphur Springs plumbing system
 - (e) chemical and physical processes in the Sulphur Springs solfatara
 - (f) volcanic products--samples of principal rocks and minerals found in Qualibou Caldera, what they reveal about a volcano's history.
 - (g) Qualibou's geothermal potential--the evidence of an energy source, the technology of energy extraction and what it means to St. Lucia.
 - (h) the future--the possibility of future island growth through volcanism or erosion into the sea.

There is not sufficient detail of exhibit content to identify the mediums to be used with each exhibit. They may include three-dimensional

map models, dioramas, clear and colored Plexiglas models of the volcano's plumbing system, Plexiglas or glass exhibit cases to display rocks and minerals, large format photographs or graphics of Sulphur Springs features--both surface and subsurface, text imbedded in fiberglass, or silkscreened text and art. Electric lighting is essential to effectively present the exhibits.

A capped geothermal drill hole at the visitor center site also offers an opportunity to interpret this feature with an interpretive sign. The visitor center should be positioned so as to complement and not conflict with any future geothermal testing at this test well.

Terre Blanche (Mt. Souf) Trail

A trail beyond Sulphur Springs can lead to the summit of Terre Blanche (Mt. Souf). This dacite dome is a prominent feature created following the creation of Qualibou Caldera. As such, it is less than 40,000 years old. The view from its summit stretches to the prominent features of Qualibou Caldera as well as the Pitons, Soufriere, Mt. Tabac and Mt. Gimie. A brass viewfinder marker at or near the summit of Terre Blanche can aid visitors in their orientation to the scene.

Publications

As with visitor center interpretation, sales publications offer a means for visitors to learn more about the resources. A booklet, Sulphur Springs - The Story of its Origin, should be published in color to tell the area's geologic story. It can use text, photographs, and drawings to present the same concepts identified in the Boardwalk and Visitor Center segments of this plan. The booklet can also serve as a self-guiding tool for the boardwalk and Terre Blanche Trails.

A set of high quality Sulphur Springs area postcards (3) also need to be produced.

Forest Interpretation

Although geologic features are the primary resource of the area, the trail to Terre Blanche also offers excellent opportunity to interpret vegetation and the story of human alteration of the landscape. Many species are native to St. Lucia. Some are uncommon or rare. Many are non-natives. Many are of important economic use. Some are noxious invaders.

Plant labels also of fiberglass can be used to identify the more interesting species. Each label should include the common name, scientific name, common family name, a drawing of distinctive leaf or floral parts and indicate whether the plant is native or exotic. Exotic species can also be identified as to its point of origin in the world. A brief text will identify the economic uses, if any, of each. About 30 plant labels can be installed.

Conducted Walks

Nothing is as effective in communicating the values and significance of a resource, as personal services. The guides, or interpreters, are not only sources of in-depth information about the resource, they are also hosts to the area and create an atmosphere of welcome that helps create an area's reputation.

Guides at Sulphur Springs can staff the visitor center. They can also walk the Terre Blanche and Boardwalk Trails to provide informal orientation and interpretation to groups of visitors on an opportunity basis.

The guides should be attired in readily distinctive uniforms so that visitors can readily recognize them as sources of information and authority.

Guides must be neat in appearance, friendly, and possess the ability to express themselves well in English. In addition, they must possess a good understanding of geologic principles, local volcanic history, as well as the natural history and ethnobotany of local vegetation. Guides need to participate in a training, testing and certification program, to ensure that professional skills are met.

Interpretive Staffing Needs

The duties at Sulphur Springs are readily interchangeable. The same demands for information are often made of both sales and fee receptionists and guides. Guides often fill in for sales receptionists and fee collectors. Daily staffing will require a fee collector at the parking area, a sales receptionist, and a park guide on informal public contact on the trails. With this in mind, Sulphur Springs can be staffed with:

Tour guides

4.2 work year

Research Needed

Considerable geologic data now exists, a side benefit of the geothermal proposal for Sulphur Springs. Many exhibits and signs and much in the way of conducted walks and talks can be done based on the existing information.

Thorough interpretation, however, requires more. The following are areas of insufficient information:

- the nature and extent of the sulfur mine operated by Messrs. Bennett and Wood from 1836-1840
- historic land use patterns of the area
- an inventory of plants in the area
- identification of archeologic sites
- the potential impact of geothermal development on the Sulphur Springs.
- the nature of the magma chamber--its size, position, temperature
- birds of Qualibou Caldera.

Cost Estimates

The projected Sulphur Springs development costs are not accurate because no detailed plans exist and no comparable developments exist in St. Lucia to use as a guideline.

The cost estimates come from two sources: (1) those items indicated for production in St. Lucia are largely based on estimates provided by Mr. Robert Devaux; and (2) items indicated for production outside St. Lucia are based upon costs in the United States and have been estimated using United States National Park Service methods for products meeting Service standards.

A 2.70 x factor has been used to convert U.S. estimates to E.C. currency. Even with the conversion factor, considerable additional cost would be involved because of the distance factor.

The present facilities are under construction and the materials are being ordered. The 3000 sq. ft. 3 modules requiring 2 weeks each of the time of a construction specialist and a salary budget of EC\$ 1.50 per month. Student, most lab costs are determined at EC\$ 5,000.

Library Development

Good interpretation requires that reference materials be available to guides. A small library of selected references (about 100 volumes) can serve for literature research and independent study in such areas as volcanology, tropical forest ecology, ethnobotany and ornithology.

SUMMARY OF INTERPRETIVE DEVELOPMENTS AND COST ESTIMATES

(in EC\$)

<u>Item</u>	Produced	Produced
	outside	inside
	<u>St. Lucia</u>	<u>St. Lucia</u>

Teaching Aids:

Teacher's curriculum guide and
student materials

7,700

Indoor Exhibits:

Plan, produce and install exhibits,
information desk, and sales display
structures in visitor center

54,000

Outdoor Plan Markers:

Plant interpretive markers (about 30)
a \$80 each

2,400

Information Signs:

Plan, produce and install about 12
informational and directional signs

6,500

<u>Item</u>	Produced outside	Produced inside
	St. Lucia	St. Lucia

Publications:

Sulphur Springs guide	40,000	
Souvenir postcards (3)	3,300	

Historical Research:

Research to support the interpretive developments of this plan (4 person/months)		8,000
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Library Development:

Acquisition of key reference volumes; about 100 volumes	4,400	
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Outdoor Interpretive Signs:

Sulphur Springs Bordwalk (4)		
Geothermal Well (1)	13,000	

Visitor Center:

Space for exhibits, sales, restrooms, storage		Provided for in Study Text Chapter III, B.3
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Maintenance of Interpretive Devices
and materials:

Annual		65,240
10-year cyclic maintenance		6542,400

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Postscript

This interpretive plan is based upon a limited information base. Some of the proposals mentioned will, therefore, require additional research. The trail to Terre Blanche, for example, is depicted only conceptually. Its final position will require detailed knowledge of slopes, preferred viewpoints, and the location of special interest plant species such as cinnamon, cassava and calabash tree. Additional knowledge of both flora and fauna may enhance these stories in the future. As with all parks, the interpretive plan evolves as the information base grows.

The future collecting and/or sales of sulfur crystals needs to be addressed in a management plan. The Sulphur Springs landscape will become more brilliantly coated with sulfur as foot traffic is confined to boardwalks. Collecting of crystals, however, could nullify these gains. The tradeoffs between improved visual impact and sales of crystals need to be assessed.

Glen Kaye
Interpretive Planner

THE RAIN FOREST

The Resource

High in the interior mountains lie the distinctive and alluring rain forests of St. Lucia. Here, rainfall averages 129" each year. It occasionally surpasses 150". Precipitation exceeds evaporation every month. The air is always warm and humid.

Under such conditions, the forest that has developed is exceedingly lush and complex. A canopy of foliage dominated by gommier, Dacryodes excelsa and chataignier, Sloanea caribaea, rises 80-130' above the forest floor. A shrub layer of such species as paletuvier, Tovomita plumieri, gasse, Swartzia caribaea, and grigri, Aiphanes minima, cover the earth. Lobster claw, Heliconia humilis, adds its brilliance. In between, a mid-canopy layer includes such tree species as palmiste, Euterpe globosa; bois cote, Tapura antillana; and l'encens, Protium attenuatum. Tree fern, Cyathea arborea, also contributes a dramatic pattern, announcing more than any other species the presence of a rain forest. Given the relatively open character of the forest, lianas are abundant. Most are of the bignonia and legume families. Epiphytes drape from trees in profusion in this hydroponic world. The largest trees may carry a ton or more of these plants in aerial gardens. Most are members of the arum, pineapple and orchid families. The forest abounds with ferns, club mosses and selaginellas, lending an atmosphere of biological antiquity.

The rain forests of St. Lucia are a part of the island's biological heritage; native life forms represent the local and West Indian story of evolution--distinctive forms that developed in relative isolation from other islands and the continental land masses. Many species are unique (endemic) to St. Lucia; they evolved here and are found no place else on earth. Other species, with better means of dispersal, are native (indigenous) to St. Lucia as well as to a wider geographic area.

Another story, then, is that of biogeography: the spread of life across the face of the earth.

Today the rain forest also includes many species introduced by humans—either intentionally or unintentionally. Settlement, especially slash and burn agriculture, and logging have altered the forest composition. Tree species such as laurier canelle, Phoebe elongata, and satinwood, Zanthoxylum sp., are rare. Unknown species have disappeared. Tree plantings have brought such non-native species as blue mahoe, Hibiscus elatus, mahogany, Swietenia macrophylla, teak, Tectona grandis, and Caribbean pine, Pinus Caribaea var. hondurensis into the area.

Few areas of the rain forest are without some degree of alteration. As a result, the native bird life they support has declined. But the forest still supports many distinctive Caribbean species of which the most famous is the St. Lucian parrot, Amazona versicolor, the national bird. Also present are the St. Lucian black finch, Melanospiza richardsoni, and the St. Lucia oriole, Icterus laudabilis. All are unique to St. Lucia. All are rare and in danger of becoming extinct.

Because of its importance as a watershed, the Quillesse Forest Reserve east of Soufriere was created to protect 1,161 hectares of land (2,970 acres). It is managed by the Division of Forestry for multiple use, including both timber production and wildlife protection. In 1981 the St. Lucia Government established a parrot sanctuary of 1,606 hectares (3,968 acres) overlying much of Quillesse Forest Reserve and the Mt. Casteau area to the west.

The area retains its character as a visually powerful world, with many bird and plant species of special interest. Mt. Casteau possesses the same rain forest resources. It is outside the forest reserve, however, and potentially subject to greater change. The view from Mt. Casteau, however, is dramatic. The forests drop away to expose a panorama that

descends 2,000 feet to the sea at Soufriere Bay--4 kilometers to the west. Gros Piton and Petit Piton thrust boldly skyward, evoking images of Rio de Janeiro.

Interpretive Objectives

Interpretation can involve many strategies for communication, including personal services, publications, exhibits, wayside signs, audiovisual devices and photographs. Whatever methods are used for this project, however, each is intended to accomplish one or more of the following objectives:

1. Provide access in such a way to ensure visitor safety and minimize impact to the resources.
2. Explain the environmental conditions and processes that allow St. Lucia's tropical rain forest to exist.
3. Identify the common plant and bird species of the forest.
4. Present the local story of man's role in reshaping the forest and its ecological implications.
5. Reduce unlawful exploitation of the forests.
6. Motivate visitors to learn more of St. Lucia's natural history on their own.
7. Ensure the quality of guide service through a program of training, testing and certification.
8. Orient visitors to other resources managed by the St. Lucia Government.

Visitor Use Analysis

Little is known about the existing pattern of visitation to the rain forest. A survey, however, of 60 individuals who participated in forest walks was conducted by the Division of Forestry in October and November of 1983. Of these, 80% were from English speaking nations, 6.6% from Italy, 8.4% from Germany, and 5%, Sweden. Only one individual was less than 20 years old. The visitors surveyed were evenly distributed from the 20's to 50+ years of age.

Factors Influencing Interpretation for Foreign Visitors

Language Barrier

The visitors to the Quillesse Rain Forest predominantly represent four languages. Of these, as much as 20% may be non-English speaking. Some may be served by bilingual guides. It is impractical to develop interpretive signs in the languages of all non-English reading visitors.

Elements of Discomfort

The discomforts of heavy rain, high humidity coupled with warm temperatures, and mosquitoes may diminish the quality of the visitor experience and reduce interest spans.

Transportation as a Barrier

The rain forest is reached only via deteriorated roads from either the east or west sides. Visitors must either rent four-wheel drive vehicles or participate in tours; most taxis will not use the 7 kilometers of poor road above Fond St. Jacques. If the road were restored, taxis and more rental cars could reach the rain forest from the Soufriere side.

Language for Interpretation

The basic language for use in visitor interpretation through exhibits, publications and the spoken word will be English. Trail guides could be developed in German and French at a later time.

Interpretive Development

Interpretive Material for St. Lucian School Groups

The tropical rain forest of Quillesse and Mt. Casteau represent excellent opportunities for the students of St. Lucia. Environmental education materials should be developed for pre-site, on-site and post-site activities to enhance the learning experience and reduce the chance of field trips degenerating into "fun days". Separate materials should be developed for teachers and students. The program can heighten an awareness of one of the important resources of St. Lucia--a watershed, a biological reserve, and a source of timber. As such it can develop wise land use ethics.

Rain Forest Trail

Crucial to the rain forest experience is the rain forest trail between Edmond Forest Reserve and Mahaut--a distance of about 9.7 kilometers. The existing trail is passable, but in need of improvement. Excessively muddy portions, landslides, deterioration of dirt steps, and growth of vegetation on and over the trail detract from the attention that could be given to the surroundings. Steps, short portions of board or log walks, graveled portions, and the clearing of plants can eliminate these impediments and permit even those in light shoes to use the trail. No rerouting of the existing trail is necessary.

The trailheads at each end are the sites to orient visitors to the area and highlight the significance of the resources. Shelters should be constructed of wood to hold fiberglass-imbedded text, photographs, and Cibachrome (fade resistant) color prints. This material is waterproof and will not rot or peel. The exhibits should include:

- regulations
- orientation maps
- photographs of artwork of representative and important birds and plants
- trail name--Quillesse Forest Reserve Trail
- identity of managing agency (Division of Forestry)
- text to discuss:
 - (a) Tropical rain forest ecology
 - (b) Forest management (multiple use) of the area
 - (c) Environmental history of the area and concerns about illegal exploitation.

Two shelters at each trailhead can serve these purposes. The exhibits at each end of the trail can be identical. These would not be staffed. No electricity is needed for this development.

Plant Labels

The story of tropical forest ecology and forest management can be reinforced by identifying key plants along the trail. About 30 plant labels can also be of silkscreened text imbedded in fiberglass resin and mounted on posts. Each label will include a drawing of identifying parts, common name, scientific name, family name, be identified as native or introduced, and identify point of origin if introduced. A brief text will note special interest information such as commercial use, ecological significance and status.

Personal Services

For initial development, personnel need only periodically patrol the area to repair signs and the trail. Visitation is now only intermittent. Ultimately, however, travelers should be accompanied by a guide, especially to identify the remarkable birds of the rain forest. Guides, however, should be required to participate in a training, testing, and certification program to ensure knowledge of the resource and management issues, and to ensure professional interpretation.

Publications

The last development for the rain forest trail would be a small booklet to complement the trailhead and trailside interpretive signs. This would provide visitors with a "souvenir" of the area while articulating its values and management issues. The publication can be sold nationwide, which would enhance visitation to the trail.

Mt. Casteau

The Mt. Casteau area can offer experiences for the less active visitor. The view to Soufriere and the Pitons is perhaps the finest in the nation. It is one of the most stunning in all the Caribbean. A viewing area, accessible by stairs, can lead visitors to a vantage point that commands the magnificent scene. Coin-operated binoculars can aid visitors. Two panels can interpret the vistas: one identifying features of the landscape, and one explaining the prominent volcanic forms, the Pitons, Terre Blanche, Belfond, and Qualibou Caldera. With development, the road to the Mt. Casteau site can be made more usable by passenger cars. The access is currently difficult for all but four-wheel drive vehicles above Fond St. Jacques. This could become one of the major tourist attractions in St. Lucia.

An interpretive boardwalk or asphalt grade trail is recommended for the rain forest adjacent to the Mt. Casteau overlook. The area possesses many of the same tropical rain forest species as the Quillesse rain forest trail and offers an opportunity to present the same themes. In this instance a single trailhead shelter with fiberglass interpretive signs can orient visitors and explain the area's resources and values. A trail can channel visitor use and prevent the impact of foot traffic. It would provide convenient, non-threatening rain forest access for visitors who are not normally prepared for forest excursions. A loop trail of about 200 yards would provide an adequate and satisfying introduction to this resource. The level nature of the area would permit access to wheelchair users. Plant labels identical to those proposed for the Quillesse rain forest trail can be used. About 30 will be needed.

Research Needed

Basic information about the natural history of St. Lucia is quite limited. Signs can be prepared from existing knowledge, but publications and personal services will require research in the following areas:

- biological inventory of ferns, "fern allies", gymnosperms and flowering plants.
- breeding biology, distribution, population, habitat requirements, and status of native rain forest birds.
- legislation pertaining to plants and animals of the tropical rain forest.
- maps delineating forest management and protection areas.
- human activities causing degradation of the tropical rain forest.
- forest successional patterns and response to environmental stresses such as hurricane damage.
- forest composition: abundance, density and frequency of notable species.

SUMMARY OF INTERPRETIVE DEVELOPMENTS AND COST ESTIMATES

(in EC\$)

<u>Item</u>	Produced outside St. Lucia	Produced inside St. Lucia
<u>Trailhead Shelters:</u>		
Quillesse rain forest trail (4)		5,400
Mt. Casteau boardwalk (1)		1,350
<u>Plant Labels:</u>		
Quillesse rain forest--about 30	2,400	
Mt. Casteau boardwalk--about 30		
a \$80 each	2,400	
<u>Teacher and Student School Material:</u>		8,000
<u>Mt. Casteau Overlook:</u>		
Interpretive signs	5,400	
<u>Publications:</u>		
Rain Forest--writing, design and publication		5,360

<u>Item</u>	Produced	Produced
	outside	inside
	St. Lucia	St. Lucia

Maintenance of Interpretive Devices

and Materials:

Annual	2,370	Unknown
10-year cyclic maintenance	23,700	Unknown

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Postscript

The rain forest plan is based upon several assumptions. First, land ownership patterns are ignored; the Mt. Casteau area in question is currently in private ownership. Second, no significant development should be done without improving the road access above Fond St. Jacques. Eight kilometers of road need upgrading to make this project practical. Third, forest management practices will continue to place high priority on preserving habitat for the rare and endangered native birds.

Glen Kaye
Interpretive Planner

APPENDIX A

Indigenous Timber Species in Demand (Goodlet, 1970)

<u>Common Name</u>	<u>Botanical Name</u>	<u>Uses</u>
Bois d'Amande	<u>Hieronyma caribaea</u>	many
Laurier Cannelle	<u>Phoebe elongata</u>	furniture
Balata Chien	<u>Oxythece pallida</u>	posts & beams
Bois Blanc	<u>Simarouba amara</u>	lumber & shingles
Bois Riviere	<u>Chimarrhis cymosa</u>	lumber & posts
Bois Tan Rouge	<u>Byrsonima martinicensis</u>	lumber & posts
Delmare	<u>Pithecellobium jupunba</u>	frames & shingles
Gommier	<u>Dacryodes excelsa</u>	planking, boats
Laurier Rouge	<u>Beilschmieda pendula</u>	planking, boats
Laurier Ti Feuille	<u>Ocotea floribunda</u>	housing timbers
White Cedar	<u>Tabebuia pallida</u>	furniture, boats
La Glu	<u>Sapium caribaeum</u>	boxes and crates
Mahoe	<u>Sterculia caribaea</u>	boxes and crates
Bois Tan	<u>Byrsonima spicata</u>	lumber & posts
Paletuvier	<u>Tovomita plumieri</u>	beams, tools

APPENDIX BMajor Rain Forest Species (Beard, 1949)

<u>Layer</u>	<u>Species</u>	
Main Canopy	gommier,	<u>Dacryodes excelsa</u>
	chataignier,	<u>Sloanea caribaea</u>
	mahaut,	<u>Sterculia caribaea</u>
	bois de masse,	<u>Licania ternatensis</u>
	laurier cannelle,	<u>Phoebe elongata</u>
	bois pain marron,	<u>Talauma dodecapetala</u>
	balata chien,	<u>Oxytheca pallida</u>
Mid-canopy	palmiste,	<u>Euterpe globosa</u>
	bois cote,	<u>Tapura antillana</u>
	l'encens	<u>Protium attenuatum</u>
	goyavier,	<u>Myrica</u> spp.
	corosol marron,	<u>Guatteria caribaea</u>
	bois blanc,	<u>Simarouba amara</u>
Shrub Layer	paletuvier,	<u>Tovomita plumieri</u>
	gasse,	<u>Swartzia caribaea</u>
	grigri,	<u>Alphanes minima</u>

SOUFRIERE ESTATE

The Resource

A short distance above the town of Soufriere, where trees begin to replace the modest homes of the town's residents, lies the ancient and decayed Estate of Soufriere. It is not a large estate. The structures are like many others on the island. No unique events are associated with this place. But here, within the confines of a modest property, lies the essence of European and African history in St. Lucia and the changes the people brought to the land.

