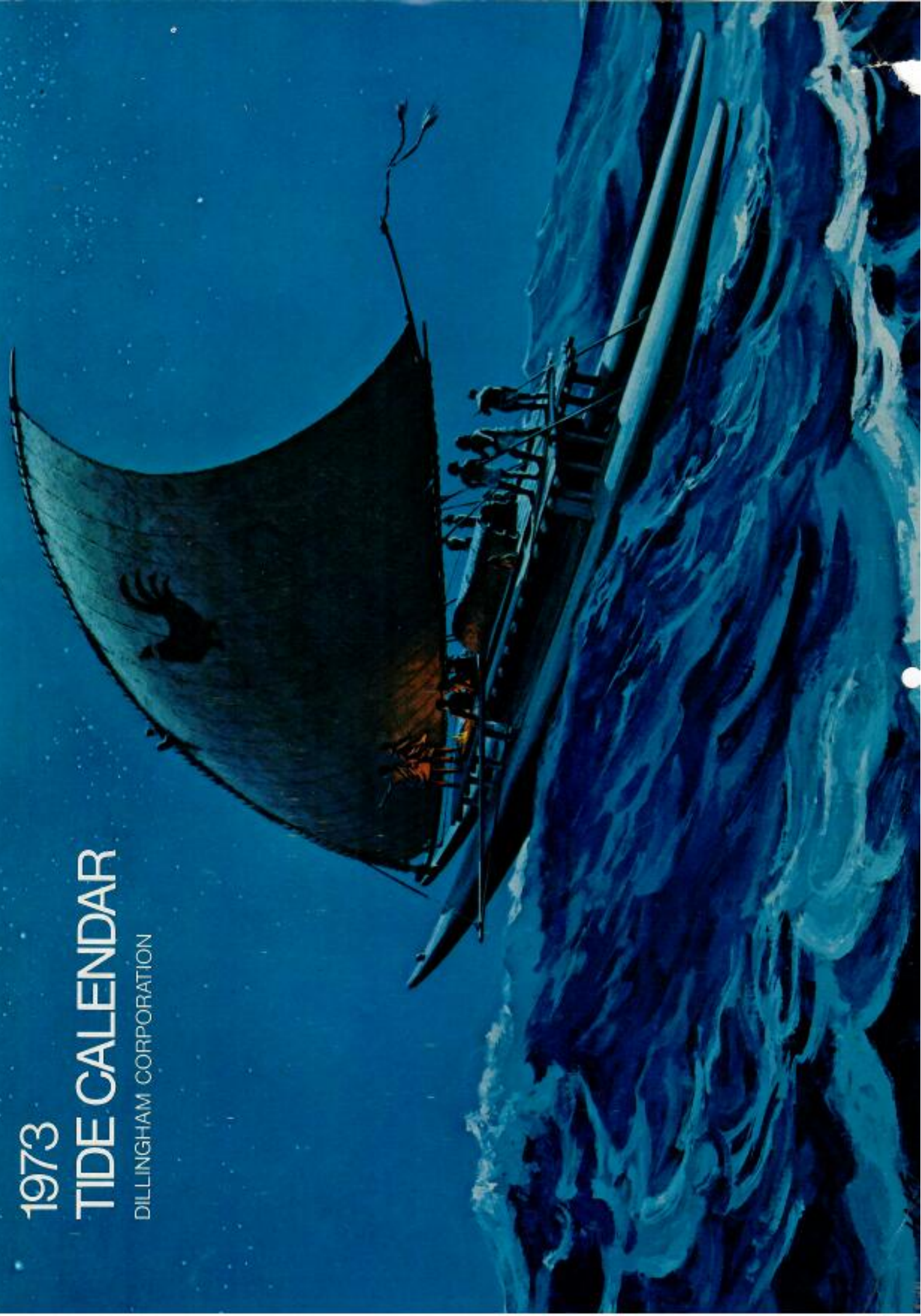


1973

# TIDE CALENDAR

DILLINGHAM CORPORATION



Depicted on the cover is a longboat of Tonga. A longboat was the first Polynesian voyaging canoe to meet a European ship at sea (1616).

# CANOE OF POLYNESIA...

This year, in response to many requests for an encore to our 1972 Tide Calendar, Dillingham Corporation is pleased to bring you more paintings and drawings of the Canoes of Polynesia by arrangement with the artist-researcher Herb Kawaiui Kane. The originals have been acquired by the Hawaii State Foundation of Culture and the Arts, and now belong to the People of Hawaii who share — regardless of racial background — a cultural inheritance that began when the long canoes first touched Hawaii's shores.

No record remains of these early craft; but in the painting reproduced below, the artist has assembled archaic canoe elements to illustrate his conception of the first Hawaiians in their vessel of discovery. Explains Kane, "Becalmed in the Equatorial Doldrums, paddlers are moving the canoe northward. Far behind are the familiar winds and swells of the South Pacific, and ahead lies an unknown sea. Later, they will encounter the strong Northeast Tradewinds, which will force them westward, and under the path of the star Arcturus they will discover the New Hawaii.

"They came to Hawaii at some unremembered time before 500 A.D., probably from the Marquesas Islands. Conquered by invaders from Tahiti several centuries later, they would be remembered as the Menehune People. But both the Menehune and the Tahitians were descendants of the world's first deep-water navigators, who began the exploration of Polynesia more than 3500 years ago. And both became the ancestors of present-day Hawaiians."

In the 1972 Tide Calendar, Herb described how the Polynesians shaped their canoes. He now suggests: "These canoes probably exerted a 'shaping' influence on their makers, to an extent unparalleled

by any other artifact ever made by man. Favored for survival were persons with powerful muscle, stamina, and ample fat to sustain the body through times of hunger and insulate against deadly exposure to wind and spray. The survivors of a voyage would form the ancestor-pool for a newly-discovered island. Thus, by musculature and size, the Polynesians may be truly identified as the children of the long canoes.

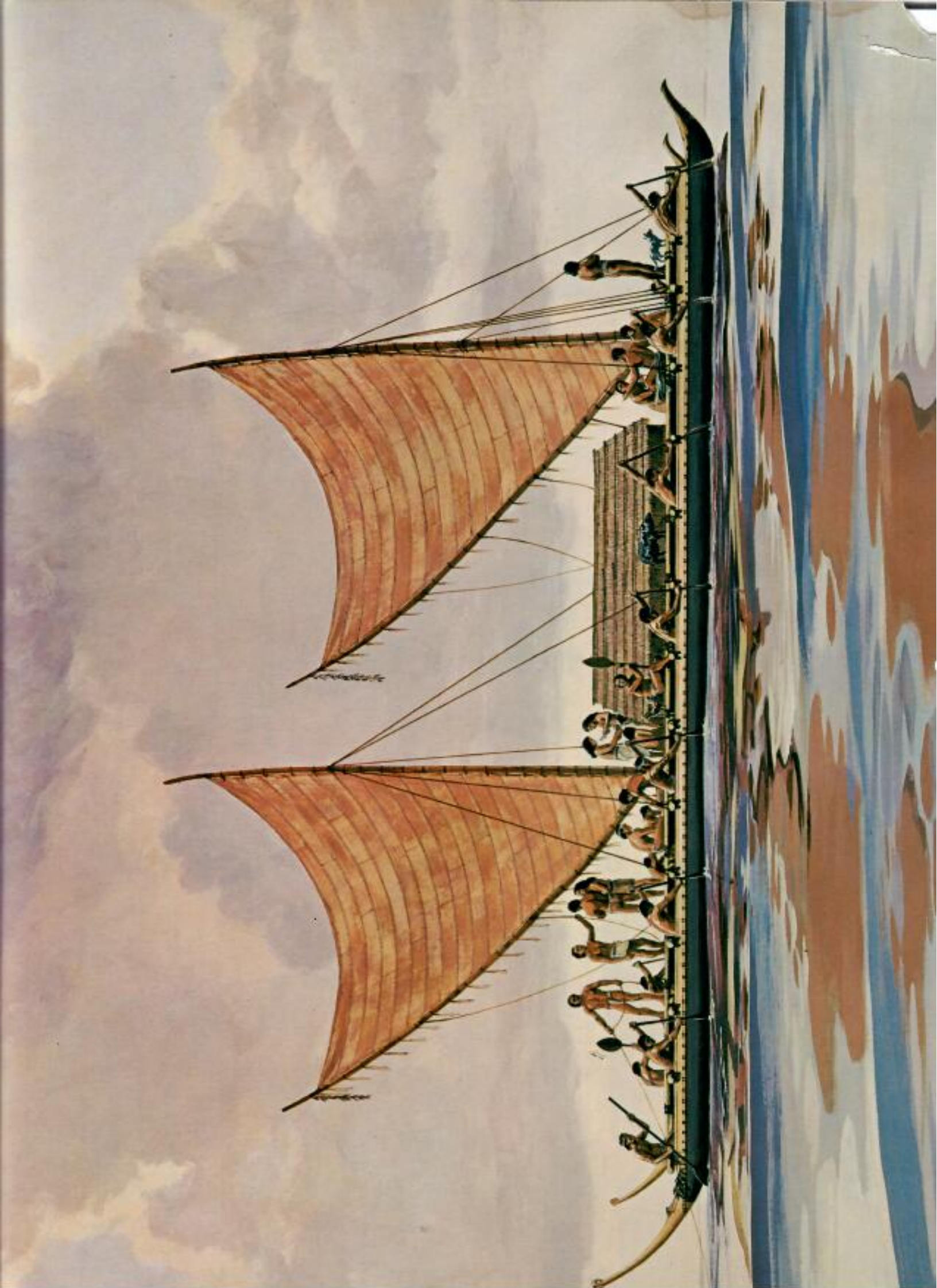
"From the canoes on these pages we may learn much about those who built and sailed them. Knowledge of sailing and hydrodynamics is revealed in their designs. Artistry and religion are expressed in the form and content of decoration. A highly practical knowledge of navigation, astronomy, meteorology, and seamanship can be assumed. The construction techniques bespeak a resourceful, inventive people with no metals and few other material resources, yet capable of extraordinary craftsmanship. Intimacy with Nature is revealed in hulls with low freeboard, obviously designed to work in harmony with — not in opposition to — natural forces.

"Sailing is a conversation between Man and Nature in which Man proposes and Nature disposes, with the canoe as the instrument of communication. In voyaging and fishing, Polynesian survival depended on an abiding respect for natural forces."

In Hawaii, the tides are a natural force which commands the respect of all who go down to the sea. Tide movements throughout 1973 are precisely anticipated by computer on the pages of this calendar, to help you enjoy Hawaii's waters throughout the coming year. Dillingham Corporation wishes you the season's greetings and a bountiful 1973.

#### DILLINGHAM COMPANIES IN HAWAII:

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The ancestors of the Polynesians settled the Tongia-Fiji-Samoa area more than 3,000 years ago, bringing plants and animals of Asian origin. Spanning more than a fourth of the earth's circumference, and settling every habitable island in an area of about fifteen million square miles, the Polynesians remained as the most widely-spread ethnic group in the world until the beginning of European colonization a few centuries ago.

# MICRONESIA POLYNESIA MELANESIA



- ① Emergence of the Polynesians from the West.
- ② Exploration eastward to the Marquesas.
- ③ Marquisian expansion period.
- ④ Hawaiian expansion period.
- ⑤ Tongan expansion period.

