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PANAMA CANAL
REVIEW

SPRING 1975



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THE
PANAMA CANAL
REVIEW

Official Panama Canal Publication

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Contents

- In the Wake of Drake** 3
Transit of "Golden Hinde" revives interest in the audacious Elizabethan.
- Some Fancy Shirts From Far-off Shores** 9
A short shirt tale.
- The Age of Aquarists** 13
These fishermen give them an aspirin and bring 'em back alive.
- A Horse in the House** 19
By hand or with net, feeding a seahorse requires finesse.
- More Than A Book of Numbers** 22
Phone directories reflect changing times from construction days to present.
- Culinary Capers** 26
A riot of rice recipes.
- Shipping Notes** 29
- Natá** 32
Oldest town on the Isthmus enters the industrial age.

Credits: Photos by Don Goode (p. 5 "Golden Hinde" and p. 11 traffic controller), Kevin Jenkins (p. 6), Mike Goode (p. 11 Panamanian dancing couple). Sketch p. 4 by Capt. Adrian Small.

Our Cover

Photographing a galleon under full sail might sound simple but getting the shot of the *Golden Hinde*, which appears on the cover, was not an easy task.

Intent on capturing the ship with her sails unfurled, the photographer followed her on a launch as she left Balboa on her way to California.

As soon as she was free of the tug, which had towed her through the Canal, her crew set about the task of putting up the sails.

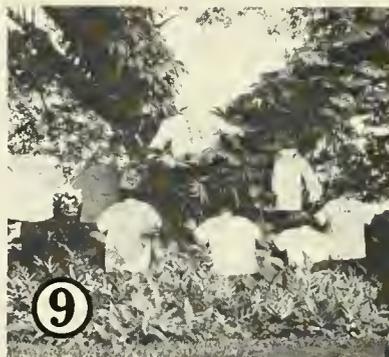
But there were no strong winds and the sails hung limply. Capt. Adrian Small, master of the ship, decided to start the small engine to help maneuver the vessel into a better position to catch the wind. Of course, with the first throb of the motor, the 16th century atmosphere vanished in a puff of grey smoke from the exhaust.

Finally, after much exertion on the part of the captain and crew, the ship was in just the right position, the wind filled her sails, the engine was shut down, the scene was perfect, but only for a moment. The 20th century intervened again when a small plane began flying back and forth directly above the ship.

At last, the plane flew out of sight but a tropical rain shower caused another delay.

The Isthmus was fast fading into the background as the ship moved along under full sail. Hurriedly the photographer focused the camera just in time to spot several small boats sailing in between the *Golden Hinde* and the launch. Responding to much yelling and waving of hands, the small boat owners moved out of range and the photographer captured the scene on the cover only seconds before an ominous black cloud appeared overhead.

The cover photograph, as well as all others in this issue, unless otherwise credited, are by Arthur L. Pollack.



In the Wake of Drake

Willie K. Friar

IT WAS A STRANGE SIGHT—A small 16th century galleon sailing serenely past the modern gargantuan tankers and container ships lying at anchor off Balboa waiting their turn to transit the Panama Canal.

The small sailing ship, her sails set taut, was the *Golden Hinde*, a replica of the ship on which Sir Francis Drake circumnavigated the globe.

From the time the *Golden Hinde* anchored off Portobelo early in December 1974 until she completed transit of the Canal, she attracted unusual interest on the Isthmus, where Drake has always been an important part of the local history.

Drake's victories over the Spanish along the Las Cruces Trail are well known and a lively interest in locating the lead casket in which he is supposed to have been buried at sea near Portobelo has continued through the years. An island in the vicinity is still known as Drake's Island.

It was on the Isthmus that Drake, after climbing to the top of a tree and viewing both oceans, fell on his knees and asked God to give him "life and leave to sail an English ship in the South Sea." His prayer was answered later when he succeeded in circumnavigating the world on the *Golden Hinde*.

On his trip in 1577, Drake took the *Golden Hinde* through the treacherous waters of the Strait of Magellan and harassed Spanish ships along the Chilean and Peruvian coasts before arriving in California. The replica of the ship, enroute from England where she was built,



The "Golden Hinde" lies at anchor off Portobelo in the area where it is believed that Drake was buried. The galleon also stopped briefly at Nombre de Dios.

Drake's Drum

*Drake he's in his hammock an' a thousand mile away,
(Capten, art tha sleepin' there below?)
Slung atween the round shot in Nombre Dios Bay,
An' dreamin' arl the time o' Plymouth Hoe.
Yarnder lumes the Island, yarnder lie the ships,
Wi' sailor lads a-dancin' heel-an'-toe,
An' the shore-lights flashin', an' the night-tide dashin',
He sees et arl so plainly as he saw et long ago.*

Henry Newbolt

to San Francisco where she will be on permanent exhibit, took the short cut through the Panama Canal. The insurers of the ship, which is valued at a million dollars, took a dim view of having her go through the Strait of Magellan.

Plans are to berth the ship at Fisherman's Wharf in San Francisco to commemorate Drake's voyage and his landing on the west coast of America in 1579.

The *Golden Hinde* replica was designed by Chris Norgaard, a Californian, for a consortium of San Francisco businessmen including Albert D. Elledge, president of a tugboat and harbor tour line, and Art Blum, public relations consultant.

The idea to build such a ship for San Francisco germinated in the mind of Art Blum, at least 10 years ago. Pre-

liminary designs were produced about 5 years later following considerable research. Although often reported in the press as "an exact replica," this would be impossible as little is known about the original *Golden Hinde*.

After studying every scrap of historical evidence available, including manuscripts which described Drake and his ship and viewing paintings of the period, Norgaard came to the conclusion that the *Golden Hinde* was a classic example of a mid 16th century warship. It is believed that the ship was built in France and was bought by John Hawkins, Drake's uncle.

Norgaard was greatly influenced by Nuño da Silva, the Portuguese pilot captured by Drake, who became his navigator. He had a high opinion of the ship and wrote: "The Capitana (flag-

The replica was built to commemorate Drake's landing on the coast of California in 1579

ship) is in a great measure stout and strong. She has two sheathings, one as perfectly finished as the other. She is fit for warfare and is a ship of the French pattern, well fitted out and furnished with very good masts, tacke and double sails. She is a good sailor and the rudder governs her well . . . She is, water-fast when navigated with the wind astern and not violent but when the sea is high she labours and leaks not a little . . ."

It is interesting to learn that the new *Golden Hinde* had the same problem. (From the Captain's Notes a short time after leaving England: "We have been pestered with small leaks at bow and stern, only apparent when the ship is in a heavy sea.")

Since no detailed records of the design of the original ship existed, Norgaard relied to some extent on the ratios of lengths to depth and width, which is the way shipbuilders of the 16th century worked. Matthew Baker, an English shipwright, working some years after the supposed date of the construction of Drake's ship, explained the process in a unique manuscript preserved in the Pepys Library at Magdalene College, Cambridge:

Proportiones for shippinge

The breadth is arbitrarie, ye depth must never be more then $\frac{1}{2}$ ye breadth, nor less then $\frac{1}{3}$.
The length never less then double ye breadth nor more then treble . . .

The size of the *Golden Hinde* was determined to a certain extent by the known size of the dock at Deptford, England, where the original vessel lay for almost a century before she rotted away. A brick wall was built around her on the orders of Queen Elizabeth I to help preserve her as a museum piece.

There was a somewhat whimsical proposal at that time that she be hauled to the top of the tower of the old St. Paul's Cathedral and kept there permanently as a "reminder and treasure for all Englishmen."

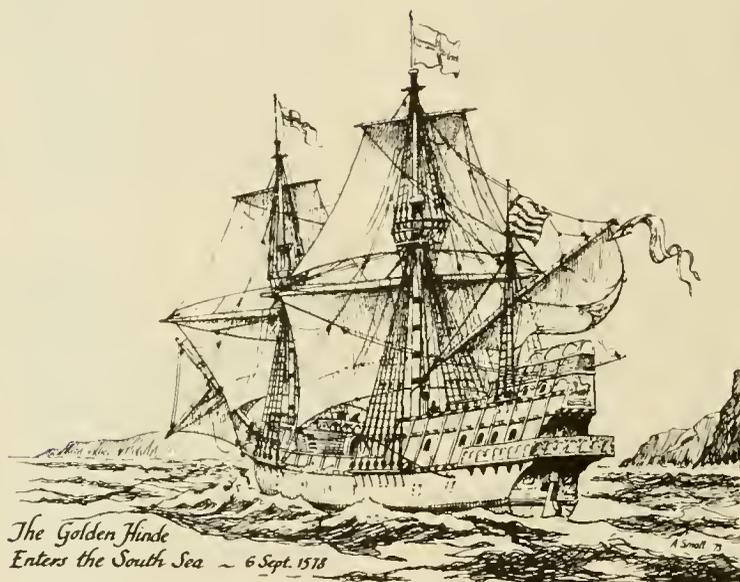
It was reported that she was also used as a restaurant and Pepys wrote of visiting the ship in 1662 and noting that the timbers were rotting. About this time the decision was made to break up the ship. The only relics remaining today are a chair of polished oak made from the ship's timbers, which is in the Bodleian Library at Oxford, and a table in the Middle Temple in London.

From the information concerning the Deptford berth of the original ship, Norgaard estimated the *Golden Hinde's* dimensions to be 75 feet on the waterline; 102 feet overall (not including the bowsprit); maximum breadth 20 feet; extreme draft 13 feet, her mainmast 80 feet tall, her foremast 71 feet and her mizzenmast 36½ feet. The replica carries a total of 4,150 square feet of sail and displaces 290 tons.

and transfer it to the hold of the *Golden Hinde* while the ships stood off the coast of Peru. When Drake released the captain, he gave him a number of gifts including a gilt corselet and 600 pounds of iron as well as a letter of safe conduct in case he should encounter other English ships.

Drake's cabin is the most uncomfortable part of the ship during rough weather. Beneath it is the Great Cabin, complete with a beautifully carved oak table capable of seating 10 people. Since the furniture was recorded as being the finest of the period, hand-carved replicas in English oak were commissioned for the ship.

On the poop deck is a "round house" in which Drake spent many hours painting with his young nephew, John Drake. The main deck, in front of the Great



The planning of other aspects of the construction also required much attention to detail. The lower deck has 14 long-barrelled cannon, typical of a ship of the period, complete with loading and priming gear at each gun station. Lanterns and small arms racks are also fitted on this deck. In the hold are shot and powder-kegs along with a store of small arms, cooking utensils, barrels, and tools of the period.

Beneath the afterdeck of the ship are two cabins. First, Drakes, where he "entertained" San Juan de Antón, the captain of the famed treasure ship, *Nuestra Señora de la Concepción* (Our Lady of the Conception) which was called by the crew the *Cacafuego*. Drake treated the captured captain in a gentlemanly manner while he held him aboard the *Golden Hinde* for the 3 days required to remove a fortune in gold, silver, and jewels from the Spanish ship

Cabin, where Drake was knighted by Queen Elizabeth I following his circumnavigation of the world, has a crucifix and a grog cask and on the fo'c'sle forward of the main deck are two small cannon.

Carving on the ship is limited to a gilded figurehead representing a hind (hind is spelled with an e in the name of the ship because research revealed that was the way it was spelled in Elizabethan times) and a gilded lion mounted on top of the rudder-post.

Once the designer had completed his plans, the search began to find someone to build the ship. The owners finally settled on J. Hinks & Sons, of Appledore in North Devon, England. Hinks had recently built a replica of the 17th century ketch *Nonsuch*, the ship of the Hudson's Bay Co., which is now in a museum in Canada. The Hinks family has constructed wooden sailing ships

since 1844 and the policy of the shipyard has been to continue the methods of wooden shipbuilding that have been used for hundreds of years.

They used old fashioned tools including chisels, augers, and adzes for much of the work but they also used modern saws and electrical tools on some structural features.

For rigging the ship, Hinks called on two retired craftsmen, Joe and Oswald Bennett. Both are over 70 and had worked on some of the last square-rigged ships sailing out of Appledore, the last port in England to operate commercial sailing ships.

It was decided that the timbers used in the original ship were probably English oak, elm, and pine and a search for the right timbers included visits to timber yards throughout the country. Finding the tree for the mainmast of the *Golden Hinde* involved visits to estates as far afield as Scotland before a suitable one was found on an estate in Devon.

The keel was laid September 30, 1971 with the keel bolts driven home by the Mayor of Plymouth and the Earl of Mount Edgcumbe, the present owner of Buckland Abbey, Drake's country home.

Two months later, the Duke of Edinburgh came by to watch the men at work on the laying out of the ribs of the ship.

The launching, by the Countess of Devon with a bottle of mead, took place April 5, 1973. During the ceremony an engraved Devon cider flagon containing water drawn from the River Tavy near Drake's former home was presented to the owners to be carried to California on the ship.

After being on display in England, the ship, with Capt. Adrian Small as master, sailed from Plymouth, September 29, stopping at Falmouth, England; Lisbon, Portugal; Bridgetown, Barbados; Cartagena, Colombia; Nombre de Dios and Portobelo, Panama; before arriving at the Canal.

Drake's ship sailed out of Plymouth, December 13, 1577. She was at that time named *Pelican*, but Drake changed the name to *Golden Hinde* at the eastern entrance to the Strait of Magellan to honor his patron and good friend, Christopher Hadden. The figure of a hind or deer was a part of his crest. (While transiting the Canal, a Panama Canal launch carrying a photographer approached the ship, the crew noted with amusement that the name of the launch was *Pelican*.)

Most of the crew of 18 are seasoned square rigger seamen, having sailed with Captain Small on the replica of the *Nonsuch* during her voyages around the

south coast of England and the Great Lakes of Canada. Chris Daniel, the first mate, of the National Maritime Museum in London, is an expert in old navigational instruments and carried out a number of experiments with old period instruments during the voyage.

Talking with the captain and crew of the *Golden Hinde* about their crossing of the Atlantic and walking through her narrow low passages one can well imagine what life was like on the original ship when Drake and at least 80 other men were packed aboard her during the circumnavigation. Records show that they negotiated the Strait of Magellan in a raging storm with at least 90 men aboard since they had collected crew members from other of Drake's ships.

Most of the men huddled together in complete darkness below deck while others lay on deck between the cannon with the icy sea sloshing back and forth over them with every roll of the ship. They were a discontented lot, having already spent more than 7 months away from home and found no treasure, only half naked natives who ate bloody raw seal meat. They had resorted to eating penguins themselves.

The stout little ship, however, was a match for the raging storms in the Strait and was able to make its way around the world, after the historic landing on the coast of California, and return to Plymouth September 26, 1580, with what some have estimated at today's valuation as \$50 million in silver and bullion taken from Spanish ships. An exact accounting was never made public so no one can be sure of the value but all historians agree it was a fortune.

Sixteenth century ships, like the *Golden Hinde*, were not built with the comfort of the crew in mind. The men were expected to find places to hang their hammocks among the guns and the cargo.

The new *Golden Hinde* has narrow wooden bunks built-in but because of the dark cramped quarters below many of the men prefer to sleep on the deck.

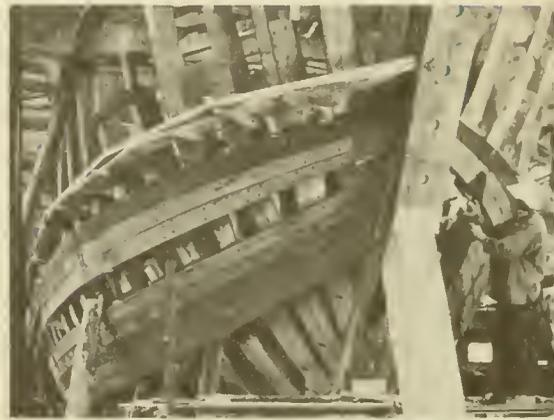
A few other modern additions include a generator to provide electric lights and a radio as well as a small auxiliary engine for maneuvering in and out of harbors. Living conditions aboard the ship, however, are Spartan and everyone must be capable of performing all the necessary tasks including climbing the rigging.

There is little leisure time for the crew while at sea. Much of the time during the crossing of the Atlantic was spent in maintaining the sails and wood structures.

One of the worst jobs on a sailing ship



Oswald Bennett, who is 77 years old, one of the riggers for the "Golden Hinde," binds a rope-end.



A shipwright tightens a clamp on the planking near the stem.



Pitching the seams to make them watertight.



Gov. and Mrs. David S. Parker welcome the ship's owners and officials of the San Francisco Convention and Visitors Bureau who, accompanied by a group of other California businessmen, flew to the Isthmus to transit the Canal aboard the ship. Left to right are: Albert Elledge, co-owner, Mrs. Parker, Dick Buxton, Governor Parker, Harry Orchard, and Art Blum.