This was one of the earlier land grants in St. Lucia. About 1713, the Du Boulay family received a grant from Louis XIV of France for the site, and in 1720 the family executed its claim. The estate has been in the Du Boulay family ever since.

On the 25th of September, 1745, M. de Longueville asked the Surveyor General to select a suitable location for the "bourg" of Soufriere, and by the next year Soufriere possessed a square, a site for a church and a presbytery. In 1763, M. de Rochemore was able to boast:

"At Soufriere there is quite a fine 'bourg' which is growing fast and already all the land around has been sold for building purposes. The old planters have established a very prosperous trade in cocoa, cotton and coffee."

The colonization and alteration of the tropical world was underway.

In 1765 a sugar mill was built at Soufriere Estate--harbinger of an industry that was to become the backbone of the St. Lucian economy until 1890. It also symbolized the introduction of African slaves to St. Lucia; four years later 23 colored persons and 1,067 negroes were recorded in Soufriere. It was the population center of St. Lucia.

The hurricane of 1780 devastated the island. Soufriere Estate was also demolished and had to be rebuilt. "The wealthiest have held out," reported M. Lefort de Latour, "and are recovering little by little; the poorest, seeing themselves without resources, have abandoned their goods and have sought a better fortune elsewhere."

Coffee and sugar brought prosperity to St. Lucia. By the late 1700's the island possessed 43 sugar plantations and 143 coffee plantations. But then came the French Revolution, and, again, destruction of the Soufriere Estate mill. That "terrible little man", Victor Hughes, made Soufriere the Revolutionary headquarters for the Brigands, L'Armee Francaise dans les Bois. "Sainte Lucie est Francaise!" shouted Lebas Goyranud. "Vive La Republique!" Later the guillotine in the town square did its deadly work during the reign of terror. In the zealous aspirations of men, Soufriere Estate once again became a reeking shambles.

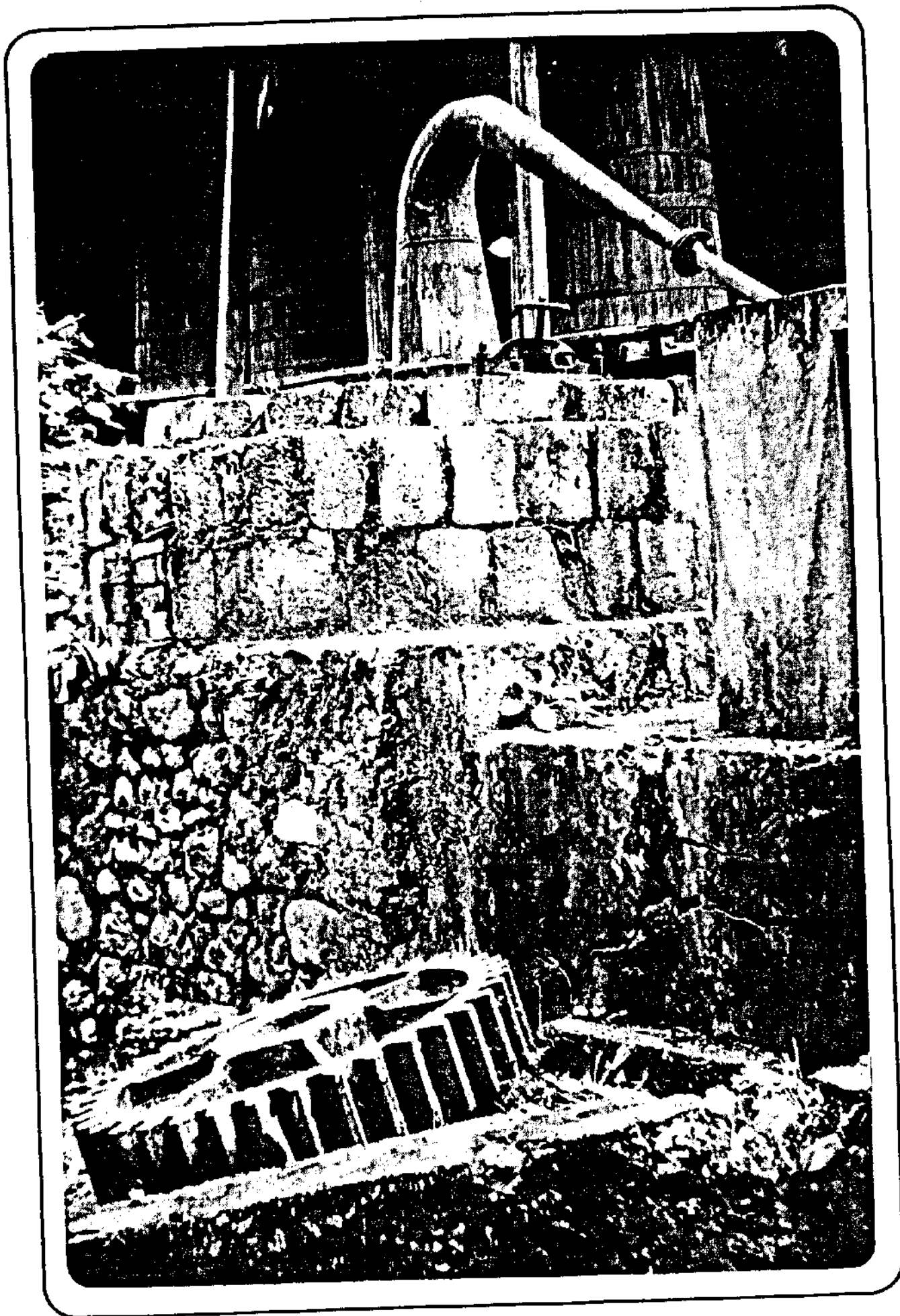
In all, Britain and France exchanged flags over St. Lucia 14 times during the course of the island's history. Some skirmishes occurred near Soufriere. St. Lucia came under British control for a final time in 1814. But the French imprint remains, in foods, in elements of architecture, in place names, in the patois, and in the biological heritage of many people.

There were minor repairs to Soufriere Estate and a "major alteration" sometime after 1838; the aqueduct and great steel waterwheel from C. Fletcher & Co. of London may have been installed at this time. But St. Lucia's one-crop economy collapsed with the price of sugar in 1890 and Soufriere Estate was never the same. Coconuts, first planted in St. Lucia in the 1870's, brought increasing income in the form of copra. Bananas were planted in the island in the 1920's. The Estate of Soufriere was put to use to produce rum, lime, ice, pigs, chickens, and from the great waterwheel, electricity.

The sugar mill is no longer in use. The plantation lands surrounding it, however, produce bananas, cocoa and coconuts. Copra is still produced on the estate as a cash crop, as it has been for many decades. Black peasants, descendants of the slaves emancipated by Britain in 1834, perform much of the same work their forefathers did.



French architectural elements, Soufriere Estate sugar mill



Rum distillation plant, Soufriere Estate sugar mill



Copra building and banana trunks used as fuel, Soufriere Estate

Interpretive Objectives

The plan for Soufriere Estate calls for selective adaptive use, restoring some structures, removing others, and continuing some in the existing plantation operation. With this in mind, each element of the interpretive plan is intended to accomplish one or more of the following objectives:

1. Provide access in such a way as to ensure visitor safety, minimize impact to the resources, and minimize interference with continuing commercial operations.
2. Explain the continuing plantation operations of cocoa and copra production.
3. Acquaint visitors with both the electric and pre-electric operations of the sugar mill.
4. Present to visitors the highlights of human history of St. Lucia.
5. Identify the common plants of the sugar mill area.
6. Ensure quality personal services through a program of training and testing.

Visitor Use Analysis

Visitor use is assumed to be similar to Pigeon Point National Park, with about 75% of the visitors able to speak English. The remainder of the non-national visitors will speak principally German, French, Swedish and Italian.

Factors Influencing Interpretation for Foreign Visitors

Language Barrier

Most visitors to the sugar mill are expected to be nationals from other countries. Most will be able to speak and read English. It will be impractical to develop bilingual services to serve all visitors.

Elements of Discomfort

Heavy rain, high humidity coupled with warm temperatures, and mosquitoes may diminish the quality of visitor experience and reduce interest spans.

Transportation as a Barrier

Access is no problem. The Estate is only blocks from downtown Soufriere and the ocean. Increased popularity, however, could cause a parking congestion at the entrance.

Lack of Food and Drink

This is not a problem. A snack bar planned for the sugar mill can provide this service.

Language for Interpretation

English will be the basic language for use in interpretation through exhibits, publications, and the spoken word. Plantation workers also speak patois. Plant labels could be designed to include French and German names. It would be helpful to have employees in the snack shop, museum and gift shop who also speak German and French.

Interpretive Development

Access to Soufriere Estate

Although beyond the Estate's development, the way in which visitors approach the sugar mill will color the quality of their experience. The preferred approach is for visitors to walk or take a donkey cart from town or the beach (refer to the Town Plan). The easy pace of such travel will allow visitors to arrive with a more receptive mode that will let them feel the spirit of the plantation way of life and have a far richer visit. It is not a place to be rushed through.

The Entrance

The copra huts and drying sheds will immediately capture visitor interest. Plantation workers are husking coconuts and preparing them for drying. Other workers are fueling a fire with banana stems to dry the coconut meat to copra. Some are removing the copra and bagging it for shipment to the copra plant for final processing. The visitors' interest is immediately captured by the tableau. It is made more powerful because it is a real world scene--not a reenactment. The questions fly fast and furious. How does the drying kiln work? How are coconuts gathered? What price is obtained? What products are made from it? What are you paid? The workers are suddenly interpreters, explaining the step-by-step processes. Most important, the visitors are involved, rather than viewing the activities in a detached manner. The human activity can be supplemented by an interpretive sign explaining copra production.

Also at the entrance is an existing woodshed. This can serve as a site for ticket sales and sales of products germane to the plantation experience: lime, coconut, cocoa, banana, spices, and sugar-related items will help visitors recall their experience, with a heightened appreciation for how the products are prepared.

The Sugar Mill Access

The road to the sugar mill is lined with a delightful array of trees and shrubs. This also sets the stage for the sugar mill experience, giving a growing view of the complex. The plants should be retained as is.

The Sugar Mill--exterior

Visitors immediately ask "What do I see?" Interpretive panels in fiberglass resin can identify the exterior features of the mill and how they were used. One panel can explain the operation of the waterwheel and aqueduct. The other can explain the operation of the rum (and lime?) distillation works. Each text would be accompanied by drawings. Fiberglass panels are waterproof and fadeproof and will not rot.

The Sugar Mill--interior

Visitors entering the sugar mill (see Architects drawings) will immediately encounter a patina of history. The very walls of rock and masonry speak of antiquity. Bricks and arched doors evoke eighteenth and nineteenth century images of the people who worked and lived here. This space, about 8 x 20 meters on the ground floor, plus about 3 x 8 meters on the second floor, can be devoted to a museum depicting the human history of St. Lucia. A bust or bas relief plaque can identify this as Andre Du Boulay Memorial Museum.

In a broad way, the museum will be laid out thematically and in chronological order. Two partial walls will break up the space and promote a general "wave" pattern route for visitors to follow.

The first quarter of the space can be devoted to Soufriere Estate, the estate sugar mill, and island sugar mills in general. The great waterwheel serves as a focal point for this story. Similar large pieces of machinery from this and other mills can serve both for interpretation and to create a decorative, evocative atmosphere. Small labels can

explain the function of each. Historic photographs, documents, and drawings are a particularly rich resource to draw upon and can be enlarged to large format photographs for mounting on walls as a montage of images. Selected historical quotes, like those used in this plan's resource description, can be photographically enlarged to also serve as interpretive messages. Powerful quotes can often accomplish what third person texts cannot. Quotes can also be used to present contrasting points of view; the lesson to the reader is that history is not always as clear-cut or tidy as thought.

A working model of the Soufriere sugar mill or similar mill would be interpretively effective. A first question of visitors is often "How does it work?"

Music can also serve as an effective period setter for this and other selective themes in the museum. Recommended are creole, French and British music--the national anthems, for example, of the latter two cultures. These can be played at low volume so they do not overlap and compete with one another.

In a similar vein, all the themes to be presented can rely on artifacts, large format photographs, quotes from historical accounts, and music. Track lighting can effectively highlight selected materials. The effect will be a rich sensory experience. To the visitor, the impression of St. Lucia's history will last long after the detail of fact is forgotten.

Other than music, audiovisual devices should not be used. The marine atmosphere, high humidity, and difficulty of obtaining repair and replacement parts for equipment promise many problems.

The historical themes of St. Lucia have considerable overlap. The proposed Andre Du Boulay Memorial Museum, however, should include the following:

Sugar Mills of St. Lucia

Locations, mechanics of operation, products, relationship to the developing social structure, relationship to slavery, why they succeeded, why they declined.

The Early Ones

The evidence of pre-Arawak, Arawak, and Carib cultures. Their origins, encounters with western explorers, and their fate.

The Tentative Years

Conditions settlers encountered, the tenuous character of many settlements including the Oliph Blossome disaster of 1604.

Changing Hands

Circumstances surrounding the 14 exchanges of island ownership between Britain and France. British and French perceptions of its strategic position, accounts of battles at Morne Fortune and Pigeon Island. The French Revolution, Soufriere as the Capitol of St. Lucia, the Brigands War 1785-87, and the destruction sweeping across Soufriere Estate and Soufriere.

Shackled

The slavery of men. St. Lucia's role in the African slave trade, laws that justified its existence, including the Code Noir of France and Britain.

A Little Bit of France

France's contribution to today's island character. Customs, language, architecture, place names. Origins of greatness, the island home of Josephine Tascher de la Pagerie (Empress Josephine).

Britania Rules

Britain's contribution to today's island character. Customs, laws, dress, language, architecture, place names.

Slavery to Creole

The evolution of a lifestyle. Patois and how it developed.

The Faces of St. Lucia

The many ethnic groups that have contributed to the rich human character St. Lucia possesses today--French, English, Scottish, Irish, Italians, Germans, East Indians, and the many ethnic groups from Africa.

Sugar No More

The circumstances surrounding the transition from sugar to coconut, then bananas and sea island cotton.

The Achievers

The men and women of St. Lucia of all races who contributed to what St. Lucia is today--including writers, artists, settlers, government leaders, explorers and military leaders, as depicted in paintings, drawings, etchings, and busts.

The achievers should be the only theme to be placed on the second floor space (see Architects drawings).

The Cocoa Trail

A trail from the museum back to the entrance will allow departing visitors to meander through the cocoa trees and observe the nature of this crop. An interpretive sign in fiberglass resin will illustrate the nature of the fruit, the agricultural requirements of raising cocoa, and the processing to obtain cocoa.

Cocoa beans should be dried at the site. This would aid in understanding of the processes and greatly enhance the sale of cocoa products.



Cocoa, Soufriere Estate

Research Needed

Many original maps, historical accounts, and historical etchings are available on the island for graphic reproduction. The exhibits, however, could be made richer by drawing upon the graphics available in the New York Public Library, the Barbados Museum, The British Museum, and The Paris Archives.

Specific research includes:

- history of the Soufriere Estate, especially the evolution of the estate sugar mill
- the life of Josephine Pagerie on St. Lucia
- the history of French military activity in the Soufriere area.

Cost Estimates

Most interpretive signs and exhibits will presumably be produced in the United States. All figures, however, are in Eastern Caribbean dollars calculated at 2.70 x factor.

SUMMARY OF INTERPRETIVE DEVELOPMENT AND COSTS

<u>Item</u>	<u>Produced outside St. Lucia</u>	<u>Produced inside St. Lucia</u>
<u>Trailside Signs:</u>		
Copra huts (1)	\$ 2,700	
Sugar mill (2)	\$ 5,400	
Cocoa grove	\$ 2,700	
 <u>DuBoulay Museum Development:</u>	 \$225,800	

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DIAMOND MINERAL BATHS AND BOTANICAL GARDEN

The Resource

The warm springs of Diamond Estate were quickly recognized by Saint Lucian settlers. Chemical analysis revealed a striking similarity to famous spas of France, and so funds were approved by Louis XVI of France to develop mineral baths at the site for use by his troops. In 1786 construction plans were prepared under the direction of Baron de Laborie, Governor of St. Lucia, and the baths were built that same year.

Within short order Saint Lucia fell under the turmoil of the French Revolution, and in the Brigands War that followed, the baths were destroyed. They were not restored to public use until the 1930's.

Proposed geothermal development for the nearby (upstream) Sulphur Springs included a detailed physical and chemical analysis of the Diamond warm springs. The baths are now promoted for their healing properties as they were two centuries ago. The efficacy of the bath treatments are not known.

The baths are in a most attractive setting. Upstream stands Diamond Falls, where the mineral-stained rocks of the falls are framed by lush herbs and shrubs. Visitors to the baths enter an attractive walkway along which are planted numerous exotic and native plants, including white cedar, philodendron, nutmeg, soursop, and elephants ears. In this warm climate, with precipitation exceeding 90" a year, the vegetation is easily as much an attraction as the mineral baths.



Elephants ear, Diamond Mineral Baths

Interpretive Objective

1. Systematically develop the grounds adjacent to the mineral baths into a botanical garden.
 - a. Develop concept of evolution in St. Lucia's island ecosystem.
 - b. Develop concept of the greening of St. Lucia with plants from across the world.
 - c. Develop concept of alteration of St. Lucia's vegetation with specific emphasis on threatened and rare species.
 - d. Develop gardens to maximize visual interest.

Visitor Use Analysis

Visitor use is assumed to be similar to Pigeon Point National Park, with about 75% of the visitors able to speak English. The remainder of the non-national visitors will speak principally German, French, Swedish and Italian.

Factors Influencing Interpretation for Foreign Visitors

Language Barrier

Most visitors to the botanical garden are expected to be nationals from other countries. Most are expected to read and speak English. Some will not be able to understand English. It will be impractical to develop services to serve all visitors. A botanical garden guide, however, could be prepared in German and French in addition to English. Most employees will be able to speak patois.

Elements of Discomfort

Heat, high humidity and rain may deter travelers from visiting the botanical garden. Physical impairments may prevent them from using the resources unless all trails have less than a 5% grade and no steps.

Transportation as a Barrier

The mineral baths are now accessible by automobile. However, there is extremely limited parking. There is presently no way to dismiss a taxi and call another. Development of donkey cart rides from Soufriere may complement taxi service.

Lack of Food and Drink

Beverages are now available at the mineral baths. A snack bar is also planned for the adjacent Andre DuBoulay Museum.

Language for Interpretation

The basic language for use in visitor interpretation is to be English. However, a trail guide could be developed in German and French. Outside tour guides could provide German and French language service.

Interpretive Development

Botanical Garden Planning

The existing entrance to the mineral baths provides a most visually attractive introduction to the estate. The colors of shrubs are well balanced, and the overall impression is one of luxuriance. Beyond this, however, the tract considered for a botanical garden is either undeveloped or in groves of cocoa and coconut.

How should it evolve? The difficulty of a tropical botanical garden is that there is almost too much from which to choose. A number of important tropical plant families have over 1,000 species worldwide. Plants from Asia, Australia, Polynesia, Malaysia, Africa, and South America have been introduced into St. Lucia. Some are economically important, some are ornamental, some are noxious weeds. St. Lucia has its own special interest species.

The local climate must be considered. Annual rainfall exceeds 90" per year. Humidity is high. The temperatures rarely drop below 72°. Some plant community types, such as dry bush, would not do well.

What concepts should a visitor carry away? If it's only beauty, then plants could be organized in any way. Visitors to botanical gardens, however, are usually interested in more.

First, they want to identify what they have been viewing in the region. They want to make the world comprehensible. Some will have interest in particular groups of plants. Second, they want to know something about the origin of plants--especially ornamental ones--and their care. Third, they want to know about plant uses. Fourth, some want to use the plants for scientific reference and study. Last, but not least, visitors will come for an aesthetic experience.

Of the different audiences to a botanical garden, the smallest group are those with scientific interest. But their needs can be met, even if a garden does not have taxonomic organization.