NORTH  
AND  
NORTH  
AMERICA

AUSTRALIA

AOTEAROA (New Zealand)

RAPA NUI (Easter)

TE HENUA ENANA (Marquesas)

TUAMOTU ISLANDS

PUKUTU

TAITU

TONGA

FUJI

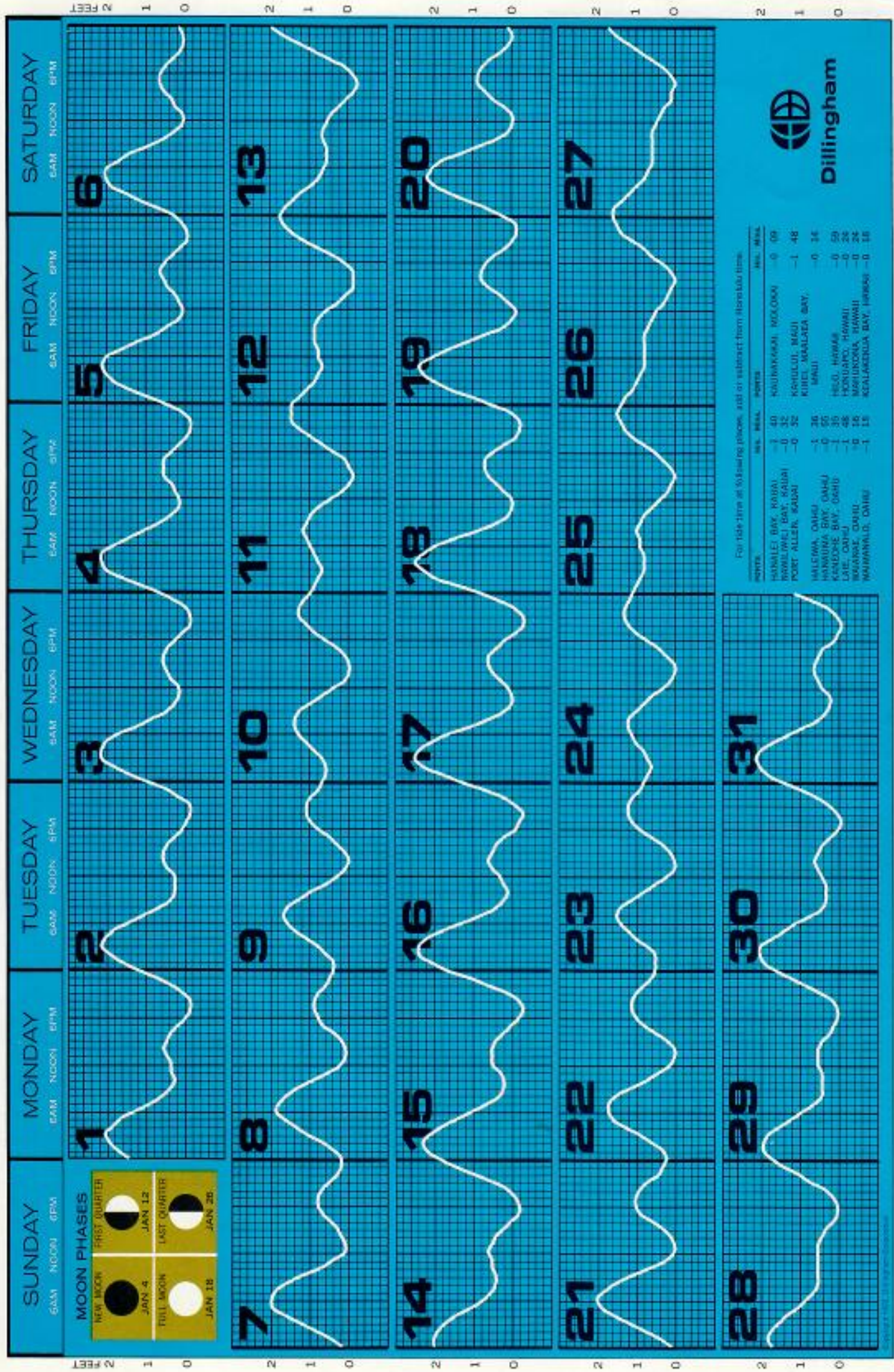
SAMOA

SAMOBILI

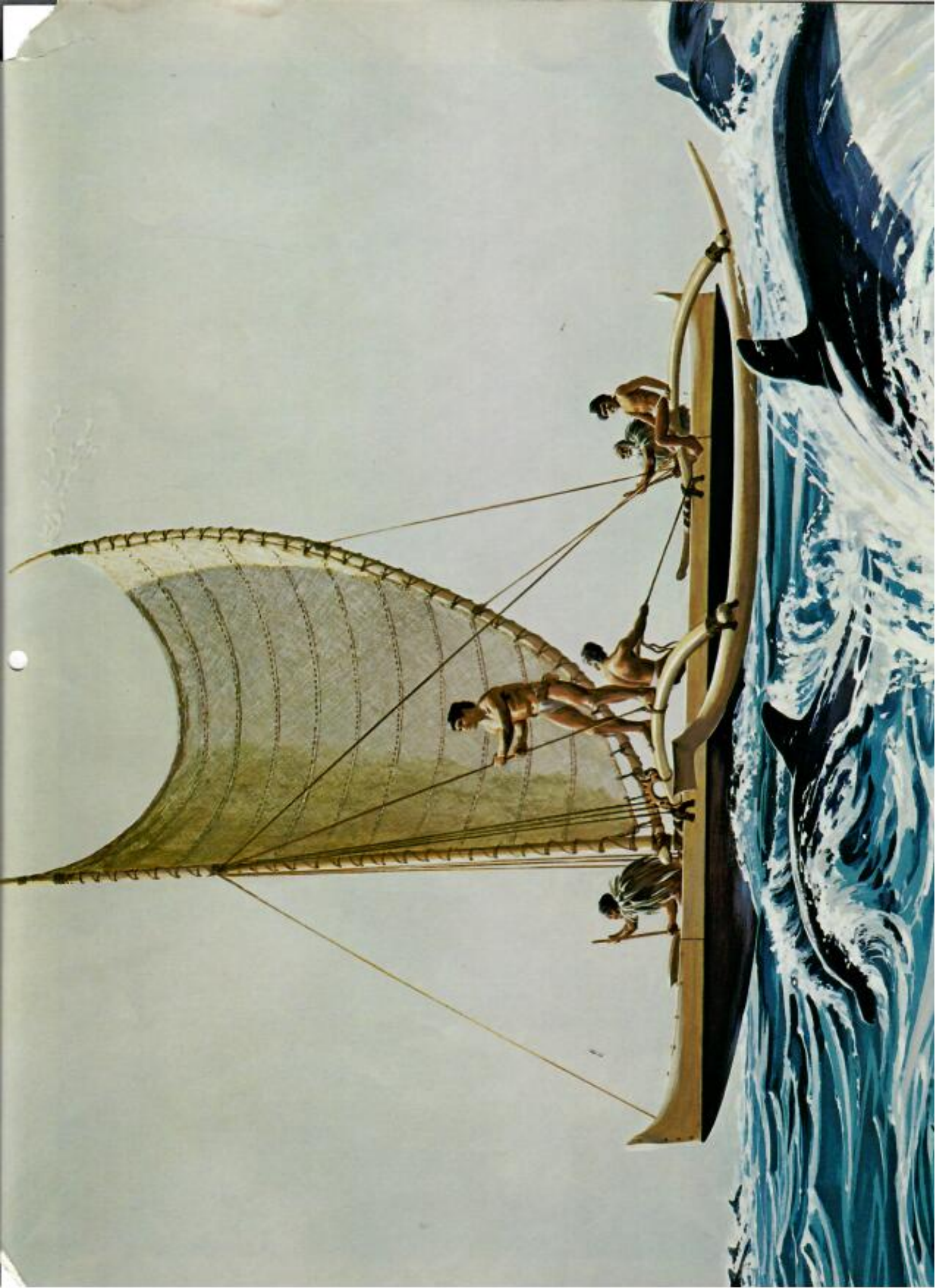
HAWAII

LANGAMARANGI

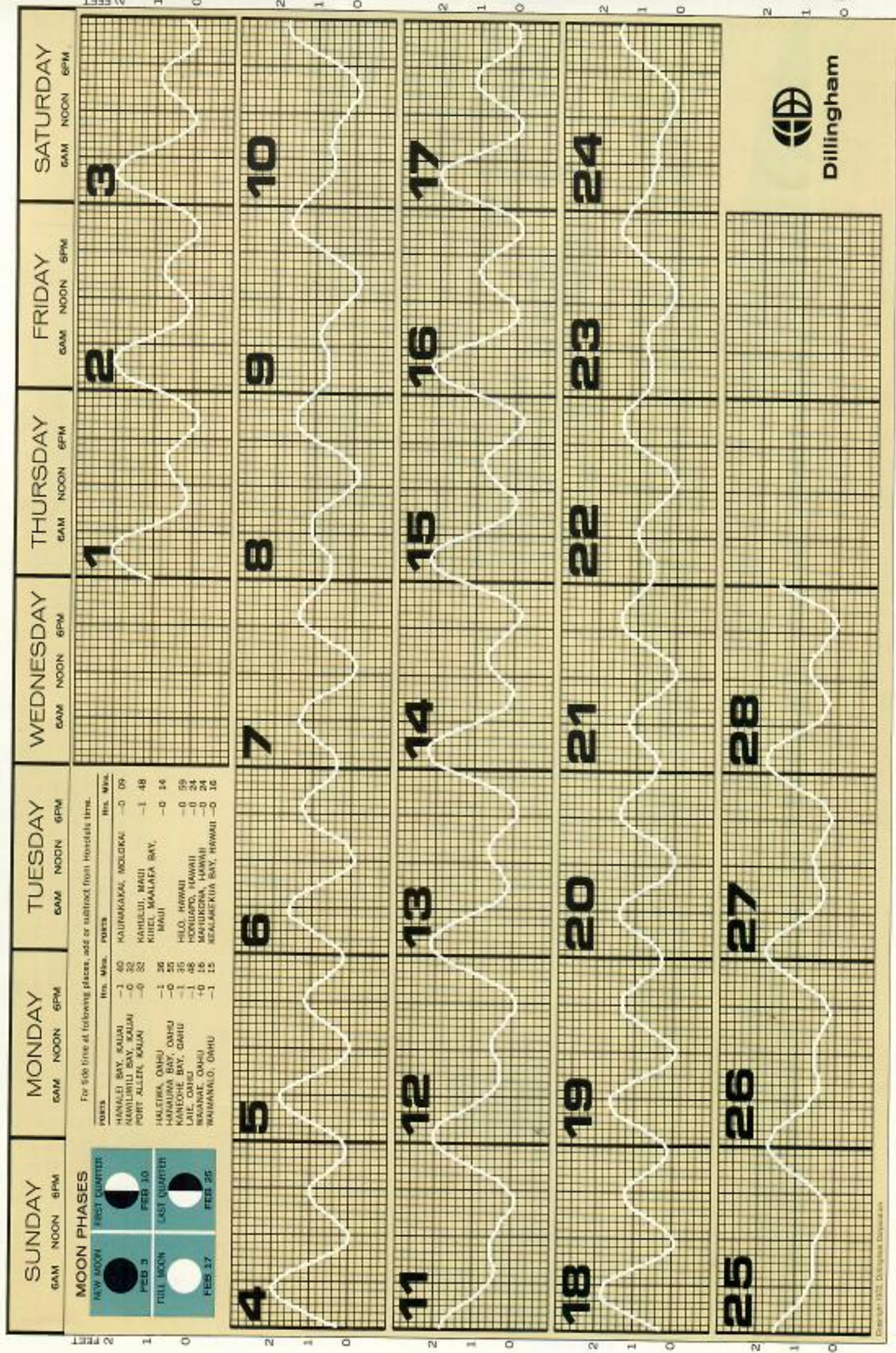
# January 1973 Tide Chart



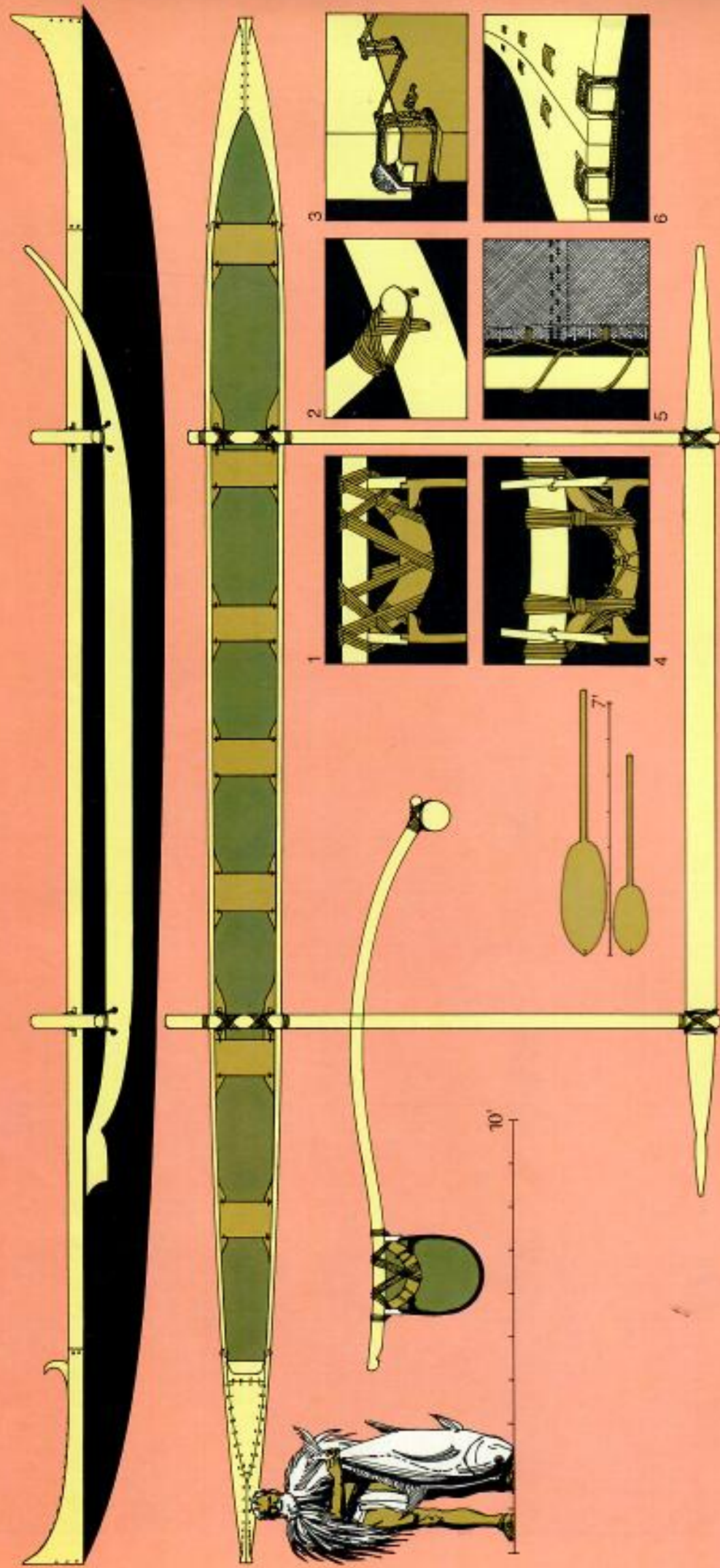
For 15¢-type of tide gauge prices, call or visit us at Honolulu office.



