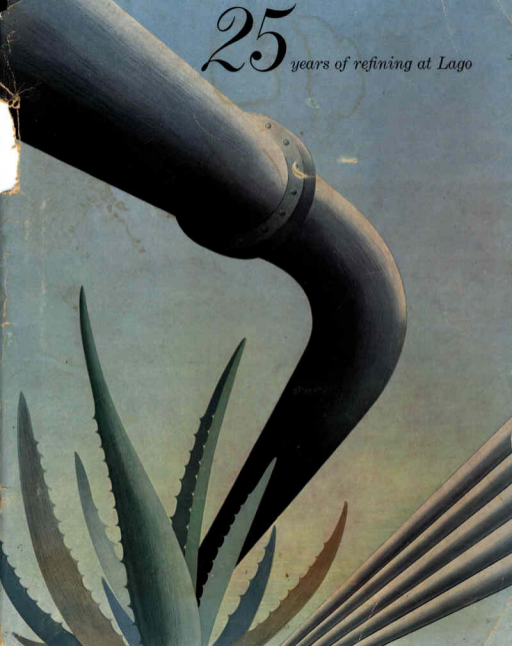


25 *years of refining at Lago*



25

dedication

Lago is many things. It is a forest of steel and concrete. It is intensive research, endless planning, high technical skills. It is millions upon millions of dollars. No less than any of these it is the employees who make the lifeless equipment—the plans, the materials, and the dollars—come alive as a great industrial enterprise. It is to the men and women who help maintain the Lago refinery in its high place in the petroleum world that this booklet is dedicated.

Lago's place

If a Lago employee could follow one barrel of gasoline or fuel oil or any other product which he helped to make, after it left the refinery, he would see strange and new parts of the world. His journey, which would start aboard a tanker, might take him to Boston, New York, Baltimore, or other cities on the United States East Coast, where Lago fuel oil helps make power for heat and light and for heavy industry.

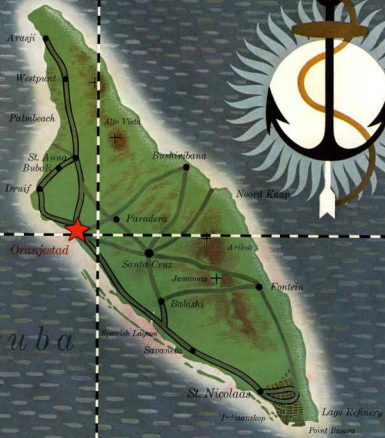
He might follow somebody's automobile in Brazil, or ride a truck hauling food from farms to the cities. He might go to the farms themselves, where Lago-made fuels help drive tractors and other equipment preparing the ground for the growing of valuable crops.

Or he might find himself in the Antarctic, where Lago's fuel oil furnishes power for Norway's huge whaling ships. He might be on any of the seven seas, with Navy vessels whose fuel came from Aruba, or with any of the world's merchant fleets. He might follow this barrel to Iceland or Norway; to New Zealand or the Belgian Congo; to an asphalt runway in Chile; or to a cottage in Sweden, where, by the light of a kerosene lamp, the housewife cooks her family's meal with Lago kerosene.

Millions of people depend on oil from Lago. They need it to help raise and transport their food. Without it there would be less light in Panama and The Hague; the industries of Rio and Oslo would slow down; winter's cold would be more deeply felt in millions of homes.

The world cannot get along without oil. Ships from Lago, sailing west as far as Japan and east as far as India, almost cover the globe in delivering products to help fill this vital need.

Caribbean Sea




introduction

In December, 1928, as construction of the Lago refinery neared completion, Aruba's population was small. Fishing, hat-making, and the growing of aloes were the chief industries. Aruba's 10,000 citizens had been content with a life in which there had been few changes from one decade to the next.

Lago itself, although it displayed the hustle of heavy construction, was a baby in both age and size in December, 1928. It had only the newly opened harbor with one narrow entrance, a handful of storage tanks, a few small ships to fill them with oil, eight topping stills almost completed, and construction of eight cracking stills just begun. Built on the barren coral of Aruba's easternmost point, 2,000 miles from its source of food, water, and equipment, 150 sea miles from the oil it would refine, its great future was impossible to foresee.

Twenty-five years later Lago has become the world's largest petroleum refinery; it includes a shipping operation so large that its harbor ranks in tonnage with the world's greatest; its employees form a community whose members make up nearly half the island's population, and who hail from places as diverse and distant as Singapore and Chicago and Guadeloupe.

This is Lago's story, told as it rounds out a quarter-century, from the first small gush of oil into the new stills in January, 1929, to the 428,000-barrel daily flood of January, 1954.



The late Captain Robert Rodger, member of the original party that selected Aruba as a transshipping station, came back later to be the first manager of the infant enterprise, and for many years was known as "Mr. Lago."





Fifty years ago the Aruba Phosphate Company loaded its product into sailing vessels in San Nicolas Harbor. Traces of the pier's stone foundation can still be seen near today's all-welded steel piers where oil has taken the place of phosphate as Aruba's principal export.



Lago in late 1927 (above): 1. Captain Rodger's home, later Executive Office, now Main Shops area. 2. Now main still area. 3. All there was to Lago when harbor opened in November, 1927. 4. The "White House," originally a country home, furnished living quarters and then offices for the embryo transshipping station, later became a refinery office before it was torn down in early forties. 5. Receiving and Shipping office is on this foundation, which was then a separator box.

the beginnings

The Lago Oil & Transport Company, Ltd., was a corporation organized in Canada in 1924, which later became a subsidiary of the Pan American Petroleum & Transport Company. In Lago's first year Captain Robert Rodger and two associates were sent into the Paraguana-Curaçao-Aruba triangle to find a shipping terminal for oil being produced at Lake Maracaibo, Venezuela, by the Lago Petroleum Corporation, another Pan Am subsidiary. In August, 1924, after exploring the possibilities at the first two sites, they visited Aruba. For two weeks they studied the problem of dredging a channel through a narrow break in the reef that connected the bay with the sea. San Nicolas was their choice, and dredging began late in 1925.

A channel first had to be cut through the reef (now the east entrance), and a great amount of dredging was needed to deepen the bay for ships that would draw 25 feet of water when loaded. Work was begun on eight 70,000-barrel crude storage tanks and on a main dock. (This was the "T-dock," dismantled in 1950 to make way for two modern finger piers.)