St. Lucia's vegetation carries three major ideas. First, the forms of life that developed here in relative isolation--and in the West Indies--are distinctive because of that fact. Second, the generous climate has permitted an enriching of island flora with species from across the world. Third, the history of land use now threatens many species distinctive to St. Lucia.

With this in mind, the recommended organization for the mineral baths botanical garden is by point of origin, with additional groupings within foods and spices, special interest families, and significant St. Lucian species.

Suggested groups and typical species are as follows:

Native Plants of Economic Importance

Bois blanc, bois d'amande, bois pain marron, balata, gommier, incense, tree fern, laurier canelle (endangered), satinwood (endangered), and calabash.

Foods and Spices

Nutmeg, papaya, sweet sop, sour sop, guava, banana (3-5 varieties), cacao, cinnamon, clove, bay, coffee, mango, breadfruit, dasheen, grapefruit, avocado, and almond.

Plants of Africa and Madagascar

Tulip tree, colvillea, travellers tree, dombeya, royal ponciana, sausage tree, pandorea, and bird of paradise.

Plants of Asia and Malaysia

Amherstia or pride of Burma, banyan, rubber tree, camphor, crepe myrtle, jack fruit, orchid tree, mountain apple, ixora, red ginger, thunbergia, and chenille.

Plants of Australia and Polynesia

Casuarina, eucalyptus (3-5 species), cannonball tree, croton, Norfolk Island pine, and copper leaf or beefsteak plant.

Plants of Central and South America

Kapok, chicle tree, elephants ear, yellow elder, jacaranda, yellow poui, pink poui, angel's trumpet, plumeria, poinsettia, anthurium, common ape, bougainvillea, yellow allamanda.

Common and Distinctive Tropical Plant Families

Bromeliad family (1,400 species)--e.g., Spanish moss, pineapple, common epiphytes.

Orchid family (12,000+ species)--about 30 St. Lucian species, common epiphytes.

Arum family (1,500 species)--e.g., philodendron, anthurium, common epiphytes.

Hibiscus family (1,000 species)--e.g., Cuba bast, hibiscus.

Palm family (2,640 species)--e.g., travellers palm, blue latin palm.

Coffee family (5,500 species)--e.g., coffee, gardenia.

Banana family (125+ species)--e.g., bananas, lobster claw.

Bignonia family (600 species)--e.g., purple bignonia, cats claw climber.

Begonia family (800 species)--begonias.

Common fern family--e.g., sword fern, maidenhair ferns.

Mango family (500 species)--e.g., mango, cashew.

The task becomes one of deciding what not to include. Regardless of the space allocated, however, a collection of high interest can easily be made.

Existing tropical botanical gardens, such as those in St. Vincent, Jamaica, or Honolulu, Hawaii, should be reviewed to evaluate design, traffic flow, species used, and general operations. Well executed, a botanical garden could be a major attraction on St. Lucia.

Interpretive Signs

Information on each species should be presented on small fiberglass imbedded signs. Information should include the common name, scientific name, family name, point of origin, and a few short sentences of interesting information such as use and status. Fiberglass signs are waterproof, fadeproof, and will not crack or peel. Multiple copies can be prepared at one time for easy replacement. It is critical that these be professionally designed. The garden will be quickly evaluated by their quality.

Visitors at each entrance to the botanical garden should be greeted by a sign giving welcome and explaining the garden's major themes. These signs should also be of fiberglass in an attractive design.

Publications

A booklet can be used to reaffirm the important concepts of the botanical garden. A map with trail layout and species locations can aid those with special interests. The booklet should also be in English, French and German.

Research Needed

Considerable information exists in botanical literature about the ornamental plants, particularly those of extensive distribution beyond their native lands. The following, however, are areas of insufficient information:

- Inventories of exotic (non-native) ornamentals presently on St. Lucia.
- Inventories of native species of interest.
- Identification of geographic distribution of native species of interest.
- Means of propagation for each species.
- Potential for new introductions to St. Lucia to become pest species.

Cost Estimates

The projected Botanical Garden development costs are not accurate, because no detailed plans exist and no comparable developments exist in St. Lucia to act as a guideline.

Cost estimates for production of items outside St. Lucia are based upon costs in the United States and have been estimated using United States National Park Service methods for products meeting Service standards.

A 2.70 x factor has been used to convert U.S. estimates to E.C. currency. Even with this factor, considerable additional cost would be involved because of the distance factor.

SUMMARY OF INTERPRETIVE DEVELOPMENTS AND COST ESTIMATES

<u>Item</u>	<u>Produced outside St. Lucia</u>	<u>Produced inside St. Lucia</u>
<u>Interpretive Signs:</u>		
Entrance (2)	\$ 5,400	
<u>Garden Guide:</u>	\$40,000	
<u>Botanical Research:</u> (6 person/months)		\$12,000
<u>Outdoor Plant Markers:</u>		
About 200 at \$80 each	\$43,200	
<u>Maintenance of Interpretive Devices and Materials:</u>		
Annual	\$ 4,860	
10-year cyclic maintenance	\$48,600	
<u>Staff</u> (2 full time, 1 half time)		\$24,000

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Postscript

Botanical gardens require time to develop. They also evolve. Although work is expected to be done piecemeal, the entire area available should have a comprehensive plan so that the garden does not evolve without direction. The final garden should be at least ten acres in size.

Each species considered for introduction to St. Lucia must be critically evaluated. The history of tropical islands across the world is the repeated story of ornamental plants escaping cultivation and becoming pest species, competing with valued native species.

As an option, the botanical garden can connect by trail with the proposed Soufriere Estate sugar mill complex to permit access from either end (see Landscape Architect drawings).

Glen Kaye
Interpretive Planner

THE PITONS

The Resource

Thrusting a half mile above the sea stand the mighty Pitons, the symbols of St. Lucia. Gros Piton (2,619 feet) and Petit Piton (2,460 feet) are relatively youthful, geologically speaking, for these dacite domes were extruded from the earth as hot masses of lava only 200,000 to 300,000 years ago. Their high silica content represents an advanced stage of volcanic activity in the southern end of St. Lucia. The domes were extruded from major faults, which are Qualibou Caldera and Sulphur Springs to the east.

Prominent as they are, the Pitons were quickly represented on the maps of early New World explorers and cartographers. They have been objects of curiosity and both visitor and scientific interest ever since. The power of their physical presence is not to be denied. Their forms now appear on the national flag of St. Lucia. Soufriere Bay is made stunning by their presence.

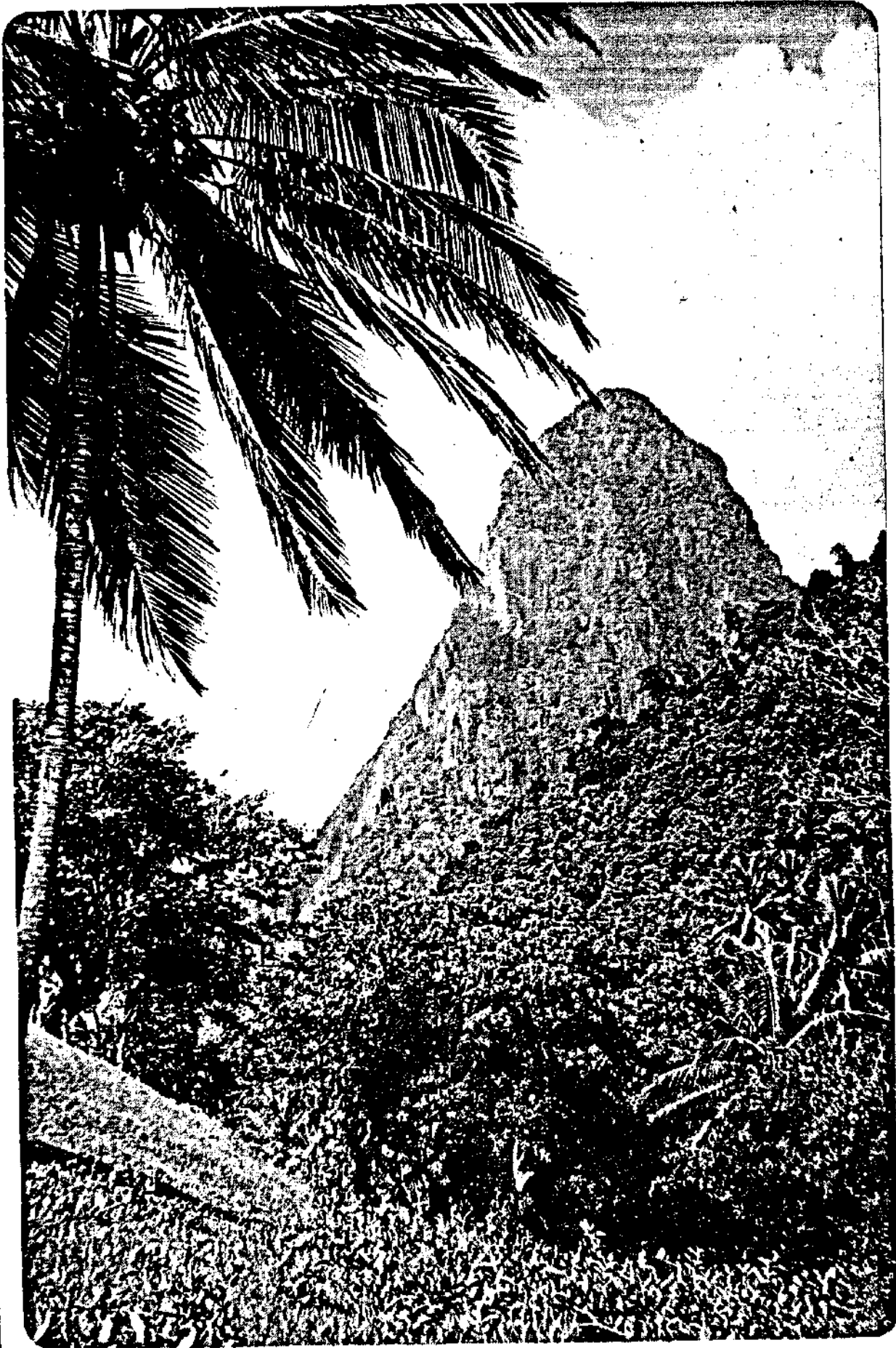
On their steep flanks survive many forest and scrub species native to St. Lucia. A native cactus also thrives here. Most of the lowland forest around the two pitons are highly altered. Groves of coconut, cocoa and banana abound. Peasant huts dot the landscape, and crops have even replaced forests on impossibly steep slopes.

Tantalizing suggestions of Amerindian activity lie in the area. Several hundred feet above sea level lies a cave on the south side of Petit Piton. A square cavity is hewn in the rock at the base of Gros Piton. Petroglyphs at Stonefield depict parents and child. A startlingly large, human-shaped work of rocks at Belfond suggests a relationship to solar equinoxes. Vast stonework nearby may be the work of mainland Indian cultures.

The sea beneath the Pitons is rich and transparent. Visibility extends more than 100 feet into the sea. The sea bottom drops away as abruptly as the Pitons rise above it. Wrasse and snapper and parrotfish thrive here, as do chromis, t inkfish and butterfly fish. Sea rod, giant tube sponge, barrel sponge, and sea fan add to this visually rich sea garden. The beaches of Jalousie and Malgretoute are graceful and inviting. In all, the Pitons and the resources associated with them are as rich and diverse as any in St. Lucia.



Petit Piton Towers, one-half mile above Soufriere Bay



Petit Piton, surrounded by a cultural landscape

Interpretive Objectives

1. Provide access to the Pitons and their surrounding in such a way as to ensure visitor safety and minimize impact to the resources.
2. Explain the volcanic character of the Pitons.
3. Gain support for preservation of the Piton area as a national treasure.
4. Aid the economy of Soufriere.
5. Identify the common marine plants and animals below the Pitons. Explain their community structure, distinctive traits, uses to mankind, and environmental conditions.

Visitor Use Analysis

Visitor use is assumed to be similar to that at Pigeon Point National Park, with about 75% of visitors English speaking. The remainder of visitors speak principally German, French, Swedish, and Italian.

Factors Affecting Interpretation for Foreign Visitors

Language Barrier

Most visitors to the Pitons area are expected to be nationals from other countries. Although most are expected to understand English, it will not be practical to develop bilingual services for all visitors. Fishermen who provide taxi services to the Piton area speak patois in addition to English.

Elements of Discomfort

Ocean storms, rain, heat, humidity, and intense sunlight may deter travelers from visiting the Piton area. Physical impairments may prevent them from using the related resources.

Transportation as a barrier

The Piton area is currently accessible by boat, by dirt roads to Malgretoute and Union Vale, and by a trail from Dasheene Hotel. The roads are essentially four-wheel drive access. The trail from Dasheene begins on private property. Boats do not run regularly. A fisherman must be sought to provide "boat taxi" service from Soufriere.

Lack of Food and Drink

With full development this may be a factor for those wishing to climb the Pitons. Most hikers, however, will provide their own food and drinks or obtain them in Soufriere.

Language for Interpretation

The basic language for use in visitor interpretation is to be English. Orientation signs in Soufriere could be prepared in German and French, and personnel in the Soufriere Tourist Bureau office should be bilingual in German and French.

Interpretive Development

Interpretive Material for St. Lucian School Groups

The land and water resources of the Piton area represent national treasures. An appreciation of their values and significance needs to be developed among St. Lucians. An educational package should be developed to include pre-site, on-site and post-site activity material. School field trips will then be enhanced and less likely to be "off days". Separate materials should be developed for teachers and students.

The Piton Approach

For the time being, the land approaches to the Piton area should be left to those who know access to the area. The following public trails should be developed at a later date:

Malgretoute - Jalousie

Malgretoute - Dasheene Hotel

Jalousie - Beausejour

Beausejour - Union Vale - L'Ivrogne - Beausejour

Malgretoute - Stonefield

Access to Stonefield would permit viewing of an important archeologic feature. The other trails would provide beach access and access to the cultural and natural features of the Piton area.

Boat taxi service from Soufriere can be implemented immediately. No investment is necessary other than signing at the Soufriere beach. Fishermen are willing to participate. This can be as much a part of the Piton experience as the Pitons themselves. The colorful, hand-hewn boats and the patois of the fishermen present a powerful message of way of life in Soufriere.

Underwater Nature Trail

Among the pristine waters of St. Lucia are those in the area of the Pitons. The area is rich in fish, coral and invertebrate life. An underwater nature trail can be developed that would be one of the notable attractions of the Caribbean.

Interpretive signs, with color graphics, can be placed at intervals in the water to explain the features and processes before visitors' eyes. Placed within six feet of the water surface, snorkelers can easily read the text. The underwater trail should be a loop route, to lead users back to their starting point.

The concepts to impart with the signs are:

1. Plant and animal identification.
2. Life of a coral colony.
3. Natural history of sponges.
4. Waves and wave action.
5. Food chains in the sea.
6. Water color--the physics of light in water.
7. Preserving aquatic ecosystems.
8. Regulations.

The signs should be of silkscreened text and graphics imbedded in fiberglass. The material is waterproof and will not peel, crack or fade. They are unaffected by water and corrosion. Spare sets can be made for ready replacement of damaged signs.

Piton Climb

Climbs of the Pitons are expected to increase as the area's fame spreads. Visitors now climb Petit Piton with the aid of local "guides" recruited from the streets of Soufriere. None, however, have formal training in technical climbing. Given Petit Piton's Class IV ranking, however, guides must receive training and certification to ensure visitor safety. Visitors should be able to locate qualified guides by inquiring at the Soufriere Visitor Bureau.

Interpretive Signs

An interpretive sign at Rachtette Point can serve to explain the geologic process that created the Pitons. The sign should be made of fiberglass to prevent peeling, cracking and fading. Spare copies should be made to facilitate replacement.

Publications

With trail development, a general guide to the Piton resources should be developed to elaborate on all resources: geologic, marine, botanic, and agricultural.

Research Needed

- Inventory of the marine resources of Anse de Pitons.
- Archeological survey of the Piton vicinity.
- Inventory of the native plants of Petit Piton and Gros Piton, especially to identify rare and unusual species.

Cost Estimates

The projected Piton development costs are not accurate, because no detailed plans exist and no comparable developments exist in St. Lucia to use as a guideline.

The cost estimates are based on production in the United States using United States National Park Service methods for products meeting Service standards.

A 2.70 x factor has been used to convert U.S. estimates to E.C. currency. Even with the conversion factor, considerable additional cost would be involved, because of the distance factor.

SUMMARY OF INTERPRETIVE DEVELOPMENTS AND COST ESTIMATES

<u>Item</u>	<u>Produced outside St. Lucia</u>	<u>Produced inside St. Lucia</u>
<u>Underwater Nature Trail Exhibits:</u>		
(12-14)		\$10,000
<u>Guide Training:</u>		
3 weeks		\$ 5,000
<u>Interpretive Sign:</u>		
Rachette Point	\$ 2,700	
Soufriere	\$ 2,700	
<u>Publication:</u>		
The Pitons - a story	\$40,000	
<u>Park Staff:</u> (Guides, gate, etc.)		\$24,000
2 full time, 1 half time		

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Postscript

Further interpretive development of the Piton area will depend upon the ultimate use to which the land is put. Interpretive trails will require knowledge of land ownership. Acquisition of some private property may be necessary to provide additional trails and road access. Archeologic research may eventually justify additional trails, signs, publications and personnel.

Existing agricultural ways of life on the Piton lowlands are instructive and a pleasure to experience. It represents the backbone of St. Lucia's human resources. The human landscape could be included in interpretive development but only if it retains a non-mechanical, non-agribusiness character.

An underwater nature trail is effective only if the marine resources it interprets are protected. A marine preserve for the coastline of the Piton area is therefore recommended.

Glen Kaye
Interpretive Planner

ANNEX II
INFRASTRUCTURE AND PHYSICAL ENVIRONMENTAL ASPECTS

I. Infrastructure Overview

A. Airports

St. Lucia is serviced by two airports, Vigie in the North, and Hewannorra International Airport in the South. Hewannorra International Airport is situated 17 miles south of Soufriere and was completed in 1969 to service St. Lucia's tourism development thrust. It has been improved significantly since 1969 to cope with the emerging tourist traffic, and is capable of handling wide-bodied aircraft, i.e., 747s, L1011s, etc., not flying direct, long hauls. To handle direct long hauls of wide-bodied aircraft, an extra 1,500 feet of runway are required. The diminished market for this type of traffic renders this deficiency unimportant for the time being. To facilitate Hewannorra's overall capability as the main ingress/egress point of St. Lucia's tourism, the following improvements have already been identified:

Runway Appurtenances

(a) Improvements in ramp and parking apron space.

This deficiency is critical in the high season. During the low season it can be aggravated by airline schedule changes.

(b) Ramp Space/Fuel System

The existing fuelling system restricts the efficient use of the existing ramp space. Two additional parking/fuelling spaces are required.

(c) Taxiways

There is a single ingress/egress to the parking apron which is inefficient and problematic during periods of high traffic. An

additional taxiway to parking apron is required in the short-term. A complete parallel taxiway has been identified as a necessary improvement in the medium-term.

(d) Terminal facilities

Passenger arrival facilities are in need of expansion, especially to accommodate wide-bodied aircraft arrivals.

B. Roads

Soufriere is situated 26 miles from the capital of Castries and 17 miles from Vieux Fort. From Castries, Soufriere is accessible by the West Coast Road, a scenic and dramatic route that articulates the diversity of the island's landscape. The journey time is approximately one hour and twenty minutes. Access through the East Coast Road, a 57-mile journey, is ordinarily accomplished in one hour and forty minutes. The East Coast Road is a two-lane highway, and the major artery of the North/South transportation system, that underpins the Island's Coast Road. In its present form, it was completed in 1977 by the Crown Agents at a cost of EC\$1.8 million, and represents a significant improvement over previous conditions.

The above depicts the adverse road conditions and the accessibility of Soufriere. The Government of St. Lucia, in response to the debilitating effect of difficult access on the development of the West Coast generally and Soufriere in particular, has initiated the West Coast Road Improvement Project, presently at the design stage, and projected for construction in 1986.

The Soufriere-Vieux Fort Road has been significantly improved during 1984.

The existing Castries to Soufriere West Coast Road remains a tortuous route, totally conditioned by the adverse terrain, the narrow road width, the poor sightlines, and the adverse gradients. The

combination of adverse gradients and poor drainage makes the maintenance of an adequate road surface problematic and costly.

The West Coast Road Improvement Project will have a strong impact on the delivery of educational and health care that service that part of the Island. In addition, it will open the most scenic of St. Lucia's coastlines to tourism plant development, and improve accessibility of St. Lucia's prime tourism attraction, Soufriere and environs.