# February 1973 Tide Chart



Dillingham



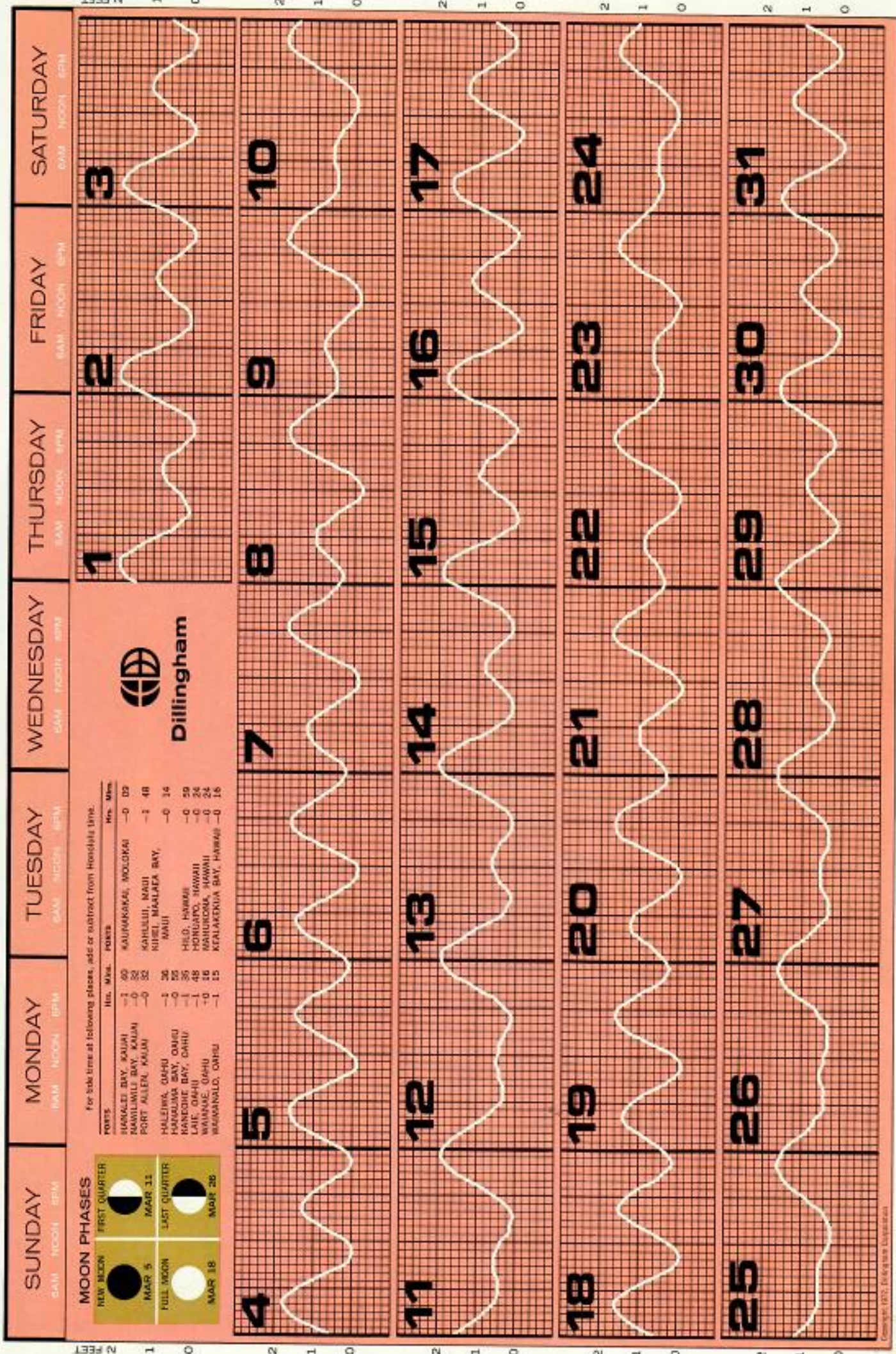
**A WA'A, KAUKAHI OF HAWAII**

The Painting: Paced by playful porpoises, an outrigger fishing canoe of Old Hawaii speeds across the wind. Two crewmen ride out on the crossbooms to balance the vessel, while another holds his paddle firmly to the hull to prevent leeward drift. In 1779 Captain Cook's officers counted more than 3,000 canoes on the water at Kealahou Bay. Today, a few paddling canoes remain, but the sailing canoe has disappeared from Hawaiian waters. Paddling canoes may be sailed by reversing positions of bow and stern, reversing the positions of the crossbooms and the float, and stepping a mast at the forward crossboom. Of paddling canoes, an early observer noted that one man could "paddle a single canoe faster than a boat's crew could row a whaleboat."

The Drawing: Measurements taken from a paddling canoe used for fishing by Kamehameha V are expressed in this drawing, which also displays the ancient methods of lashing and assembly. Details are: 1, an ornate form of boom-to-hull lashing; 2, boom-to-hull lashing; 3, assembly of gunwale strake to dugout hull (cut-away); 4, boom-to-hull lashing of a double canoe; 5, sail to spar assembly; 6, end piece assembly (cut-away). A paddle and a large steering paddle are also given.

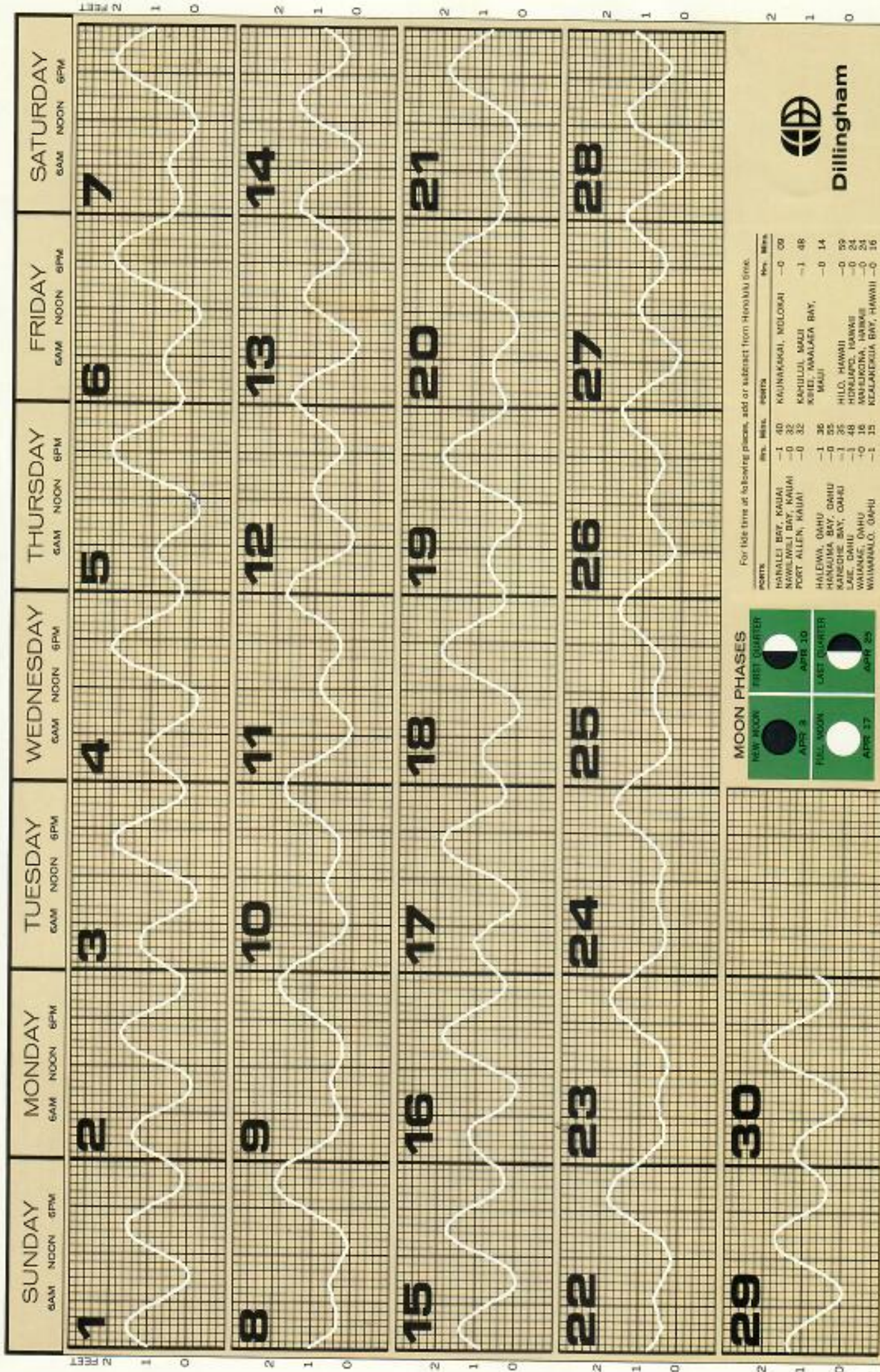


# March 1973 Tide Chart





# April 1973 Tide Chart

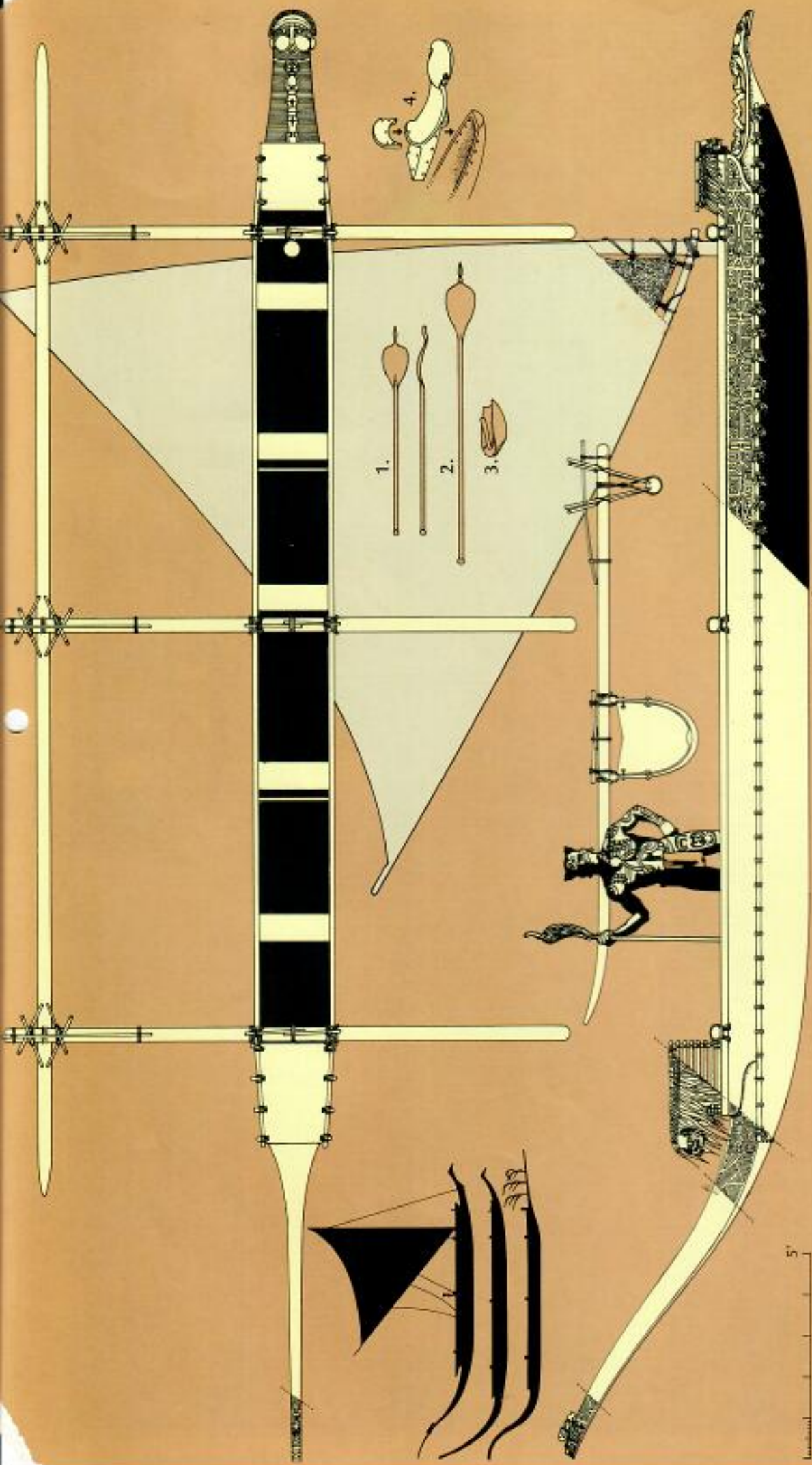


For tide time at following places, add or subtract from Honolulu time.