Meantime, two small ships were sent out from England to haul crude oil from Lake Maracaibo. One, the *Francunion*, eventually was returned to Europe for harbor bunkering duty, and had honorable service there in the last war. The second, the *Inverampton*, shows only as a cross on the charts of the Maracaibo sand bars, where it was lost in 1928. The *Invercorrie* was added in 1925, and four ships of the *Inverlago* class were added the following year. These ships loaded crude in Lake Maracaibo and discharged it into a depot ship at Oranjestad, which in turn pumped it into other tankers for ocean transport.

Lago's harbor officially began its career as a great oil port November 17, 1927. Two ocean tankers and five lake tankers entered the first day. San Nicolas, a lonely expanse of cactus and low shrubs, and once a haven for fishing smacks and sailing vessels in the early phosphate trade, was never the same again. Industry and world trade had come to stay.

The pre-refinery operating staff at San Nicolas lived in twelve frame houses that are still in use. It was not an easy life. In the words of Captain Rodger, "Fresh meats, fruits, and vegetables were unknown and most edibles were to be found only in cans, but occasionally small luxuries were brought over by the lake tankers from Venezuela. Ice was brought from Curaçao in barrels. Chickens pro-



Most of the Accounting and Storehouse clerical staff are in this December, 1928, picture. They were, from top down: first row: I. Cohen, P. J. Bakker, G. C. Gibson, J. Jensen; second row: J. R. Golden, C. G. Netts, J. E. Correia, L. N. Rought; third row: R. V. Bartlett, T. C. Brown, J. D. Scott; bottom row: E. Dirks, M. deCuba. Bakker and Brown were still with Lago at the 25th anniversary.

vided the main staple of diet, and could be purchased at Fls. 40¢ to 50¢ each. Eggs were a penny or two each."

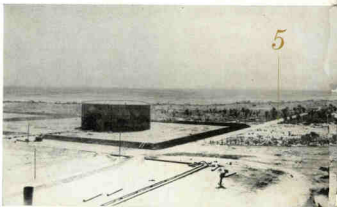
The year 1928 brought more deep and permanent changes to Aruba's landscape and life. In July, 1927, a plan to build a refinery somewhere in the Maracaibo area for processing Venezuela crude was being considered. An inspection group, including Paul H. Harwood, Thomas S. Cooke, Lloyd G. Smith, and Donald J. Smith, visited Maracaibo and Aruba in August, 1927.

In years to come, each of these pioneers continued in close association with the enterprise they launched. Mr. Harwood became an executive in marine activities, Mr. Cooke in refining. D. J. Smith directed construction at Aruba, and L. G. Smith was Lago refinery's general manager from the early thirties until 1946.

Again Aruba was the choice. From the top of a water tower in the harbor area these men looked at the transshipping station, only a little cluster of tanks, houses, and sheds huddled next to San Nicolas Bay, with barrenness beyond. But in their mind's eye they saw rows of stills, acres of storage tanks, pipelines, warehouses, shops, hospital and schools, and a settled community of homes. During the return trip to New York planning began for the original plant construction.

San Nicolas continued to operate as a transshipping depot for crude oil through 1928, loading four or five ships a week with oil brought

View eastward in 1927 from present Storehouse area in heart of plant. 1. Where Powerhouse No. 1 now stands. 2. Then a bunkhouse, later No. 2 Laboratory. 3. Now main refinery road. 4. Center of area where stills are located.



in by the steadily increasing number of lake tankers. During one high point of the year the station loaded a ship a day for 100 days.

Final approval for the refinery came in February, 1928, and the first men arrived February 24 to build bunkhouses for the construction forces.

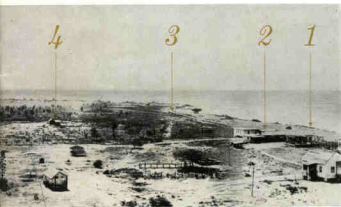
Donald J. Smith years later recalled the delays, inadequate equipment, labor and housing shortages, difficulties in securing sufficient food and water, and countless other complications that went with a pioneering operation nearly 2,000 miles from sources of supply. A report he wrote tells the end of the refinery's first phase:

"All of the energy of the original construction force was devoted to the construction and completion of the powerhouse and topping stills. The powerhouse started in December, 1928, and the topping stills in January, 1929, and while the operation was somewhat ragged, the plant had actually started to earn money."

January 29, 1929, is recorded as the first day on which the stills were operated.

Over a hundred men who were with Lago when the first barrel of oil was processed were still with Lago twenty-five years later as the 2,234,000,000th barrel went through the plant. How the earliest employees lived and worked, as seen in the reminiscences of a few, best shows the vast changes that have taken place in Lago and in Aruba.

5. The road which fifty years ago led from phosphate mines to harbor; now, at the far end, a portion of it connects Lago Colony and San Nicolas. New houses at right, later moved, are still used.





View east in 1928 from Powerhouse No. 1 area. 1. Present Cracking Plant area. 2. Site of "Cat Cracker." 3. Old Hospital, later Personnel Office, now site of "Cat Cracker" compressor houses. 4. Bungalows 1-15, now site of Laboratory, General Office, and Powerhouse No. 2. 5. Main refinery road, the only thing unchanged.



Orenjestad's main street was being paved in January, 1928. Below, same street in January, 1954, shows change twenty-five years later.



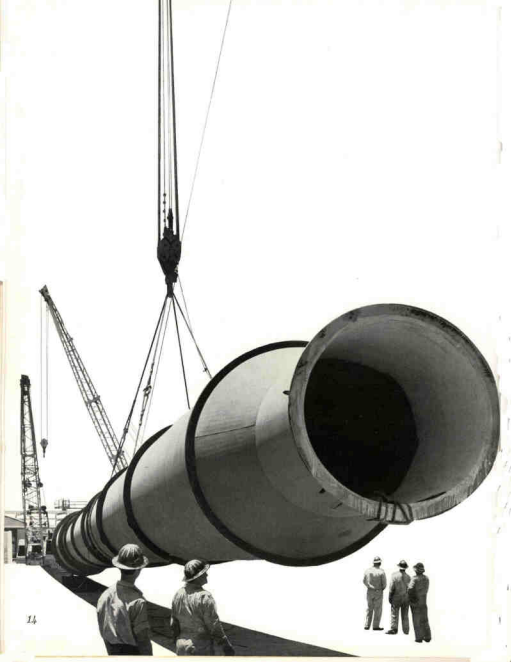
Jose Oduber of Oil Accounting, who was hired in September, 1925, well remembers Lago's Oranjestad days. When he took the job of cable clerk, paymaster, and general office man, Lago's total payroll at the Oranjestad office consisted of seven men and a woman who did the cleaning. Sometimes, he says, "the whole company knocked off in the middle of an afternoon and went swimming." On the other hand, the whole company was likely to work at night or on Sunday when a ship finished loading and was ready to put out to sea. He still has a record of the loadings: 6 ships were filled from the depot ship in 1924, 57 in 1925, 80 in 1926, and 148 in 1927 up to November, when the business moved to San Nicolas.