C. Water

Soufriere Town is situated in the Island valley richest in vegetation, and one which abounds with springs. The majority of Greater Soufriere's water is supplied by springs, the most noted of which is the Diamond Springs. The Soufriere Reservoir has a capacity of 72,000 gallons, and is fed from these springs. After the necessary chlorination the water is piped to town via a 6-inch main. The St. Lucia Central Water Authority has estimated that Soufriere has a 190,000 gallons per day water demand, and that for 1989 the demand is projected to reach 200,000 gallons per day. Existing minimum water resource yields of 180,000 gallons per day have been estimated, with a 1989 projection of 346,000 gallons per day. (Source - South Water Resource Development Study.)

Soufriere Town is blessed with a predominantly agricultural catchment, with an abundance of water resources. Within the catchment area, however, the marked accentuation of the prevailing terrain creates a few minor problems. At the urban level, the main supply to the newer urban settlements in the northern urban and the Malgretoute areas is deficient. Minor improvements in the distribution reticulation system would solve the present problems.

Soufriere's water supply resources are adequate to service the development potential of Soufriere Town and environs with relative ease.

D. Sewerage

Soufriere Town is without a central sewerage system, a factor increasingly critical to the realization of its tourism development potential.

The dominant means of urban sewerage disposal remains the septic tank, a means unsuited to higher density urban settlement, or the higher unit occupation in tourist-type accommodation units. Given an urban population of 4,500, the problem of acceptable sewerage disposal within the broader considerations of environmental protection is significant.

E. Electricity

Soufriere is serviced through the Vieux Fort Power Station, which has 4.1 megawatts generating capacity. A small hydroelectric plan of 100 kilowatts capacity in Soufriere broke down in 1977 and has never been repaired. The exploitation of geothermal power would facilitate the development of the Soufriere Area.

Soufriere should experience no short term supply problems, and the intended creation of a National Grid will obviate any supply problems in the longer term future.

G. Soufriere Pier

Soufriere Pier was constructed approximately 30 years ago to service the then important West Coast boat shuttle service that existed between Castries and the West Coast Villages and Soufriere. With the improvements to the West Coast Road and the emergence of better land-based transportation, the coastal traffic deteriorated, and later totally ceased. The coastal boats, 30-40 footers were motor-powered cargo and passenger carriers and plied on a daily basis.

The conditions that had generated the need for the Soufriere Pier have transformed dramatically over the years. The growth of the Tourist Industry, and the emergency of Soufriere as the "Capital" of the

attractions package in St. Lucia's tourism has meant that the Soufriere pier now serviced a much larger recreational-service oriented craft on a reasonably frequent basis.

The growth of Soufriere as the centre of the Copra Processing industry with the establishment of the Coconut Oil factory, had originally made the Soufriere pier vital as the means of importation of inputs and the export of products. The continued use of the pier to service traffic for which it had not been designed, had already impaired the structural integrity of the pier before the prolonged wave attack of the 6th November 1984.

The wave attack of the 29th October to the 6th November 1984, known officially as Hurricane Klaus, seriously damaged the pier and rendered it dangerous for berthing. The wave attack was of prolonged duration within Soufriere Bay, and caused the failure of the four deepwater piles with the collapse of the subject decking.

II. Sewerage

A. Existing Conditions

The population of Soufriere Town is approximately 4,500, 63% of the total district population. Like most West Coast settlements, Soufriere's development is compact and essentially high to middle density.

The growing number of modern commercial and tourism enterprises, with their higher per unit occupancy, cannot be suitably serviced by the septic tank means of disposal. The septic tank is the predominant system. Since only about 55% of the urban structures are serviced with piped water, the initial sewer catchment will be relatively small. Thus, the problem of final disposal will create no critical environmental problem for some time.

B. Design

The proposed sewer system is designed for a 20-year saturation period, and influenced by the following developmental trends:

- a. Improvement in housing standards, and growth in domestic space, water service levels.
- b. Growth in tourism facilities (guest houses, etc.).
- c. Commercial expansion, as the regional shopping centre for the surrounding West Coast region.

Soufriere has experienced little population growth over the years. Assuming the successful implementation of development policies, it is further assumed that Soufriere's population will grow at the national average rate of growth of 1.7%, and that the urban population will increase to 75% of the district population.

Design criteria:

1. District population - 10,000 persons
2. Central urban population - 7,500 persons
3. Waste generation per capita - 30 gallons/hd/day.

The network of sewer mains is as shown in Plan . The Soufriere River dictates that the system be installed in two distinct sub-areas. This coincidentally allows for the phased implementation of the scheme.

C. Location of Treatment Plant

The development of the waterfront as the touristic and recreational focus of Soufriere town requires that it be kept free of obnoxious uses, such as sewerage treatment plants. However, the topography and land-use of Soufriere, precludes its location outside of the waterfront area. Efforts must center on making the treatment plant as inobtrusive as possible.

D. Disposal Options

The two options for sewerage disposal considered were:

- a) disposal of raw, untreated sewerage by sea outfall;
- b) primary and/or secondary treatment and disposal of effluent by sea outfalls.

The first option is responsive to the need to limit capital costs. The second reflects more concerns for environmental protection. The present and future water-related attractions of the Soufriere area, which will center around the activities of diving and underwater photography, as well as the recreational activities planned, necessitate the maintenance of high water quality. There is, therefore, a need to subjugate the advantage of cost to environmental objectives in this case.

The scarcity of land for the location of a treatment plant, and the locational difficulties in the context of the intended proposals, runs contrary to the need for a low technology, low maintenance, treatment process.

Within the option of treatment and the sea outfall the two possible systems recommendable are:

- a) An Imhoff tank, consisting of a two-stage sedimentation and digestion process, and then disposal of effluent by sea outfall. (Final sludge treatment will, however, have to be carried out off-side.)
- b) A small treatment plant to include primary treatment, i.e., sedimentation, and secondary treatment through mechanical aeration, and then disposal of final effluent by sea outfall.

E. Preliminary Project Costs

An estimation of costs of the sewerage system is:

	<u>(EC\$ 000's)</u>
Preliminary siteworks and setting out:	6
Excavation:	130
Pipework including pumps and manholes:	302
Treatment plant (second option):	<u>150</u>
	588
Contingency: (10%)	59
Administration and Supervision (10%)	<u>59</u>
TOTAL	<u>706</u>

A phased approach to the implementation of the sewerage scheme can be adopted. In this approach the sewer network serving the central urban and higher density portion of the town, i.e. the area south of the Soufriere River, would become Phase I of the scheme.

III. Soufriere Bay Improvement

A. Description

The understanding of the coastal processes within Soufriere Bay is critical to many aspects of tourism development. It is critical to the proposals emanating out of this project, including those for:

1. beach reinstatement;
2. pier/jetty reconstruction; and
3. waterfront mall/park along Soufriere Bay.

The Compton/Deane Report Vol. III, 1973, classified Soufriere Bay as follows:

"Bay type:	Leeward, protected by headlands crescent beach.
Sediment type:	Poor-sorted coarse grain size to well-sorted fine medium sand.
Type M stability:	Slight accretion."

Soufriere Bay, under conditions of limited human intervention, would appear to be typical of leeward sheltered beaches, with limited alongshore transport of littoral sediment, and a "wave climate" with limited effect on the onshore/offshore transport of sediment. Soufriere Bay is, however, susceptible to marked changes in the "wave climate" between "summer" and "winter" months, and drastic changes during periods of hurricane attack.

The unavailability of information on the bay's bottom topography makes difficult the assessment of the coastal processes of Soufriere Bay and the importance of associated factors, like wave refraction, etc.. Historical data on the dominant beach processes, however, allow the identification of some of the causal factors and relationships.

B. Sand Extraction

Soufriere Bay and its coastal environs have been the prime source of fine aggregate of all major construction projects in the vicinity of Soufriere for a protracted period. With no upland fine aggregate deposits, and the undeveloped nature of mineral substitutes - pumice, (which ironically abounds in Soufriere), Soufriere Bay and environs has borne the brunt of supplying the need for fine aggregate. Sand extraction has taken place over the whole stretch of coast, but it has been severe in Zone I, the area of greatest erosion as shown in Plan

Estimates of sand extraction from the greater town area between the period 1970-1982 are:

	<u>1970-1976</u>	<u>1977-1980</u>	<u>1981-1984</u>
	cu. yds.	cu. yds.	cu. yds.
Soufriere	12,150	4,480	2,200
Malgretoute	1,350	2,000	3,100

(Estimates derived from construction activity in the Soufriere area during these periods.)

C. Condition of Soufriere Bay and Environs

The main effect of sand mining has been a global diminution of beach sand and a deterioration of coastal amenity. In terms of present and proposed land use, Soufriere Bay can be conceived of in three zones:

Zone 1 - Northern point of the bay to Soufriere River

Zone 2 - Soufriere River to the jetty

Zone 3 - Jetty to the southern bay area (Coin de L'Anse)

The recent sand accretion within Zone 2 and jetty edge of Zone 3 is not an active process but the creation of freak weather conditions between October 29 and November 6, 1984, known officially as Hurricane Klaus.

During this period Soufriere Bay experienced a prolonged wave attack, which partially destroyed the jetty and resulted in a marked transport of inshore sediment unto the beach. The severe wave attack had no impact on the erosion in Zone 1, but severely exacerbated the erosion within Zone 3, to the extent of undermining the Coin de L'Anse road.

D. Remedial Measures - Studies

In the absence of information on bottom topography, offshore and nearshore current patterns, sediment type and the location of deposits, a proposal on traditional remedial measures that depend on the existence of

significant alongshore littoral transport e.g. the use of groynes would be presumptuous. More drastic measures, such as beach nourishment, must be examined with great care given the fragility of the coastal amenity, and the growth in the Soufriere area of the selective tourism attraction of diving and underwater photography.

The generation of information on the following is crucial to the decisions required in attempting the reinstatement of Soufriere Bay:

1. Bottom topography
2. Sediment characteristics
3. beach profiles
4. Inshore-offshore current patterns
5. Reinstatement of seawall

1. Bottom Topography

Information on establishing the depths and bottom contours is needed. This would aid the understanding of the effects of wave retraction patterns. This information is critical to the consideration of large berthing facilities.

2. Sediment characteristics

Information is needed on the importance of material transport in dominant beach processes, and the availability and suitability of deposits, if any, for beach nourishment programmes.

3. Beach profiles

Beach profiles need to be drawn up and their changes over time in erosion or accretion monitored through the establishment of fixed stations.

4. Inshore/offshore current patterns

The current inshore/offshore patterns within Soufriere Bay need to be determined by the "float tracking" method. This would involve plotting the movement of drogues at various depths.

5. Reinstatement of seawall

The methods proposed for the reconstruction of the seawall is influenced by:

- i. the degree of exposure to wave attack and the vulnerability of the immediate upland area;
- ii. the need to obviate the siting of seawalls within the active zone of the beach;
- iii. the intended use of the immediate upland.

a) Zone 3 - Coin de L'Anse

4"-6" concrete slab forming new seawall on 5'-7' deep gabion baskets as shown in Plan 10, Section B.B.

Total length of the new seawall	- 500 feet
Cost per lin. yd.	- \$330.00
Total cost	- \$55,000.00

b) Zone 2 - Waterfront Mall-Park

New wall constructed behind existing wall so as to minimize interference with existing beach front. Procedure must involve provisions against the undermining of existing wall. (See Plan 10, Section A.A.)

Total length of Mall-Park wall	- 450 feet
Cost per lin. yd.	- \$450.00
Total cost	- \$67,500.00

- 13 -

Administrative and supervisory costs, estimated preliminarily at 10%, are additional to the above construction costs, and a 10% contingency allowance is also to be added. The cost of the shore works would be about EC\$ 147,000.

IV. Road Improvement Program

The improvement of the roads in and around Soufriere is crucial to the development of the tourism attractions in the area. Within the area itself, certain priorities exist for road improvement and reinstatement. Though projects for construction and repair of roads may fall within the plans of the St. Lucia Government, they are being examined presently from the viewpoint of facilitating the accessibility of key tourism attractions.

A. Road from Soufriere Town along the West Coast to the Sulphur Springs

Very few opportunities exist for road widening or straightening at reasonable cost within this section, because of the steepness of slopes, both upslope and downslope, that characterizes that section of the road.

Remedial work would center on hazard limiting measures viz:

- a) improvement of visibility at corners and sharp bends;
- b) introduction of crash barriers in areas where steep downslopes create passenger anxiety.

See Map 11. Sulphur Springs Road.

B. Junction of the West Coast Road to the Sulphur Springs

Road characterized by narrow widths and poor sightlines. Poor roadside drainage exacerbates the problems of potholes and the resultant poor quality of ride to the user.

Improvement program to include viz:

- a) Road widening throughout to 18 feet carriageway
- b) The straightening of a section of the road as shown
- c) Rebuilding of the bridge damaged by the rains of Hurricane Klaus.

Preliminary cost estimates:

Section 1 - General improvement of sightlines

Provision of crash barriers where shown
Cost - \$40,000.00

Section 2 - Road widening - \$60,000.00

Road straightening - \$58,300.00

Bridgeworks - \$48,000.00

TOTAL \$206,300.00

Administration and supervision costs, and contingency allowance are both roughly estimated to add 10% to the above estimate of construction costs. The overall is therefore expected to be around EC\$ 248,000.

V. A New Pier for Soufriere

The demand to replace or repair the pier reflects both local aspirations for the development of Soufriere, generally, and the desire for tourism and recreational uses a pier makes possible.

The local aspirations for the development of Soufriere centre around the difficulties of road transportation. The pier is essential for various types of pleasure craft bringing visitors to Soufriere. Also Soufriere Bay and environs are popular with yachtsmen en-route to the Southern Caribbean.

The Proposed Pier

The proposed pier is 24 ft. wide and 120 ft. long. It is constructed of 35' long precast concrete piles, with 12 ft. by 24 ft. precast concrete bent beams grouted to top of piles, forming both pile caps and decking support. Decking is made up of a 3 ft. composite topping on 4' x 10' precast concrete planks panning between supports. It is felt that 24 ft. x 120 ft. pier allowed for a reasonable maximization of opportunities. (See Plan 11.)

Preliminary costing

1. Precast concrete piles 35' long driven in place	50 No. x \$2500	125
2. Precast Bent Beams as Pile caps	12 No. x \$2100	25
3. Precast 4' x 8' x 8" slab as decking	48 No. x \$ 700	34
4. Composite topping 3" thick to precast decking	320 x.y x \$ 30	10
5. Bulkhead wall and gabion protection		10
6. Hardware, handrails, lighting rubber fenders, etc.		20
7. Mobilisation		
a. Pile driving equipment		100
b. Crane, lifting equipment, etc.		100
Contractor's overhead and profits		<u>106</u>
Contingency allowance		<u>42</u>
Total		571

. A N N E X I I I

Photographs

- . Soufriere Town-Waterfront
- . Historic Architecture Walk
- . Beaches
- . Soufriere Estate
- . Sulphur Springs

.

Soufriere Town

Waterfront

:

Jetty. Entrance and Texaco sign to be removed



Waterfront. From Jeremy st. to South (C)



From the Jetty to the Fishermen's front (C-F)



Fishermen's front - Picturesque sight (F)



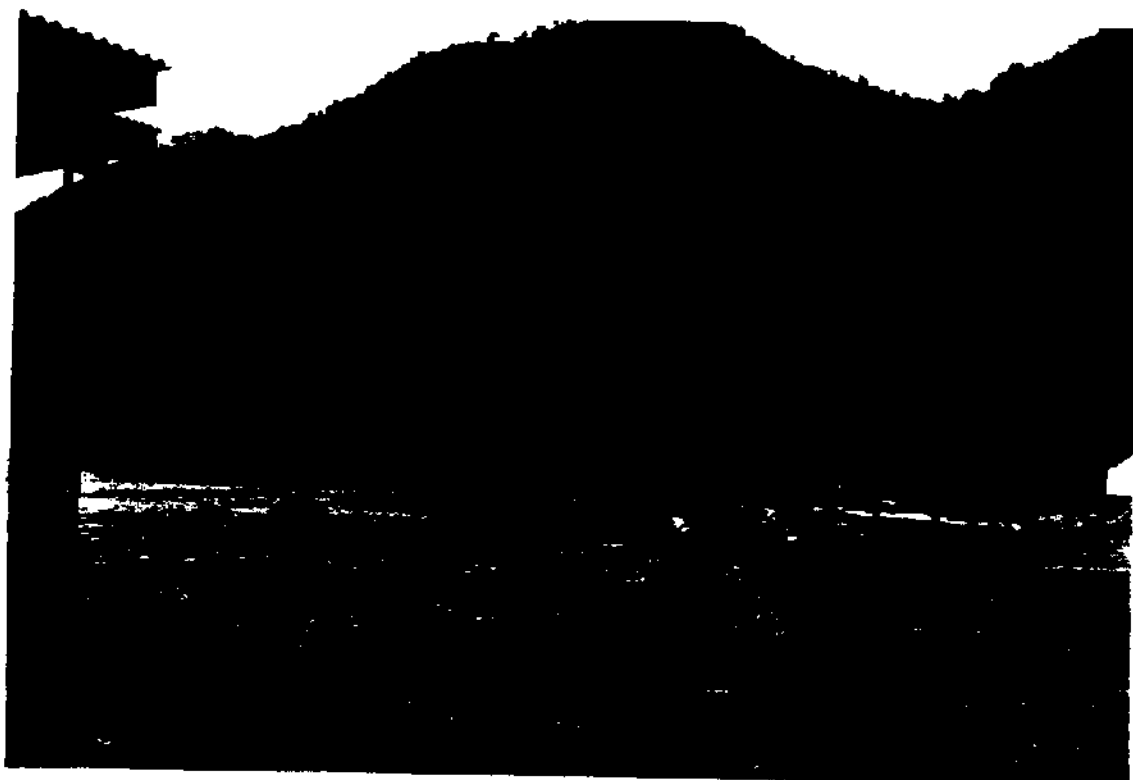
Fishermen's road - Deteriorated road (F)



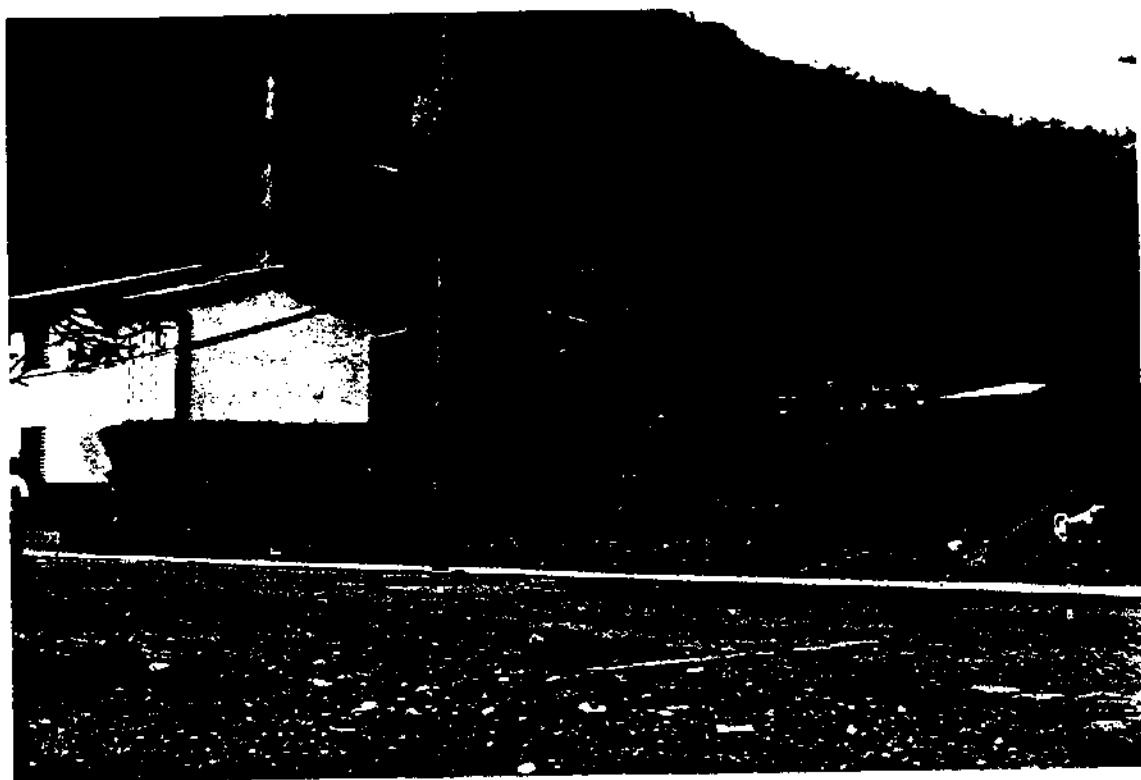
Waterfront. From Jeremy st. to Meat's Market (B)