Keeping alive sailing ship traditions

is tarring down the rigging. Along with this hot and dirty work, there was also the chipping off of old varnish and the revarnishing of masts and other wooden parts.

Although food on the ship includes much of the type that Drake carried such as salt pork and beef, corned beef, and dried fish, this is supplemented by canned food.

Throughout the voyage it was the custom of the master to muster all hands on the quarter deck for "divine services to give thanks to the Almighty for a safe passage." This was also a custom of Drake, who was a devout Lutheran.

Captain Small noted that on the ship they are trying to keep alive sailing ship traditions, not specifically those from Elizabethan days.

It is not possible to reprint the log, which is beautifully written in Captain Small's Spencerian script, but these brief notes (printed at right) which he hurriedly made for the REVIEW while he was in Panama give a first hand account of what it was like crossing the Atlantic



A crewmember holds "Snatch" who joined the ship in England as a newly born kitten.

on the *Golden Hinde*. The log will be turned over to the owners at the end of the trip just as Drake presented his log to Queen Elizabeth I. Unfortunately that log, which covered the voyage of circumnavigation, a great historical document, was never seen again.

Because the *Golden Hinde* required the service of a tug throughout the transit of the Canal, she paid \$6,000 in tolls.

After spending almost 2 weeks in Balboa, she left December 20 for Acapulco, arriving there January 5. The ship will be opened to the public in San Francisco sometime in the spring.

At left: Members of the crew climb to the top of the masts for a good view of the Canal. Below: The gilded carved figurehead of a hind is clearly visible on the stern as the ship joins a tanker in Gatun Locks.



Crossing the Atlantic on A 16th Century Galleon

Captain Small's notes:

Sailed Plymouth 29 September. Put into Falmouth as did Drake's small fleet of five ships. Sailed Falmouth 1 October with fresh northerly winds increasing to gale force. Vessel ran before the gales and made very good time, 130-150 miles per day. Reached Lisbon in 6 days and 3 hours (a total of 824 miles). Anchored at Cascais Bay at mouth of Tagus River as Drake had done on earlier voyages.

We spent 5 days in Lisbon taking on provisions and water. Sailed Lisbon October 11 for the Atlantic crossing to Barbados. Took the southern route towards the Canaries and Cape Verde Islands as the winds were still strong from the north. Blew strong gales as we approached Palma about 12 days out.

Palma is the westernmost of the Canary Islands and was our last sight of land for several weeks. It served to establish our position from which point we steered westwards. Heavy seas and strong winds continued putting a great strain on the hemp rigging and wooden masts. About the 18th day, the weather improved and the ship settled down to a steady 3-4 knots in the northeast trade wind. Everyday progress was made towards our destination. Had only two days of complete calm and even so made about 40-50 miles. Towards the West Indies, the trade winds increased in strength and we sighted Barbados 33 days out from Lisbon . . . all hands in good health, ship undamaged, still plenty of drinking water left.

The water ration started with about 15 gallons per day for all hands and for cooking but was later increased to 20 and 25 as we were making good time. It was November 13 when we arrived Barbados. The only port is Bridgetown where we tied up along with the luxury cruise liners. The island is green and beautiful. Watered ship and took on fresh provisions (including 100 coconuts) and sailed after 5 days. Enjoyable visit, very friendly people.

Next day we sailed close by St. Lucia Island and into the Caribbean

Aboard the ship, Captain Small, dressed in Elizabethan costume, talks with Rev. Edwin C. Webster, Dean of the Cathedral of St. Luke in Ancon. Dean Webster is recognized as an authority on Drake's local exploits.



THE MASTER OF THE "GOLDEN HINDE"

One of the few experienced sailing ship captains still active today, Capt. Adrian Small, with his full red beard and pipe, dressed in Elizabethan costume, looks the part of a 16th century sea captain.

Captain Small, who is 44 years old, began his career as an apprentice aboard the Finnish four-masted *Passat* during her voyage around the world from 1946 to 1948 which included an eastward rounding of Cape Horn. After brief service in the British Merchant Marine, he spent several years employed by the film industry, sailing the ships featured in "Billy Budd," "Damn the Defiant" and "Hawaii" among other productions. He was introduced to the movie business by Capt. Alan Villiers in 1954 and served with him aboard the *Pequod*, the ship used in the Hollywood version of "Moby Dick." He also served with Villiers in 1957 as his second mate on the *Mayflower* replica.

At the time that he was selected as captain of the *Nonsuch*, the replica of the Hudson's Bay Co. ship, he was already one of the most experienced square-rig sailors in the world.

When it was time to choose a master for the *Golden Hinde*, Captain Small, of Brixham in Devon, was the obvious choice. In addition to his other qualifications, some insisted he even looked like Drake and the British thought it was appropriate that he came from Drake's own part of the country.

Sea. Coasted the Spanish Main and after 10 days put into Cartagena . . . a short visit of 2½ days . . . incredibly ancient walled city with modern Miami-type city spreading around the shores of the Bay. After Admiral Vernon's attack, the Boca Grande was closed with a submerged breakwater. We went in by Boca Chica . . . same as Drake did.

Three days after leaving Cartagena we dropped anchor at Nombre de Dios. It was not a safe anchorage and I can well understand why the Spaniards shifted their base to Portobelo.

The shore looked inviting, green hills and thick jungle I suppose, but we had not time to explore. We anchored at dusk and sailed at dawn. No one, I think, had seen us.

Half a day's sail took us to Portobelo. We fell in love with the place and did explore the town and ruined forts. It reeks of history—the ghosts of Spaniards and heaps of silver bars. Anchored off the town, we used our boats to explore the shore.

Regretfully we weighed anchor and stood out of Portobelo on the morning of December 5. Carrying a fresh east wind we sailed along the coast and shortly after noon were off Cristobal harbor. We sailed through the breakwater in fine style with all sails set and Elizabethan banners flying (also Stars and Stripes).

On the 7th of December we were towed through the Canal to the Pacific shores. Sailed approximately 5,300 miles from Plymouth, England to Panama in 53 days.

Drake's Golden Hinde Visited California Almost 400 Years ago

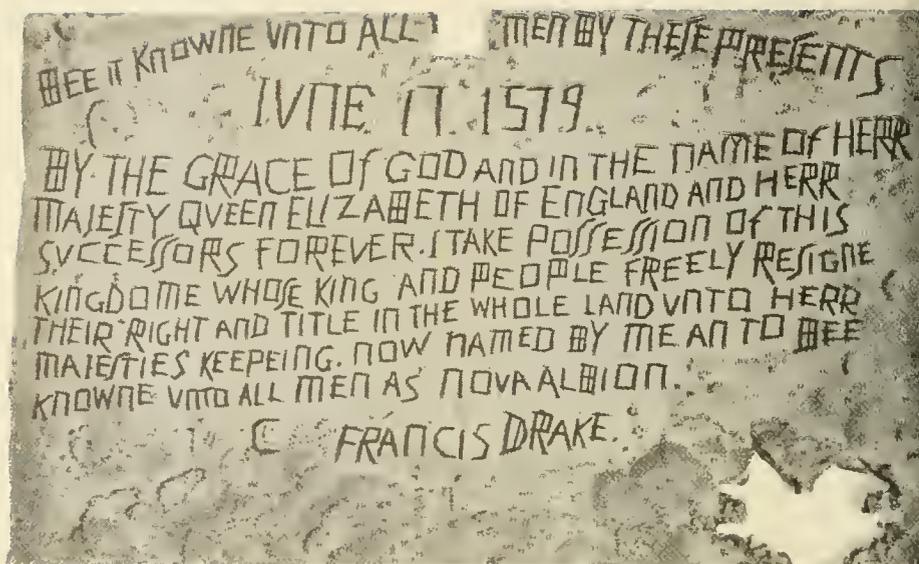
The replica of the *Golden Hinde* was built to commemorate Drake's landing in California, June 17, 1579, where he spent 5 weeks overhauling his treasure-laden ship.

Several historical reports state that he ordered "a plate of brass" (one report said it was lead) to be engraved with a record of his taking possession of the land for England and naming it Nova Albion. Albion, white land, was a Roman name for England.

While the extraordinarily friendly natives watched, the plate was nailed to a post along with a sixpence placed so that Queen Elizabeth's head, which appeared on the coin, showed through a hole that had been made in the plate.

In 1936, a brass plate that fits this description was found near San Francisco but although studied by many experts, its authenticity has never been fully proved or disproved.

A subject of controversy also is the exact location of Drake's anchorage. Historians, geographers, and anthropologists have at-



The "Plate of Brass" now displayed near the entrance to the Bancroft Library at Berkeley. A facsimile hangs in Drake's ancestral home, Buckland Abbey.

tempted to solve the problem. The sites considered most likely are the areas now known as Drake's Bay and San Francisco Bay.

Heated debates on the location of the

anchorage and the authenticity of the plate continue. Probably only Drake's long-lost logs of the circumnavigation could settle the arguments.

Exploration of Drake's Burial Site Planned

This spring, the Marine Archaeological Project Panama will begin a search at Portobelo for several shipwrecks of great historical importance.



Sidney Wignall holds the Duke of Edinburgh Gold Medal awarded to him by Prince Philip for his expedition's excavations of Spanish Armada ships. His current expedition will work off Portobelo for 6 months.

In the course of this exploration, Sydney Wignall, the leader of the expedition, a historian and marine archaeologist from Colyn Bay in North Wales, will also search for the lead coffin in which Sir Francis Drake was reported to have been buried.

Drake's burial has been described as follows:

"His interment was after this manner: His corpse being laid into a coffin of lead, he was let down into the sea, the trumpets in doleful manner echoing out this lamentation for so great a loss, and all the cannons in the fleet were discharged according to the custom of all sea funeral obsequies."

Wignall believes it is possible that the senior surviving officer, Col. Sir Thomas Baskerville, scuttled English and Spanish ships in the area where Drake was buried in the bay and that the expedition, while searching for these ships, might locate his coffin. Wignall says that he knows the exact weight of the lead sheathing and the location of the Drake burial site within a margin of error of not more than 300 meters.

If the coffin is located and it contains human remains, a detailed anatomical examination will be carried out by Professor R. G. Harrison, of Liverpool University. He is one of Europe's leading anatomical scientists, whose examinations and blood tests of the Pharaohs, Tutankhamen and Smenkare, recently aroused great interest.

The expedition is supported by the Coun-

cil for Nautical Archaeology of Great Britain and will operate in Panamanian waters for 6 months with permits issued by Panama.

The M.A.P.P. will search for a caravel possibly abandoned at Portobelo in 1503 by Christopher Columbus, two Elizabethan ships, the *Delight* and the *Elizabeth* and several Spanish frigates scuttled by Drake's men following his death.

The expedition will work under the supervision of the Panama Government. A conservation laboratory, the first of its kind in Central America, will be set up by the expedition and after completion of the project, it and all recovered objects will be turned over to Panama.

The project is designed for scientific and historical investigation only, with no interest in treasure wrecks. None of the ships the expedition seeks contained treasure. Wignall said that the goal is: "To strive to enrich the sum of man's knowledge of his great maritime historical heritage."

He will produce a series of documentary films for international distribution and will write a book which will be published simultaneously in England and the United States.

With staff members from eight different countries, including a number of leading scientists, Wignall regards the project as an opportunity for international cooperation in the fields of history and science.

Some Fancy Shirts From Far-Off Shores

*(and some prefer
the local product)*

By Vic Canel

FROM THE PHILIPPINE BARONG tagalog to the Paraguayan ahoi toi to the African dashiki and the Venezuelan liquelique, you're apt to see them all in this tropical crossroads of the world.

Of course, there are also the classical guayabera and Panama's own camisilla and montuno, along with shirts from China, India, Mexico, Guatemala, Nicaragua, and many other lands.

Social gatherings in the tropics often tend to be informal and men wear fancy or distinctive shirts instead of coat and tie. And Panama's centric geographical location and heterogeneous population make it a great place for shirt watching.

Most often seen here and throughout the Caribbean area is the guayabera or variations of that four-pocket shirt with vertical pleats at front and back. Derived from the Spanish word "guayaba" (guava), the guayabera originated in Cuba, where it was worn chiefly by the "colonos" or gentlemen farmers. The original guayabera was made of fine linen and was worn heavily starched and impeccably ironed. It had long sleeves and a collar that could be buttoned and worn with a black bow tie, which made it acceptable dress at places where coat and tie were required.

The price of a guayabera was determined by the number, size, and workmanship of the tucks and the quality of the linen. Even back in the late twenties and early thirties, when prices were so much lower than today's, affluent colonos paid as much as \$25 or \$30 for a fine guayabera.

In the Philippines, the barong tagalog, an elaborately embroidered, long-sleeved shirt with French cuffs and no pockets, is worn as formal attire. With open collar, it is equivalent in elegance to wearing a dinner jacket, but button the collar and it ranks with white tie and tails.



The elegant barong tagalog comes from the Philippines, while the sophisticated version of the guayabera, below it, is a product of Puerto Rico.



“Where did your shirt come from?” is often asked question on the Isthmus.



Traditionally, the intricate embroidery on the barong tagalog is done by women in the outlying towns or “barrios” of the Philippines. Embroidering the pre cut lengths of cloth is an exacting chore, for the women must know exactly where to place the embroidered designs so that they are symmetrical when the shirt is ultimately cut out and assembled.

The finer Philippine shirts are made to order. The customer buys the embroidered material and takes it to a tailor who turns out the finished product. Some shirts are entirely covered with embroidery. These are referred to simply as “all over shirts” and the material alone may cost close to \$200.



Similarly, the Paraguayan ahoi toi (which in Guaraní means fine cloth), was originally embroidered in private homes, then made into shirts or dresses. At first they were made mainly as wedding shirts, with a similar design for the bride’s gown. Today it is a big industry. Shirts and dresses, made of new synthetic materials, some even equipped with the adhesive Velcro closures, are now being exported.

Typical of Venezuela is the liquelique which is not really a shirt, but a complete costume consisting of a Mao-type jacket with metal buttons and matching trousers. The name is believed to be a corruption of the French word liqueur, a synonym of shirt.

From Guatemala come brightly colored homespun cotton shirts with bold and distinctive designs woven into the cloth. A favorite subject is a stylized version of the quetzal, the bird that



serves as the country’s national emblem and lends its name to the unit of currency.

The Nicaraguan version of the popular guayabera, produced in many colors, usually features embroidered pastoral scenes paralleling the vertical tucks in front. The embroidery is most commonly done with thread several shades darker than the shirt material.

Increasingly popular on the Isthmus, as with young people everywhere, are the embroidered, light cotton shirts and blouses from India. Made in short, long and three quarter sleeves, they are worn by both men and women. Most are embroidered with floral designs, some have tiny mirrors sewn into the embroidery. Hindu shops in Panama report that they are currently among the fastest selling items.

Also available in Panama shops are richly embroidered shirts from Hong Kong. Like the Philippine and Paraguayan shirts, embroidery work is done on lengths of cloth and the shirt assembled later. In this case the cloth is hand embroidered in China. The Hong Kong shirts, still another variation of the guayabera, have only two pockets below and no breast pockets. Made mostly of polyester and cotton, they come in white and a variety of pastel colors.

The advent of black consciousness in recent years has contributed to the popularity of the West African dashiki, a loose fitting pullover shirt with a deep slit neck and flowing sleeves. The bold prints and brilliant colors of the dashiki made their first appearance in the West-

At left, from top: Somewhat less formal than the barong tagalog is the short sleeve model, also from the Philippines. From India, a high collared, intricately embroidered long sleeve shirt which is available in Panama’s Hindu shops. A stylized version of the quetzal, Guatemala’s national emblem and unit of currency, dominates most designs from that country. A touch of distinction added to this guayabera is an embroidered Aesculapian staff to proclaim the profession of its owner, Dr. R. R. Pierson, of the Panama Canal Veterinary Medicine Division. Above right: Made of unbleached muslin, Panama’s montuno shirt is decorated with a variety of cross-stitch designs.

ern Hemisphere when they were adopted by blacks in the United States, but are now a common sight on the Isthmus and are worn by all races.

The shirt industry in Panama produces a wide variety of original designs under internationally known labels. Famous brands such as Arrow, Jayson, Manhattan and Christian Dior are designed and manufactured locally under franchise.

The Jayson and Christian Dior franchises are held by a firm headed by young Víctor M. Azrak, whose late father, Moisés Azrak, founded the company in 1958. His mother is the chief designer. The factory employs nearly 200 people and turns out more than 1,000 shirts a day. Specialized seamstresses work on various components of the shirts—some models requiring up to 45 separate operations.

Azrak obtained the Christian Dior franchise about 2 years ago. Some of the finer Dior models retail for as much as \$50.