Ralph Watson of Receiving & Shipping lived during 1925 in the "White House" at San Nicolas Bay. He, an assistant, and some helpers took soundings in the bay, cleared away cactus on the shore, and put in a small water line to Mangel Cora, an old well south of the lighthouse. They finally ran out of things to do, and spent several months fishing while waiting for the dredge to arrive.

Pedro de Windt, who retired from Receiving & Shipping in 1949, remembered that one of his first jobs with Lago was greasing the machinery of a row of windmills near the lighthouse, where water for washing, and sometimes drinking, was obtained.

Henry Fuojaah of the Shipyard went from Surinam to Curaçao in 1926 to look for work, and later moved on to Aruba when he heard about the new refinery. He lived at first in a thatch-roofed hut about where the Customs House at the head of No. 4 Finger Pier now stands. He and his bunkmates had cots to sleep on, but on rainy nights they slept under the cots to keep dry. He says the first electric shop was a surplus telephone booth that had been intended for the dock but never used, and that the first "powerhouse" had only three 1-KW generators.

Captain William Craig, who came from England in 1925 as mate of the *Invercaibo* and retired twenty-eight years later as senior officer of the Fleet, especially remembered the pace of the pre-refinery days. The ships often waited a week for their turn to load at Maracaibo. There were no navigation lights on the narrow channel between lake and sea, and if the ships approached it near the end of the day they always anchored to wait for a daylight crossing.



first ten years

A refinery is a living organism. It grows and changes all the time. At Lago the growth and changes have sometimes been rapid, at other times minor and gradual.

There were several major periods of construction during the first ten years:

The original installation took place between 1928 and 1931, when the low pressure stills, combination and cracking coils and visbreaker units, utilities, pumphouses, tankage, and pipelines were built.

In 1937 the west entrance was cut through the reef, and ships no longer had to turn around in the narrow harbor.

In 1938 and 1939 over \$22,000,000 went into expansion. Stills were added, a number of units were reconstructed, gasoline storage spheroids were built, and the docking space was greatly increased.

The same period saw the slow but steady development of the rough "oil camp" of January, 1929, to the settled community of later years. Temporary shelters changed to well-built homes, good shops, and paved streets that spread out from the refinery's edge over what had recently been barren coral.

The refinery's main entrance was shifted in 1931 from a point below the Acid Plant to its present location, and San Nicolas pivoted with it. The town, previously strung out in a single rocky street west of the plant, fanned to the north and east, but still focused on the spot where most of its residents enter each day to work. Churches, stores, theaters, schools, street lights, pavements, and bus lines followed the growth in the area's population.

Aruba operations had been taken over by the Standard Oil Company of Indiana, through acquisition of the Pan American Petroleum & Transport Company. In 1932 the Aruba installation was purchased by the Standard Oil Company (New Jersey) and resumed the original "Lago" name.

In 1937 the Lago Heights community, with 150 houses, and, later, bachelors' quarters, a dining hall, clubhouse, and sports field, was built.

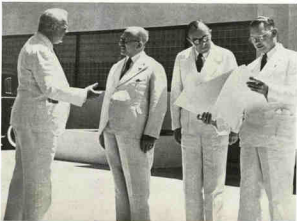
In 1938 a \$200,000 hospital was built on a high knoll northeast of the refinery; then, because changing petroleum requirements made this space urgently needed for gasoline storage, the hospital was cut into sections, and moved piece-by-piece on a special half-mile railroad to the top of a hill well away from any future expansion.

In 1939 a move that was to become increasingly important was made with the construction of Essoville—seventy-seven bungalows for employee purchase—by the Home Building Foundation.

As the refinery spread east along the lagoon shore, Colony bungalows were picked up like chessmen and dropped into distant open spots, making way for No. 3 Laboratory, the General Office Building, and No. 2 Powerhouse.

There were 5,800 employees in the refinery in 1939, and the crude oil runs had reached 230,000 barrels per day. The plant was ten years old as war clouds began gathering on the European horizon.

One of those who had most to do with Lago's development was T. S. Cooke, at far left talking with Curacao Governor G. J. J. Wouters, at 1940 General Office opening; at right is General Manager L. G. Smith with Aruba's Lt. Governor J. Wegemaker.



the war years

Loaded tankers anchored just off the reef flared up like gigantic torches a few hours before dawn on February 16, 1942. Shells screamed over the refinery to explode in the tankfarm and hit the residential area to the north of it. Aruba knew it was really at war.

Lago itself had been in the fight for a long time before that. The refinery started supplying petroleum products for the Allies with the outbreak of hostilities in Europe on September 3, 1939. Germany moved into Holland and Belgium on May 10, 1940, and by sunrise next morning all the German nationals in Aruba were on their way to internment in Bonaire. War was on the Aruba doorstep for a long time after that, but with the 1942 attack it opened the door and walked in.

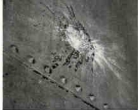
Aruba went to bed the night of February 15, 1942, expecting the usual good night's sleep. Although there had been a few ship sinkings in distant parts of the Caribbean, and the U. S. Army Air Forces had established squadrons of bombers and fighters that patrolled regularly out of Dakota Field, the war in Europe was far away.

Over a thousand American troops had landed a few days before, and their big and little guns, field telephone wires, searchlights, and big stockpiles of shells beginning to appear in isolated places were exciting and at the same time a great comfort. But the troops were still setting up their equipment.

At 1:30 next morning, February 16, they saw action they hadn't expected. With a thundering explosion that was followed immediately by flames rising hundreds of feet into the black sky, a torpedo hit the lake tanker *Pedernales*, anchored just off the reef. A few minutes later the *Oranjestad*, anchored several hundred yards away, also took a torpedo and appeared to dissolve into a sheet of flame. Then red-hot shells from the submarine's deck gun began to arch over the lagoon into the refinery area and to the north of it.

The *Pedernales* gradually drifted away, taking its lake of blazing oil along with it. Within an hour the *Oranjestad* sank where it was anchored, and the spot was marked by an oil slick for several years afterwards.