PLACES	Hrs.	Min.	PORTS	Hrs.	Min.
HAWAII BAY, KAUAI	-1	40	KAUNAKAKAI, MOLOKAI	-0	00
KAPAHULU BAY, KAUAI	-0	32	KAHULULU MAUI	-1	48
PORT ALLEN, MAUI	-0	32	KEEHI, MAUI	-0	14
HALEIWA, OAHU	-1	36	HILO, HAWAII	-0	59
HANALEIUA BAY, OAHU	-0	35	HONOLULU, HAWAII	-0	24
KANEIHEHE BAY, OAHU	-1	48	KOHALA BAY, HAWAII	-0	24
LAIE, OAHU	-0	36	NEAULAKA BAY, HAWAII	-0	16
WAIKANAHA, OAHU	-0	36			
WAIMANALO, OAHU	-1	15			



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#### VA'A OF THE MARQUESAS ISLANDS

##### The Painting:

Creating a well, an elegantly-carved canoe with bird-shaped hulls carries its tattooed company on some mission of war or ceremony. Many voyages of discovery originated in the Marquesas, where hostile competition for limited food resources meant exile for those who could not hold their lands. Hawaii, Easter Island, and many of the islands of Eastern Polynesia were first discovered by Marquesan explorers. Canoes which made voyaging and fishing possible were so important that they were regarded as living members of society.

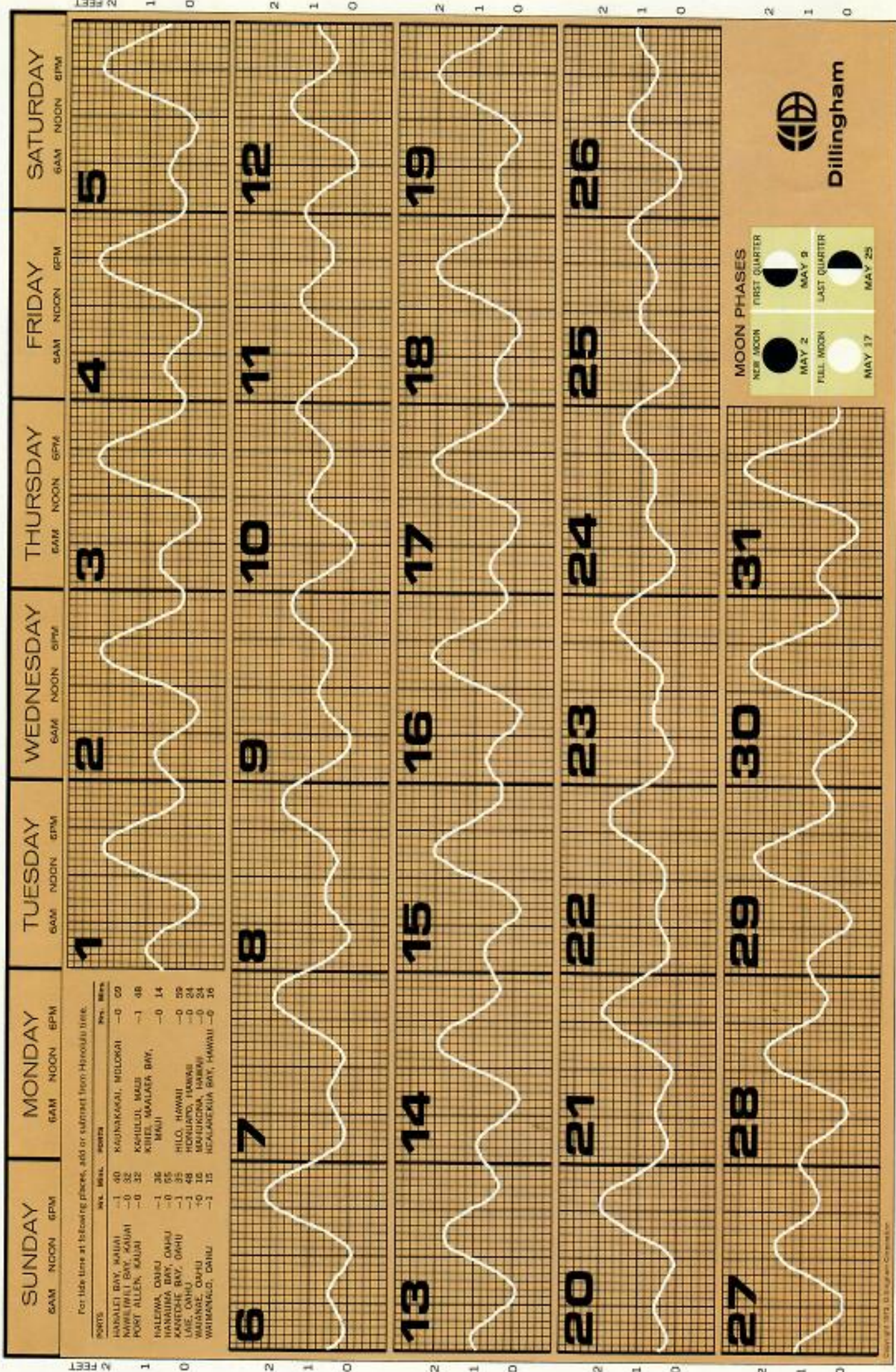
##### The Drawing:

In small canoes, men fished the deep, rough waters of the Marquesas. Here, bow and stern pieces carved with human figures, and wing-shaped gunwale strakes, are lashed to a dugout hull. The steersman's seat (aft) and the chief's seat (forward) are draped with palm leaves, and bear trophy skulls ornamented with hair, shell eyes, wooden noses and boars' tusks. Bulkheads strengthen the hull, and crossboom lashings are lightened with "Spanish windlasses." Also pictured are: 1, paddle; 2, steering paddle; 3, bailer; 4, bowpiece assembly.



H. Brantner Kunst

# May 1973 Tide Chart



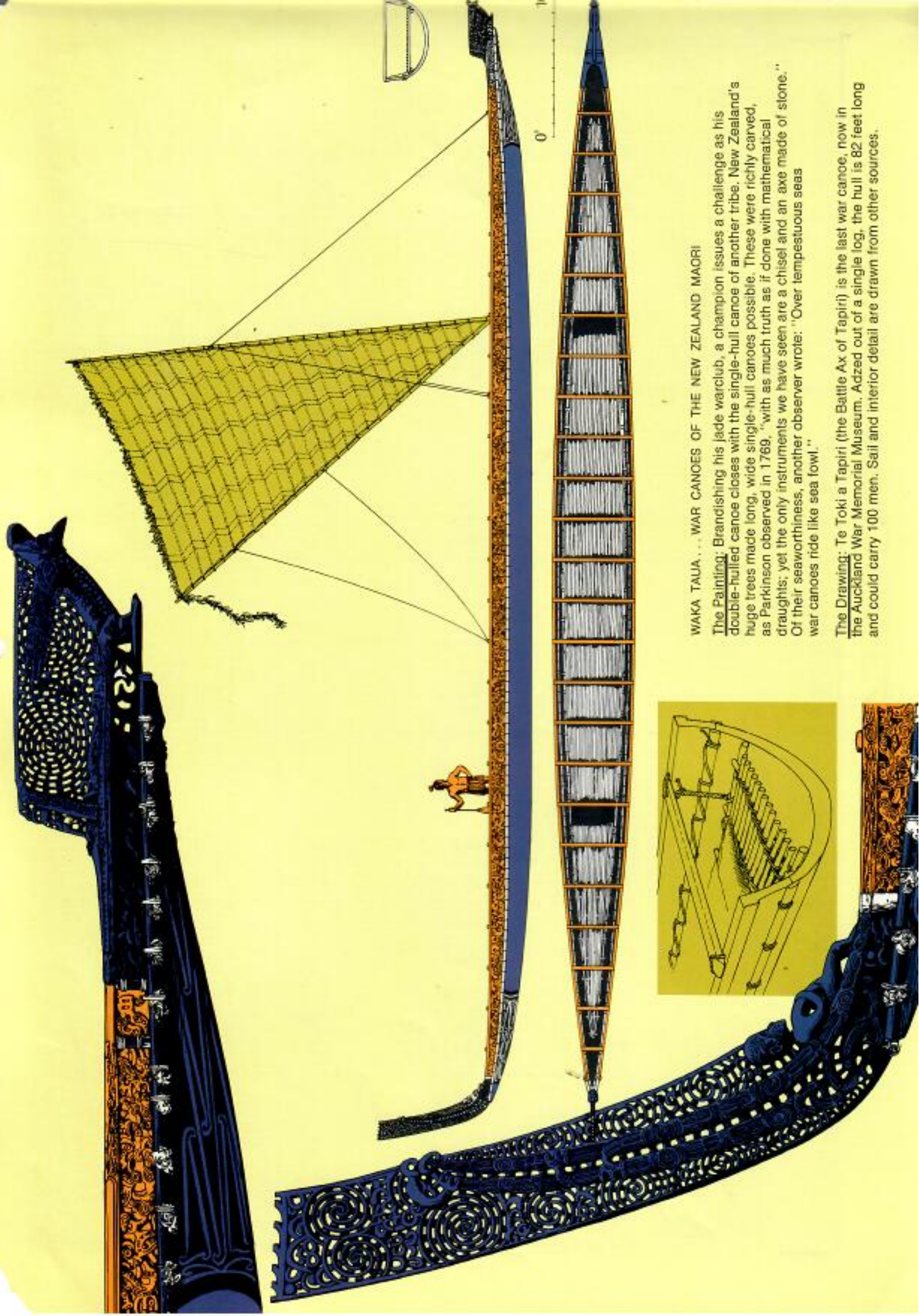
For tide time at following places, add or subtract from Honolulu time.