Manhattan shirts are turned out in a neighboring factory which also produces about 1,000 a day. Here too, though advice and technical assistance is provided by the parent factory, shirt designs are exclusive.

Though Manhattan also has a line

At right: From West Africa comes this colorful dashiki worn by Edmund F. Johnson, an employee of the Balboa Heights Post Office.

Below left: The traditional Panamanian camisilla is correct attire for the partner of a women wearing the classical pollera.

Below right: Matching shirt and dress embroidered with local scenes is the pride of this square dancing couple, Al and Anne Richardson, of Gatun.



Popular for Work or Play



William Bennett, control house operator at Miraflores Locks, wears the typical Panamanian guayabera, considered by many ideal for work in the tropics.



Guayaberas for boys also are available locally. Wearing styles in white and blue, Larry R. Rogers and his son, Larry, Jr., go for an outing in Balboa.



At left: Busy seamstresses turn out more than 1,000 shirts a day at this Panama factory.

Lower left: Expert cutters follow patterns to produce the components that will later be assembled by the seamstresses.

Left below: Buttons are the specialty of this operator. Some shirt models require up to 45 separate operations.

Below: Attractive packaging is an important factor in modern shirt marketing. Each garment is carefully ironed and placed in cardboard-backed cellophane sheaths.



of women's wear, the local factory produces only men's shirts and trousers. Materials are imported from Europe, Japan and the United States. As protection for the local industry, manufacturers are exempt from import duty on thread, buttons, snaps and other accessories.

During his most recent visit to the Panama factory, Herb Kay, technical manager for the International Division of Manhattan, who travels the world over to offer advice and solve technical problems, provided a preview of things to come in men's shirt fashions. Solid colors are in for next year, he says, and ties are on the way out. The trend, he says, is toward longer shirt collars, to be worn open and overlapping the jacket collar.

Packaging, Kay says, is among the most important phases in shirt marketing and techniques have changed radically through the years. Shirts used to be delivered to the retailer in bundles and it was up to him to make the merchandise appealing to the customer. Now, each shirt is carefully ironed and



attractively packaged by the manufacturer.

Many locally manufactured shirts are sold in Canal Zone retail stores today. In the early days of the Canal, commissary customers did not have a very wide selection of styles, though the prices were considerably lower, as indicated by this notice in the *Panama Canal Record* of July 7, 1915: "Catalogue and samples of shirts from Yamatoya Shirt Co. in Yokohama, Japan, received. Shirts made to order are of pongee, silk and crepe, and can be ordered through the Depot Commissary, Cristobal, at catalogue prices plus a surcharge. The listed price: 27 yen (\$13.80) per dozen and up."

Shirt styles vary widely. Collars change in size and shape, sleeves may be short, long, puffed or snug. But Panama's two traditional shirts, now worn only on special festive occasions such as carnival, have remained constant through the years.

The most elaborate and colorful embroidery is found on the montuno. The intricate cross stitching and distinctive designs require many months of painstaking work. Bands of embroidered figures, sometimes animals, sometimes flowers, adorn the front of the shirt on each side of the collar opening. These are called pintas. Below the collar opening is a large central design called "el corazón"—the heart. A straight, almost knee-length shirt with wide sleeves and snug, embroidered cuffs, the montuno is made of unbleached muslin. It ends in a fringe raveled from the cloth itself. The full montuno costume consists of the shirt, calf-length trousers of the same material, a hat woven from wild palm fronds and a straw bag with shoulder strap, called a chácara.

Somewhat more formal if less colorful is Panama's camisilla, a long sleeved, pleated shirt of white linen with a mandarin style collar and gold buttons. This shirt worn with black trousers, is considered to be the correct costume for a man accompanying a woman dressed in Panama's elaborate pollera dress, a multi-tiered, elaborately embroidered gown enhanced by such accessories as heavy gold necklaces and shimmering head adornments called "tembleques."

Pictured on these pages are just a few of the shirts from many lands collected and worn by residents of the Isthmus, where, along with the ships and the products of the world, there is a constant parade of fashions from afar.

ANYONE WILL TELL YOU THE Isthmus is a fisherman's paradise, but of late local aquarists have given the old sport a new angle. Not content merely to keep the freshwater "tropical" aquarium fish that are available in any well-stocked hobby shop from New York to California, more and more Isthmian fish fanciers are going out to capture lenizens of the deep, both freshwater and marine, for their tanks.

Dr. Horace G. Loftin (Assistant for Environment-Energy to the Chief of the Executive Planning Staff) noted in his Ph. D. dissertation, "The Geographical Distribution of Freshwater Fishes in Panama," that in the 1850's a "Capt. J. M. Dow, captain of the old Panama Railway Co.'s steamer *Guatemala*, was apparently the earliest serious collector of Panamanian fishes." Many others, both scientists and amateurs, have followed his lead.

Carl Chapman, a music teacher at Curundu Junior High, makes frequent



The Age of Aquarists

By Pandora G. Aleman

trips to the interior and sometimes takes students snorkeling up the as yet untamed Bayano River. Since arriving in Panama, Chapman has kept only native fish. "Here I was, in the tropics," he says, "so I thought I'd set up a real tropical aquarium."

The enthusiasm is contagious. Gilbert Young, a systems analyst with the Systems Division, used to go regularly to rivers and streams near Chepo with a friend who liked to catch and breed his own fish, which he then sold in order to buy more equipment. Young caught the bug too, as a glance at his 50-gallon tank will show.



Other zealous collectors can be found at monthly meetings of the Canal Zone Aquarium Society, headed this year by Robert E. Daisev. The group, which boasts a membership of some 137 adults and about an equal number of children, last year sponsored expeditions to a river near Chepo and to Portobelo.

The group has heard various speakers including Dr. Donald L. Kramer, a biologist with the Smithsonian Tropical Research Institute who is studying the feeding and air-breathing behavior of freshwater tropical fish. He recommends walking up a river or stream as one of the best ways to see the jungle. There are no ants and no bushes to clear, and the sandy or granite stream bed makes for easy walking.

His wife, Vanessa, who assists him in catching fish and in keeping records, wears long pants and a long-sleeved shirt as well as sneakers and socks, so

mosquitos will have a hard time finding a target.

Dr. Kramer suggests that the novice will be more comfortable starting out in clear streams where he can slip on face-mask and snorkel and study the fish in their natural habitat. He adds that in swift-running streams, especially in uninhabited areas, there's little danger of disease.

There may be more danger of snake-bite in the dry season, when the bush-master and fer-de-lance come down to streams to feed on frogs, he says, but adds that his expeditions here have netted him nothing worse than muddy feet and some mosquito bites.

Chapman, who perhaps goes a bit farther afield than most, has in the past 9 years seen one fer-de-lance and two bushmasters—all verified, as he brought back the heads for identification. Once, out around Huile, he was passing his net

At left: This redlip blenny, perched in his favorite clump of lettuce coral, is the clown of Dr. Melvin M. Boreham's saltwater aquarium. Above: This scene, difficult to capture, features Dr. Boreham's large queen angel, at left, and a smaller one, at center. At the base of the featherdusters, right, is a four-eyed butterfly fish. A dark stripe camouflages its eyes and the dark spot toward its tail misleads any would-be predators. The angelfish like to peck at the coral and at the "Caulerpa" plants, left foreground.

under the overhanging roots of a tree when a hissing sound alerted him that he was the unwelcome intruder in a crocodile's home.

But none of this seems to disturb the dedicated ichthyophile greatly. David Carlson, a student at Curundu Junior High, isn't much bothered by the prospect of running into snakes. After all, he once had a pet boa.

Luckily, not all the exotic fish are found in exotic places. About the only place that isn't good for collecting freshwater fish is Gatun Lake, which since 1967 has been taken over by the peacock bass. This beautifully marked, delicious fish—not a bass at all, but a species of cichlid—was brought in from Colombia to stock a small man-made lake. During the rainy season, the lake overflowed and the fish found their way to Gatun Lake, where they fed voraciously on the small native fishes, now all but extinct in those vast waters.

You don't need much in the way of equipment to enjoy the sport. Besides a facemask and snorkel—Chapman says the "ping-pong ball" type is best in swift-running streams—and a net of some kind, it's a good idea to take along a cooler or a bucket or two, with a battery-operated aerator if you are far from home. To transport his catch, Chapman puts water and fish in large plastic bags and adds a quarter of an aspirin to each bag. This, he says, tranquilizes the fish, which then require much less oxygen than they normally would.

Dr. Kramer has a variety of nets at his lab in an old bunker near Naos Island. It takes two people to work the seine, a net stretched between two poles—basically like the common minnow seine, but with heavier weights along the bottom.

He also has a large square-bottomed dip net on a long handle and an A-frame net, a sort of scoop-like affair that works like a one-person seine. He sometimes uses the metal minnow traps commonly used to catch live bait.

Chapman uses an apron of mosquito netting to go after his fish. The apron ties around the neck and has elastic at the wrists and lead weights along the bottom—another one-man seine. Using mask and snorkel, he crawls upstream. If he picks up a rock, anything hiding under it or clinging to it finds itself in the net. When he stands and brings his arms up, he usually has a variety of fish from which to choose.

Most fish captured locally are not as colorful as their South American relatives or those which have been specially bred by aquarists, but with their varied

personalities they are no less fascinating to watch. Through careful breeding and crossbreeding, more colorful strains can be developed—a challenge that a few local aquarists have taken up.

The collector will find it easy to pick up the wild molly, several of its near relatives, and other live-bearers in his seine.

This family of fish has long fascinated aquarists because of its unique manner of breeding. The male fertilizes fully formed eggs in the female's egg duct; the eggs hatch and the young grow in the protection of the mother's body. They are delivered one at a time, folded head to tail, and soon straighten and swim for refuge. A plus for the aquarist is that these promiscuous fish multiply rapidly without his having to play Cupid. Chapman says a cross between

Aspirin may help to calm the catch

the native molly and the more colorful "store-bought" hybrid molly produces offspring with the hardiness of the Panama molly and the fanciness of the hybrid.

In the wild, several of these little fish perform the very useful function of eating the larvae of mosquitoes that carry malaria and yellow fever. In "Exotic Aquarium Fishes," William T. Innes notes that "success in building and maintaining the Panama Canal depended partly on the solution of the fever problem" and credits one member of the *Gambusia* genus with helping to make Panama habitable to foreigners.

The "mosquito fish" found here takes its name not from its dietary habits but from its size. According to Innes, it is the smallest of the aquarium live-bearers, with an overall length of about half an inch.

The aquarist usually learns the hard way not to tangle with one member of the characin, or "tetra," family found here in abundance. Members of the *Roeboides* genus are nice to look at, with their silvery body, reddish fins, and black spot at the base of the tail. Their

sloping forehead gives rise to the nickname "humpbacked tetra." The fish seems to have a lot to offer the aquarist—but it's murder. *Roeboides* has a nasty habit of ramming other fish with spikes on his snout, knocking loose a scale or two which he then dines on at his leisure.

Another family of fish commonly found in Panamanian streams is the cichlids. Innes says that "high-strung" cichlids change colors rapidly, and this is borne out by Chapman's observation of color change after feeding—or even when excited by a finger being wiggled in water at the top of the aquarium. They have the most personality of all local freshwater fish, he says, being temperamental and moody to the extent of eating well one day and, the next, letting even live baby guppies go unmolested. Chapman says he found his fish liked to dine on slivers of corbina roe. But Sid, a blue cichlid (also known as blue acara or *chogorro*) belonging to friends of the Kramers, has a predilection for cockroaches. There's no accounting for tastes.

Dave Carlson has some zebra cichlids, which he also calls "striped convicts," that have dark spots by day and stripes by night. The female of the species has most of the color, an oddity among aquarium fishes.

Dave is rather proud of having caught two of the elusive knife fish. These graceful fish, relatives of the so-called electric eel, propel themselves backward or forward with equal ease, by the ripple of a fin.

Chapman reports finding three members of the broad-sole family, those peculiar fish that lie on one side and in maturity have both eyes on the upper side, in the Ipate River. When these relatives of the flounder undulate the fins at the edges of their bodies they glide horizontally like, as Innes says, "a pancake being propelled through the water."

The long, slender, delicate pipefish is a marine specimen that here in the tropics has moved into freshwater. Dave Carlson found a small one, along with what seems to be a freshwater eel of respectable size, in a Corozal drainage ditch. Looking at the slim pipefish, one would never guess that it's related to that marine charmer, the seahorse. In both, the male carries the eggs in a pouch until they hatch, and both have difficult-to-please palates, preferring live food of just the right size.

Even the hobbyist who doesn't fill his aquarium with fish he has caught himself makes room for the local catfish,

Coral and plants provide hiding places



Dr. Boreham readies his camera and movie light and waits for a fish to swim into range. His 83-gallon marine aquarium, which he built himself, is set up to resemble a coral reef in miniature.

valued as peaceful scavengers that help to keep the tank clean.

The graceful *Pimelodella*, commonly known as the striped catfish, and its larger relative *Rhamdia* abound in Panamanian streams. Hidden in the dorsal (or back) and pectoral (or breast) fins of the innocuous-looking *Pimelodella* are three venomous spines that can leave the unwary collector's finger smarting for an hour or more.

The *Plecostomus* and the whiptails are well-known local suckermouth armored catfish. (No catfish has scales; the armored catfish are covered with bony plates.) These fish use their sucker-like mouths, located on the underside of the head, to scrape algae and other material from the aquarium bottom and sides, plants and ornaments.

Plecostomus, light brown with dark spots, tends like most catfish to hide or lie quietly during the day. Dr. Kramer says it is much easier to catch at night,

an assertion that most collectors are reluctant to verify.

Two types of whiptail catfish are found in Panama. In the smaller *Loricaria*, common in the Canal Zone area, the "whip" appears only at the top of the tail fin. Appropriately enough, the male has a "beard" of short bristles. David Carlson has one of the much larger but still peaceful *Sturisoma* genus, which has "whips" at the top and bottom of its fin. It is found farther away, in the Mamóní River of the Bayano basin and the Antón River, Coclé Province.

Anyone who wants to can populate his tanks with freshwater shrimp. Those with small foreclaws are less likely to annoy or damage the fish, though all are fascinating to study as they scavenge, picking up minuscule particles and transferring them from claw to claw until they end up in the shrimp's tireless mandibles.

Even the aquatic "weeds" proliferat-

ing in the waters of Gatun Lake are a boon to the aquarist. *Hydrilla* and hornwort provide good hiding places for small fish, and duckweed, a small floating leaf, gives needed shade where an aquarium gets too much overhead light. Water lettuce, another floating plant, has fluted, velvety, light green leaves which add to the tank's beauty. And the floating water hyacinth, which because of its rapid propagation is probably a greater threat to navigation than any other plant, not only produces a beautiful white, blue, or violet flower but has blue-black bushy roots that according to Innes are ideal for breeding fishes that drop adhesive eggs near the surface—a group that includes goldfish.

Fascinating as it can be, an aquarium filled with local freshwater fish is to the aquarium filled with marine, or salt-water, fish what black-and-white is to technicolor.

Many are those who head out to en-

Fish fanciers find field trips are half the fun



Above: David Carlson goes after a native cichlid in one of several tanks he has in his hobby room. At right: Face down with mask and hand net in a well-shaded stream near Gamboa, he demonstrates one of many techniques used by hopeful collectors. Fish captured go into the cooler at water's edge.



joy for a brief while the wonders of the Panamanian seas—particularly the Caribbean coral reefs—but few attempt to bring the beauties of those waters into their living rooms, and rarer still are the individuals who succeed.

Dr. Melvin M. Boreham of Coco Solo, the medical entomologist with the Sanitation Division who works on mosquito control research, might be called the dean of local marine aquarists. His aquarium is an outstanding example of what can be done in creating a miniature coral reef in the living room.

After coming here in 1966 he visited the coral reefs and was fascinated by the fish. He had previously had a 15-gallon freshwater aquarium, and decided to try his hand at the marine variety. He began with a 20-gallon tank and soon realized that keeping saltwater fish was quite different from maintaining a freshwater aquarium.

For one thing, freshwater fish are much more adaptable than marine fish, since they must adjust to variations in water quality caused by the annual rainy season-dry season cycle. On the other hand, the environment provided by Panamanian seas has remained relatively constant since the Isthmian land bridge between North and South America emerged from the ocean three or four million years ago. According to some experts, the coral reef is probably the most stable environment on earth, while the quality of seawater in an aquarium is subject to rapid and drastic changes.

To combat this, the aquarist should begin with the largest tank he can man-

age. Secondly, he should thoroughly understand the importance of using the right type and quantity of gravel and a subgravel filter. A book by Stephen Spotte, "Marine Aquarium Keeping," is highly recommended by Dr. Boreham as it covers setup of the tank in detail.