Ashore, after the Lago area was shelled briefly, men and women

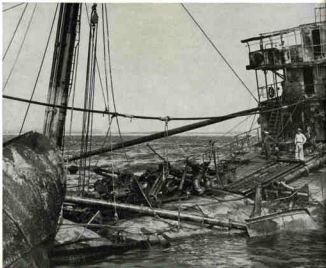


moved in restless little groups, examining each wild rumor as it came along. Army Air Force planes droned overhead. Hours later, as the fires beyond the reef flickered out and the ambulance made steady trips to the Hospital with survivors, Lago settled down into the total blackout of war. The area nearest the tankfarm was evacuated. Some residents moved to the Community Church, and others moved in with friends farther away from the millions of barrels of oil and gasoline in storage.

Out at sea, however, the night and the tragedy were not yet finished. Two hours after the first attack here, the *Tia Juana* and the *San Nicolas* were torpedoed and sunk, with heavy losses of life.

The next night San Nicolas Harbor looked like the inside of a sardine can. Nothing sailed except an Army ammunition ship, and be-

Smashed and burned by a German torpedo that struck it just off Aruba's shoreline, the Pedernales (below) sailed again. Divers cut it in two pieces, and the separate sections were floated back to Lago's drydock, where they were temporarily welded together for the long voyage to a repair yard in the United States, and a complete new midship section was put in. (Top) Coming perilously close to capturing a full tank of oil near the center of the storage field, the shell that made this dent, one of many fired at Lago in the 1942 attack, was possibly Germany's first land blow in the Western Hemisphere.





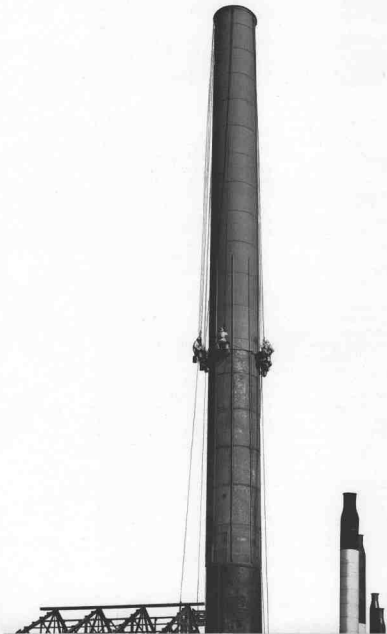
fore nightfall all the ships in the area ducked into harbor until a convoy system could be organized.

Before sundown the Army had hauled big guns into the sand dunes between the big and little lagoons, below the harbor, and on the north shore; huge searchlights were everywhere, and an anti-aircraft battery went in between the spheroids and the Hospital. Watching these preparations, Colony residents began to feel as if they were inside a fort—one without walls. The almost constant drone of bombing planes going out on search missions was reassuring.

Most of the plant was shut down until light-shields could be rigged up for the furnaces. All the sheet-iron roofs of the Pressure Stills later went for this job. Teams of blackout wardens, destined to police the Colony and Lago Heights for many months, were quick to point out any telltale lights.

With the air war being speeded up and aviation fuel desperately short, the refinery late in 1942 started on the construction of \$19,000,000 worth of equipment that would skyrocket its 100-octane gasoline production. On December 4, 1943, the new equipment was inaugurated. Work, hard urgent work and a race against time, became the order of the day at Lago. "Hopi CON Pronto" became the slogan; it meant "a whole lot of aviation gasoline quick."

Honors were heaped on the men and women of Aruba for their achievements in producing enormous quantities of aviation and motor gasoline, fuel and diesel oil, and other petroleum products for the Allied war machine. Officials of the Army, Navy, government, and Lago's parent company extended high praise for a job well done.



'46-'54

From a mighty engine of war the refinery changed overnight to a mighty engine of peace with the coming of V-J Day in August, 1945. For six years the plant's total efforts had gone into keeping the fuel tanks of the Allies filled. Now, with peace, came the opportunity to catch up on long-deferred maintenance, to build and remodel, to cope with the problem of housing shortage, and to expand employee benefit policies. Also there came the need to "change sights." During the war high production was important, costs were secondary. For several years after the war costs continued to be secondary because lack of ships and refining facilities created a world-wide shortage of oil. By early 1949, however, the shortage was over, and the oil industry had swung back fully into peacetime competition; higher efficiency and a close rein on costs became urgent matters. That Lago could meet competition is seen in the crude run figures, which continued to rise each year until 1952.

In the first postwar year, 1946, crude runs averaged 336,651 barrels per day. By 1951 they had increased to 431,174 barrels per day, the high point. The following year runs declined to 420,244, and in the refinery's twenty-fifth year, 1953, the daily average was 403,886 barrels. Markets changed substantially through the period, especially in the European area because of the steady addition of refining facilities there and the increased use of oil from the pound sterling currency areas of the Middle East. In 1947 European deliveries accounted for 34 per cent of Lago's production; by 1950 Europe took only 22 per cent; and in 1953 this had decreased to 14 per cent. (This 14 per cent of a year's production was over 20,000,000 barrels, still a sizable factor in Europe's economics and in Lago's business.)

The refinery work force continued to grow for a time after the war, reaching a top of 8,300 early in 1949, as attention was given to maintenance and construction work that had been put off during the war because not enough men and materials were available. By early 1950 much of this work had been completed, and the release of employees recruited especially for it was begun. By the end of 1953 there were 7,200 Lago employees.

Hundreds of big and little changes in the plant took place during



KLM's Caribbean network fuels its planes at Aruba through a modern hydrant fueling system.

Ballots are cast in a plant-wide election of members to an employee representative committee.

Members of Aruba's Administrative Council tour the plant in 1953. Second from left is Lt. Governor L. C. Kurtz.

Aruba's connection with all the world is demonstrated in an exhibit prepared by Lago Vocational School boys.

Proud parents and friends watch as ninety-four young men graduate from Lago Vocational School in July, 1953.



the postwar years...the General Office Building was increased in size by nearly half...a wing was added to Laboratory No. 3 to house Laboratory No. 2...the latter, which had been a bunkhouse for Chinese dining hall employees in 1927, was dismantled to make way for refinery equipment...worn-out equipment on the stills was replaced...tankage and piping were increased...a larger new telephone exchange was built...