PORTS	IN FT.	MIN.	HOURS	PM.	MIN.
HALEIUA BAY, OAHU	-1	40			00
KAHAIKAI BAY, OAHU	-0	32			48
PORT ALLEN, OAHU	-0	32			48
HALEIUA, OAHU	-1	36			14
HANALEI BAY, OAHU	-0	35			59
KANOA BAY, OAHU	-1	48			54
LAIE, OAHU	-0	15			24
WAIKANE, OAHU	-1	15			26
WAIMANALO, OAHU	-1	15			26
KAHAIKAI, MOLOKAI	-0	00			00
KAHILU, MAUI	-1	48			00
KIHEI, MAUI	-0	14			00
HILO, HAWAII	-0	59			00
HONOLULU, HAWAII	-0	00			00
KAUNAOA, HAWAII	-0	54			00
KAUNAOA BAY, HAWAII	-0	54			00
KAUNAOA BAY, HAWAII	-0	54			00

MOON PHASES

NEW MOON MAY 2	FIRST QUARTER MAY 9
FULL MOON MAY 17	LAST QUARTER MAY 25



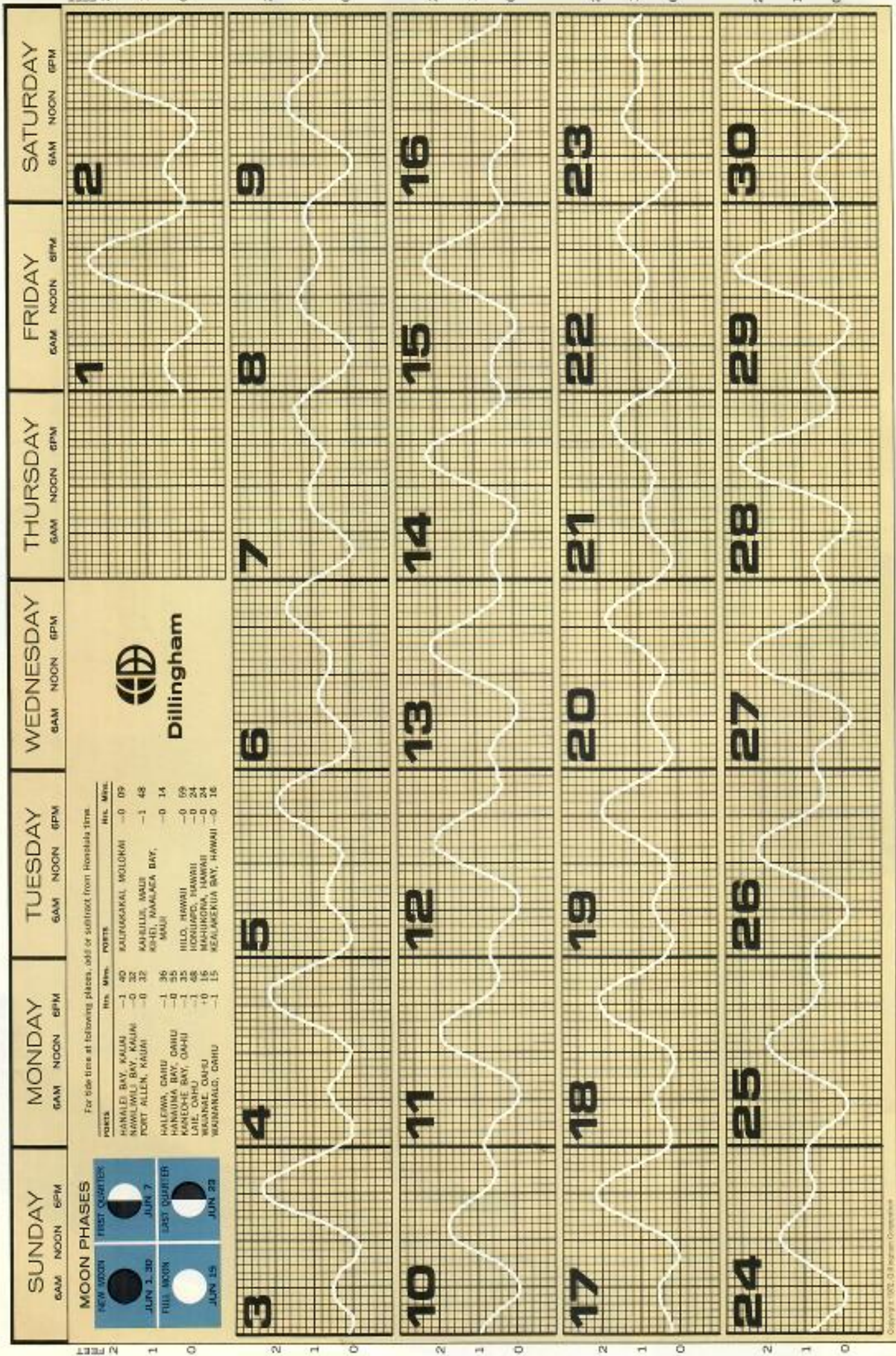


WAKA TAUA... WAR CANOES OF THE NEW ZEALAND MAORI

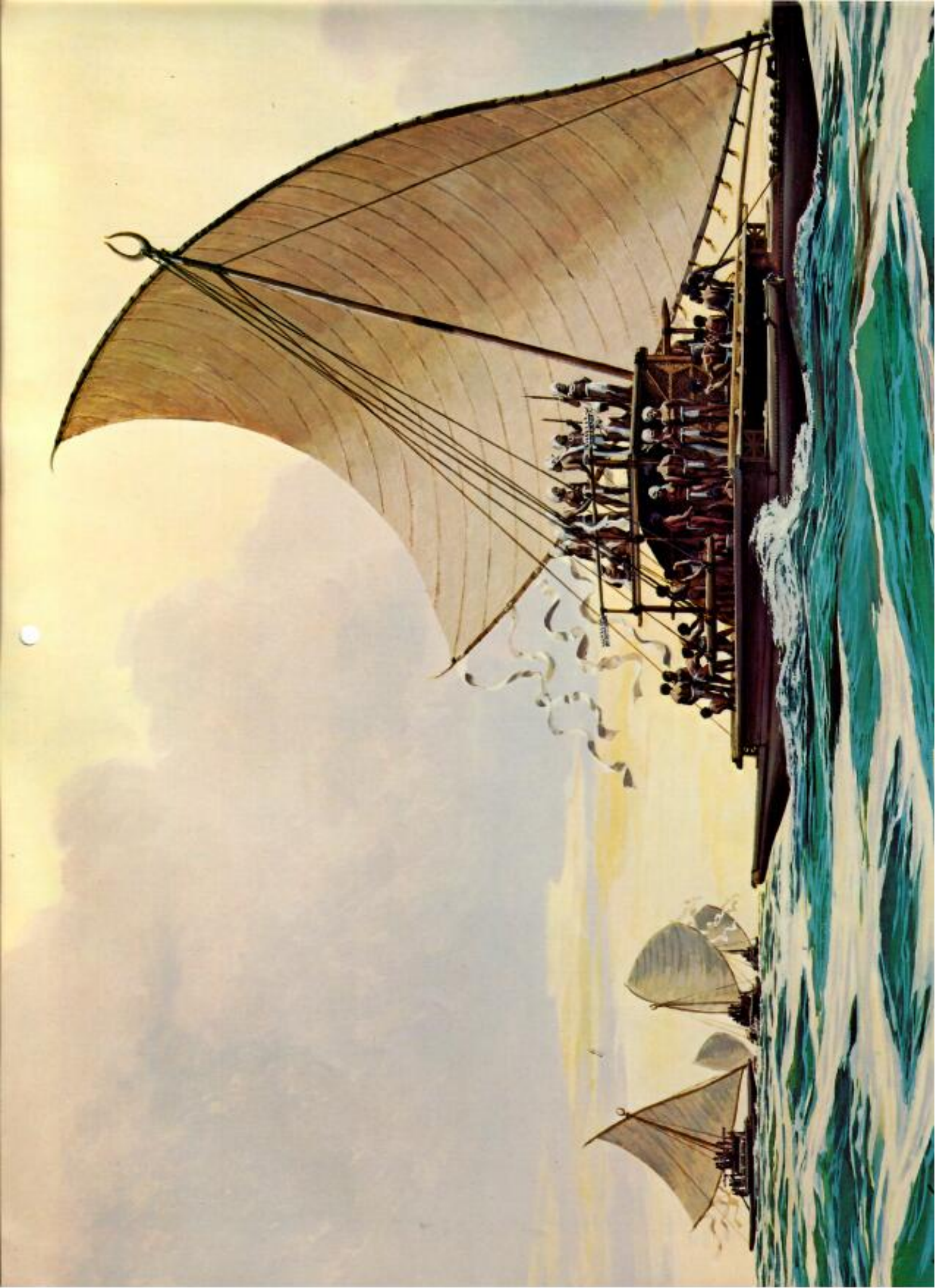
The Painting: Brandishing his jade warclub, a champion issues a challenge as his double-hulled canoe closes with the single-hull canoe of another tribe. New Zealand's huge trees made long, wide single-hull canoes possible. These were richly carved, as Parkinson observed in 1769, "with as much truth as if done with mathematical draughts; yet the only instruments we have seen are a chisel and an axe made of stone." Of their seaworthiness, another observer wrote: "Over tempestuous seas war canoes ride like sea fowl."

The Drawing: Te Toki a Tapiri (the Battle Ax of Tapiri) is the last war canoe, now in the Auckland War Memorial Museum. Adzed out of a single log, the hull is 82 feet long and could carry 100 men. Sail and interior detail are drawn from other sources.