After having trouble with his 20-gallon aquarium, Dr. Boreham built an 83-gallon all-glass tank. (The metal commonly used to strengthen freshwater tanks corrodes readily in the presence of salt water.) On top of the subgravel filter is 4 inches of 3/16-inch to 1/4-inch gravel coral.

The importance of such a setup lies in the fact that if the aquarium is properly seasoned before a large number of fish are added, beneficial bacteria collect on every surface of every piece of gravel. As the aquarium water is drawn through the gravel, the bacteria act on the highly toxic ammonia which constitutes the major waste product of the fishes, transforming it first into nitrite and finally into relatively nontoxic nitrate.

Even with all this, Dr. Boreham advises the marine aquarist to change 10 to 25 percent of the water in the tank monthly, either bringing new water from the ocean in plastic 5-gallon "jerry cans" or making up a new solution from synthetic sea salts. This is to replace trace elements and to reduce the nitrate level, both of which benefit the fish.

An aid to the aquarist, freshwater or marine, who wants to keep his pets free of disease is an ultraviolet sterilizing unit. Water is pumped through Dr. Boreham's unit at the rate of 200 gallons

per hour, and harmful bacteria and free-swimming stages of protozoan parasites are killed.

In addition, Dr. Boreham tries to provide his fish the hiding places and "territorial space" they need. Overcrowding puts the fish under psychological stress, making them more prone to disease.

Because marine fish have a strong sense of territorial rights, Dr. Boreham makes a practice of either rearranging the coral when adding new fish or adding the new fish at night, when the others have eaten and are ready to retire to their chosen niches.

He uses a timer on his aquarium lights to control the day-night cycle, giving the fish 12 hours of each. He says the period of uninterrupted darkness is crucial to the well-being of reef fish. They get fidgety and squabble just before the lights go out, as they get ready to set up for the night. The smaller, more defenseless fish, ever alert, ever wary, move from their daytime hiding places to different ones to elude potential enemies.

Proper food is important too. Dr. Boreham, like many others, makes his own, using gelatine, raw shrimp, water, a good commercial flake food, and spinach.

By speaking to the Aquarium Society and other local groups about marine aquariums, using slides and movies taken of fish in his aquarium to illustrate his points (he titled one talk "Underwater Photography Without an Underwater Camera Housing"), Dr. Boreham has interested others in the hobby.

His neighbors, George and "Bobbie" Egolf, were given encouragement on

the idea by Dr. Boreham who lent a helping hand. Now they have built and are operating a 112-gallon aquarium and their son, Bruce, is becoming an accomplished collector and photographer of coral reef fish.

The Daisey family of Corozal is another example. Robert E. Daisey, a marine engineer with the Ports Division, his wife Lori, and daughters Cheri, Cindy, and Rena like doing things together and are always ready to take up a challenge.

The Daiseys' collection of saltwater fishes started with Amigo, a damselfish captured near San Carlos, on the Pacific side. (Incidentally, they keep Pacific and Atlantic specimens together in water they get from the Pacific Ocean at Fort Amador.) Now, not only do they have two successful 30-gallon saltwater tanks, but Cheri plans to get an A.S. degree in marine biology at Canal Zone College and may go on for further degrees after that. She would like to be a crewmember of a seagoing laboratory like Jacques Cousteau's.

The Daiseys have not hesitated to innovate. Instead of gravel they use crushed shell from Farfan Beach, which they say helps maintain the water's alkalinity. They siphon off and replace about 10 percent of the water each week. Using sea water in a special container, they raise brine shrimp to adulthood to supplement their fishes' diet.

Bob Daisey installed an air compressor with storage tanks that hold enough air to keep the filtering-aerating units going for 6 to 8 hours in the event of electrical failure. Because the compressor goes on and off automatically and runs only about 10 minutes out of every hour, he figures the unit both saves them money and conserves energy.

The marine aquarist is rewarded with more beautiful hunting grounds and more spectacular quarry than his freshwater counterpart. No local dealer stocks marine fish, so he must don mask, snorkel, and flippers or tennis shoes and either embark for or wade into his chosen area. He can take along a copy of the "Fishwatcher's Guide to West Atlantic Coral Reefs," which is printed on plastic pages so he can study the fish he sees while submerged.

Tennis shoes are important to the waders because they offer some protection from the long, sharp, venomous spines of the black sea urchin. The collector soon learns also to shun the innocuous-looking fire coral and bright-orange fire sponge, both capable of inflicting nasty "burns."

As for barracuda, Dr. Boreham says



A local suckermouth armored catfish of the popular "Plecostomus" genus, shown clinging to a plant leaf, shares one of the Daisey family's tanks with some aristocratic black angelfish.

he knows of no unprovoked attack on man in clear water, though in murky water they may possibly mistake the flash from a ring or a bracelet (so keep jewelry covered with gloves) for fish. His wife, Kathy, developed an aversion to eels after an encounter with a 3-foot specimen with a nasty temper. Dr. Boreham reassuringly notes that local eels are neither poisonous nor electric, though they can bite. The closest call the Daiseys have had was when a shark moved in between Lori and daughter Cheri. A friend yelled, "Shark! Freeze!"

Dr. Boreham demonstrates inner workings of an ultraviolet sterilizer which assists in disease control within a saltwater or freshwater aquarium.



Uninvited guests often add interest to the aquarium

but to her mother's dismay, Cheri kept moving in for a closer look.

With all of this, there isn't a marine fish fancier around who won't tell you it's all worth it when he gets his prizes home. Dr. Boreham's two brilliant blue and gold queen angelfish are the pride of his tank. His two redlip blennies are clowns, playing games with the other creatures and posing for him in a clump of lettuce coral. The rock beauty, bright gold with a large dark spot, and the spectacular black-and-white spotted drum, with its graceful, high-flying dorsal fin, are among his favorites.

Adding to the beauty of his miniature reef are the featherdusters, a type of tubeworm attached to the no-longer-living coral he uses in the tank. Its delicate, feathery tentacles rise from the tube in a spray of splendor, searching for tiny food particles and delighting the eye of the observer.

Uninvited guests sometimes come in with his coral: sea urchins, crabs, bright-colored sponges, sea stars, and once a charming little fish known as a secretary goby. The goby lived in a tiny cave in a hunk of coral, and except at feeding time only his alert little head could be seen. Unfortunately, the little fellow mysteriously disappeared when a baby octopus made his entrance, unobserved, in a later batch of coral.

The Daiseys are particularly proud of their pair of red-and-white candy-striped banded coral shrimp, their orange starfish, and their adult seahorse, Duke. (Mrs. Daisey's account of their adventures with Duke follows on p. 19.)

The male shrimp sometimes posts himself in a protective position above his mate, and at feeding time, he carries food to her. He also performs a valuable service for the fish in the tank, including the seahorse, by periodically removing any microscopic parasites they have picked up.

The rivers of Panama are many and the oceans are wide. If you think you'd like to join the fun, you'll find lots of room and plenty of helping hands along the way.

IN THE SPECIAL COLOR SECTION

The Saltwater Aquarium

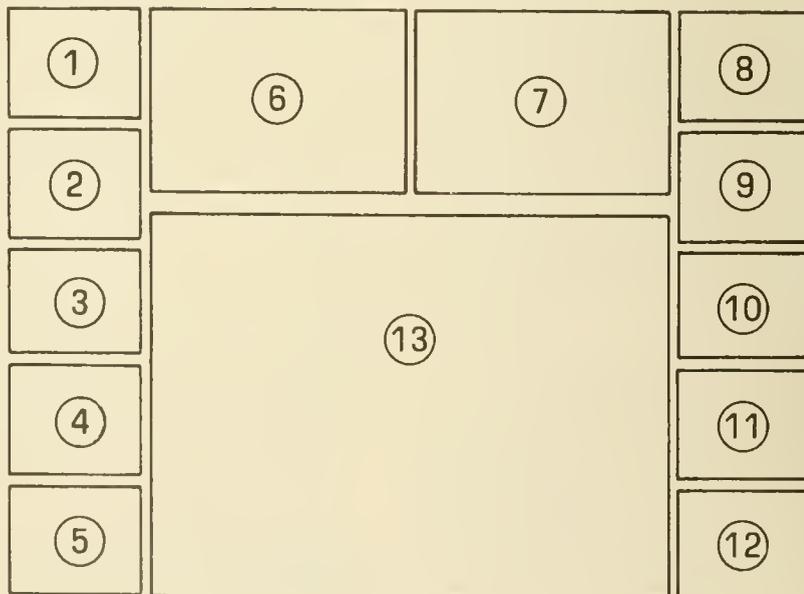
A royal gramma, left, and a queen angel are two of the 15 brilliantly colored, darting fish supported by Dr. Boreham's miniature coral reef. Another, a four-eyed butterfly fish, can be seen behind one of the finger corals. To create a natural as well as beautiful environment, Dr. Boreham uses several types of aged coral and living plants such as the bush-like *Penicillus* seen in the foreground. This photo and that of the seahorse on the fourth page of the center section are by Arthur L. Pollack.

On The Coral Reefs

The underwater photographs in the centerfold, all taken on the local coral reefs, show the diversity of spectacular fish, corals and marine creatures available to the saltwater aquarist. The barracuda (5) was photographed by Dr. Greg Quick and the other subjects by Dr. Phillip Akers. Both practice at Gorgas Hospital.

The diagram, below, will help to identify the various specimens:

1. Yellowtail Damsel fish
2. Rock Beauties
3. Juvenile Grey Angelfish
4. School of Pacific Wrasse
5. Atlantic Barracuda
6. Secretary Goby in a coral head
7. Neon Gobies near their burrow in a polyp-covered rock
8. Flamingo Tongue Snail on a Gorgonian (soft coral)
9. Anemone colony.
10. Flower coral
11. A Crinoid
12. Serpulid Worms on brain coral
13. Queen Angelfish being cleaned of parasites by a smaller fish, a common health practice among marine fishes which also occurs in saltwater aquariums.









WE HAVE A HORSE IN THE house!" Busy at work in the kitchen and hearing that call from the living room, some mothers might have been stunned, but not me. My husband, Bob, and daughters, Cheri, 17, Cindy, 15, and Rena, 6, are all extremely active and full of pranks. Nothing amazes me anymore.

Entering the living room and not coming eye-to-eye with a hay-and-oats eater, and hearing the laughter of my husband and Cheri, I laughed also—from pure, honest relief!

Then I saw the ice chest at their feet with the battery-operated aerator going and caught on to what they meant by "horse."

A year ago at Christmas I had given my husband one aquarium. During the past year the number had grown to 21. At first we had been strictly freshwater

specimen. A friend had given him to Cheri. When the temperature of the water in the ice chest matched that of the aquarium, we gently released him into the aquarium. We kept a close watch on him for the next 12 hours to be certain that no other specimens in the tank molested him.

We did not know that as beginner marine aquarists we had taken on perhaps more than we were ready for. Dwarf seahorses are relatively easy to raise, as they feed eagerly on brine shrimp. Adult seahorses are another matter.

Although Dynasta (as we called our seahorse) appeared happy in his surroundings, he refused any and all forms of food we offered him. After the third try, we knew we were in trouble.

We searched our library and discovered that adult seahorses cannot see

the tiny brine shrimp but will eat baby guppies or small shrimp. We released several baby guppies into the tank, hoping Dynasta would take them. He never had a chance; the other fish got them before he even knew they were there.

During this time, we had made it a point to place our hands in the tank, handle Dynasta, let him curl his tail around a little finger, and teach him that the hand was not to be feared. This helped us solve the first stage of our feeding problem. Cheri took a live guppy and, holding it by its tail, slowly lowered it to Dynasta. He looked it over very carefully, and then—Snap!—he ate it. She offered another, and again he ate it.

The next feeding time I offered the guppy, and he took it. He had accepted us, and he was now accepting food—live—so long as we hand-fed him. But

A Horse in the House

By Lori Daisey

fish raisers and breeders. When Cheri began snorkling and developed an interest in scuba diving and marine life, we began going as a family on field trips to the beaches and reefs. We discovered a whole new world. After joining the Canal Zone Aquarium Society and hearing talks and seeing films presented by Dr. Phillip Akers, and Dr. Mel Boreham, a medical entomologist, and being the kind of family we are, we were well into the challenges of marine aquarium keeping.

Looking into the ice chest, I saw my very first live adult seahorse. He was a beauty, 6½ inches long and a perfect

At left: Duke, the Daisey family's adult seahorse, enters the net to feed on tiny shrimp as the other inhabitants of the tank investigate the proceedings. At left in the aquarium is a French angel, to the rear, a rather shy flame cardinal, and in the right foreground, a pair of banded coral shrimp.

At right: Neither Duke nor Frenchie shies away as Cheri's hand invades their domain.



“More, please.”

I didn't like the idea of having to do this 3 to 4 times a day. Who wants to feel like a murderer that often?

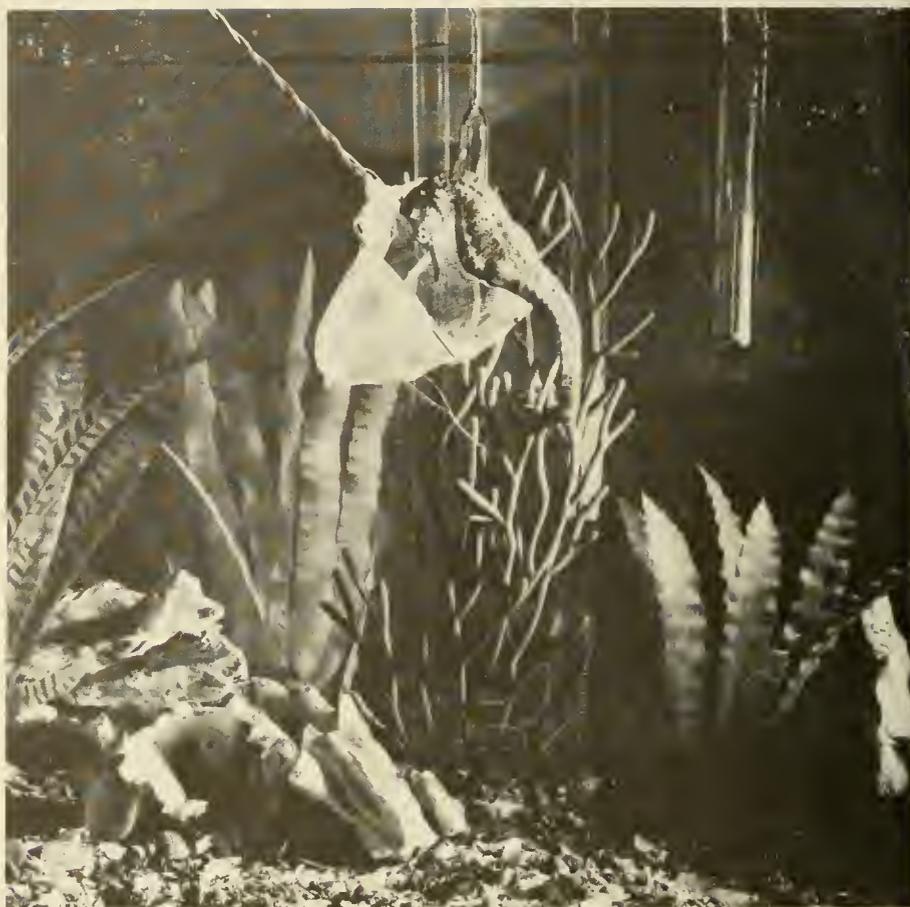
I felt we should find another source of food for Dynasta. I telephoned Dr. Boreham, who suggested I try seed shrimp. I had none and they are available only near the Tarpon Club at the Gatun spillway. Dr. Boreham, a real friend in need, came all the way across the Isthmus to bring me a supply from his freezer.

I thawed out a very small portion of the seed shrimp. Taking one, I offered it to Dynasta. He looked at it, flipped his tail and swam off. Well, I said, that's that. However, as I took the seed shrimp out of the water I noticed one of the eyes was missing. Also, I realized that the dead seed shrimp had naturally made no movement. The guppy, of course, always wiggled. I took another, making sure it had both eyes and no disfigurement, and this time I moved my fingers in a circle, making the shrimp appear to be rolling and thrashing. Snap! Dynasta ate it. I repeated the process. Snap! Again he took it. I was delighted.

At this stage you would assume we would have been satisfied. But Dynasta, one animal, was requiring at least an hour a day to feed (seahorses eat slowly), and after every feeding my hands and arms were soaking wet. I decided to try something else.

At the next feeding, I placed Dynasta's food in a long-handled net. I waited until he was close to the front glass and slowly lowered the net on the other side of him, so no fish could grab his food. He gave it a good look, but he made no move towards the food. I then gave the net a slight back-and-forth movement, causing the seed shrimp to appear to be boiling around. Before I knew it, Dynasta was in the net and eating greedily, and I was not soaking wet!