Two of the largest changes took place between 1949 and 1952: harbor reconstruction and a main shops project. At a cost of \$6,000,000 the harbor work included building two all-welded steel finger piers, dismantling the original main dock, dredging, strengthening two existing docks, and driving sheet piling for a new barge dock. A major change in the plant's skyline was the main shop building that brought machine shop, carpentry, welding, tinsmith, blacksmith, and pipe operations and a large storehouse section under one roof, with improved working conditions and increased efficiency.

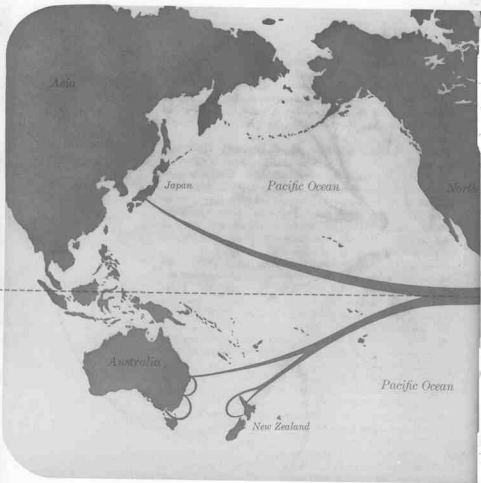
In the field of employee benefits, the years 1945 to 1954 saw the beginning of a long vacation plan providing non-expatriate employees with bonus vacation time at intervals, in addition to regular yearly vacation time; a vacation savings plan, to which both company and employees contribute; more liberal provisions in sickness, accident, and death benefits; a retirement plan for either regular or early retirement; more liberal thrift loan provisions; and an extension of the survivor benefit plan to include benefit payments to the survivors of annuitants as well as employees.

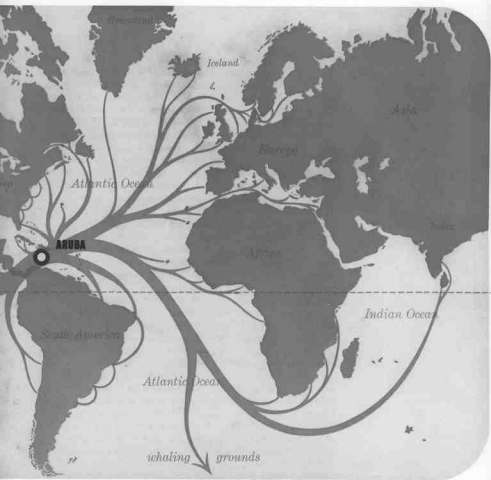
The Home Building Foundation, forced by the war to suspend activities after building seventy-seven houses in 1939, began a steady program of construction in 1947. By the end of 1953 it had financed 458 homes at a cost of \$2,250,000, providing housing for 2,500 persons in a dozen widely scattered locations.

In 1951 the Lago Commissary moved to a large, well-lighted new building, conveniently located on the San Nicolas edge of the plant, with self-service as a feature. In 1953 a new fireproof hospital wing replaced part of the original 1938 structure to give greatly improved bedspace, and construction started on a new and improved plant dispensary.

At the Lago Sport Park a 700-seat grandstand was added in 1950 and later doubled in size. Small children's needs were recognized

to the ends of the earth





millions of people depend on Lago's petroleum products

with a playground at the park in 1951. In 1953 a combination tennis-basketball court and dance floor was added, and the inauguration of floodlights with the Queen's Birthday Olympiad that year made after-dark competitions and recreation possible. A meeting room for use of the Sport Park Board was being completed as the year ended, and a gymnasium under the grandstand was being planned.

The part-time training of Aruban boys, that was started on an experimental basis in 1935 and grew into a full-time four-year school course during the war years, continued to grow in the later years while it was still the only source of well-trained young men. In 1949 the Lago Vocational School graduated seventy-four 18-year-olds, the largest class to complete the course up to then. (It was to be exceeded by the 1950 class of 104 graduates, and the 1953 class of 94.) Two of the 1949 graduates, Francisco Dijkoff and Dominico Britten, were the first to receive an all-expense-paid year of additional study at the Allentown (Pennsylvania) High School, a practice that was continued in succeeding years. By early 1954 the higher level public schools and the Aruba Technical School were graduating increasing numbers of trained students. The trainees required by the plant could now be enlisted from these groups, and be given the amount of special training needed to prepare them for specific jobs. The great mission of the Lago Vocational School was complete, providing nearly a thousand young men with valuable education and job opportunities. Although it was planned that the four current classes would complete their four-year course, no more classes were to be recruited.

Employees' safety accomplishments continued to show that it is safer to be inside the refinery gate than outside. Year after year the refinery and fleet earned high places in the U. S. National Safety Council's annual contests, one year (1948) making a clean sweep of first place in all four divisions entered, and in 1950 taking three out of four first places. Year after year the refinery's accident frequency rate was lowered until in 1953 it was 1.01 lost-time injuries per million man-hours worked.

Major changes in the employee representation system that was originally set up in 1936 took place in 1949 to keep pace with changing conditions and needs. The former Employees' Advisory Committee of thirty-three men handling all nature of problems was replaced by an eight-man Lago Employee Council dealing in the negotiable

areas of wages, hours, and working conditions. District representatives were elected from various work locations to assist employees in handling grievances within their districts. At the same time the Commissary Advisory Committee and Special Problems Advisory Committee were established to advise on off-the-job matters, and the Lago Sport Park Board took on the co-ordination of activities at the Sport Park. The first acts of the Lago Employee Council elected under this system in December, 1949, were to write a constitution, and to negotiate with the Company a Working Agreement. This was signed June 7, 1950, and with successive modernizing changes has continued to be the base for employee-management relations.

historical high lights

December, 1948, saw the lake tanker *Andino* in a new role as it brought in the first shipment of crude oil direct from the new Amuay Bay terminal. It was the first of Lake Maracaibo's crude to leave the lake area by way of the new pipeline to Amuay instead of over the sand bar at the entrance to the lake.

In May, 1949, Bertalia Mascelin of the Laundry became the first woman to complete twenty years of service at Lago.

In July, 1950, the Masons & Insulators were being complimented on a safety record of over eight years without a lost-time injury.

In August, 1950, private pilots from Lago flew loads of food supplies to earthquake sufferers at El Tocuyo, Venezuela.

In September, 1950, the Aruba Technical School opened doors to its first students, twelve of whom became Lagoites after their graduation three years later.

In December, 1950, Lermiet Kock won the 1,000-guilder first prize in the plant-wide cost reduction essay contest.

The Dispensary began giving round-the-clock service in May, 1951.