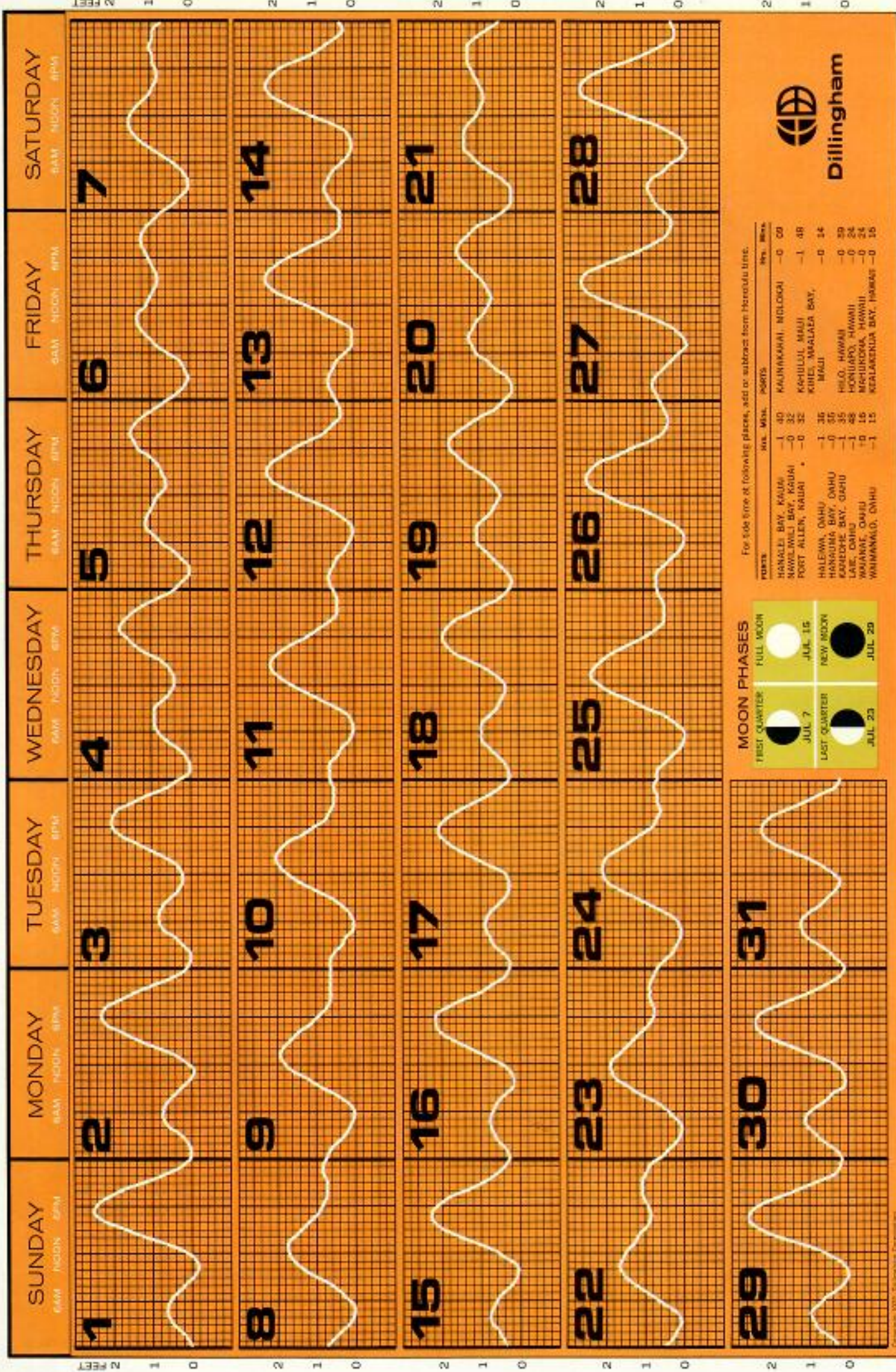
# June 1973 Tide Chart







# July 1973 Tide Chart



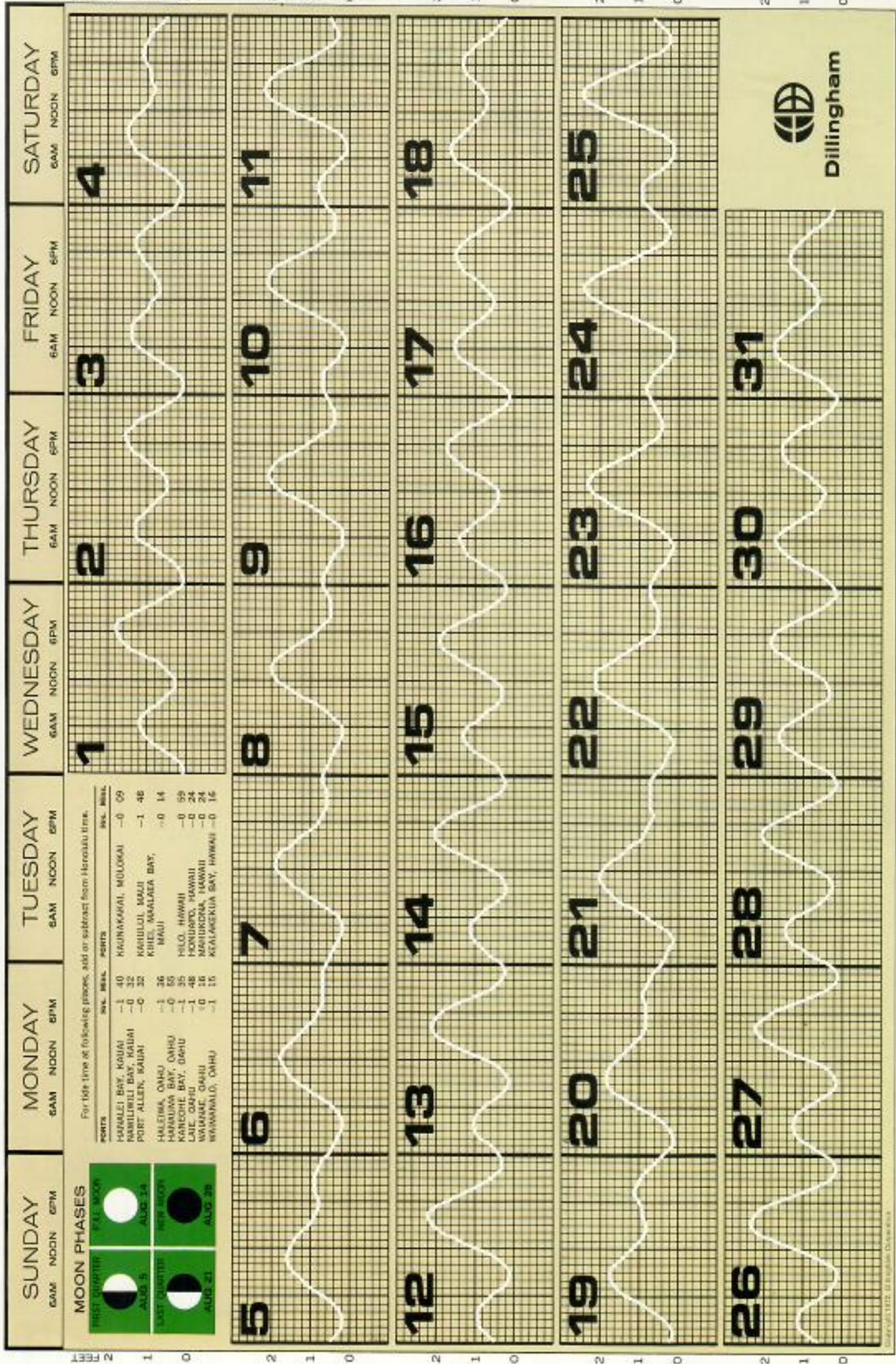
For tide time at following places, add or subtract from Honolulu time.

PLACES	JUL. MOON	POINTS	Hrs. Diff.
HANALEI BAY, KAUAI	-1 40	KAUNAKAHI, MOLOKAI	-0 00
NAWALEWALE BAY, KAUAI	-0 32	KAHULUI MAUI	-1 48
PORT ALLEN, MAUI	-0 32	KIHEI, MAUI	-0 14
HALEIWA, OAHU	-1 36	HONOLOULU, HAWAII	-0 00
HONOLULU BAY, OAHU	-0 36	KAUNAOA, HAWAII	-0 28
KAHOOLAWE BAY, OAHU	-1 48	KAUNAOA, HAWAII	-0 28
LAIE, OAHU	+0 16	KAILUA, HAWAII	-0 16
WAIKANAHE, OAHU	+0 16	KAILUA, HAWAII	-0 16
WAIKANAHE, OAHU	-1 15	KAILUA, HAWAII	-0 16



Dillingham

# August 1973 Tide Chart



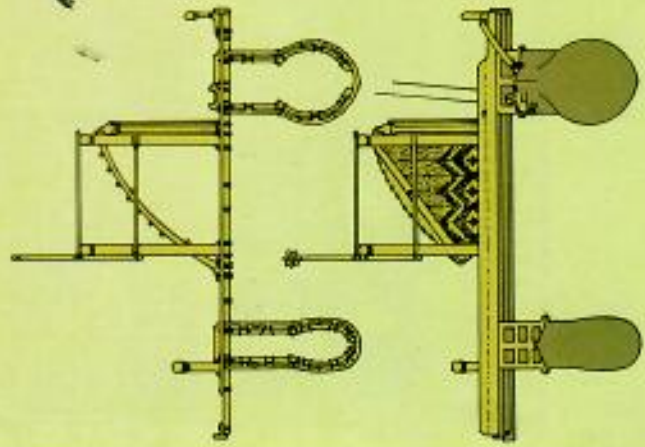
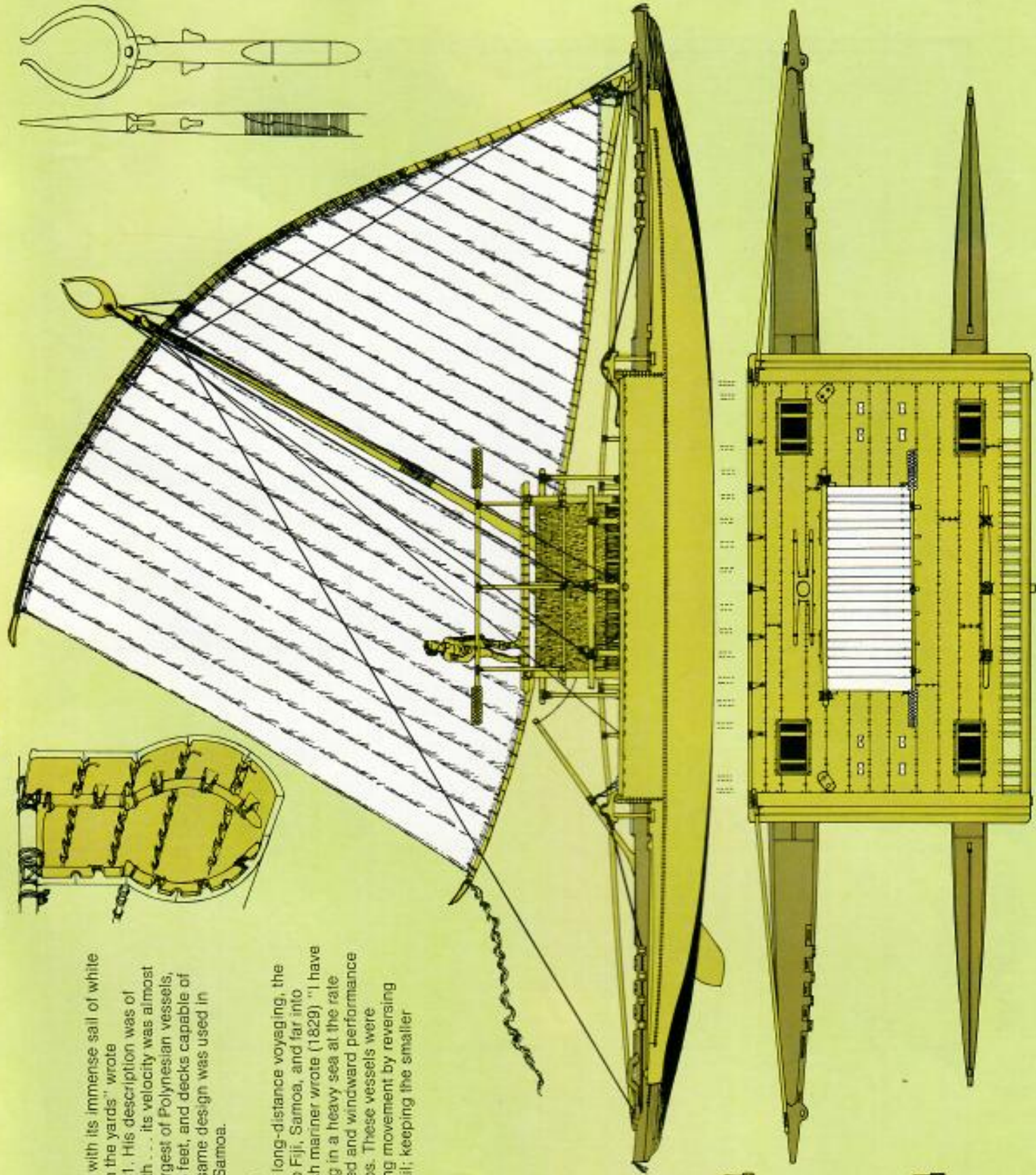
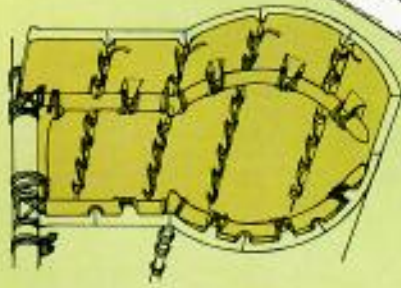
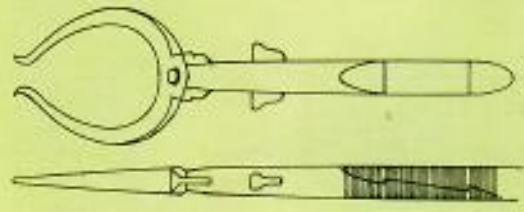
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The Painting: A NDRUA OF FIJI

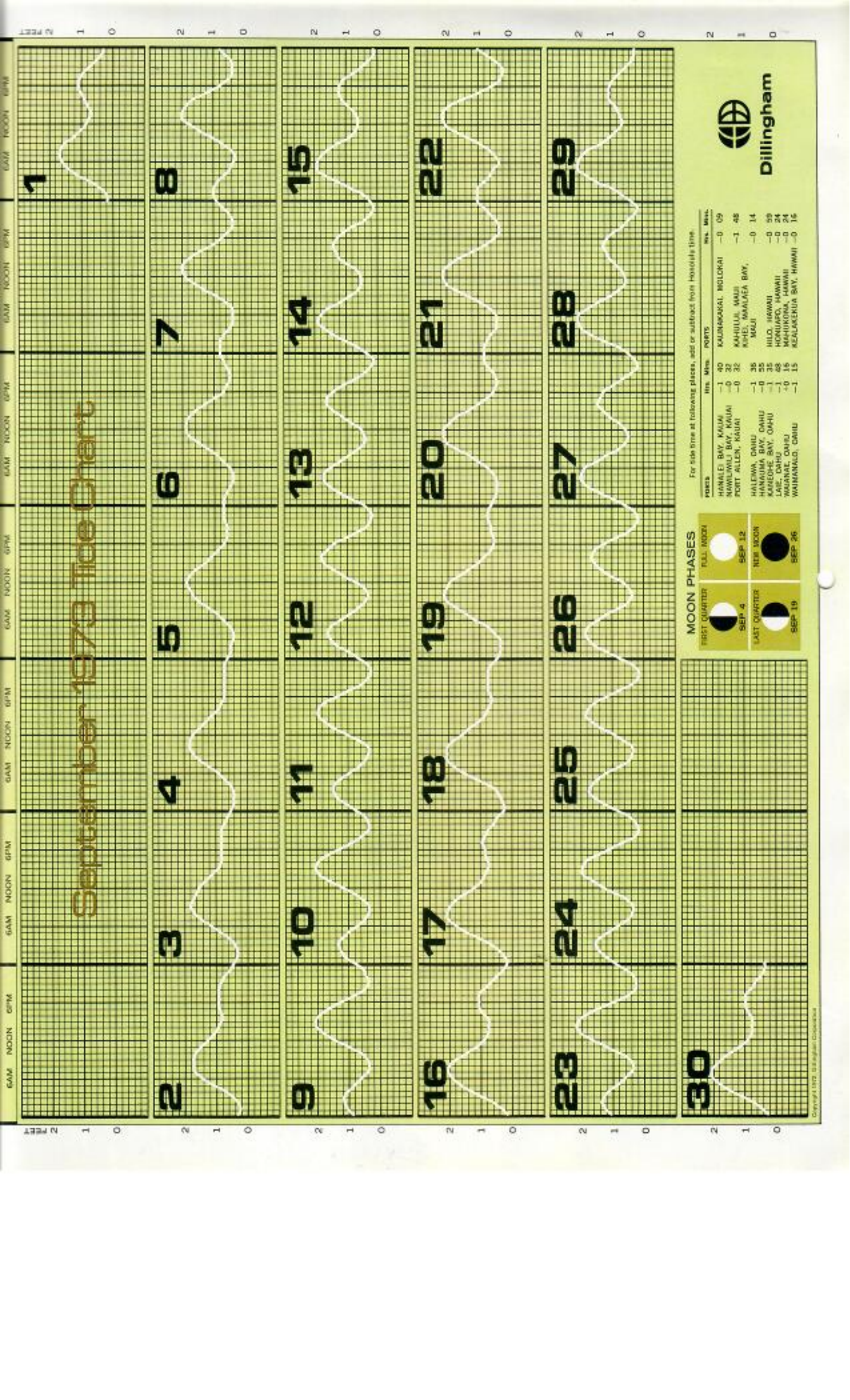
"It had a magnificent appearance, with its immense sail of white mats; the pennants streaming from the yards" wrote Commander Wilkes, U.S.N., in 1841. His description was of a ndrúa "one hundred feet in length . . . its velocity was almost inconceivable." These were the largest of Polynesian vessels, with hulls recorded as long as 118 feet, and decks capable of carrying more than 200 men. The same design was used in the kalía of Tonga and the 'alia of Samoa.