About this time we received a phone call from another friend. He had a couple of adult seahorses, both refusing to eat. Would we help? Bob and Cheri grabbed the ice chest, the battery-operated aerator, a 5-gallon jug of salt water (we keep 40 gallons on hand for emergencies) and rushed out. About an



Duke looks the tiny shrimp over well before deciding to dine while the banded coral shrimp below move in to see what's going on.

hour later, they returned with two very thin seahorses. My heart sank when I saw them. They had both turned black—a sure death sign.

Going by our previous experience with Dynasta, we placed our hands in the ice chest and gently massaged their leathery backs, racing against time, hoping they would quickly realize that the hand was a friend.

Sadly, we lost one, a female, within an hour. The other, however, let us pet his back and showed no signs of panic. We then offered, by hand, a live guppy. Weakly, he looked it over, while we held our breath. Snap! He took it, swallowed it, and raised his little crown up towards us as if to say “Thank you. More, please.” We offered him another, he took it, and we began to have hopes of saving him.

For the next 24 hours we hand-fed him in relays. As soon as he began to move around on his own and show strength enough to protect himself, we gently put him in the aquarium with Dynasta. They were like two long-lost friends. I have never seen such a beautiful water ballet as they put on together that day.

At the next feeding, I was concerned

over the new seahorse (which we now called Duke). It would be his first “net feeding” experience. Would our trick work on him as it had on Dynasta?

The net was lowered, complete with seed shrimp. Dynasta was into it like a shot. Duke followed along and for a few minutes just sat there, his tail hooked on the rim of the net, his body only barely inside. Dynasta was happily eating away. Duke just looked things over. I could see once again several months of feeding problems ahead. Just when I was about to give up, he stretched further into the net, looked the shrimp over—I gave the net a tiny wiggle—and he struck! Down one went. He struck again, down went another. Evidently Duke had decided, if it's good enough for my buddy, Dynasta, then I'll give it a try.

About a week later, I made a deadly mistake. We had gone snorkling at Galeta Island and brought back some finger coral. I put it in with Dynasta and Duke to enhance the beauty of the tank.

That evening I found Dynasta with his head caught in the jagged openings of the coral, thrashing and trying to free himself. While I held Dynasta, Bob gradually applied pressure to the coral



Duke snaps up a seed shrimp as Frenchie tries to figure out how he can get his share. The proximity of food brought even the normally nocturnal flame cardinal, left foreground, out of hiding.



Now accustomed to net feeding, Duke shies away from the handheld baby guppy offered by Cheri. The French angel, at right, shows no interest in the proceedings.

until it broke. I immediately released Dynasta, who swam to his usual tree plant. We looked him over closely, and could see no external injury at all. But, sadly, Dynasta refused his next feeding. He never ate again, and he died.

Any of you who may consider keeping seahorses, please learn from our own heartbreaking experience. Never place any decorative item that has holes in it in the aquarium housing your seahorses regardless of how pretty you might think it will make the aquarium look. It's not worth the price you'll pay.

I am happy to say that Duke and our other species are still thriving. We hope in the near future to locate a mate for Duke. Who knows? We may just end up with an entire family of "horses in the house!"

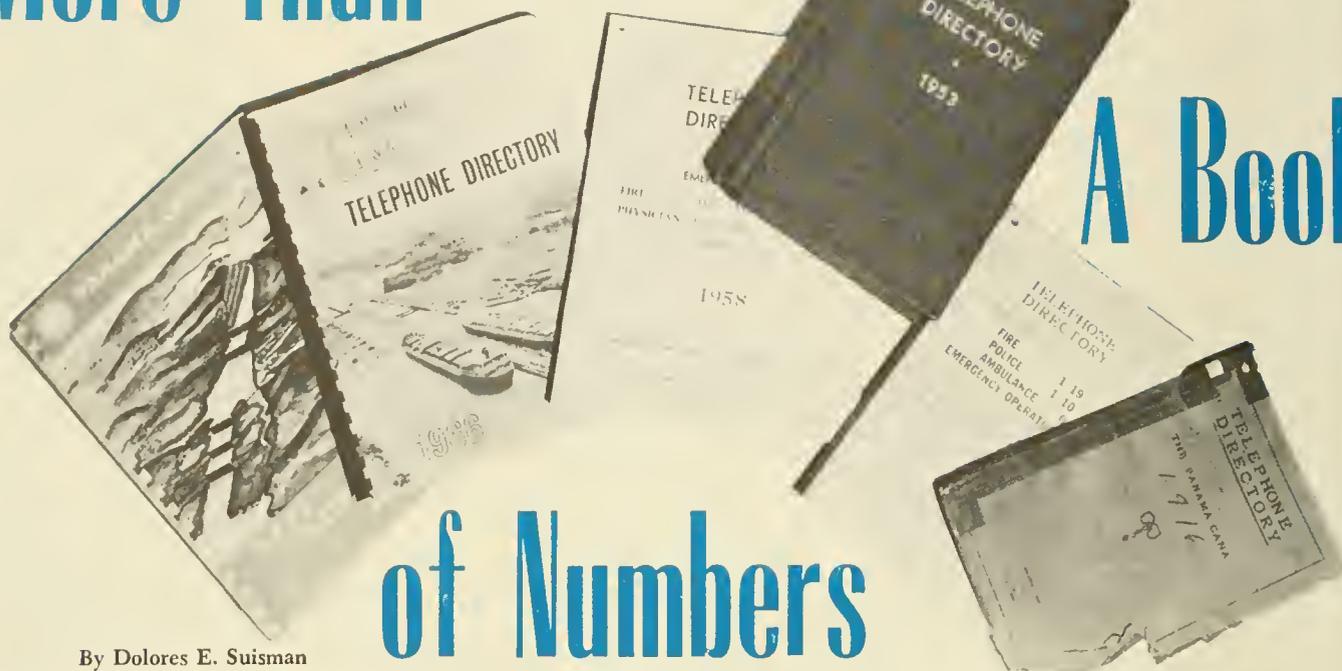
Guest writer Lori Daisey is married to Robert E. Daisey, a marine engineer with the Ports Division. Her article "Can I Have a Horse, Daddy?" about the family's paso fino horses appeared in Horse Lover's Magazine.



Lori Daisey watches as daughter Cheri moves Duke from one part of the tank to another. The Daiseys say almost all of their fish will allow themselves to be handled.

More Than

A Book



By Dolores E. Suisman

of Numbers

THE PANAMA CANAL telephone directory is a gold mine of information. It's an almanac, a history, and, if one wishes to be prosaic, it can even be used to look up a telephone number.

For 60 years, its size and content have reflected the growth and organization of the Company. The buildup of services as they became necessary and the decline of services as they became available in the Republic of Panama and through mail and freight service from the United States are quickly visible. The increase in personnel during wartime and the decrease with the return of peace are shown in its pages. In a very real way, it tells the story of the Panama Canal.

The first edition, published December 1, 1915, by the Panama Canal Press at Mount Hope, was a modest 59-page pamphlet-type publication bound in Government-green paper.

It was divided into two sections: a list of departments and divisions of the Canal organization and branches of the Army, and an alphabetical list of individuals. Out of a workforce of 26,897 employees, the 2,000 who had occasion to use a telephone in the performance of their duties were listed. Of these, only 343 rated a residence phone.

The first name in the alphabetical listing was Abston, J. M. and the last was Zunder, F. F. Neither a familiar name.

But many of the names in the 60-year-old book are well known today. Gen. George W. Goethals, office phone Balboa 230, residence phone Balboa 300, is one.

Other names in the 1915 book have been in every edition from that day to this.

One is Benny, W. E., Foreman, Paraiso Shops, Mechanical Division, whose son, Benny, W. L., and grandson, Benny, W. L., Jr., are in the 1974 book.

There was a Hummer, C. D., Wreckmaster (*Hercules* and *Ajax*), Mechanical Division; the father of Hummer, C. W., whose name appeared in the 1925 directory, and the grandfather of Hummer, C. W., Jr., Assistant Chief of the Dredging Division.

In 1915, De La Mater, W. W., Auditor's Office, Fortifications Division, was listed. After he died, the '32 book added De La Mater, Mrs. Ann, secretary to the Superintendent of Schools. Today, their son, William L. De La Mater, is listed as Aide to the Governor.

Although telephones had been in use in the Canal Zone since 1910, an official directory provided a golden opportunity to tell residents how to use a telephone; which it did in great detail.

"To Make a Local Call," it read, "Place the receiver to your ear and when Central answers with the expression 'number' give the number. The operator

will repeat the number. If the party fails to answer, the operator will say, 'They don't answer'."

The section entitled "To Make a Call to a Distant Exchange," included directions for calling such "distant" exchanges as Pedro Miguel.

Cross-referencing became more complicated as the Panama Canal telephone directory grew in size and scope.

Logically enough, in 1915 you turned to T to find "Telephone Branch, Electrical Division." But by 1916, in the big, new 80-page directory, when you turned to T you found "Telephone, see page 28," and on page 28, under E, you found "Electrical Division, Telephones."

Looking under C for the number of the Corral, you were referred to B for Balboa Corral, G for Governor's Coachman, N for New Corral, or O for Old Corral.

Suggestions played a minor part in actually changing the directory. But that didn't stop suggestions from flooding in, often the same suggestion year after year. There were suggestions that maps be included, and that they be deleted; that tide tables be included, and that they be deleted; that vertical index tabs be used and that horizontal index tabs be used. There were suggestions for looseleaf notebook directories and for directories with wood covers (from a man who made a wood cover for his phone book every year). And for

60 years, including 1974, there were suggestions that every listing include a post office box number.

But it was the cross-referencing that elicited more suggestions and complaints than any other subject.

One: "To find the number of the Central Labor Office, it is necessary to know that it comes under the Personnel Bureau, and to know that it is not listed at all under Central Labor Office, the name by which it is ordinarily known, but under Chief, Local Rate Employment Branch."

Another: "To locate the telephone number of the Administration Building Janitor, you have to look under Housing Division, Balboa Heights; Housing Office, Janitor Foreman; Basement, Administration Building."

And from the most persistent suggester: "It is suggested that in the future editions of the phone directory that credit unions be listed together in a bunch. There are quite a bunch of them by now and it would simplify matters somewhat for subscribers. They don't always know the exact name but they do know the species of animal."

If suggestions did not change the directory, they convinced the Executive Secretary there was a problem. In 1917, he wrote to the Panama Canal office in Washington, for a copy of the Washington, D.C., telephone directory "and in-

These odd-looking telephones in use when early Panama Canal directories were published would be collector's items today if any could be found.



60 Years



With the only complete collection of Panama Canal directories stacked high on his desk, James W. Riley, Communications Manager, Central Office, thumbs through the latest edition.



The 1919 directory in this busy office meets original specifications which included the requirement that a hole be punched in the corner and a wire loop provided for hanging it on a hook.



Adrien M. Bouche, retired Canal employee, finds his name in the 1975 telephone book just as he did 60 years ago when the first edition came out.

formation which may be obtained without expense relative to the procedure followed in collecting and compiling telephone directory data."

The result was a 110-page "big-city" type telephone directory with Panama Canal activities, military activities, and individuals in one alphabetical listing.

But if the problem of organization was solved, cross-referencing was still in its infancy.

The following year, an announcement in THE PANAMA CANAL RECORD reported a new directory in print and that "cross references are used extensively to assist in finding a number with a minimum of research."

"Used extensively" was an understatement.

Now to find a military number, you had to know you were to look under M for "Military" where you were advised to see A for Army, B for Bands, Army, C for Camps, F for Forts, G for Guards, N for Navy, T for Troops, or U for U.S. Army.

The situation didn't improve with age. Thirty years later, you could find four and five consecutive listings, all followed by a reference to another listing where you might or might not find a telephone number: Terminals Building (see Port Captain); the Texas Company (see Texas Petroleum); Ticket Offices (see Railroad Division); Time Inspection (see Accounting Division); Time Keepers (see Division concerned); ad infinitum.

Every year the original little pamphlet grew as personnel increased and pages of information were added.

The 10th anniversary edition, published in January 1925, introduced the new and sensational automatic telephones.

Now instead of jiggling the hook for the operator, you were told to dial 112

for a fire, 113 for police, 114 for information or 0 for an ambulance or the emergency operator.

Instructions for using the automatic phones began with the exclamation CAUTION!!! CAUTION!!! centered at the top of the page. Under this warning were listed all of the things you could do wrong. The list ended with the disquieting thought that "You will probably disconnect your telephone if you hang up the receiver before you finish talking."

Once an item was in the directory, it took a declaration of war, subterfuge, or a drastic budget cut to get it deleted. The warning that you could disconnect your phone by hanging up the receiver was reprinted in every issue for 27 years.

It wasn't long before the information pages included rates for long distance telephone calls (all calls beyond Darien cost 25 cents); hospital visiting hours, business hours in the Administration Building (8 to 12 and 1 to 4, except Sundays and holidays); business hours for 16 post offices, a complete restaurant schedule and departure and arrival times of a launch service to Taboga Island.

Then the tide tables that were to become so controversial appeared, the Panama Railroad timetable, hours of business for commissaries and clubhouses; and later, hours of operation for gasoline stations, banks, storehouses, libraries and schools.

There was no end to the vital informative material that was added year after year. Soon there were moonrise and moonset tables, sunrise and sunset tables, passenger connections from the Canal Zone by ocean or air, an airmail schedule (to Miami and Brownsville four times weekly), sailings of the Panama Railroad ships.

And warnings. Subscribers were urged to keep social calls on residence phones to a minimum during business hours and were told they must not use a Panama Canal telephone in any manner whatsoever to request or transmit information concerning lottery numbers or tickets, or any other business pertaining to lotteries.

There were directories within the directory—a Directory of the Panama Canal, a Directory of Officials of the Panama Government, and a Directory of the Diplomatic and Consular Corps Accredited to the Republic of Panama.

There was even an 11-page alphabetical list of every steamship line that had a representative on the Isthmus with capsuled information about the services it offered for subscribers who had to know that "The Societe Francaise d'Armement has a freight service

with steamship *Alsace* between Le Havre and Chilean Ports."

The additional pages of information and the needs of the employees increased the size of the telephone directory.

There were soon 17 retail commissaries listed, 9 clubhouses, 6 churches, and 4 private clubs.

There was an abattoir, a bakery, a coffee roasting plant, two ice cream plants, and farms—the Corozal Hospital Farm, Mindi Chicken Farm, Mount Hope Hog Farm, New Chilibre Chicken Farm, New Chilibre Truck Farm.

And a cattle industry with eight listings—Caimito Pasture, Mandingo Pasture, Frijoles Plantation, Juan Mina Plantation, Miraflores Pasture, Mount Hope Pasture, Paraiso Pastures and Summit Plantations and Pastures.

The book continued to grow bigger, the listings more numerous, the cross-referencing more complex. But nothing increased so much as the cost.

The price of printing 2,000 copies of the first directory in 1915 was \$145. By 1918, that figure had doubled. The Army picked this unfortunate time to reply to the annual request for updated telephone listings with a request for three Army lists—one alphabetical, another classified, and a third to be inserted in the regular Panama Canal listing. And, they asked, please print each list on a different and distinctive colored paper.

When apprised that this special treatment would cost \$600, they decided to let well enough alone.

By the time the book was 5 years old, the cost of printing had increased to \$1,435 for 4,000 copies, and a committee was formed to study the matter. For 2 years there had been an edition in January and July. This luxury was the first to go. But when the committee found that telephone expenses were in excess of revenue, they decided that 154 pages for a directory of a telephone system with only 2,518 subscribers "seems larger than necessary."

Although anxious to economize, committee members were unanimous in their decision that employees could not take their old phone books with them when they moved because "it is not considered sanitary to carry the old books along with the phone to new quarters."

After many meetings, the committee wrote a report that ended: "The question is largely whether the Canal wishes to issue a first-class book, such as the present one, or to issue a less attractive-looking book." They compromised by keeping the first-class book and adding

The Making of the Telephone Book 1975

to revenues by selling the book to subscribers for 40 cents and allowing subscribers to the Panama and Colon telephone service to have their names inserted in the Canal directory upon payment of \$1.

Since just about everyone wanted his name inserted, this brought about the problem of what type of subscriber could be listed without offending the user of the directory.

Liquor companies were among others not considered proper for inclusion in the Canal directory. It was 30 years before a realistic Governor penciled the note "no objection to any legitimate business" on a memo and that ban was lifted.

One of the few events that could and did reduce the information pages of the Canal directory was the advent of World War II.

"Perhaps enemy countries should not be listed as having diplomatic and consular officials in Panama," someone suggested. Someone else wrote, "In view of the existing international situation it is extremely difficult to determine just who should be included in our telephone directory." And the diplomatic and consular lists were never seen again.