Countless miles of pipe form the arteries of the plant.

In August, 1951, the refinery operated at two-thirds capacity during a five-day work stoppage; this was caused by a misunderstanding of a special cost-of-living study. Government mediators established the final settlement conditions.

In September, 1951, a reconstructed and greatly enlarged refinery at Fawley, England, resumed operations, replacing Lago as a principal supplier of Britain's oil.

A headquarters building near the Main Gate for the Lago Employee Council was opened in November, 1951.

Two Lago men, Jorge Brion and Juan Briezen, were members of the Netherlands Antilles Olympic football team at Helsinki in May, 1952, and the Antilles' only Olympic goal was made by Briezen on a pass from Brion.

Conducted plant tours for employees' family members were started in December, 1952 (and by January, 1954, over 6,500 had accepted the invitation).

In January, 1953, employees contributed generously to aid the thousands made destitute by floods in Holland and England.

A referendum to recall the Lago Employee Council in June, 1953, was unsuccessful, but the group resigned and a new Council was elected.

A new refinery in Belgium went on stream in September, 1953, taking with it some of Lago's market.

In December, 1953, the largest Coin Your Ideas initial award ever made, Fls. 5,000 (\$2,650), went to machinist supervisor C. F. Bond.

Lago today

No one who saw the eight topping stills and eight cracking units of 1929 could have predicted the refinery's growth to its present size and pre-eminence in the petroleum world. In 1954 the largest operating refinery in the world, the plant represents one-third of all the overseas refining capacity of the Standard Oil Company (New Jersey). With a rated capacity of 440,000 barrels daily, and with peak runs of over 500,000 barrels a day, its throughput equals that of several United States refineries combined.

Its dozens of different grades of refined products go into the engines and furnaces of Norway, Sweden, Denmark, Finland, England, Holland, Belgium, France, Italy, Switzerland, Spain, Africa, South and Central America, the Caribbean islands, and the United States East Coast.

Lago's operations are simple by some standards: it makes no lighter fluid, or insecticides, or finished lubricating oil. It puts nothing in little cans or bottles. But it can fill four 100,000-barrel ships today, four more tomorrow, and four more the day after that.

To do this takes men who turn valves and watch gauges, maintaining pressures or levels or temperatures to a fine point; men who fit pipe and weld steel; men who lift and carry; doctors, grocery clerks, accountants, chemists—over 7,000 men and women of twenty-two nationalities, from fifty-six different islands or countries.

They work in the Accounting, Colony Service, Industrial Relations, Marine, Mechanical, Medical, Process, Public Relations, and Technical Service departments.

The Accounting Department maintains the multitude of records necessary in so big an operation. The Colony Service Department operates residential colonies, laundry, commissaries, and other service units. The Industrial Relations Department assists and advises management in administering Company policies, and recommends courses of action in fostering stable employee-management relations; it co-ordinates employee representative committee matters. The Marine Department co-ordinates the transportation by ship of Lago's inbound crude oil and outbound refined products. The Mechanical Department builds and maintains equipment and structures, and procures supplies. The Medical Department safeguards the health of employees and their families through the Hospital and Dispensary. The Process Department performs all the operations involving the



"The Man With His Hand on a Lever" is symbolic of Lago's rapid mechanization in recent years, a move that benefits many hundreds of employees. With an investment of \$15,976 for every Lago employee, both investment and wages are at their highest. As more work is done by men operating more costly machines, wages go up; at the same time less physical energy is used to earn the higher sums.

handling of crude oil and the manufacturing and loading of finished products. The Public Relations Department keeps the public informed about the Company and its operations, policies, and activities; it co-ordinates activities that help maintain the Company's position as a good neighbor in the community. The Technical Service Department designs equipment, analyzes operations, and through the laboratories maintains countless checks on the quality of products shipped as well as on products in all stages of manufacture. In addition to these major units, an operations co-ordinating group assists the management in scheduling operations so that the refinery can meet its commitments.

planning it

Lago's parent company, the Standard Oil Company (New Jersey), has a vast and continually changing pattern of what crude oil it can expect to have on hand, what equipment it has or will need to process the oil, what its customers will want, and what transportation will be available to carry the product to the customer. To keep operations fitted to this pattern, a Company-wide "outlook" is prepared each year for the succeeding five-year period. One phase of this is the fitting of Lago's operations and capacity into the broad picture of the Company's world-wide operations.

Outlooks are based on long-range trends: how much of what kind of travel can be expected and what fuel will be used; conversion of heating units from coal to oil; improvements in engine design, and new designs. Markets expand or contract. A new crude with different characteristics may be found. All these and a host of other factors (including the root of all: general business activity) influence what Lago will be doing one, two, or five years away.

In addition to the five-year look-aheads, shorter-term yearly outlooks based on similar principles, but with the addition of some sales contracts, and other more definite data, are prepared by co-ordination groups.

Finally, to keep up with changing demands and unavoidable delays to ships, monthly outlooks of requirements are prepared; these are usually correct to within a few thousand barrels.

process operations

Lago's function is to receive crude oil, change it with heat, pressure, and chemicals into useful products, and keep it until it is called for.

At the heart of this function is the Process Department, which has the oil in charge from the moment it is pumped out of a tanker from Venezuela until it is again pumped, usually in greatly changed form, into an outbound tanker. The 1,500 Process employees assist the ships in mooring, attach hoses between ship and shore, handle all movements of oil, operate all manufacturing equipment, load the product into ships, and finally cast off the mooring ropes.

The raw material they work with, crude oil, is made up of hundreds of components known as hydrocarbons. These boil at temperatures all the way from ordinary room temperature (these are usually gases) up to almost 1,000 degrees Fahrenheit. Because of these differences in boiling point, the hydrocarbons may be separated into a large number of commercial products.

Basically, aside from special treating operations, refining falls into three main categories: distillation, thermal cracking, and the more modern method of catalytic cracking.

In distillation the crude oil is pumped through the coils of a pipe still, where it is heated to a suitable temperature, and then delivered to a tower; the hot petroleum vapors rise through the various levels in the tower, and are drawn off as they cool and condense. Gasoline is taken from the top of the tower, kerosene, diesel oil, or heating oil at lower levels, a base stock for lubricating oils near the bottom, and heavy residual fuel from the bottom of the tower.

Cracking consists of supplying sufficient heat to break up heavy compounds into lighter material that boils in the gasoline range. This may be done by heating the stock to a temperature approaching 1,000 degrees Fahrenheit, at pressures up to 1,000 pounds per square inch, to "decompose" the oil.