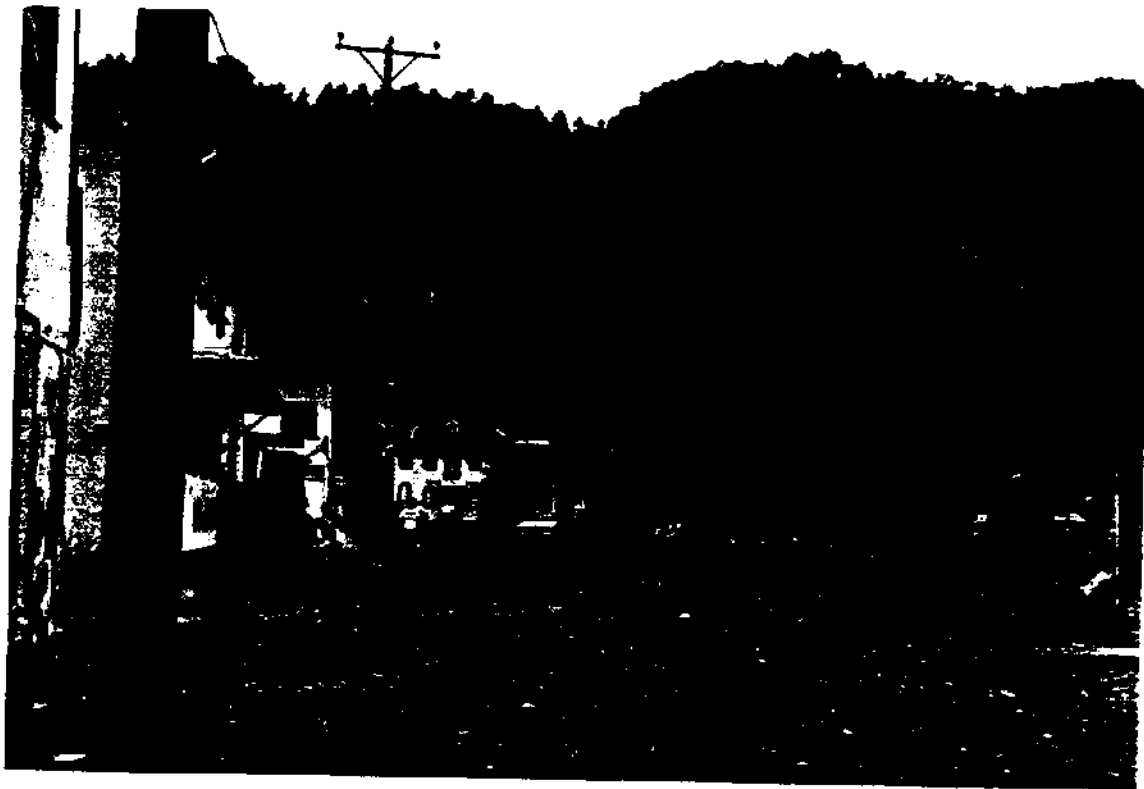
Waterfront. From Gas Station to Meat Market (B)



Waterfront. Vacant Plots (B)



Waterfront. From Meat's Market (B-C)



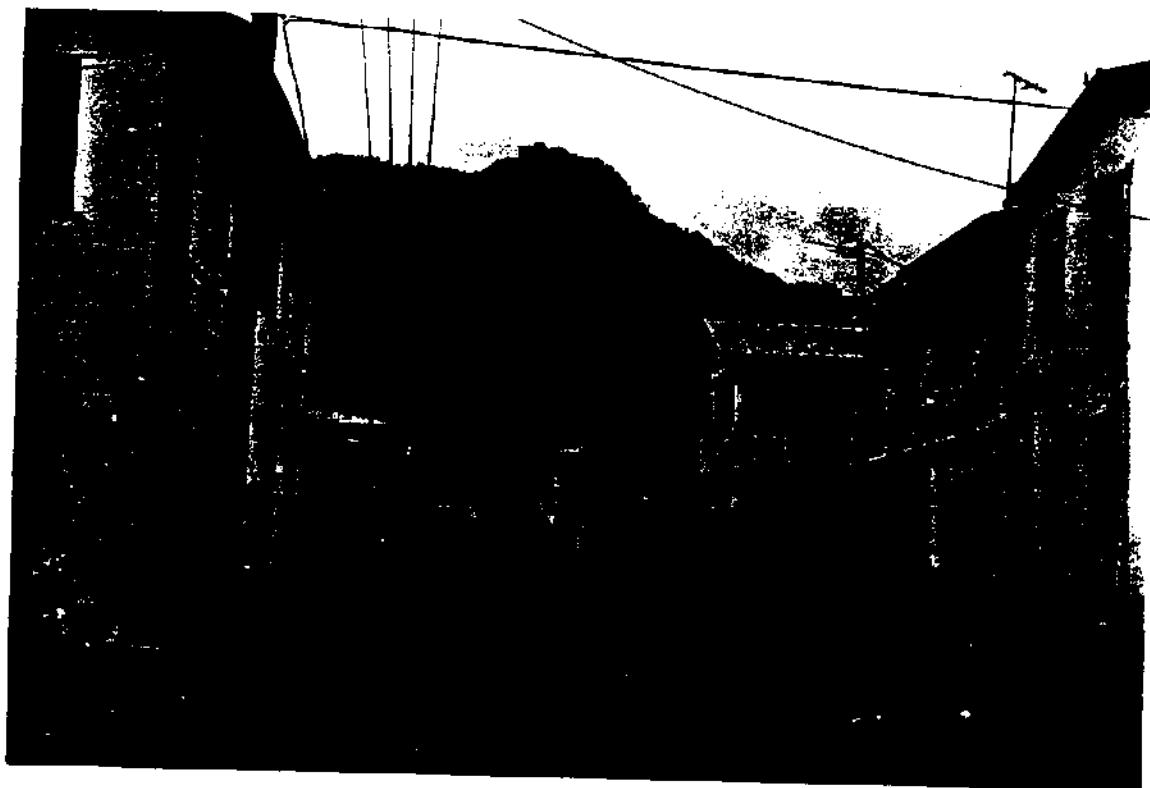
Waterfront. From Meat's Market (B). Fountain to be conserved



Waterfront end at the Meat's Market (B)



D. Alexander Street. Contemporary buildings of no visual interest



Soufriere Town

Historic-Architectural
Walk

:

Clarke st. North sidewalk from the Waterfront



Clarkest. South sidewalk from the Waterfront



Clarke st. The square and Church



Clarke st. North sidewalk to the Waterfront



Clarke st. South sidewalk to the Waterfront



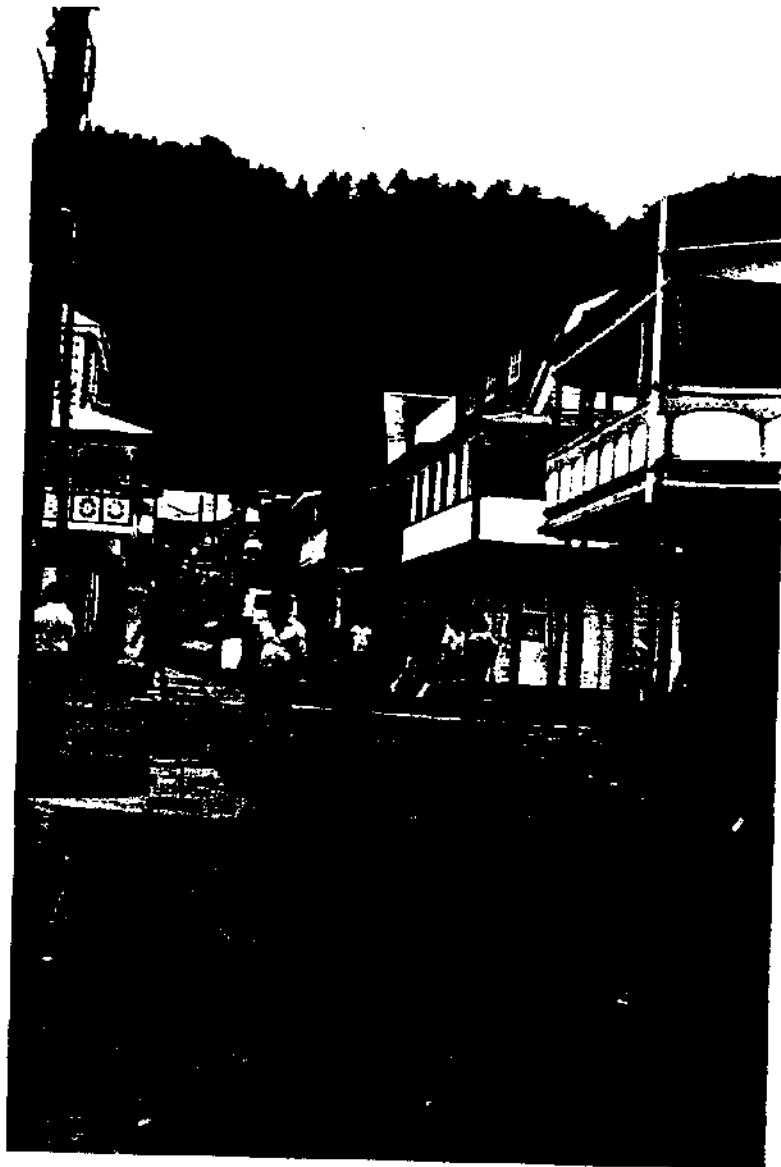
A Lewis street between Bridge st. and Church st.



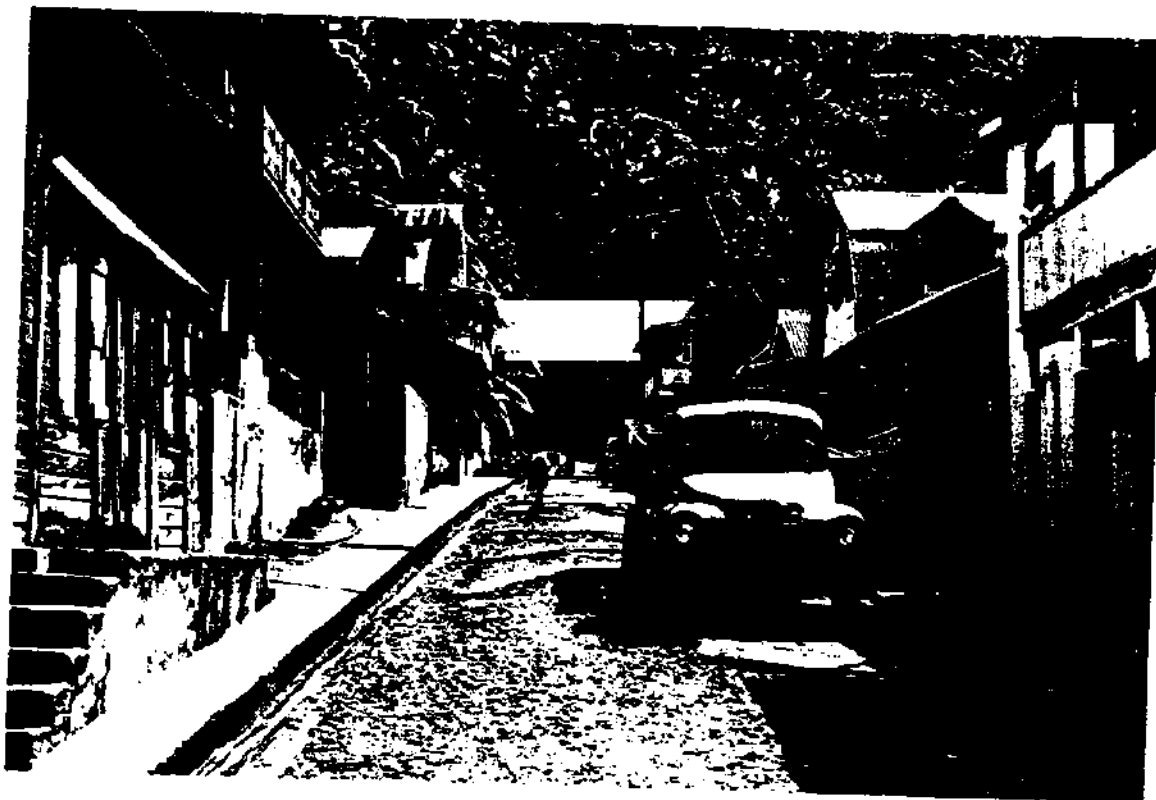
Catholic Church



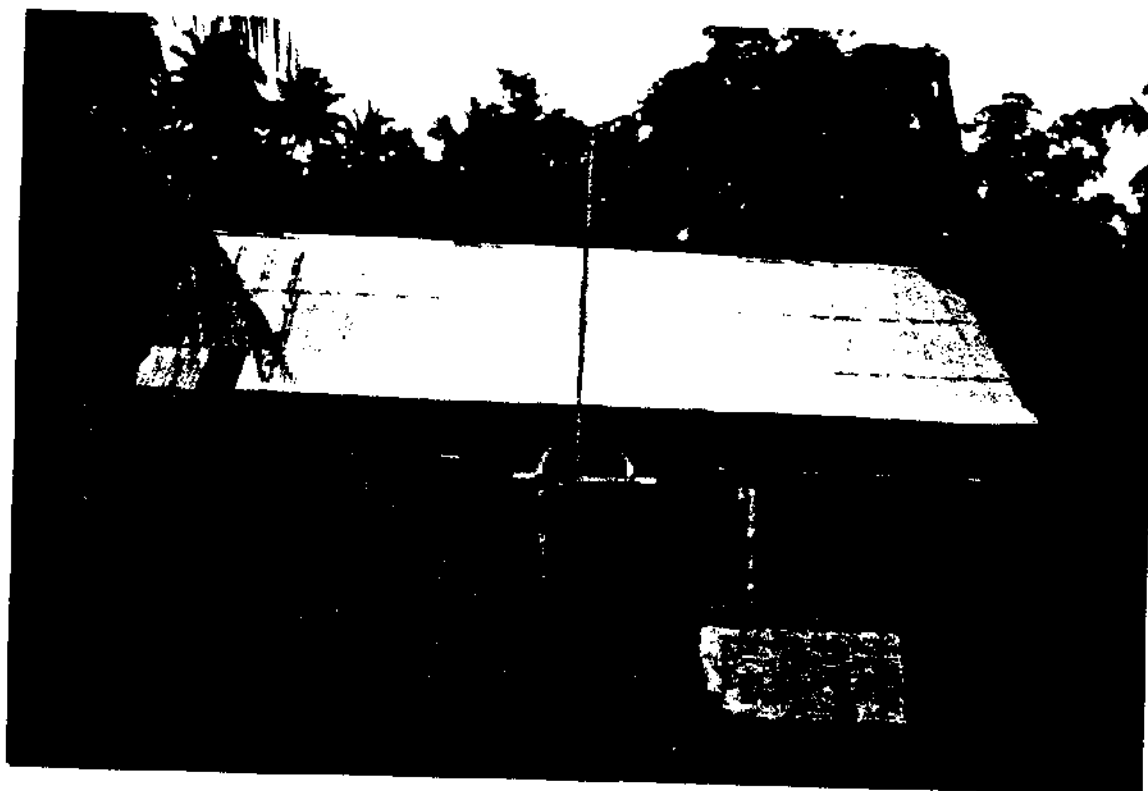
Bridge st. from square to Anglican Church