The Army worried that "non-secret telephone directories in general use constitute a perfect means for enemy agents to acquire complete information concerning military units," and the military disappeared from the directory.

Now changes often meant less rather than more. The farms, the pastures, the markets were long gone and, in 1952, the directions for using automatic telephones were at long last removed.

But the tide tables, which had stirred more controversy than any other subject—pro and con—seemingly were to go on forever. Then, in 1965, a daring decision was made, and a memo worthy of war plans written: "Cleared with Governor. He was informed of possible repercussions. Following is decision. Remove from telephone book. Put notice in new directory. No SPILLWAY or any other notice."

Some changes were more dramatic than others. After the military was listed in the directory for a few post-war years, they were notified that the Canal could no longer afford to carry their listings, and a joint military-Panama Canal feasibility study of a uniform format for military and Panama Canal directories resulted in the large book that first appeared in 1958.

Staples became a big issue in 1959 when townsite maps appeared. If letters from subscribers are to be believed, no one ever looked for directions or a house



Albert Farrell types card strips for new entries and removes the old ones to produce up-to-date pages for reproduction at the printing plant.



Mrs. Judith Holder, Electrical Division Administrative Officer, delivers page panels of the 1975 directory to Juan Fernández, left, and Rafael Camargo, right, who make the plates for printing the directory.

number except to find that what they were looking for was directly under the staple.

The trusty old staples were thought of almost fondly in 1974 when faulty glue caused the directory to come apart page by page after it was used a few times.

For the most part over the past 20 years, the telephone book went unmoled. Few people thought about changing it. In 1963, emergency numbers were moved to an inside page and there was an illustrated cover. A few years later photographs appeared on the cover, and a contest in 1970 resulted in a two-color cover.

In 1972, the last big change: every page of information was printed in both English and Spanish.

A collection of the directories—and there is only one—is an invaluable source of information. Without it, we might not know that Crede Calhoun was the first Civil Affairs Director. That the sun rose in Balboa at 6:11 a.m. on August 26, 1926. That the tide was high in Cristobal at 2:22 a.m. on December 7, 1941.

This might have been lost forever if, on September 25, 1914, the Executive Secretary hadn't scribbled a note to the "Supt. Telephone and Signals," asking that "as soon as practicable, please get up and have printed on cards a telephone directory for this building."

That was yesterday. Today it is a modern, color coded book with a 2-year calendar, a map showing time zones and area codes in the United States and an explanation of civil defense warning signals. And tomorrow—who knows. Maybe tide tables.

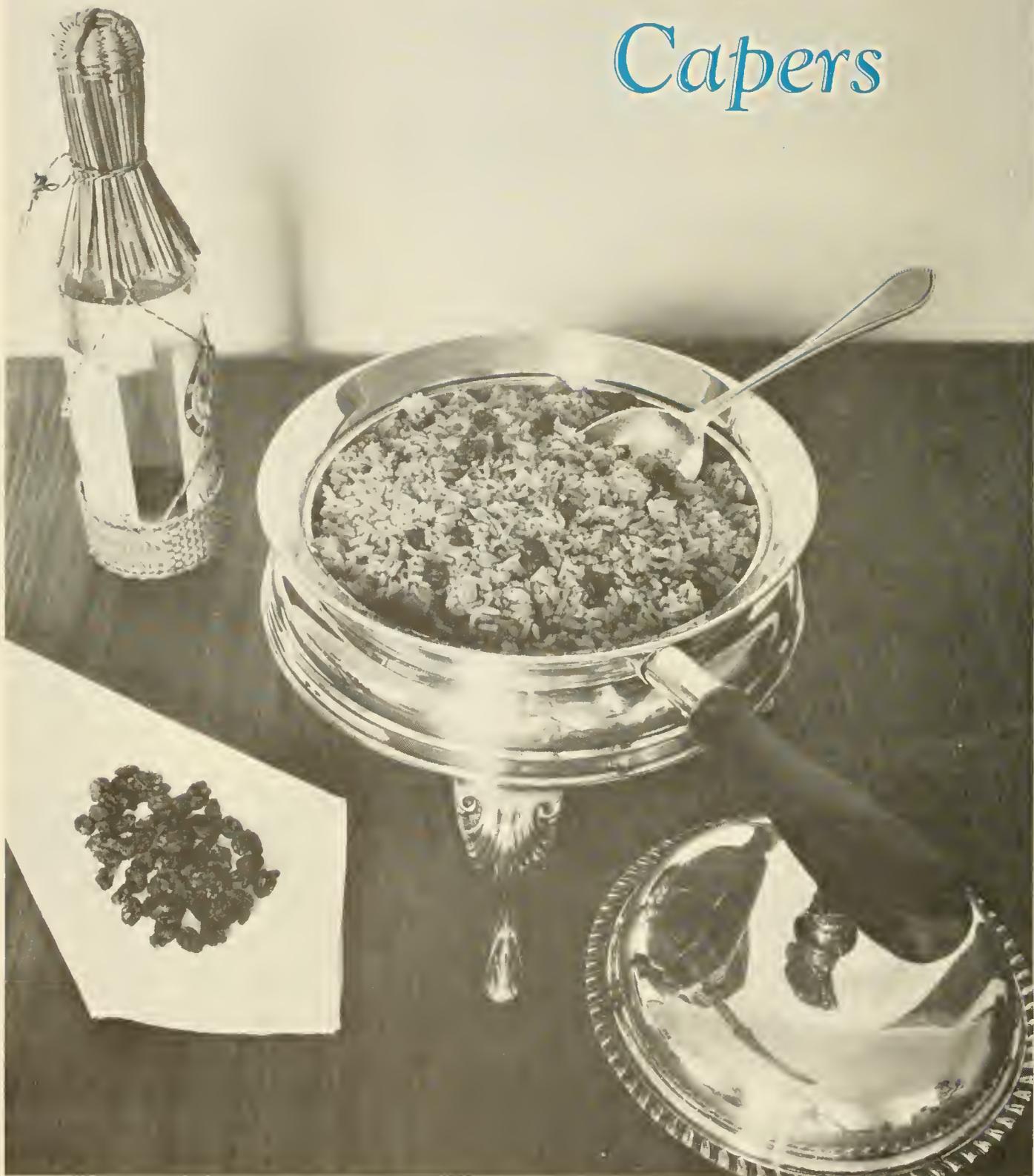


Roy Goreng checks uncut pages of townsite maps as they come off the press.



After the famous faulty-glue fiasco of 1974, José Aguilar makes sure the stapling job on the 1975 book is done to perfection.

Culinary Capers



IT HAS BEEN USED TO PAY taxes, debts and wages, and to pepper the bride for good luck. It has saved millions from starvation and today provides half of the world's population with 80 percent of its calories. More rice is consumed throughout the world than any other food.

The tiny, but mighty, little grain has been around for a long, long time—about 5,000 years—and it has had an important role in the history of mankind. Early Asian historical records show that, in China, in 2,500 B.C., it was so highly regarded that only the Emperor was privileged to grow it. It had a place in religious rites, as a temple offering, and was a symbol of happiness and abundance.

The cultivation of rice spread slowly to the Mediterranean civilization. The Egyptians were growing it in the 4th century B.C. It was cultivated by the Greeks and the Romans and much later the Moors took it to Spain from where it was introduced into the New World with the conquest.

In the United States, South Carolina was the first to grow it and after the Civil War, Louisiana became the rice center. Now it is grown also in Mississippi, Arkansas, Texas and California with Louisiana and Mississippi producing mainly the long-grain type and California growing the round-grain, known also as Japanese rice.

According to a 1964 study by the International Rice Research Institute, there are more than 9,779 varieties of rice and many different types, shapes, and colors cultivated throughout the world. The two main types are upland rice, which is grown in ordinary soil, and aquatic or lowland rice, grown in hot marshy regions or irrigated fields. It is prepared for sale as brown, unpolished, polished, or coated. What we call wild rice is not a true rice at all, but the grains of a perennial grass native to North America.

The lowly grain has been assimilated into the cooking of nearly every region on the globe with many countries producing at least one rice dish that has become universally known.

The Spanish have combined rice with seafood and vegetables to give us paella; in Italy, where surprisingly more rice than pasta is consumed, rice is cooked in chicken broth to produce the delicious risotto; the Mideastern countries sauté rice in butter, olive oil and onion (often adding slivered almonds) and produce pilaf. And so it goes, each country eating rice plain, boiled or sautéed, in soups, as a main dish combined with seafood,

poultry or meat, with vegetables, and as a dessert.

An important staple in the Panamanian diet, rice usually is served twice a day and in large quantities. Per capita consumption averages 320 grams a day which amounts to about 220 pounds a year, and, in comparison with other Latin American countries, only Surinam and Guyana, with a daily per capita consumption of 600 grams, eat more rice than Panama.

From 100,000 to 110,000 hectares of Panama's soil is devoted to the cultivation of rice and the 1973-74 crop produced approximately 3,574,600 quintals (hundredweight) of unhulled rice, yielding 60 percent of this amount in polished

and cook for 14 minutes. (Do not stir or disturb while it is cooking.) Remove from heat and serve. For a fluffier rice leave cover on an additional 10 minutes and let it steam.

Sautéed Rice

Melt 1 tablespoon butter in heavy pot. Sauté 1 medium chopped onion over medium heat until golden. Add 1 cup rice and stir until each grain glistens. Add 2 cups water or chicken broth and 1 teaspoon salt. Bring to a boil and continue as for boiled rice.

One of the most delicious rice dishes made in Panama is rice cooked in coconut milk.



By Fannie P. Hernández

Arroz con Coco (Coconut Rice)

- 1½ cups rice
- 1 coconut, grated
- 1 cup boiling water
- 1½ teaspoon salt
- 1 teaspoon butter
- 3 cups water

Pour boiling water over the grated coconut, let it set a few minutes. When it is cool enough to handle, squeeze the coconut to obtain the milk. Add the 3 cups of water to the grated coconut and set it aside. Put the milk in a heavy pot and let it cook down until coconut butter forms and is a little toasted. Add the rice and stir until it is golden color. Squeeze the grated coconut again and add this water to the rice with the salt and butter. When the liquid has been absorbed, turn heat to low, cover tightly and cook from 15 to 20 minutes.

A sweet rice that is not a dessert is rice with raisins, often cooked in coconut milk, but water will do fine. Delicious with ham.

Boiled Rice

To make 3 cups of rice, put 1 cup of raw rice, 2 cups of water, 1 teaspoon salt and 1 tablespoon butter in a heavy, 2-quart saucepan. Bring to a boil over high heat and turn heat to low. Stir it once with a fork, cover with a tight lid

Rice with raisins, one of Panama's favorite rice dishes, is shown at left. The recipe appears on the next page.



The cooking of rice, basis for many dishes, requires careful measuring and a heavy pot with a tight fitting cover.



Rice with guandú, one of Panama's traditional rice dishes, has a flavor all its own. While cooking, guandú exudes a pleasing bouquet, made even more appetizing when coconut milk is used for the liquid.

Arroz con Pasas (Rice With Raisins)

- 2 cups rice
- 4 cups water or coconut milk
- 1 cup raisins
- $\frac{1}{4}$ lb butter
- 2 sticks cinnamon
- 1 teaspoon salt
- 1 cup brown sugar (not packed)

Cook raisins in butter until plump. Remove with slotted spoon. Add rice to butter and stir until grains are golden. Add liquid, salt and the raisins. Boil briskly until liquid is just about all absorbed. Sprinkle the brown sugar on top

and when it has melted and almost dry, cover, lower heat to as low as possible, and cook 20 minutes. Remove from heat. With a big spoon stir up from bottom of pan and mix carefully.

As typical of Panama as the Panama hat is rice with guandú, a pea which resembles a small bean and has a unique flavor. Guandú, also called pigeon peas, are available in bunches or shelled at the market when in season or in cans at the supermarkets.

Arroz con Guandú (Rice With Guandú)

- $\frac{1}{2}$ cup guandú
- 1 cup rice
- 1 teaspoon salt
- 1 coconut, grated
- 4 cups hot water

Put the grated coconut in water. Let it set a few minutes, then squeeze to obtain the milk. Cook the guandú in the liquid until it is reduced to 2 cups. Add rice and salt. Cook over high heat until liquid is absorbed. Cover and steam for 14 minutes. (A delicious aroma will permeate the kitchen.)

Arroz con Pollo came from Spain to Mexico, then Peru, Colombia and Cuba, and each country has its own version. Panama has several. Here is one:

Arroz con Pollo (Chicken With Rice)

- 1 3-lb chicken, cut up
- $1\frac{1}{2}$ cups rice
- $\frac{1}{2}$ cup olive oil
- $1\frac{1}{2}$ teaspoon salt
- pinch of pepper
- 3 pimientos cut in strips
- 2 large ripe tomatoes, cut up
- 1 clove garlic
- 1 teaspoon orégano
- 2 peppercorns
- hot water or hot chicken stock
- 1 teaspoon capers
- 12 black olives

In a mortar, pound garlic, salt, peppercorns, pepper and orégano in a little oil. Rub chicken pieces with this mixture and let it season a few minutes. In a heavy pan (or paila), brown chicken in the oil. Add tomatoes, capers, olives, 2 of the pimientos. Cook until chicken is almost tender. Add rice and hot liquid to cover about an inch. Cover and simmer until the liquid has been absorbed and rice is tender. Garnish with remaining pimiento strips. Some cooks add a cup of cooked peas just before serving.

With an abundance of seafood available in Panama, there are dozens of recipes combining rice with one seafood or several. Here is one that is served in many Panamanian homes.

Arroz con Camarones (Rice With Shrimp)

- 1 onion, chopped
- 2 tomatoes
- 2 cloves garlic
- 2 pounds shrimp
- 1 small can tomato paste
- 2 tablespoons olive oil
- 2 cups rice
- 4 cups water
- olives and capers to taste

Fry the onion, tomatoes and garlic in oil. Add the cleaned raw shrimp. Add 4 cups hot water and cook for 5 minutes. Remove the shrimp. Add the rice to the liquid and cook until rice is tender. Add the shrimp, capers and olives and mix carefully with a fork. Cover and remove from heat. Serve after 5-10 minutes.

Rice is used in Panamanian desserts, too, in either a rice pudding, similar to our old-fashioned rice pudding, or a favorite rice dessert made with coconut milk and chocolate.

Arroz con Cacao (Chocolate Rice)

- $\frac{1}{2}$ cup rice
- 1 cup water
- 1 cup coconut milk
- 4 sticks cinnamon
- 1 can condensed milk
- 1 small can chocolate syrup
- $\frac{1}{2}$ cup sugar

Soak the rice overnight in enough water to cover. Add coconut milk and cinnamon sticks to rice. Simmer until it has dissolved, adding more coconut milk to maintain a soft consistency. Remove cinnamon sticks. Add sugar, condensed milk and syrup. Cook stirring constantly over low heat until custard like. Cool. Serve with coconut cream.

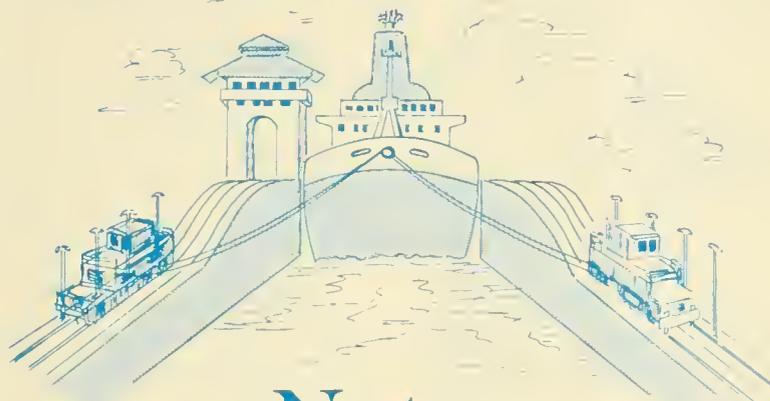
Not a Panamanian recipe, this version of rice pudding comes from Brazil.

Arroz con Café (Coffee With Rice)

- $\frac{1}{2}$ cup rice
- 2 cups strong coffee (made with instant or brewed)
- 3 tablespoons butter
- 3 eggs, well beaten
- $\frac{1}{2}$ cup Karo (dark)
- $\frac{1}{2}$ cup sugar
- 1 teaspoon vanilla
- $\frac{1}{4}$ teaspoon salt
- $1\frac{1}{2}$ cups milk

Cook the rice in the coffee for 20 minutes. Add butter. Combine the eggs with remaining ingredients and add to the rice and coffee. Pour into a buttered baking dish. Set the dish in a pan of water and bake 30 minutes. Serve warm with milk or cream.