The modern technique is Fluid catalytic cracking, using a finely powdered alumina catalyst that flows through the "cat cracker" with the oil and is used over and over. This process, using low pressures, increases the amount of high-quality gasoline that can be made from crude oil.

Practically all products receive additional refining before they are





...four 100,000-barrel ships today, tomorrow, and the next day.

shipped, to meet the exacting specifications of the purchasers. All but a few of the many products shipped require blending, with as many as six or seven different base stocks going into a single quality of finished gasoline.

Nearly forty different types of finished products are loaded into ships: six grades of aviation gasoline, including superfuels; ten different motor gasolines; six grades of kerosene, including tractor and jet fuels; five grades of gas oil; and so on through the list of Navy diesel oil, lube distillate, naphthenic acid, residual fuel oil, and cut-back asphalt.

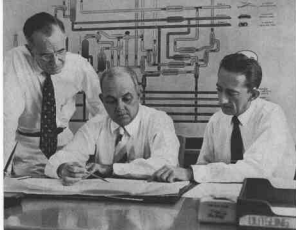
The kind and amount of crude oil and the processing equipment



available, the shifting demand for products, and ship schedules all affect the amount and kind of products that will be made. At the same time operations must be planned so that any of the various products can be prepared on a few days' notice.

to do the job

In a year Lago receives up to 150,000,000 barrels of crude petroleum, and in the same time pumps nearly that much of refined products into the cargo and bunker tanks of outbound ships. One hundred and fifty million barrels would cover the entire island of Aruba—or of



Operations must be planned, and the plans must be changeable to meet changing conditions.

Manhattan—to a depth of nearly half a foot. This quantity of oil would fill enough drums laid end to end to encircle the earth two times, with several thousand miles to spare.

Many things enter into the preparation of that vast amount of oil for market, but the most important factors are the experience, skill, and co-operation of every employee. Next is the best of modern equipment, kept modern by alterations and improvements to keep up with continual technical advancements in refining.

Some statistics help give the size of the operation:

Every day 350,000,000 gallons of sea water are pumped from the lagoon into the refinery for cooling and other purposes—more water than a big city uses. Every day over a million and a quarter gallons of fresh water are consumed—some of it brought by ship from the United States East Coast, Panama, and other distant locations, some made in sea water evaporating plants, and some taken from the crude oil itself.

The plant uses up to a million pounds of steam in an hour, may use as much as 17,000 cubic feet of compressed air a minute. Over 12,000 tons of sulfur were brought each year from Texas and Louisiana to be made into acid for treating purposes (until 1954, when a system was installed for recovering the sulfur that is part of the crude oil).

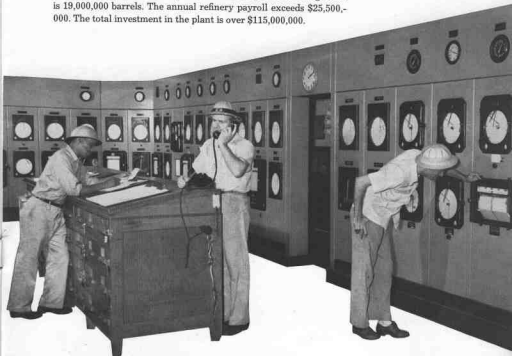
The installed power capacity in two powerhouses is 56,000 kilowatts, enough to light an average city of 100,000 people. Nearly 5,000 electric motors are in use, of all sizes up to 1,250 horsepower.

Four to five thousand tons of cargo are unloaded at the docks each

month to supply the refinery with everything from potatoes to structural steel. Over 60,000 different items for supply and maintenance are always on hand, with an inventory of nearly \$9,000,000.

While Lago is making fuel for millions of engines, the refinery's own fuel bill is enormous. From its own products Lago takes fuel for its own furnaces and boilers: 3,000,000 barrels per year of fuel oil, 7 billion cubic feet per year of gas, and 65,000 tons per year of petroleum coke.

Three thousand pairs of goggles protect employees' eyes from injury; 75,000 coins are needed each month to make up the odd amounts in pay envelopes; the total capacity of the storage and working tanks is 19,000,000 barrels. The annual refinery payroll exceeds \$25,500,000. The total investment in the plant is over \$115,000,000.



Heart of operations is in the control house, where temperatures and pressures in all parts of a huge still are automatically recorded.

valuable assets

trade proficiency »

talented craftsmanship »

painstaking care »

« *community interest*

unusual skill »

highly trained engineering »

know-how of testing »







The general manager offers the Company's good wishes to a new Esso dealer



Over 6,500 family members of employees have taken the opportunity given by the Family Program to see the plant in action at close hand.



Employee and management representatives enjoy a pleasant evening at the annual party for committeemen and district representatives.



The Sport Park's lights, for night events, were first lighted for the 1953 Queen's Birthday Olympiad.



On March 15, 1945, sixteen years after the first barrel, Logo processed its billionth barrel of crude oil. On July 4, 1952, the second billion barrels was completed, and by the 25th anniversary a fourth of the next billion was done. Speaking at a celebration of the first billion, L. G. Smith paid special honor to over a hundred men who were with Logo continuously from the first barrel to the billionth.





Many refineries receive their crude oil and ship their products entirely by pipeline or railroad tank car. To Lago, however, the sea is all-important as a highway for raw materials and finished products. Its refinery is separated from producing areas by 150 miles, and from markets by as much as 12,000 miles, all over water.

One of Lago's principal marine links to the rest of the world has been the Lake Fleet, whose ships have shuttled ceaselessly between Aruba and Lake Maracaibo, first with oil to be transhipped, and after 1929 with oil to be processed in the refinery stills. The original three "lakers" had a combined capacity of 24,000 barrels. From this small beginning the hauling operation grew to mammoth proportions: in 1948 to a peak of nearly sixty ships, of which over half were specially built lake tankers with a combined capacity of 1,500,000 barrels, and the balance were chartered vessels.

The lake tankers were specially designed to cross safely over the tricky shifting sand bars that separate Lake Maracaibo from the Caribbean Sea. With wide beams, shallow draft, and twin rudders and propellers, they were built for maneuvering in tortuous channels through the sand bars. In the early years a channel was navigable by loaded tankers at high tide only; it was maintained solely by natural causes and by the "scouring" action of ships' propellers continually passing back and forth. By 1937, however, this channel was deteriorating, and Lago joined a co-operative effort to keep the channel clear and to deepen it for the passage of larger ships. The lake tanker *Invercaibo* was converted to a dredge, and spent the next thirteen years sucking sand into the hoppers that replaced its cargo tanks and dumping it at a distant point at sea. When the *Invercaibo* was retired in 1951, a specially built dredge took over the work.