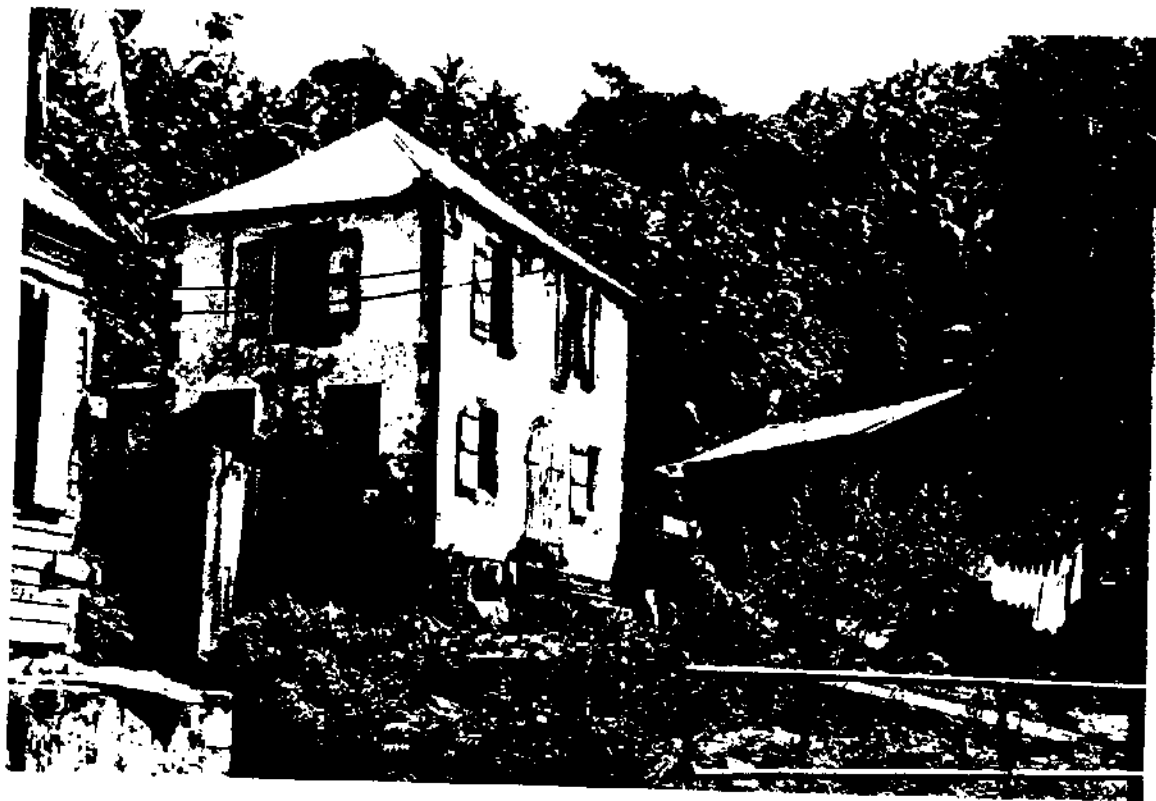
From Bridge st. to Anglican Church



Anglican Church



Old Police Station Building



Charming space in front of Old Police Station



From Bridge st. to the sea



From Police Station to Meat's Market

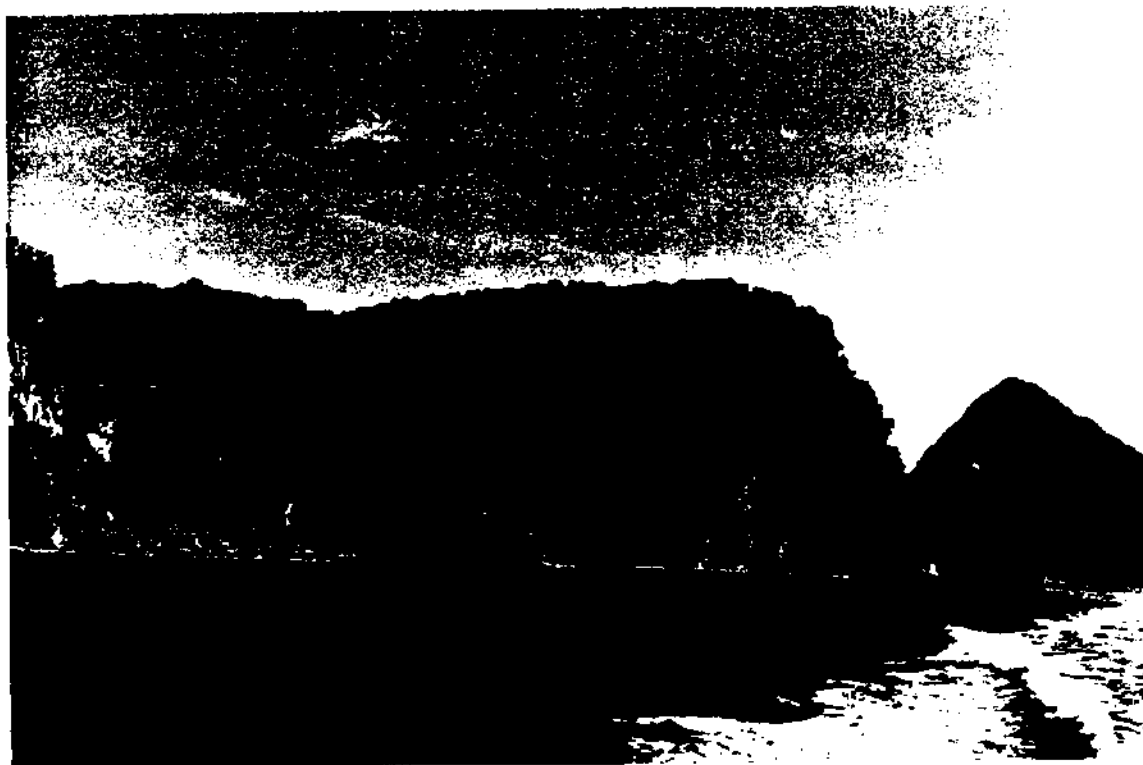


Beaches

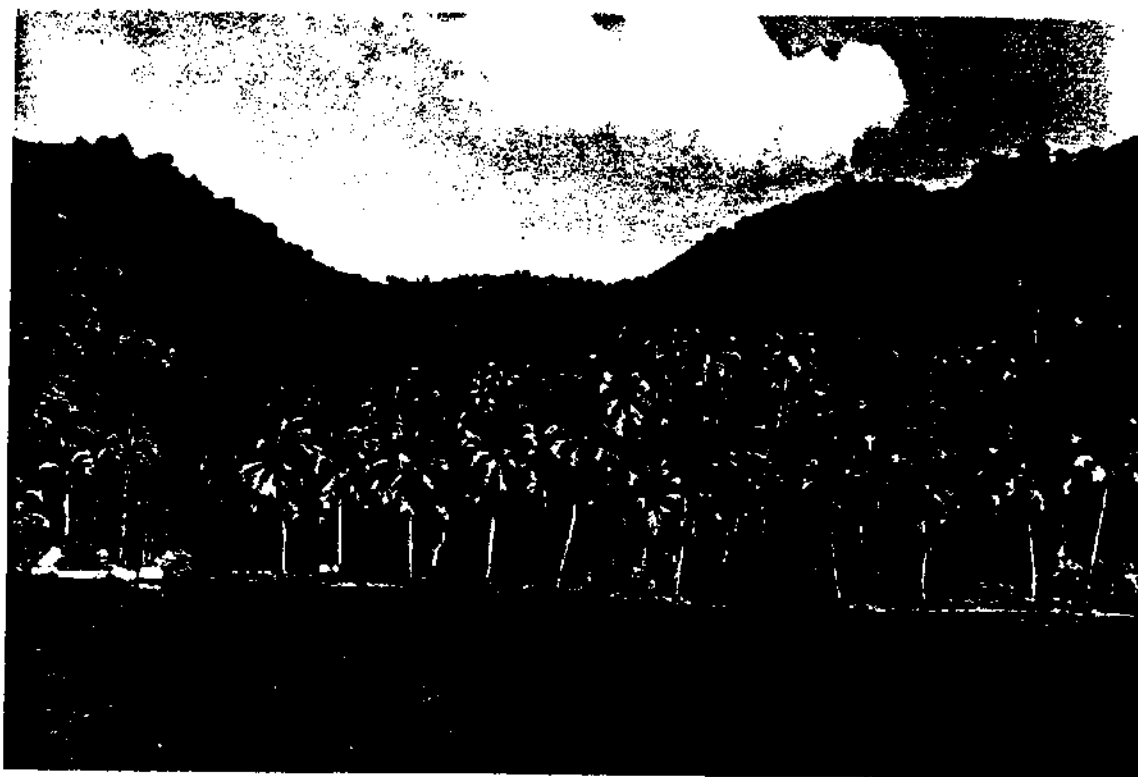
Anse Mamin, F 1



Anse Jambon, F 2



Anse Mahout, F 3



Anse la Liberté, F 4



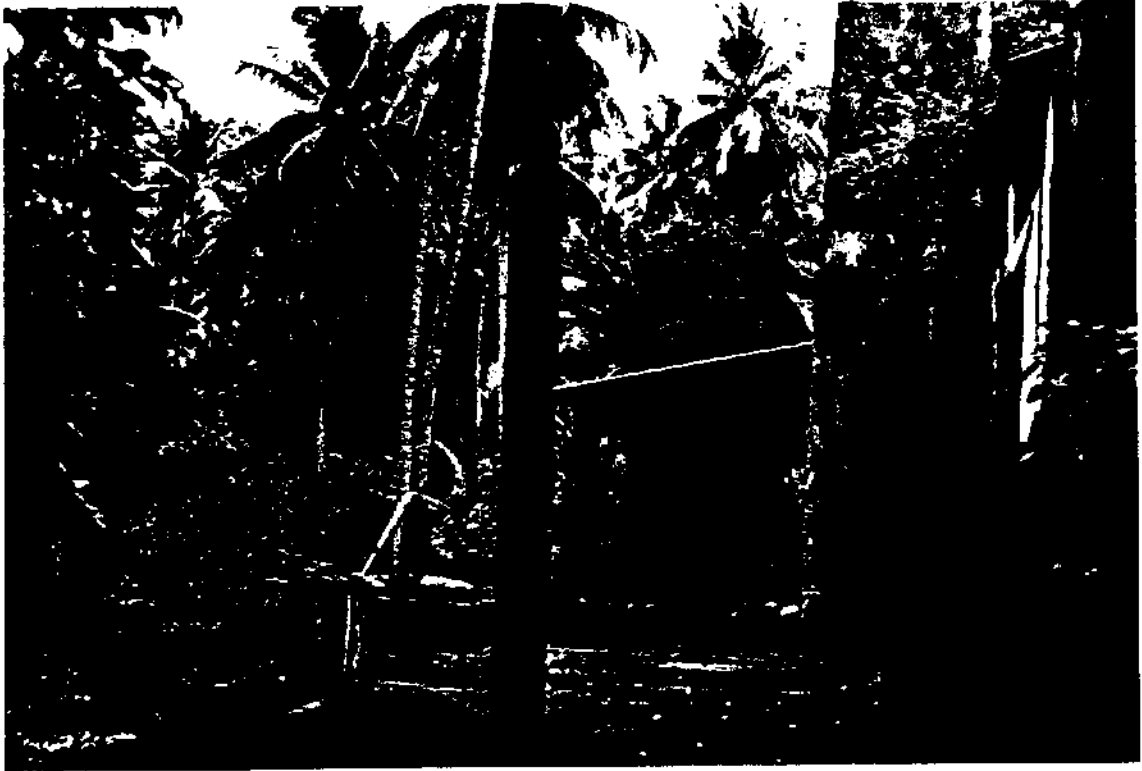
Anse La Liberté, F 5



Anse La Liberté, F 6



F 6 Terrace and still to be provided



West Facade. Needs stone over entrance



Anse Cannaries, F 8



Anse La Verdure, F 9



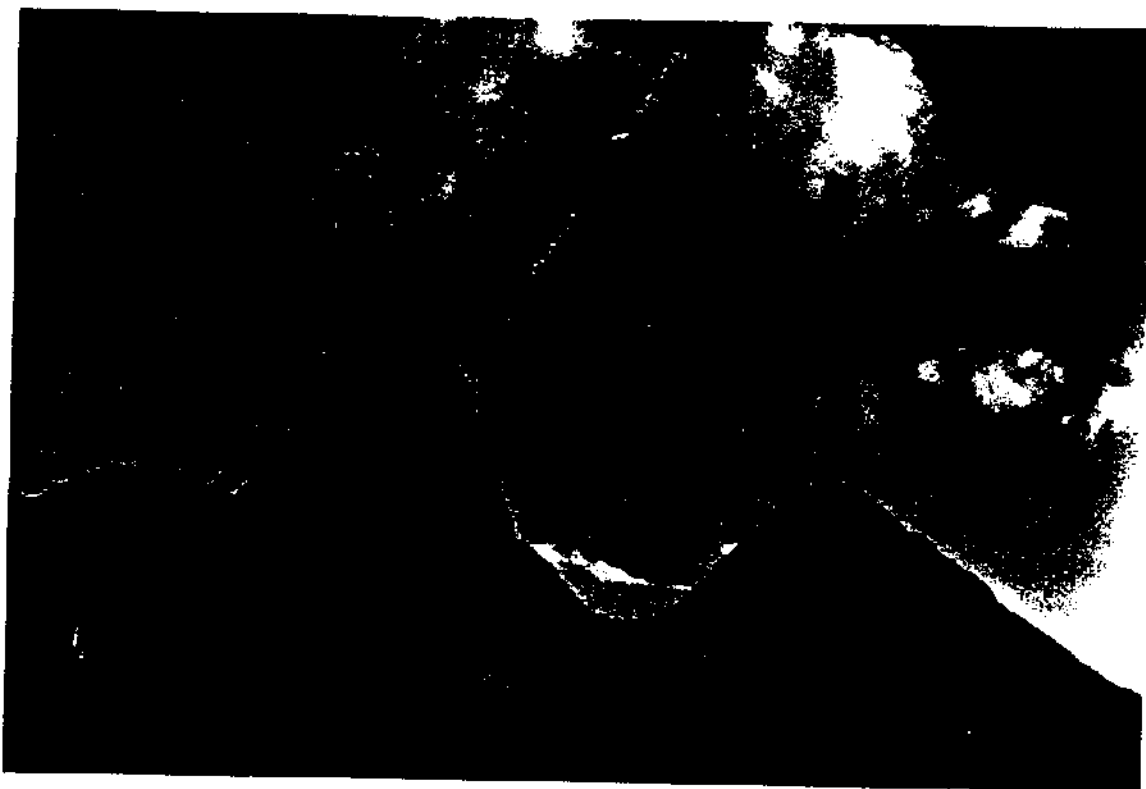
Anse Cachon, F 10



Anse La Pause, F 11



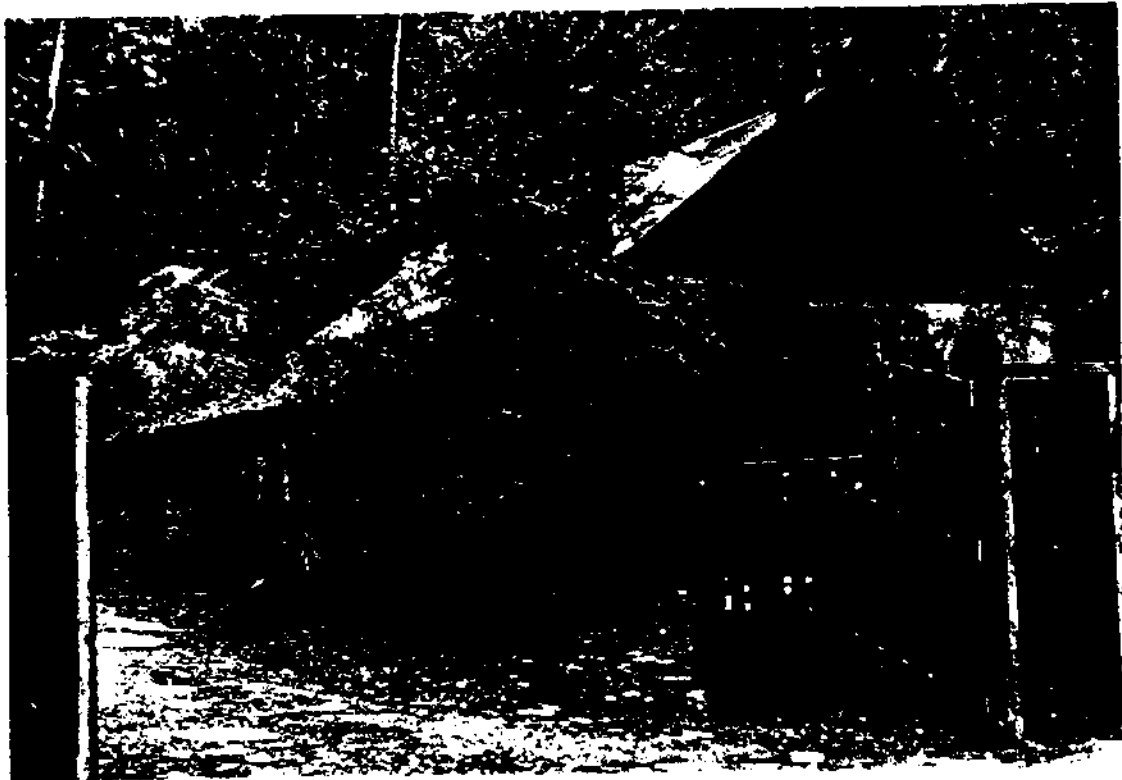
Pitons, F 13



Jalousie, F 14



F 1 Entrance, ticket booth, stone building now used as wood storage



F2 Beautiful access road



Malgretoute Beach



Soufriere Estate

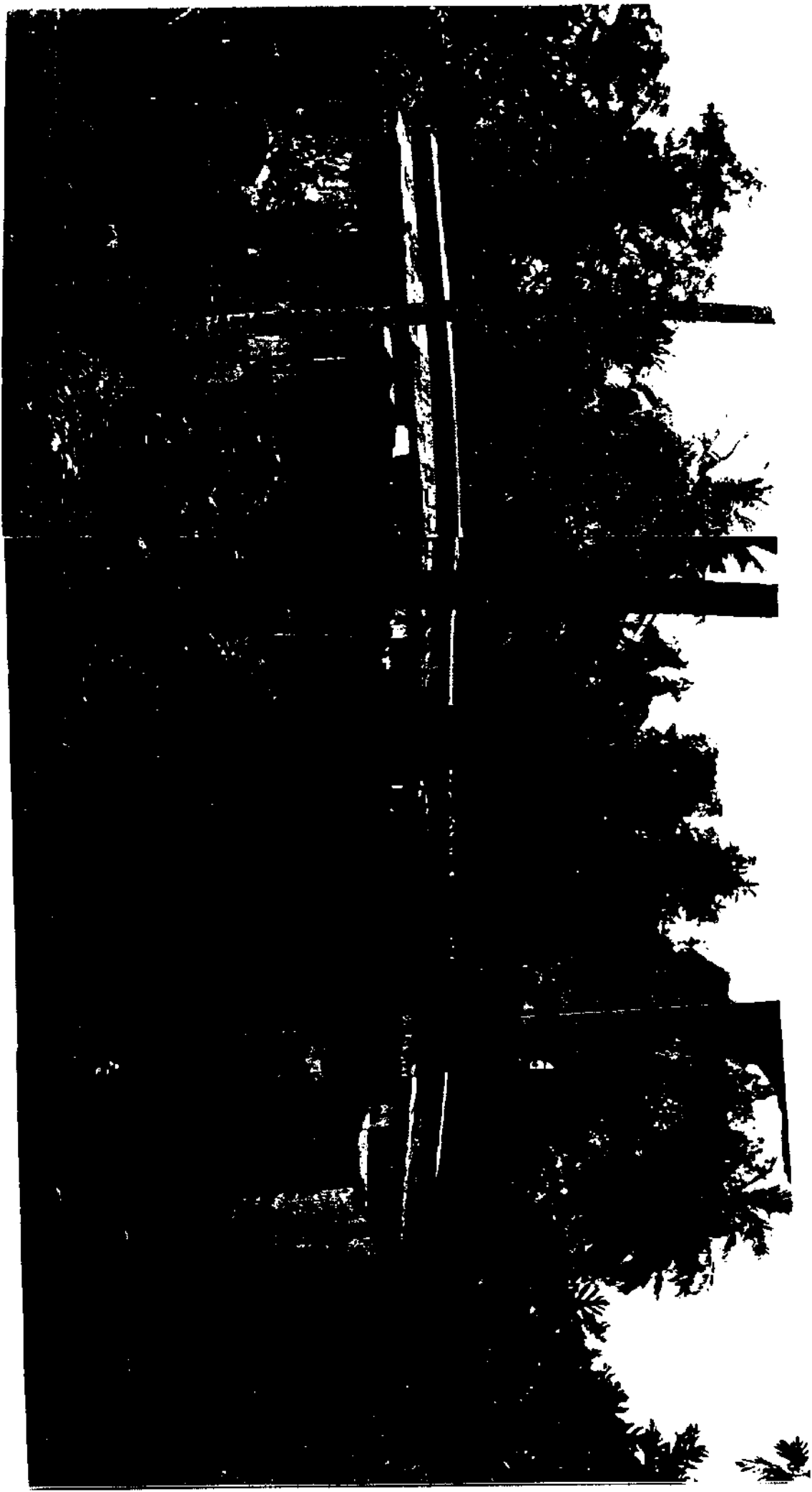
F 3 Coconut drying hut. One at each side of the access road