Shipping



Notes

ADMIRAL SAMUEL E. MORISON, Pulitzer Prize winning author, best known for his books "The European Discovery of America: The Northern Voyages" and his latest book "The European Discovery of America: The Southern Voyages" was aboard the SS *Santa Mercedes* this year when she sailed from Los Angeles around South America. Morison was selected by the Prudential Lines to retell the adventures of the famed navigator, who first discovered the Strait of Magellan in 1520. The *Santa Mercedes* took only 2 days to transit the Strait compared to the 37-day voyage of Magellan.

During the cruise, the ship called at Balboa, Manzanillo, Acajutla, Cartagena, Curacao, La Guaira, Rio de Janeiro, Santos and Buenos Aires before transiting the Strait at the height of what is the summer season in that area.

Morison, who is now 87 years old, is a Distinguished Professor Emeritus at Harvard and winner of every prize for history and belles lettres in the United States (among them the Pulitzer Prize twice and the Emerson-Thoreau medal).

He is also a mariner who has reconnoitered and often duplicated the well known voyages made in the age of discovery.

Morison could add another dimension to the trip through the Strait because of his vast knowledge concerning Magellan's original voyage.

In his book "The Southern Voyages," he points out, for instance, that Magellan put to sea on the first voyage around the world with the full knowledge that three Spanish captains on his fleet planned to murder him.

It was on Palm Sunday at St. Julián in Patagonia that the mutineers finally attempted to put their plan into effect. They seized three of Magellan's ships and demanded his surrender. Magellan, however, through audacity and extraordinary seamanship managed to recapture his fleet with only one loyal man injured. Since mutiny was a capital offense, Magellan had one captain drawn and quartered, the second hanged, and the third one was marooned.

As cruise passengers relaxed in comfort dining on choice foods, they could not but be awed by the accomplishments of Magellan under such hardship conditions. Morison reported that food became so scarce on the first long haul across the Pacific that rats were sold for food at \$1.16 gold and sailors often resorted to eating the leather chafing gear off the yards.

The *Santa Mercedes* and her sister ships, the *Santa Mariana*, *Santa María*, and *Santa Magdalena*, make regular visits to the Isthmus on their sailings from west coast ports to Canada, Mexico Central America, the Caribbean and around South America every 14-16 days throughout the year.

Trans-Canal Cruises

More and more cruise ships are featuring trips through the Panama Canal.

During 1975, approximately 8,000 passengers will sail with Royal Viking Line on 16 Trans-Canal cruises, originating from both coasts and including one from New Orleans.

In its promotional material, Royal Viking Line writes of the Canal: "Time was, a trip through the Panama Canal suggested banana boats, steaming jungles and small bands of intrepid travelers determined to reach a distant port in faraway South America, or even points beyond. Today, things are different, passengers have a front-row seat for the trip, in a choice of air-conditioned lounges."

Royal Viking ships offer all first-class accommodations (with 94 percent having an ocean view) for approximately 500 passengers with spacious staterooms and public area. The decor is Scandinavian, with artwork by the area's finest artists. Dining is international with native specialties from some ports of call included in daily menus. As on the Prudential trip around South America, guest lecturers provide information about the various ports of call.

One of their lecturers was Irving Stone, author of "The Agony and the Ecstasy," "The President's Lady" and "Lust for Life." He was on the *Royal Viking Sea* when she transited the Canal on January 12 during a 96-day around-the-world cruise.

Although the Royal Viking Line is only a few years old, its three ships, the



The "Royal Viking Sky," one of the three cruise ships of the Royal Viking Line, passes through Gaillard Cut.

CANAL COMMERCIAL TRAFFIC BY NATIONALITY OF VESSELS

First Half Fiscal Year

Nationality	1975		1974		1965-69	
	No. of transits	Tons of cargo	No. of transits	Tons of cargo	Avg. No. transits	Avg. tons of cargo
Belgian	71	535,377	78	279,717	39	100,725
British	638	7,030,475	638	6,924,670	679	5,072,872
Chilean	68	828,951	43	665,614	60	406,198
Chinese Nat'l	80	1,050,329	104	1,146,805	57	443,818
Colombian	70	148,780	94	230,816	117	225,971
Cypriot	136	911,080	107	649,689	7	50,000
Danish	151	1,204,269	175	1,362,868	198	1,137,816
Ecuadorian	50	419,881	46	509,732	33	41,799
French	123	733,936	113	663,295	107	421,446
German, West	379	2,303,193	378	2,516,863	590	2,063,139
Greek	633	9,410,121	701	9,478,162	255	2,606,268
Italian	116	743,403	135	1,025,817	110	743,021
Japanese	646	6,042,448	643	6,923,312	468	3,431,691
Liberian	950	17,812,491	894	15,417,105	674	8,920,295
Netherlands	207	921,077	229	1,334,531	257	1,086,592
Nicaraguan	42	75,266	37	68,318	36	55,717
Norwegian	428	6,815,866	518	7,636,929	739	7,171,883
Panamanian	509	3,825,363	505	3,256,365	261	1,215,812
Peruvian	97	1,012,647	90	838,128	79	387,875
Polish	45	288,509	20	92,909	7	56,174
South Korean	56	384,599	50	302,761	14	87,421
Soviet	76	487,638	132	822,350	27	207,691
Swedish	171	1,753,471	163	1,248,731	225	1,462,003
United States	538	4,649,986	616	5,045,671	823	4,602,063
Yugoslavia	43	468,751	34	448,961	12	134,854
All other	434	3,399,216	425	3,332,238	368	1,435,550
Total	6,757	73,257,123	6,968	72,222,357	6,242	43,568,694

TRAFFIC MOVEMENT OVER PRINCIPAL TRADE ROUTES

First Half Fiscal Year

Trade routes—(Large commercial vessels, 300 net tons or over)	Avg. No. transits		
	1975	1974	1965-69
East coast United States—Asia	1,595	1,777	1,389
Europe—West coast South America	540	547	651
East coast United States—West coast South America	624	640	895
Europe—West coast United States/Canada	389	422	484
Europe—Asia	435	374	107
Europe—Oceania	250	238	191
East coast Canada—Asia	163	226	99
United States Intercoastal (including Hawaii)	200	206	258
East coast South America—Asia	132	133	96
West coast South America—West Indies	132	172	130
All others	2,297	2,233	1,931
Total	6,757	6,968	6,231

MONTHLY COMMERCIAL TRAFFIC AND TOLLS

Vessels of 300 net tons or over—(Fiscal years)

Month	Transits			Tolls (In thousands of dollars) ¹		
	1975	1974	Avg. No. transits 1965-69	1975	1974	Average tolls 1965-69
	July	1,219	1,210	1,067	\$11,834	\$9,697
August	1,121	1,127	1,044	12,254	9,663	6,298
September	1,095	1,125	1,015	11,928	9,530	6,139
October	1,125	1,220	1,049	11,855	10,170	6,387
November	1,086	1,160	1,021	11,150	9,772	6,258
December	1,111	1,126	1,035	11,487	9,886	6,409
January	—	1,200	1,003	—	10,574	6,167
February	—	1,026	922	—	8,988	5,654
March	—	1,189	1,098	—	10,137	6,748
April	—	1,202	1,087	—	10,016	6,681
May	—	1,229	1,110	—	10,417	6,854
June	—	1,219	1,052	—	10,573	6,609
Totals for fiscal year	—	14,033	12,503	—	\$119,423	\$76,526

¹ Before deduction of any operating expenses.

PANAMA CANAL TRAFFIC

STATISTICS FOR FIRST 6 MONTHS OF FISCAL YEAR 1975

TRANSITS (Oceangoing Vessels)

	1975	1974
Commercial	6,757	6,968
U.S. Government	107	95
Free	2	10
Total	6,866	7,073

TOLLS *

	1975	1974
Commercial	\$70,533,506	\$58,750,924 ¹
U.S. Government	882,164	540,368
Total	\$71,415,670	\$59,291,292¹

CARGO** (Oceangoing)

	1975	1974
Commercial	73,257,123	72,222,357
U.S. Government	348,541	258,436
Free	—	—
Total	73,605,664	72,480,793

* Includes tolls on all vessels, oceangoing and small.

** Cargo figures are in long tons.

¹ Revised.

Royal Viking Star, Royal Viking Sea, and Royal Viking Sky have attracted unusual attention because of their beauty and Norwegian style.

Many visiting the ships at the Canal have expressed curiosity concerning the origin of the stylized bird on the ships' stacks.

When the Royal Viking Line set out to develop a total design system for its ships, it began with the emblem, which was inspired by a symbol of the ancient Norsemen.

From history and folklore, ancient tapestries and stone rubbings, the line gathered information about birds and their role in the Viking Age (800-1000 A.D.). The Vikings paid great homage to heraldic birds and eagles. Traditionally, the eagle was a divine and wise creature, closely associated with Odin, the one-eyed chief god of the North who lived in Valhalla. Norse kings, vikings, and great deities were envisaged and symbolized as eagles.

Prophecies of the era told of a forthcoming struggle between the gods and powers of evil, predicting that the cock of Valhalla would crow to awaken Odin's warriors, and that it would be "ominously echoed by the soot-red cock of hell."

The Royal Viking Line revived this venerable symbol of the Vikings in 1970 when three Norwegian steamship companies joined forces to form this new cruise line.

Fertilizer for the Arabs

The first shipment of liquified manure passed through the Panama Canal recently enroute to Lake St. Charles, La., where it was pumped aboard an oil tanker for shipment to Bahrain and Dubai on the Persian Gulf. The 850,000

gallon shipment originated in Tacoma, Wash.

It is being shipped to the Middle East for a billion-dollar desert reclamation project financed by Arab oil money. Plans are to mix it with pulverized wood chips, spread it on the desert sands, and plant grass to build soil and prevent wind erosion. The two Arab states have contracted for 50,000 metric tons a year, according to an official of Worldwide Brokers, of Galliano, La. The North-west quota is 250,000 gallons a month, according to a local contractor.

Since the dairy business is suffering from the recession, this new project is considered a life saver for the industry. As one farmer said, "We have been operating \$3,000 a month in the red. Now we can make up to \$4,000 a month on manure. It seems like a fairy tale."

The Use of English

New value has recently been given to English by its official adoption by the International Maritime Consultative Organization as the common sea language, according to a report in *Fairplay International Shipping Weekly*.

In commenting on this, *Fairplay* noted:

"In a world in which a misunderstood message or order could result, say in the destruction of most of the beaches of north-west Europe by a wrecked very large crude carrier, the importance of an internationally accepted means of communication is clear enough, and the English speakers of the world may well feel grateful that it is their language which has been chosen. Those who believe that they speak the tongue of Shakespeare, however, may well raise an eyebrow at some of the words which are said nowadays to be theirs—doppler, mach number, coriolis, isogriv and VOR-TAC, for example, the latter being defined as "a co-location of VOR and the distance-measuring element of a TACAN ground beacon."

Largest Ship Afloat

The American Bureau of Shipping has recently classed the largest vessel afloat. It is the 476,292 dead weight tonnage *Globtik London*. The vessel, of British registry, is approximately 1,181 feet long, 203 feet wide, and 118 feet in height from the keel to the main deck. During 1974, the ABS classified seven other tankers of over 250,000 dead weight tonnage.—WKF

PRINCIPAL COMMODITIES SHIPPED THROUGH THE CANAL

(All cargo figures in long tons)

Pacific to Atlantic

Commodity	First Half Fiscal Year		
	1975	1974	5-Yr. Avg. 1965-69
Manufactures of iron and steel	4,832,370	3,401,890	1,816,926
Petroleum and products	4,385,673	5,843,529	643,782
Ores, various	3,117,063	3,074,279	2,957,624
Sugar	1,842,260	1,832,808	1,460,243
Lumber and products	1,674,555	2,640,783	2,196,431
Pulpwood	919,416	809,518	374,817
Coal and coke	881,163	297,038	95,051
Metals, various	834,817	475,767	651,078
Bananas	789,980	764,270	623,764
Food in refrigeration (excluding bananas)	714,949	813,758	499,550
Sulfur	686,437	401,777	103,009
Fishmeal	537,532	232,146	754,400
Autos, trucks, accessories and parts	509,580	461,982	38,594
Paper and products	353,146	244,083	141,696
Chemicals, unclassified	245,251	153,874	118,463
All other	6,377,983	5,583,155	4,354,577
Total	28,702,175	27,030,657	16,830,005

Atlantic to Pacific

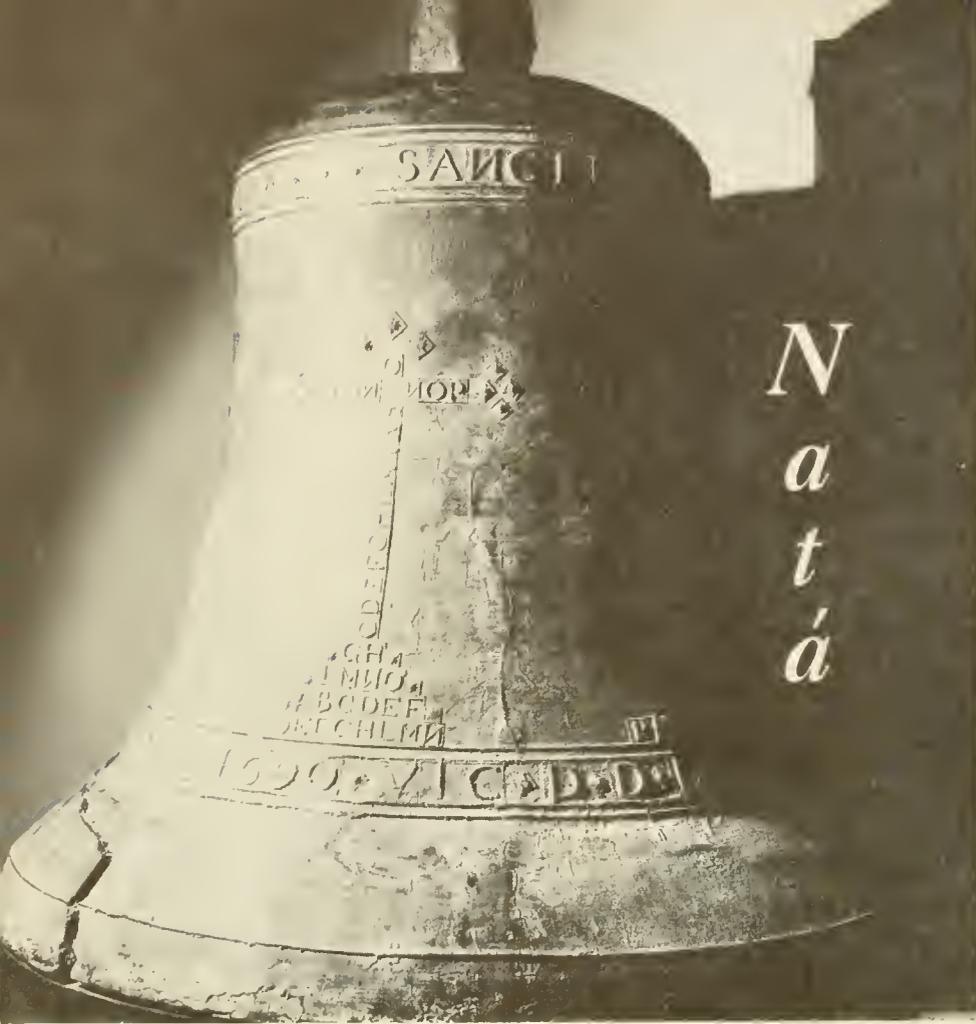
Commodity	First Half Fiscal Year		
	1975	1974	5-Yr. Avg. 1965-69
Coal and coke	13,019,920	8,262,531	4,483,207
Petroleum and products	7,577,168	8,749,089	7,382,958
Corn	3,392,113	5,675,008	1,339,076
Phosphate	2,826,222	2,545,084	1,911,363
Wheat	2,738,492	3,301,650	621,073
Soybeans	1,911,300	2,065,802	1,165,254
Ores, various	1,232,583	1,250,883	816,530
Sorghum	1,183,903	1,458,630	N.A.
Manufactures of iron and steel	1,050,553	805,054	907,176
Metal, scrap	1,036,239	1,994,046	1,458,047
Sugar	756,192	715,768	406,555
Fertilizers, unclassified	636,954	642,653	218,304
Metals, various (excluding scrap)	503,338	362,340	661,758
Chemicals, unclassified	466,329	712,419	428,399
Paper and products	378,770	383,702	349,756
All other	5,844,872	6,267,041	4,589,233
Total	44,554,948	45,191,700	26,738,689

CANAL TRANSITS—COMMERCIAL AND U.S. GOVERNMENT

	First Half Fiscal Year				
	1975		1974		Avg. No. transits 1965-69
	Atlantic to Pacific	Pacific to Atlantic	Total	Total	Total
Commercial vessels:					
Oceangoing	3,335	3,422	6,757	6,968	6,231
Small ¹	194	160	354	365	276
Total Commercial	3,529	3,582	7,111	7,333	6,507
U.S. Government vessels:²					
Oceangoing	53	54	107	95	447
Small ¹	24	33	57	58	63
Total Commercial and U.S. Government	3,606	3,669	7,275	7,486	7,017

¹ Vessels under 300 net tons or 500 displacement tons.