Through the years a channel has been established enabling ships of much greater draft than the flat-bottomed "lakers" to enter the lake. Venezuela is carrying the work still further, dredging a channel that will be 35 feet deep at low tide, so that by the end of 1955 all but the very largest tankers will be able to enter.

Crude oil haulage varies from month to month; in 1947 the monthly average was 378 ship arrivals from Maracaibo, discharging 11,982,346 barrels per month into the refinery's storage tanks. A peak in ship arrivals was reached in March, 1948, when 434 shiploads totaled 13,762,138 barrels. In December, 1953, however, approxi-

sea side



San Nicolas Harbor racks with the world's bustiest.

mately half as many ships—222—pumped ashore over a million more barrels of oil—14,948,000. Behind these statistics lies a change in operations that has reduced the Lake Fleet to thirteen vessels in early 1954 and that will eventually make it as obsolete as the windjammers that once called at Aruba for phosphate.

In 1948 the first of two pipelines was completed from the producing fields in Venezuela across the Gulf of Coro to the deepwater port of Amuay Bay, on Paraguana Peninsula. The first line, with a capacity of 300,000 barrels per day, was supplemented in 1953 by a second line which increased the daily capacity to 500,000 barrels. Besides reducing the ship-hauling distance by 100 miles, this puts the oil in a port where the largest ocean tankers can load it for discharge at Aruba. In place of a 24-hour voyage from the fields up the lake with a load of 40,000 barrels, ships can now come from Amuay in four hours carrying from 100,000 to 198,000 barrels in a single cargo. And the refinery's needs can be more closely met by having the big ships make one or more crude-hauling trips from Amuay Bay before they take off to a faraway point with their outbound load.

(To accommodate the largest tankers afloat, dredging was being



The Shipyard has long been one of Lago's busiest operations in keeping the Lake Fleet in good repair.

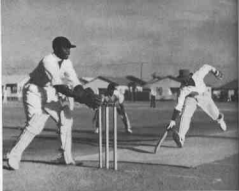
planned early in 1954 designed to increase harbor depth at San Nicolas to 40 feet, allowing ships with a draft of 37½ feet to enter.)

The "lakers" were a lifeline to Lago during twenty-five years when they provided the only means of bringing out the oil from Venezuela's fabulous fields. As tanker runs go, the 150-mile trip from Maracaibo to Aruba is like a step across the street. The bigger ships on the ocean routes may travel thousands of miles with a single cargo; their routes crisscross the seven seas. The Lake Fleet, on the other hand, has shuttled endlessly on the same short route. The champion of them all, the *Sabaneta*, made 3,028 voyages for a total of over 1,200,000 miles. This might well be called "the longest short haul in the world."

The ships that tie up at Lago's docks to take away finished oil represent almost every seagoing flag: Dutch, Norwegian, American, British, Panamanian, and many others. Beyond the huge oil cargoes loaded as routine business, fuel oil has been pumped into submarines, cruisers, round-the-world yachts, and factory-ships bound for the Antarctic whale hunting grounds.



1



2



1—Cricket is the favorite of British employees.

2—Softball draws nightly crowds in season.

3—Training courses of many varieties help employees do their job well and increase their opportunities for advancement.

4—Periodic physical check-ups help safeguard employees' health.

5—Played on dozens of fields in every part of the island, football is Arabs' oldest and still most popular game.

6—Basketball interest is growing.



3



4



5



6

the human side

In all the range of Company assets, none is so valuable as its employees: the men and women who, for five years or twenty-five years or all their working life, are Lago. Financial statements fail to show this. They deal in sales, inventories, and capital investment. Some of Lago's assets can be read in terms of money. But the biggest asset is its personnel.

There is a two-way reliance and importance between Company and employee. It is recognized in many ways, some related to the present, some looking to the future.

The employee receives good wages, the prevailing rate for comparable work in the area, or better.

He may have the opportunity to advance himself by training, and he is paid while learning. He can "coin his ideas," profiting by his suggestions for ways of improving operations.

His health is safeguarded by the best of medical facilities. In fact, he or his family calls at the hospital or dispensary for medical attention more than 80,000 times each year.

Company plans make it easy for him to take a vacation without financial cares.

If he is sick or has an accident, he receives benefit payments—usually in excess of the law's requirements. Death benefits are provided.

The Company helps provide for his future with a retirement plan which will give him an income when he should no longer work for



Above — Flags symbolize Lago employees' outstanding achievements in working safely.

Top right — A high school student receives free instruction from an Arriba Flying Club instructor.

Center right — Pillow fights are hilarious at Queen's Birthday Olympics.

Bottom right — Two "hobos" are prizewinners at a costume party.



his living. He and the Company together put money into a thrift fund that helps him to accumulate savings, both for now and the future.

After hours employees stop being refinery workers. They band together in stamp clubs. They swim, or golf, or knock a baseball around, or play cricket. They battle for trophies on a tennis court, a football field, or a pool table. Some study in their free hours to improve themselves. Every so often they celebrate great occasions by gathering by thousands for an all-day sports meet at the Lago Sport Park. They join with others for community activities in organizations of every kind, in every part of the island.

With their families they comprise nearly half the population of the island—leaders in many things, good citizens.

to the future

Four hundred years ago Aruba was the center of the fabulous Spanish Main. Galleons and treasure ships, piled with gold and other precious cargo from the southern continent of America, sailed through these waters on their way back to Europe.

Today, as the Lago refinery rounds out a quarter-century of operation, Aruba is more important to the world than it ever was in the past. More ships than the Spanish conquerors ever dreamed of sail from Aruba, and their cargoes are infinitely richer.

The world needs petroleum and petroleum products to raise food, to turn machinery, to fuel trains and trucks and aircraft and ships. Lasting peace may well depend on adequate supplies of oil. Lago, as one of the world's great suppliers of this vital commodity, firmly expects to go on holding a secure position in world trade. That it has faith in its own and Aruba's future is to be seen in continued major contributions to the island's welfare, in long-range employee policies, in the yearly expenditure of millions of dollars to make and keep the plant an efficient competitor in the oil industry.

For a quarter-century Lago has helped Aruba develop a great present. It firmly expects to go on helping Aruba build a great future.

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years of refining at Lago