F 4 Construction to be demolished



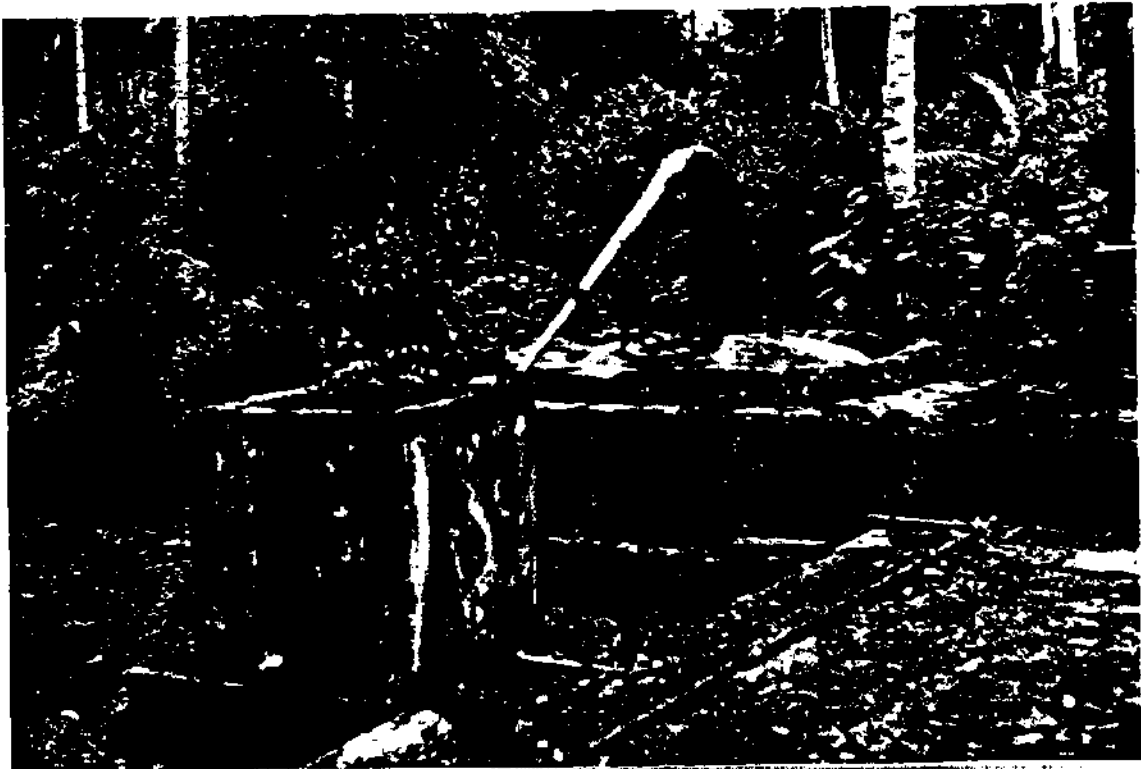
F 5 Actual North Facade



Vats storage to be re-built being accesible to public



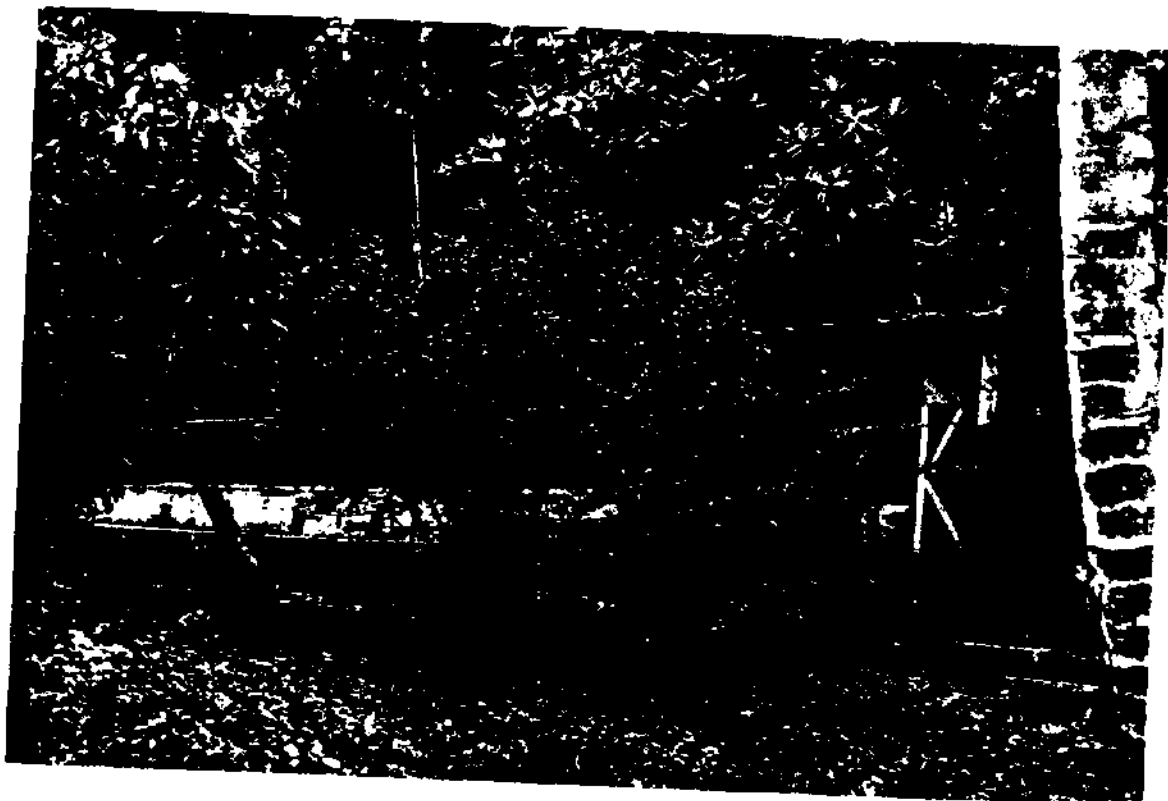
Still



Rear Facade. Desired appearance of stone walls and actual office



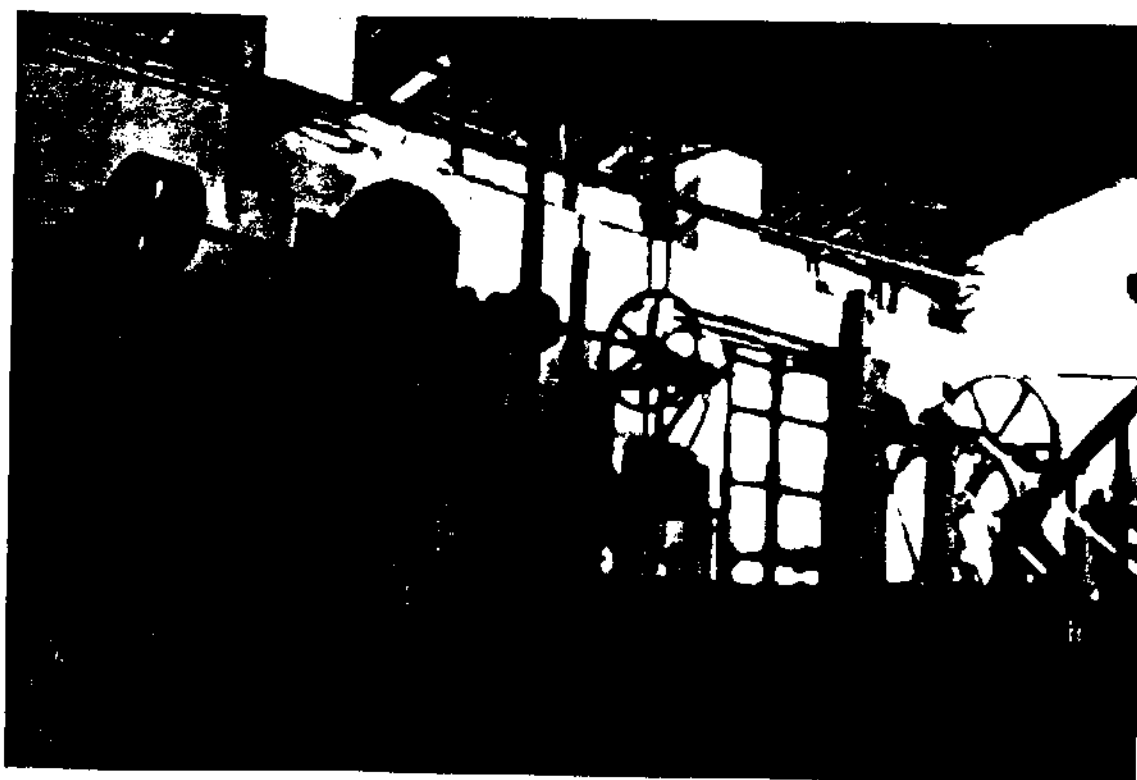
Chicken Coop. To be hidden with row of plants



South Wall



South Wall



East Wall



North Wall



West Wall



Chicken Coop.

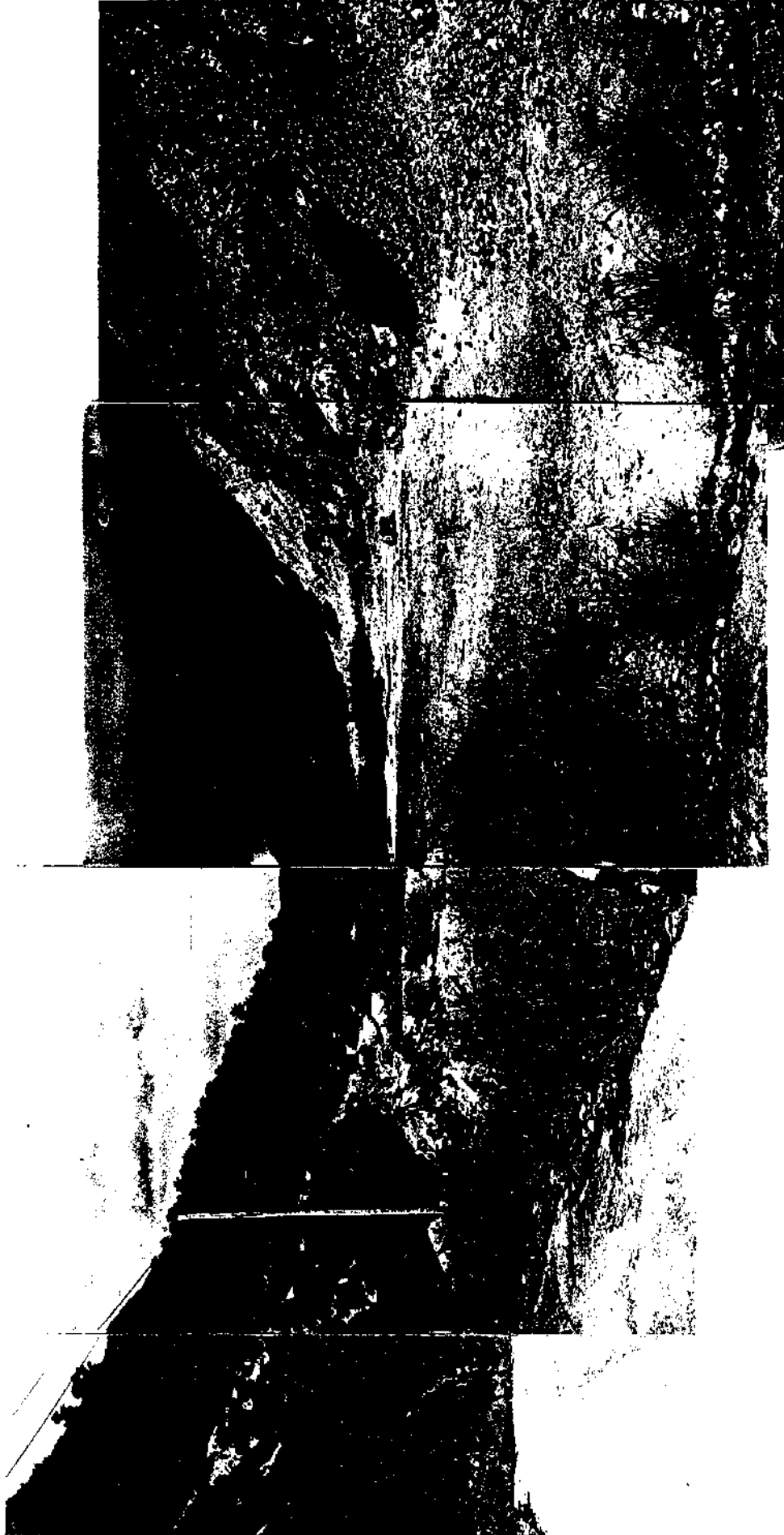


Sulphur Springs

View from the terrace of visitor. Reception Center



Site for the visitor. Reception Center

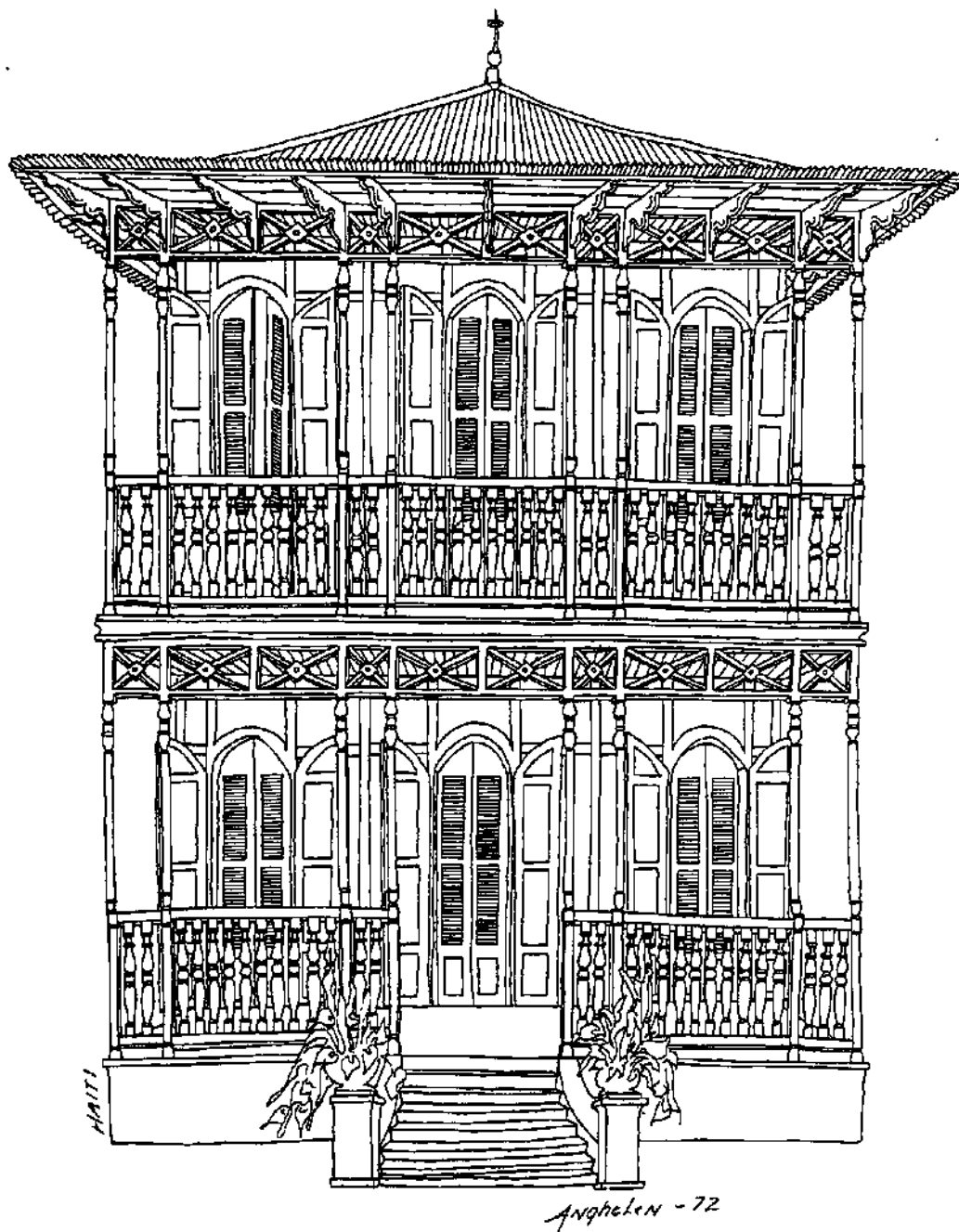


ANNEX IV

Town Preservation Projects: Models
(Missing)

A N N E X V

Gingerbread Houses



« 13 Ave. M »
Port-au-Prince

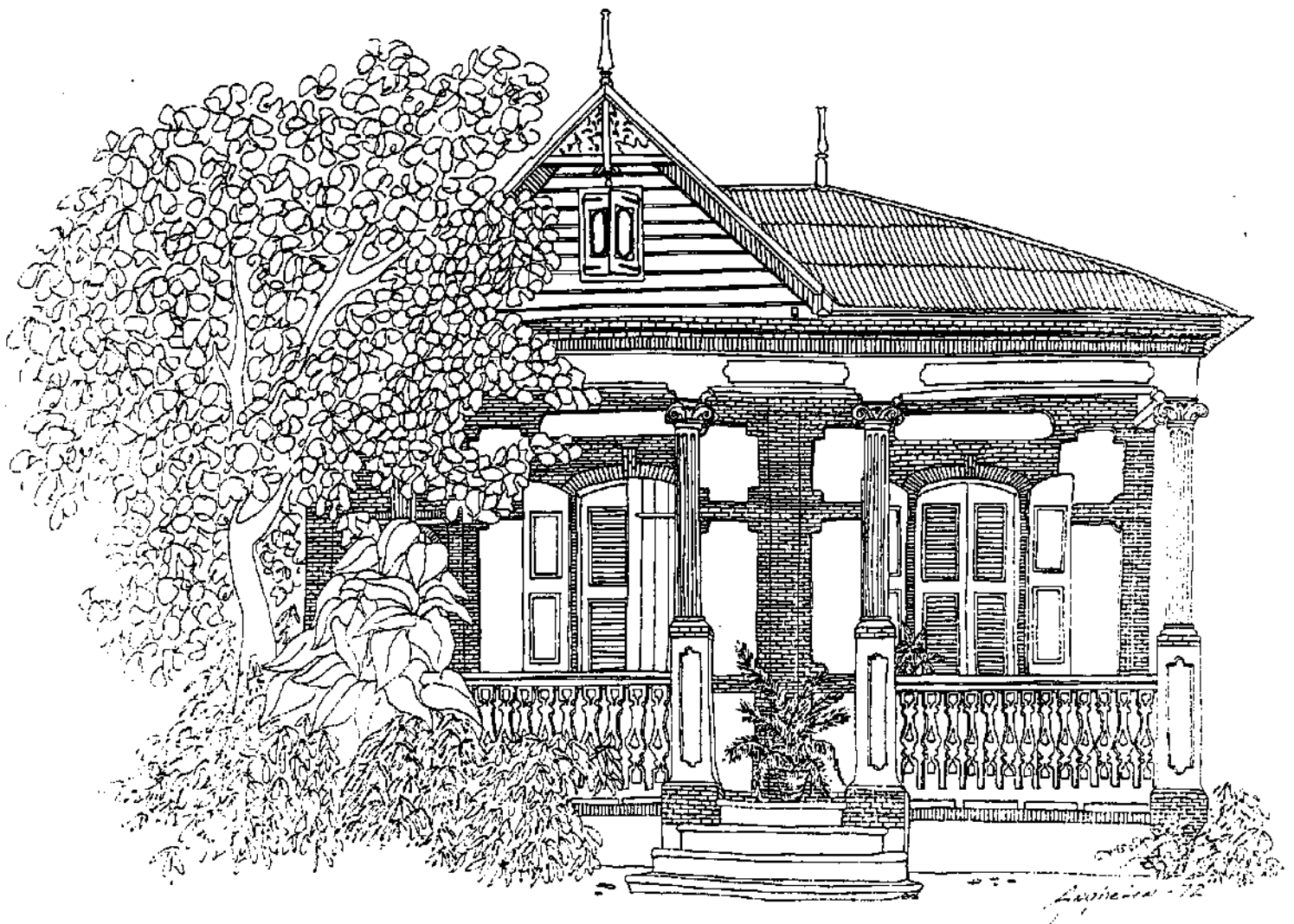
This two story wood trimmed house was built in 1915 for Mr. H. Mc Dougal of the U. S. Marine Corps. It is presently owned, and rented as a private residence, by Mr. Antonio de Matteis.

Construite en 1915 pour M. H. Mc Dougal, du Corps des Marines, cette bâtisse à deux étages, garnie de bois appartient actuellement à M. Antonio de Matteis.

« 27 Rue Marcelin »
Port-au-Prince

This tranquil cottage, in a dense tropical setting, was built in the 1920's and is presently owned by Mrs. Claire Pauyo.

Paisible villa dressée au milieu d'une dense végétation tropicale en 1920. Elle est actuellement la propriété de Mme Claire Pauyo.

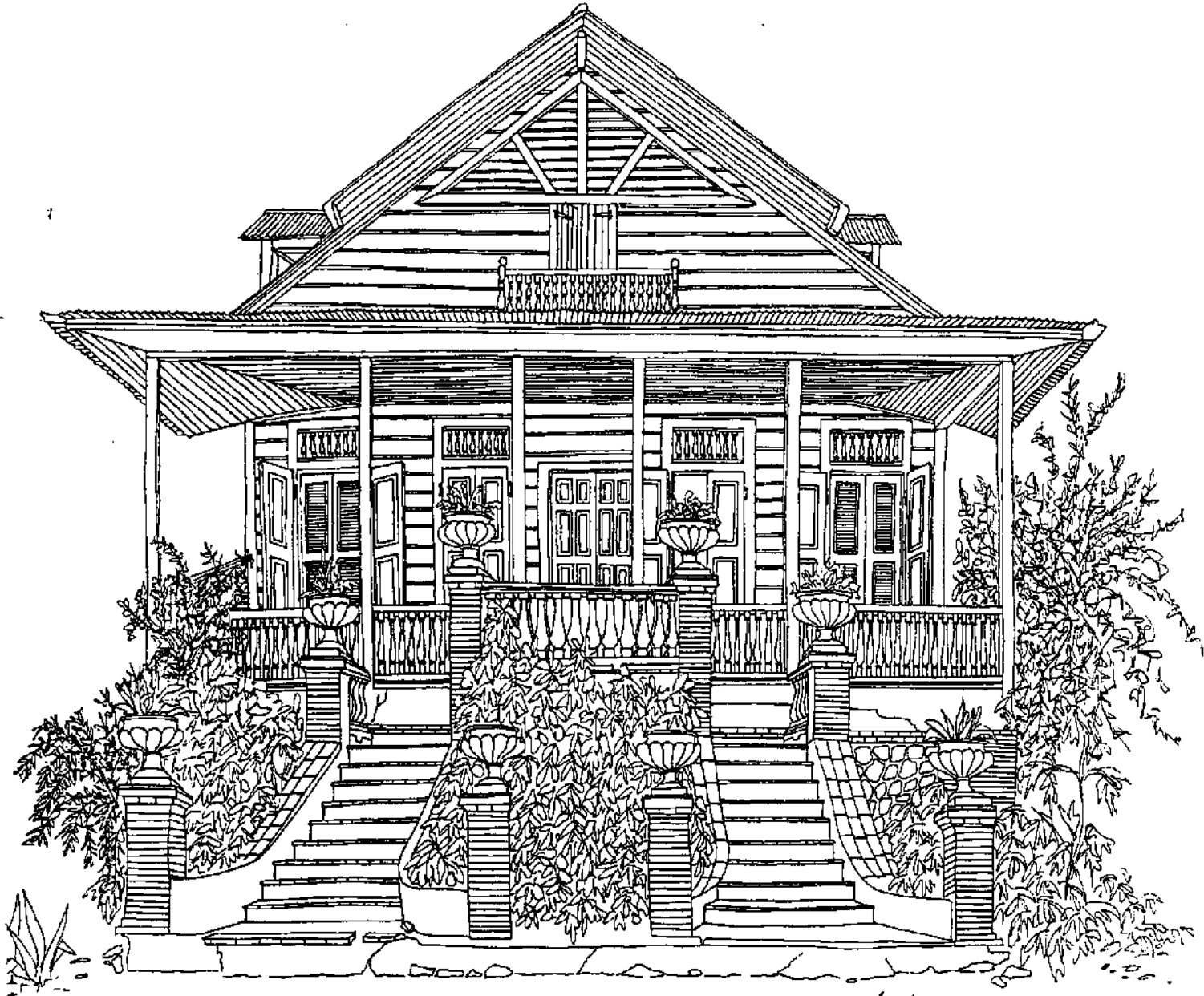


« No. 14 Rue Rigaud »
Port-au-Prince

Charming and simple. This cottage was built at the turn of the century by Boss Ana for Mr. Chochotte Excellent ; then, Director of Financial Services. It is presently owned and occupied by the Excellent family.