² Vessels on which tolls are credited. Prior to July 1, 1951, Government-operated ships transited free.



Pastoral But Progressive

By José T. Tuñón

IN EARLY 1520, MORE THAN 100 years before the Pilgrims landed at Plymouth Rock, a small group of Spanish colonials founded Natá de los Caballeros, the oldest city on the Isthmus. Its predecessors, Santa María la Antigua and Nombre de Dios, in Darien, were burned by Drake in 1595 and Morgan destroyed Old Panama in 1671.

Natá served as an outpost for the conquest and colonization of the western part of Panama and for 300 years, until 1820, was the capital city for western Panama.

Its inhabitants engaged in farming and cattle raising activities and in the

later part of the 16th century they lived mainly from the profits of corn sent to Panama for feeding the mules and slaves that carried goods between Panama and Nombre de Dios.

For many years Natá remained a sleepy, interior rural community. Its inhabitants eked out a living using primitive farming methods. With the exception of the ancient church with the colonial facade and the old tower, and a sterling silver pelican, a treasure reminiscent of past glories, which attracted tourists who ventured to the interior, Natá had little impact on the remainder of the Republic after the colonial era.

But in 1938, when Compañía Panameña de Alimentos, S.A. (Panama Foods Co.) established a milk processing plant there, Natá and the surrounding areas gradually were revitalized from a centuries-old lethargy. The plant's tall chimney, visible from a distance, signifies that Natá has entered the industrial era and once more is playing an important role in the destiny of her country.

Beginning modestly with an annual production of 519,000 liters of milk, Panama Foods has experienced a progressively increasing rate of growth. Today's annual milk production of 20 million liters is evidence of the company's tremendous impact on farming and cattle raising in the Central Provinces of Panama. In addition to producing evaporated and condensed milk, the company has expanded its activities to include the processing of other foods that are produced in the area and is today the most important commercial canning industry in the country.

In 1947, the farmers of Natá witnessed the beginning of a new project that would soon make possible their entry into the modern marketplace.

The company, using new technology, began experimenting with the growing, processing, and marketing of tomatoes. Two years later with the fruition of much research and development, 408,611 pounds of tomatoes were processed by the company and the well-known Maggi products, including paste, sauce, juice and catsup were produced in Natá and sold on the local market.

Company agriculture experts advise tomato growers on the control of diseases in tomato plants, a major problem in the tropics, and teach them how to improve the quality of the product. The company has established a 50-hectare experimental field near Río Hato in Coclé Province, where these experts are continuously experimenting with irrigation methods, various insecticides, fertilizers and herbicides in their efforts to produce the best quality tomato varieties for industrial purposes. Plans are to attempt to increase production to 80 million pounds a year, and to export these products.

At another experimental tomato field in Río Grande, an area about 40 kilometers from Río Hato, technicians are experimenting with tomato varieties resistant to fungi, bacteria, and other soil-borne diseases that cause tomatoes to wilt in unfavorable environments such as that caused by flooding in that area. Tomato wilt has been one of the most bothersome problems to tomato growers. Experimenting with a variety of seeds brought from all over the world by the

Above: Showing the ravages of time is one of the two bells that called worshipers to mass at the old Church of Natá during colonial days. The bells, which were cast in Lima in 1690, are currently displayed at the Museum of Colonial Religious Art at the old Santo Domingo Chapel in Panama City.

National Agriculture Institute, the Ministry of Agricultural Development and by Panama University, several varieties have been developed that seem to be resistant to wilt.

At harvest time, as many as 150 tomato pickers are employed and there are plans to mechanize the operation to reduce the high cost of production and ultimately benefit both the growers and the company.

In addition to processing milk and tomatoes, Panama Foods cans guandú, a small pea-like legume which grows on vines about 6 feet high, often referred to as "pigeon peas" by the English speaking population on the Isthmus. The guandú's distinctive flavor and pleasing aroma while cooking make it a favorite food of Panama, where erroneously it is often considered a product grown only in this country. Actually, guandú is popular in Puerto Rico, the Dominican Republic, Jamaica, Brazil, Trinidad and in Kenya and Uganda in Africa.

In the past, Puerto Rico was one of the main producers, but due to the high cost of harvesting, its cultivation has fallen off and today the Dominican Republic is the main exporter.

Aware of the nutritional value of guandú, the United Nations has dispatched dietary experts to India and Ceylon (now known as Sri Lanka) to inform the inhabitants of these famine-plagued areas of the merits of guandú and to encourage its local cultivation.

In general, the main problem in the cultivation of guandú, which requires very little care in the field, is the high cost of harvest and the shelling of the pods, which is done by hand. In Panama, where it is largely a home production,

with the farmer planting his own guandú fields, then selling the yield to the company, it has so far been economically successful.

Benefitting from the industrialization of this legume are approximately 400 families, mainly in the areas around La Atalaya in Veraguas Province. They are supplying Panama Foods approximately 1,600,000 pounds of guandú a year. The company would like to triple guandú production in the next 2 years, with hopes of obtaining a market for this product in the United States.

Although the Panama Foods installation at Natá processes products grown only in that area, the impact of the industry extends to the provinces of Coclé, Los Santos, Herrera and Veraguas, with a total population of about half a million.

In 1970, now producers of Nestle, Maggi and Libby products in Panama, the company extended its sphere of activities to the fertile lands of Chiriquí Province and took over the management of the Chiriquí Milk Co. in Boquerón. Here it processes powdered milk, fruit juices and vegetables that are grown in the cooler areas of that province.

But one of the principal functions of the Boquerón installation is found 41 kilometers northeast of there, at San Andrés, more than 400 meters above sea level, near the Costa Rican border. It is a pineapple plantation of the finest industrial quality and constitutes one of the company's most important projects. The fertile volcanic soil of the region and the infrared rays of the sun at that particular altitude give the pineapple the ideal flavor for industrial use, according

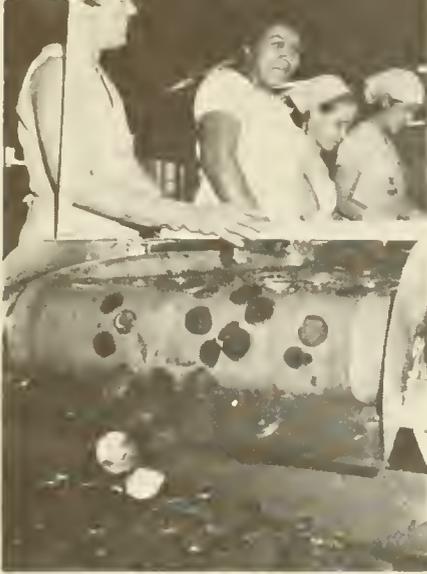


A chemist tests the purity of Panama Food Company products at a modern laboratory in the Natá installation.

*Revitalized from
a centuries-old
lethargy*



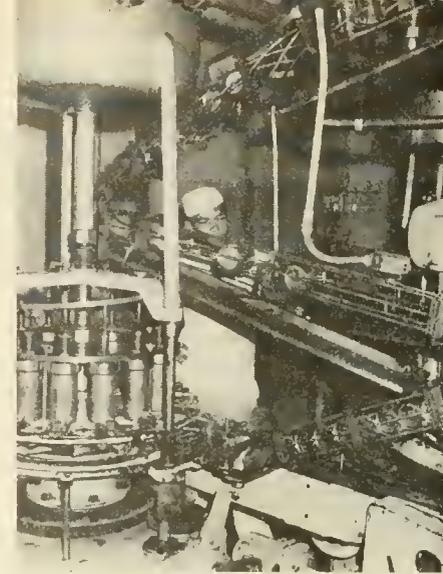
A field of grain and a dairy herd that supplies milk to the Chiriquí Milk Plant in Boquerón form a scene of tranquil beauty.



Employees of the Boquerón processing plant check beet slices prior to canning. Fruits and vegetables of the area are processed at this plant.

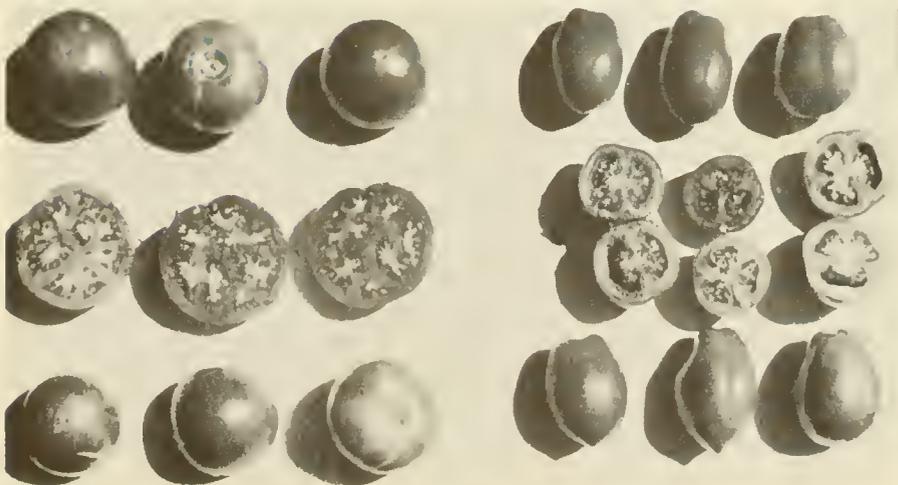


A smiling employee operates a machine which extracts juice from the delicious oranges grown in the Boquerón area.



Cans are manufactured at the Panama Foods Company plant at Natá. These will be used for evaporated milk.

Cans of diced beets are packed in cartons at the Natá plant. Also shown are cases of maracuyá juice.



to Juan Wintgens, head of the Agriculture Department of the company. Commenting on the excellent quality of another variety of pineapple produced in Panama, the delectable "water pineapple" grown in Taboga, Wintgens explained that it is perhaps the most tasty fresh pineapple, but it is not suitable for canning.

The San Andrés pineapple field covers 22 hectares, each hectare containing 40,000 pineapple plants. Slips have been imported from Martinique and Hawaii, with superior results from the "smooth Cayenne" variety from Hawaii.

Pineapple cultivation requires a large investment, extensive fumigation, weeding, fertilizers and constant care. This project is in its infancy and large scale production will depend on the ability of individual growers to supply the company with sufficient fruit.

Located at the pineapple plantation, and appearing a little out of place in this environment, is a row of stables housing several dozen high-grade calves. They are part of 2,000 purebreds that the company is planning to distribute among its milk suppliers to improve the quality and quantity of milk with resulting benefits for the company and the suppliers. The calves will be sold to the cattle raisers at a nominal cost, which

Shown are two varieties of tomatoes that seem to be resistant to wilt, one of the most bothersome problems to tomato growers coping with the tropical environment.

Agriculture expert Alberto Delgado, at right, discusses the characteristics of the pineapple that make it suitable for canning with Jean P. Robert, left and Juan Wintgens, engineers working with the Panama Foods Company.

Passion fruit is popular new local product

can be deducted from their payments for supplying milk. Dairy experts also will continue to offer technical assistance in matters of feeding and disease control.

A short distance from the pineapple plantation, the company has a 2-hectare plot planted with granadilla, one of several varieties of passion fruit, commonly known as maracuyá. The fruit, about the size and shape of a small pear, has a tough hull and the inside contains small black seeds surrounded by aromatic, yellow pulp. Its taste somewhat resembles the peach with a tinge of apricot and the exotic tang of guava. A little juice goes a long way as it has a penetrating flavor but it is ideal for mixing with pineapple and other fruit, in cocktails, punch and for flavoring fruit desserts. Since it is said that the taste lingers like a happy memory, it is in great demand. The plant, a vine, needs very little care and hardly any investment. It is a matter of planting, putting a stick in the ground for it to climb on, and waiting for the fruit to fall when it is ripe. Because of these attributes Panama Foods is encouraging the cultivation of maracuyá.

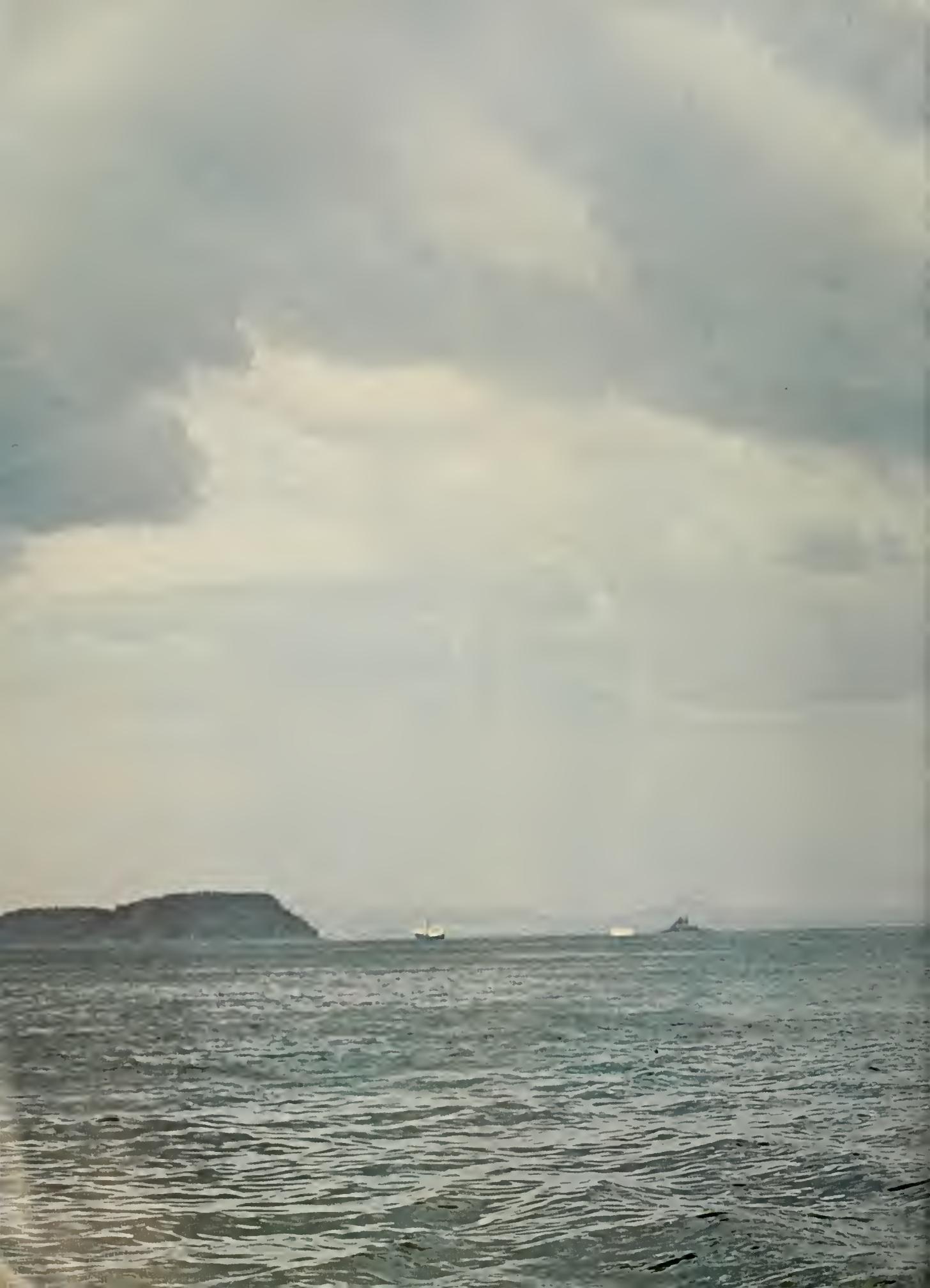
The overall economic impact of Panama Foods on the five provinces where the company operates is difficult to determine. However, in purchases, services and salaries, the company's output is approximately \$15 million a year. And benefits derived from its numerous experimental projects and the technical assistance offered to the hundreds of dirt farmers and cattle raisers are incalculable.



A field of maracuyá, a species of passion fruit, in San Andrés, Chiriquí Province. Juice of the maracuyá is in great demand internationally.

Part of the herd of 2,000 purebred calves to be distributed to their milk suppliers by the Chiriquí Milk Company to improve the quality and quantity of milk.







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