The Drawing: A KALIA OF TONGA

Superbly crafted as a windship for long-distance voyaging, the kalía carried Tongan conquerors to Fiji, Samoa, and far into Melanesia and Micronesia. A British mariner wrote (1829) "I have frequently seen their canoes sailing in a heavy sea at the rate of nine or ten knots an hour." Speed and windward performance far exceeded that of European ships. These vessels were double-enders, capable of reversing movement by reversing all positions of mast, yards, and sail; keeping the smaller hull to windward at all times.



# September 1979 Tide Chart



For tide time at following places, add or subtract from Honolulu time.

PLACES	Hrs.	Min.	PORTS	Hrs.	Min.
HAWAII BAY, KAUAI	-1	40	KALANANAKALI, MOLOKAI	-0	09
NAWILIWILI BAY, KAUAI	-0	32	KAHULUI, MAUI	-1	48
PORT ALLEN, KAUAI	-0	32	KIHEI, MAHALAUA BAY, MAUI	-0	14
HALEIWA, OAHU	-1	35	HANALEIUA BAY, OAHU	-0	59
HAMAUNA BAY, OAHU	-0	55	KAMEHENE BAY, OAHU	-1	35
LAIE, OAHU	-1	48	HONOLULU, HAWAII	-0	24
WAIKANA, OAHU	-0	16	KAHUKOHA, HAWAII	-0	24
WAIMANALO, OAHU	-1	15	KEALEKOA BAY, HAWAII	-0	16

### MOON PHASES

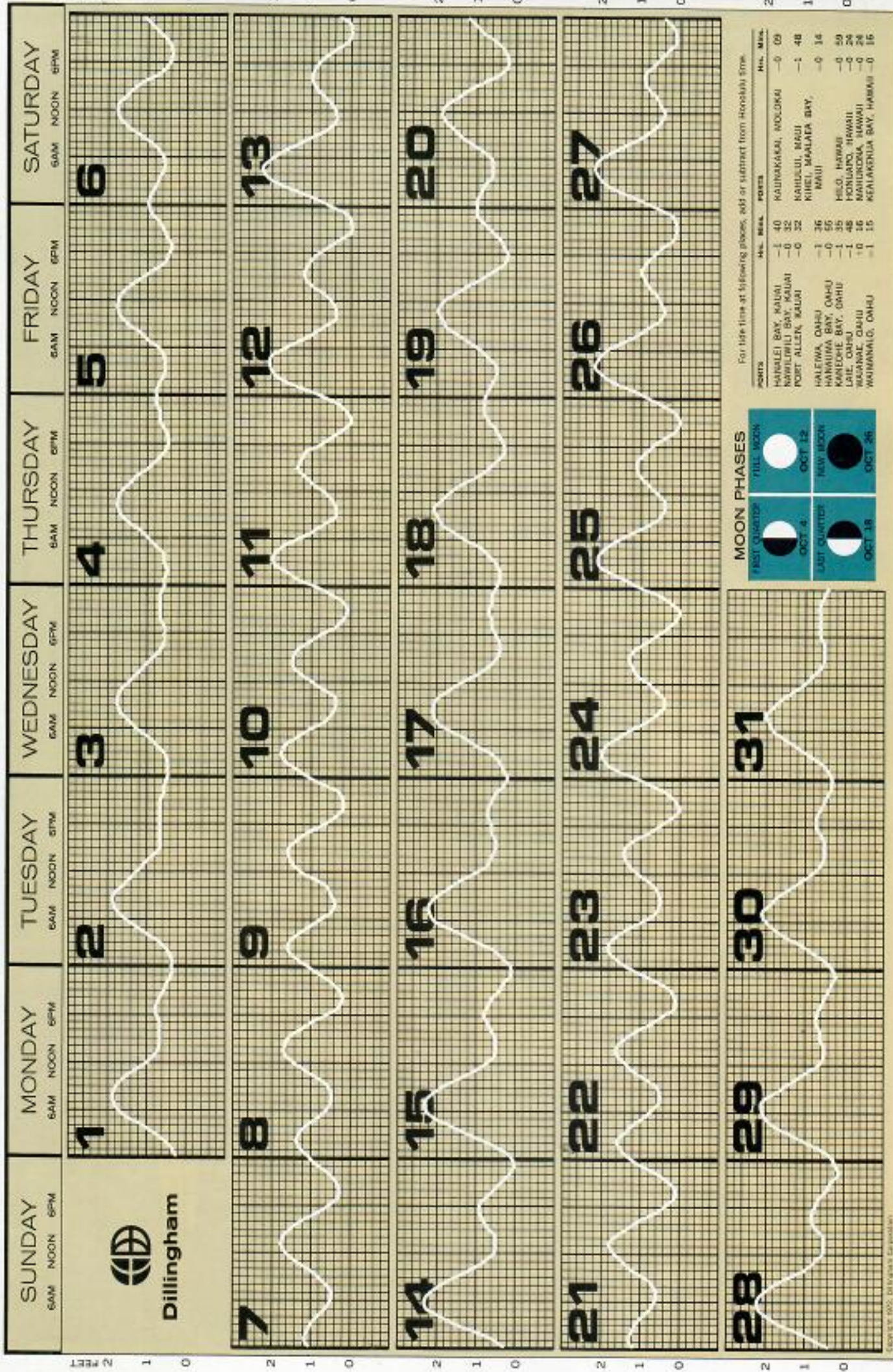
FIRST QUARTER SEP 4	FULL MOON SEP 12
LAST QUARTER SEP 19	NEW MOON SEP 26

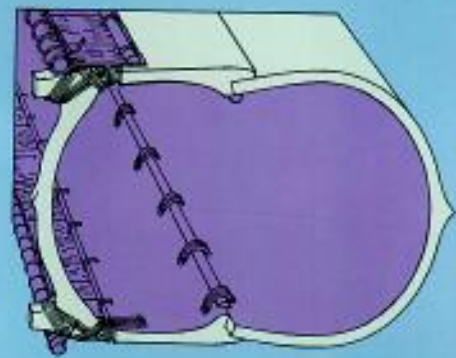
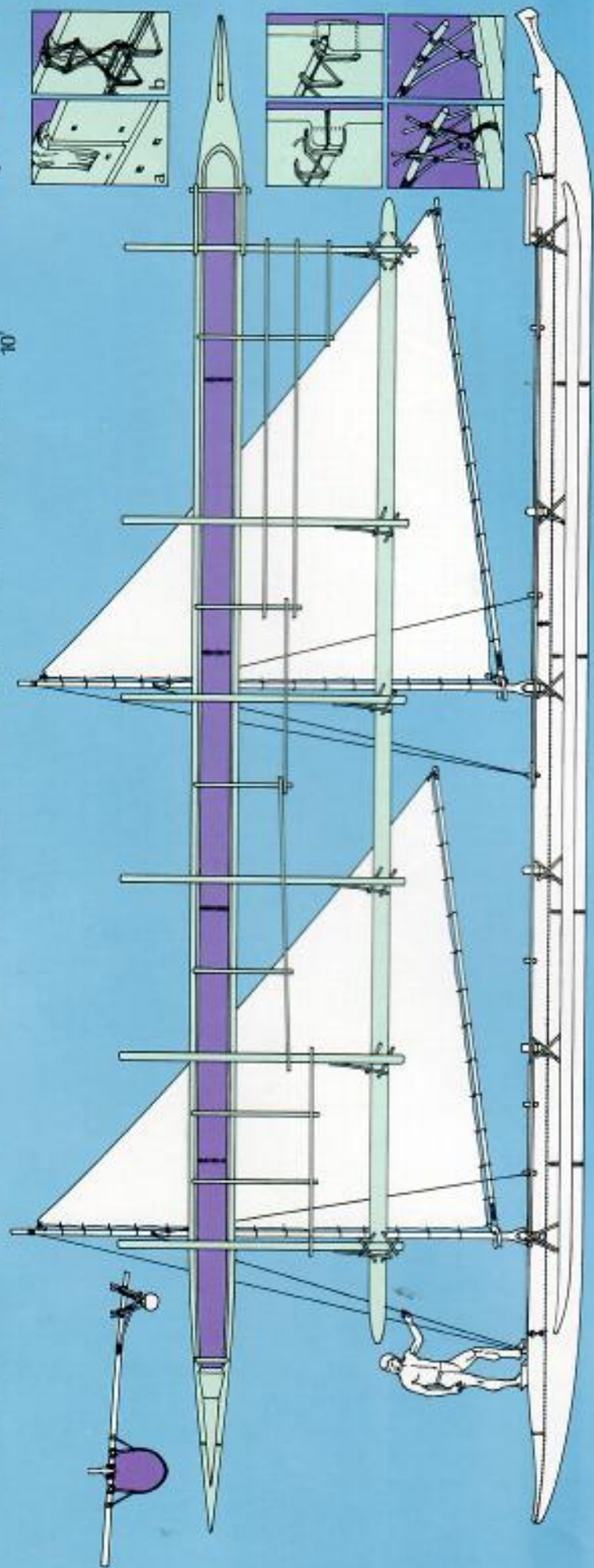
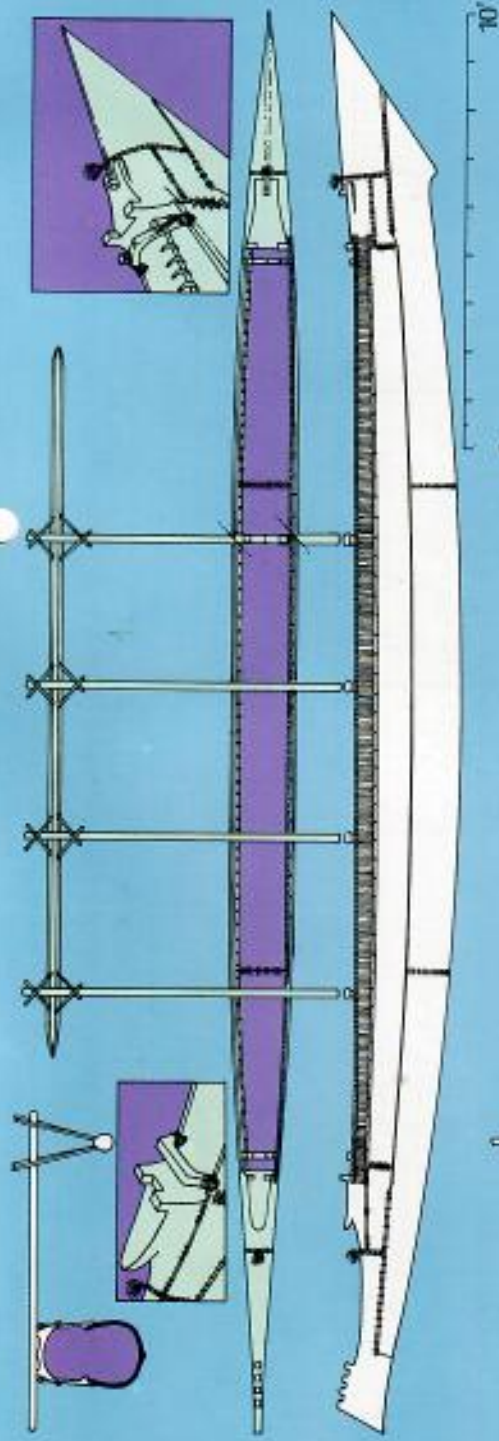


**Dillingham**



# October 1973 Tide Chart





**The Painting:** A VAKA TAURUA OF MANIHIKI AND RAKAHANGA ATOLLS  
 For centuries, the people of these two widely-separated atolls lived as a single group, occupying only one atoll at a time. Each year, they assembled the double canoes by removing the floats from their fishing canoes and lashing the hulls together, bow to stern. Then the entire populace migrated across the sea to the other atoll. In this way, the lagoons could not be over-fished and the land produced breadfruit abundantly. When this sound ecological practice was discouraged by a sea-sick missionary in 1852, the populace split into two groups, each permanently inhabiting an atoll, and the great canoe fleet disappeared.