Délicieuse villa
entre cour et jardin
d'un style simple construite au début
du siècle par Boss Ana pour
M. Chochotte Excellent,
ancien Directeur des Finances.
Propriété de la famille Excellent.

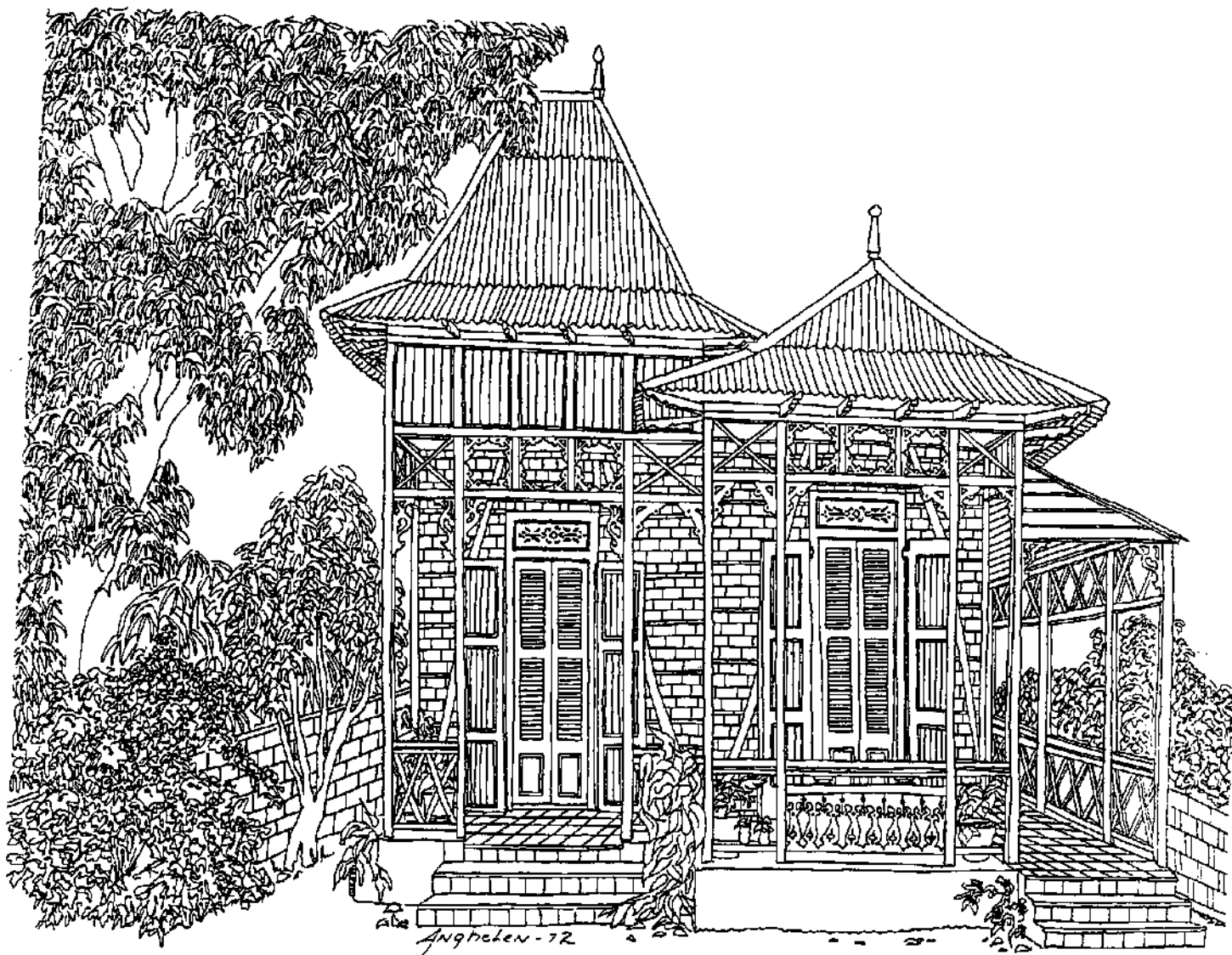




« 28 Bois Verna »
Port-au-Prince

Distinguished by its grand double staircase entrance, this historic residence was built by engineers Jacques Durocher and Thomas Price in 1896, for Thomas Price. He was the engineer in charge of the Hydraulic Service of Port-au-Prince and also an engineer for the National Palace. Thomas Price was the nephew and adopted son of Hannibal Price, who was among other things Haiti's Ambassador to the United States. The house now belongs to Thomas Price's children.

En 1896, l'ingénieur Thomas Price, assisté de l'ingénieur Jacques Durocher construisit sa propre résidence dont l'entrée desservie par un double escalier. Thomas Price, ingénieur responsable du service hydraulique et du Palais National à Port-au-Prince était le neveu et fils adoptif d'Hannibal Price qui fut aussi Ambassadeur d'Haïti aux USA. Elle appartient présentement à ses enfants.



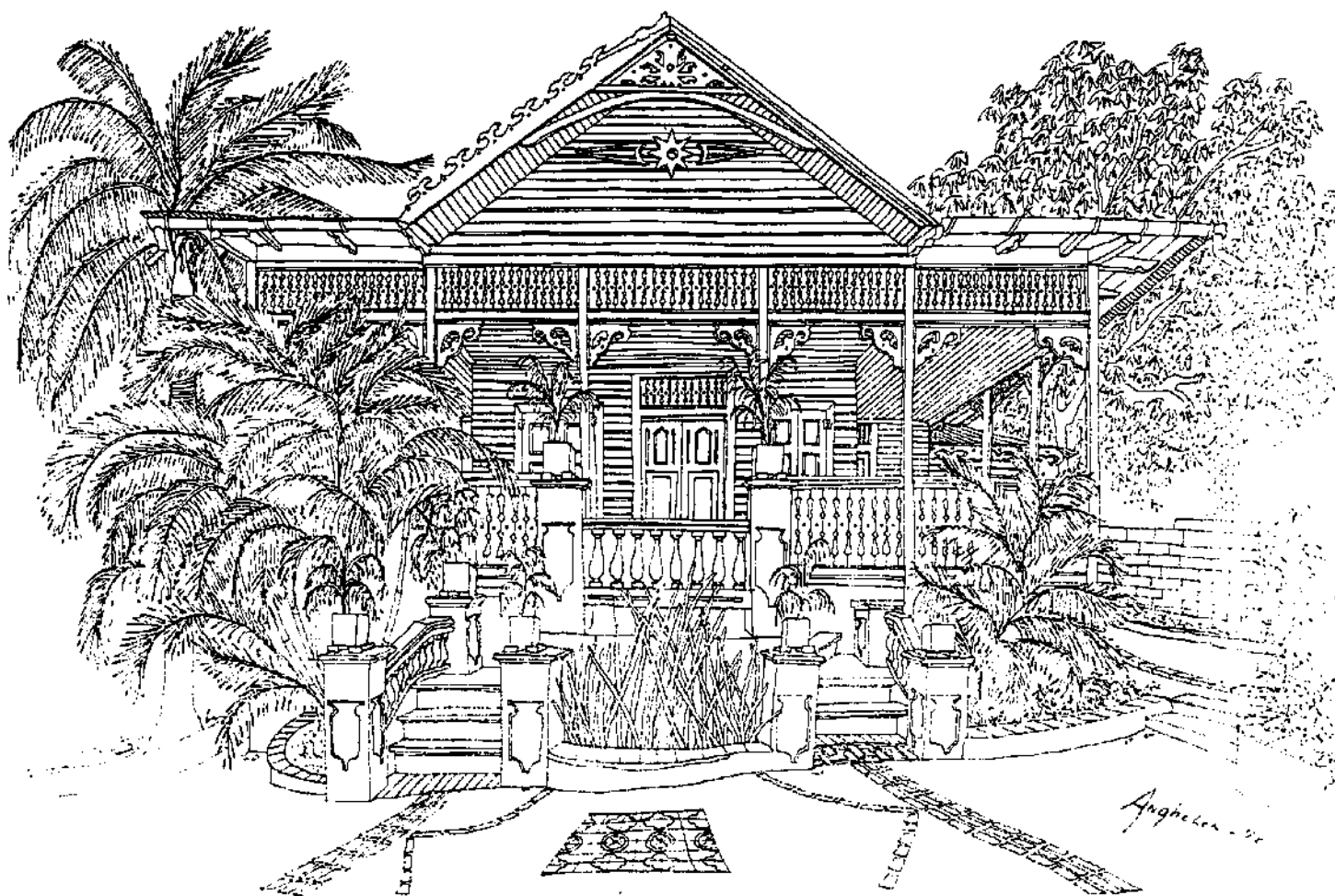
« No. 4 Ruelle Berne »
Port-au-Prince

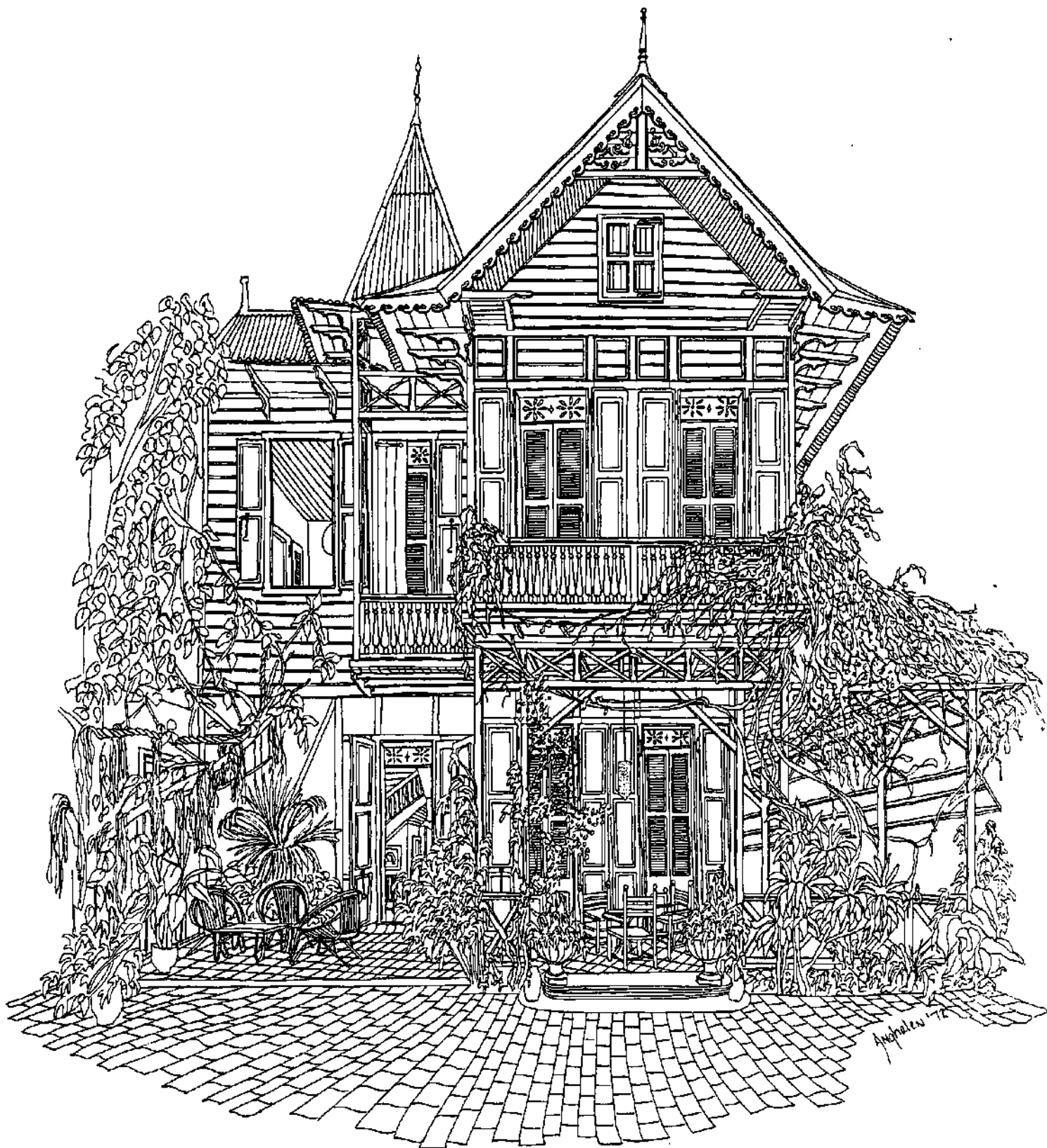
This pale green cottage,
which is one
of the original Gingerbread houses,
was built in 1878
for Mr. Louis Robert Stecher.
It is now owned by
Mrs. Gérard Appollon.

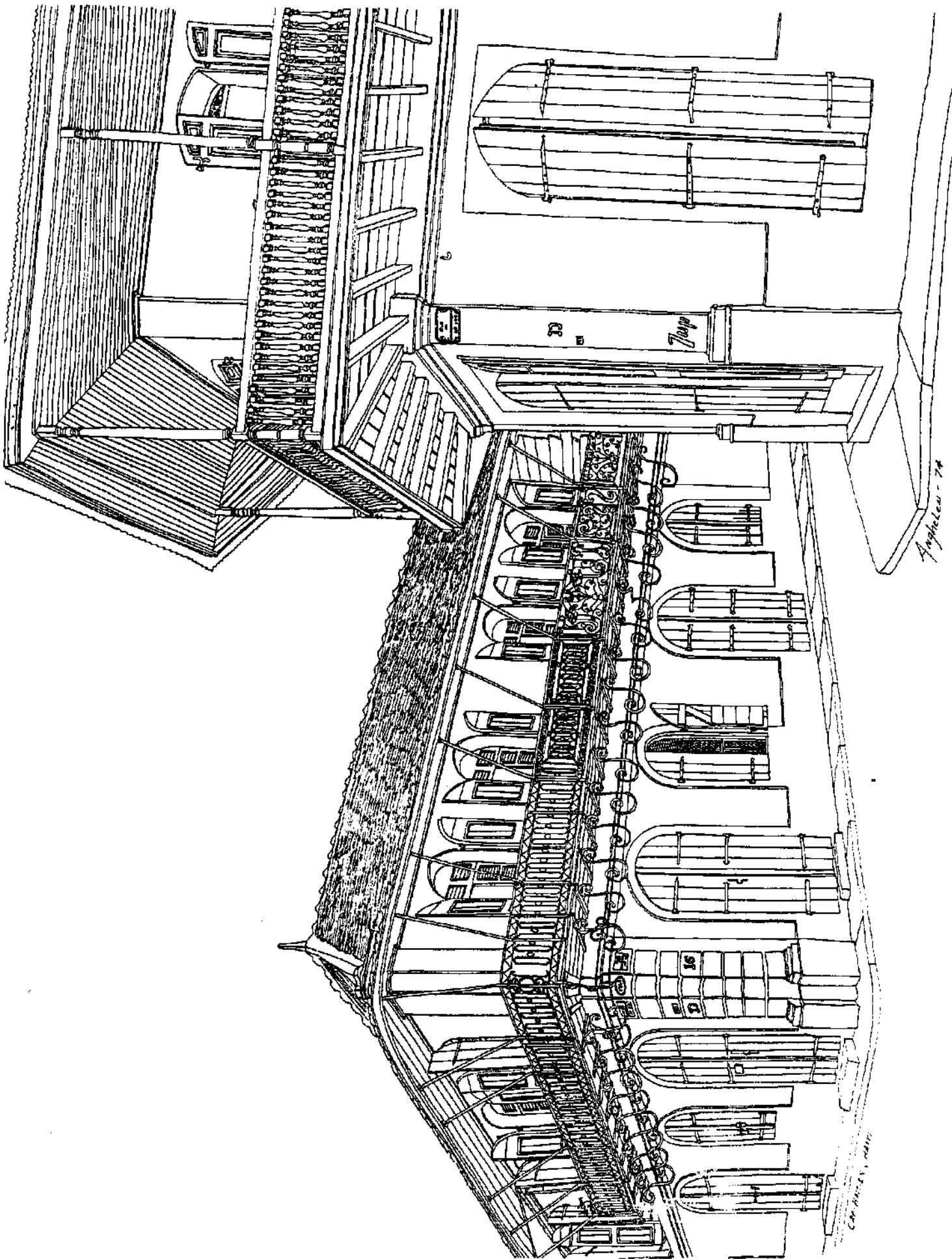
Cette villa verte pâle
construite en 1878
pour M. Louis Robert Stecher
d'un style «Gingerbread»
très original
appartient actuellement
à Mme G. Appollon.

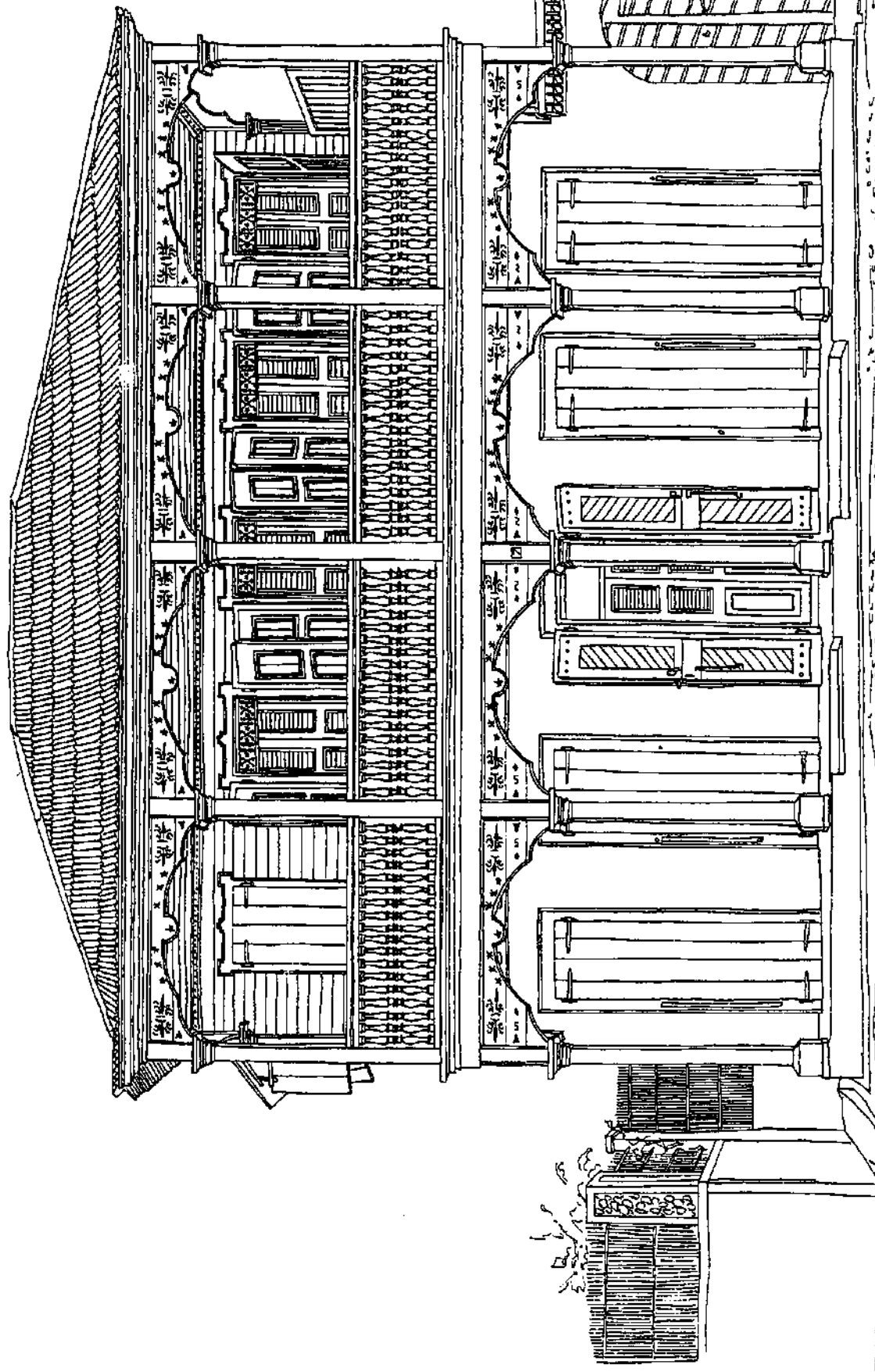
No. 9 Rue Quatre, immersed in a tropical setting of palm trees and ferns, was built in 1922 for Mr. Franck J. Martin. It is presently owned and occupied by Mr. Generoso Martino.

Au milieu de palmiers et de fougères se dresse cette bâtisse en bois conçue en 1922 pour M. Franck J. Martin. Elle est occupée par son propriétaire actuel M. Generoso Martino.









HAITI

Architecten '73