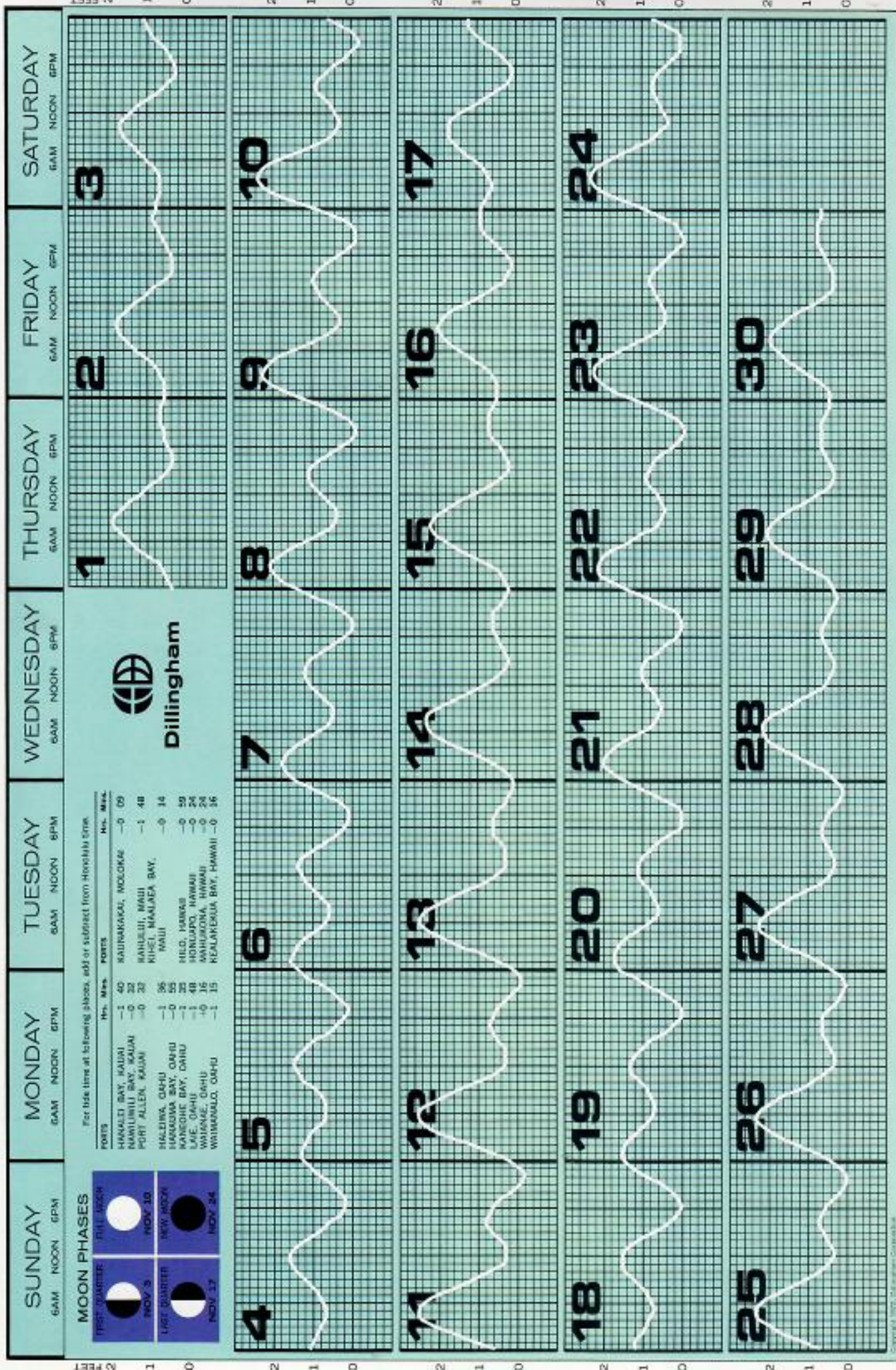
**The Drawings:** VAKA OF THE NORTHERN COOK ISLANDS

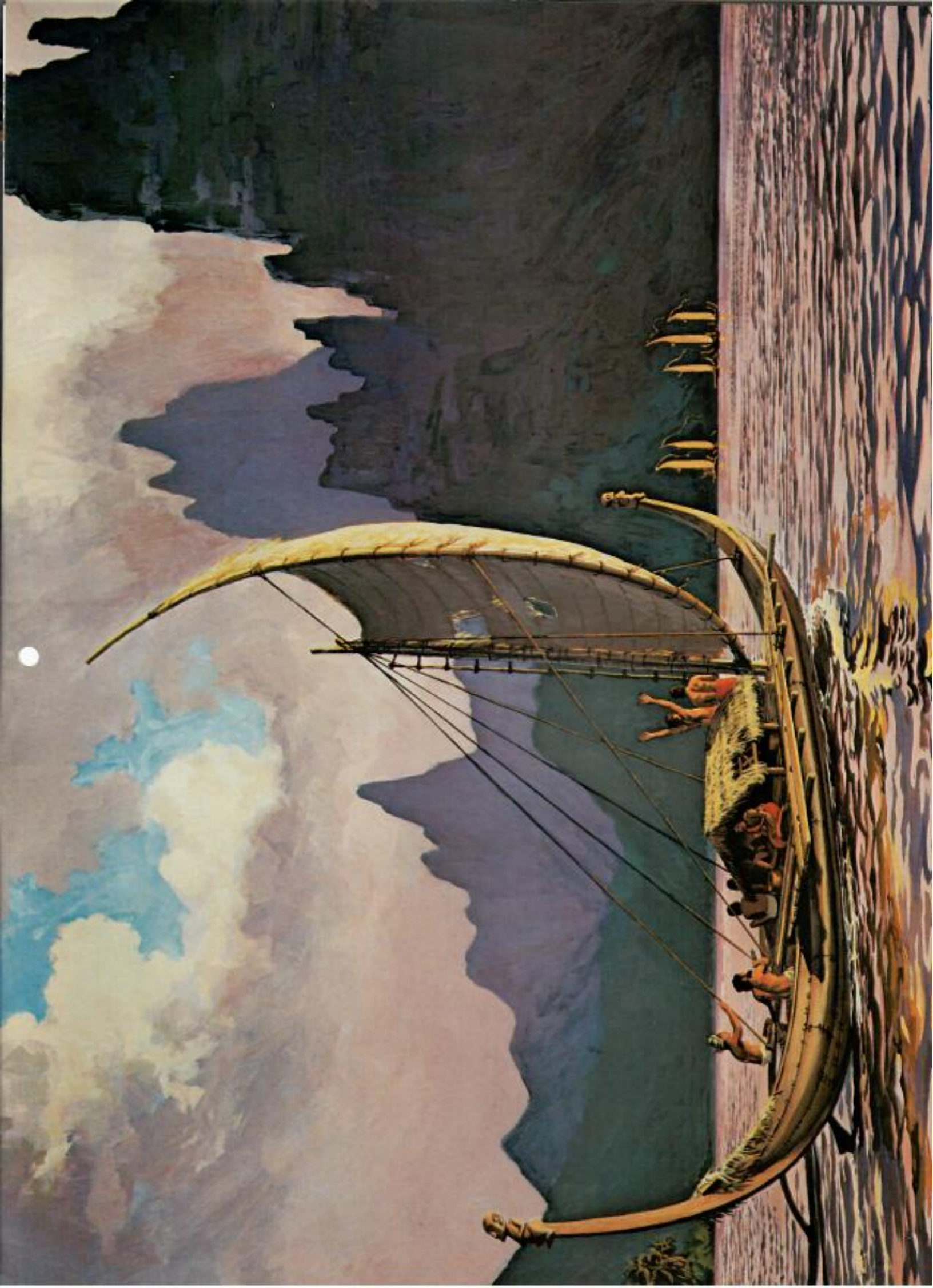
Manihiki — Rakahanga: The elegant, pearl-shell inlaid canoe in the painting is depicted in the top drawing as an outrigger, with inset drawings of construction details. When used for fishing, canoes were tabu to women — a practice prevalent throughout Polynesia.

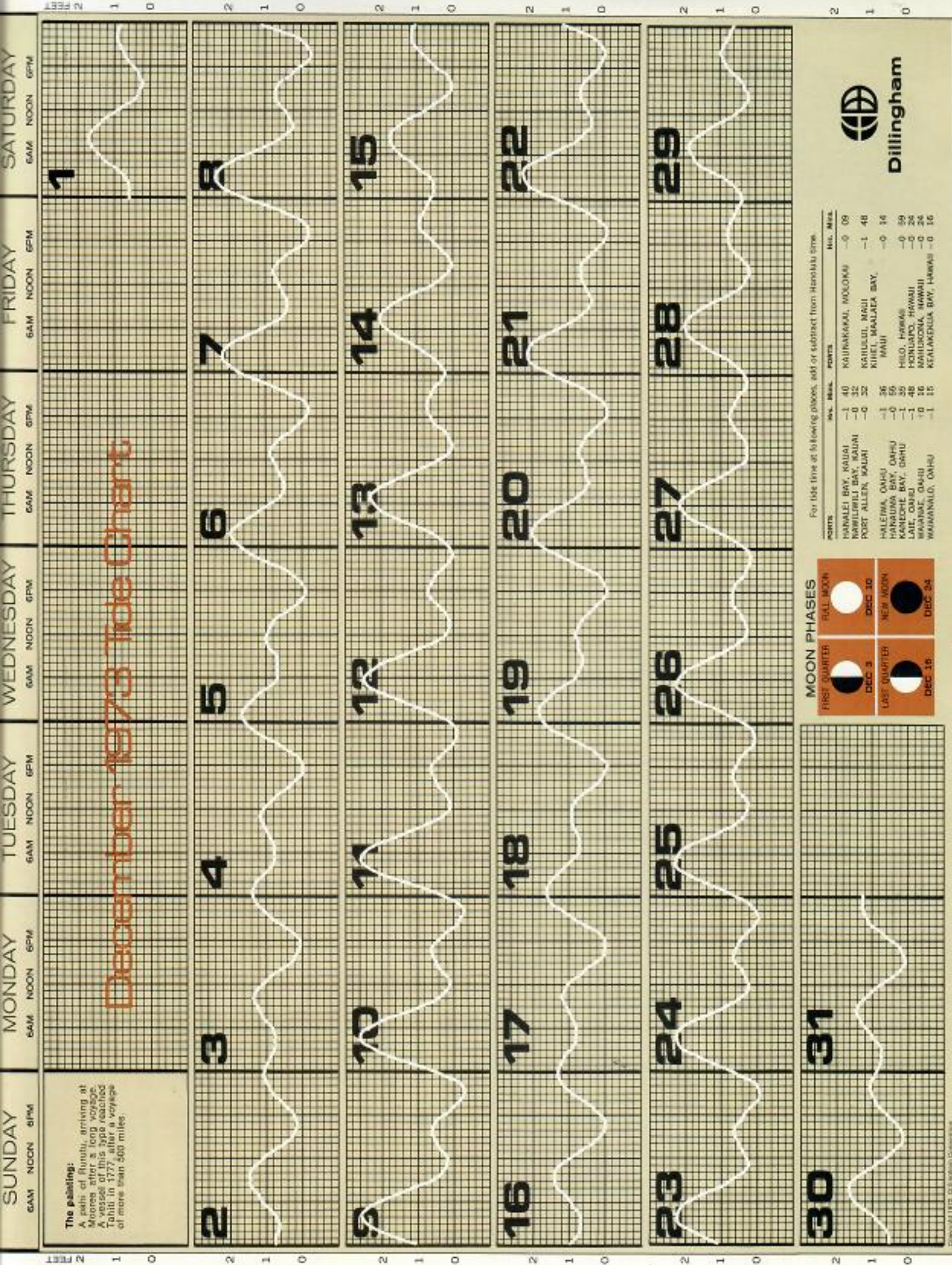
Pukapuka (Danger Island): The bottom drawing is of the last large canoe of Danger Island, and displays the distinctive porpoise-shaped hull. Inset drawings depict the assembly of hull sections and attachments of the crossbooms to the float.



# November 1973 Tide Chart







**The painting:**  
 A path of Runnib, arriving at Moorea after a long voyage.  
 A vessel of this type reached Tahiti in 1777, after a voyage of more than 400 miles.

For Use Time of Following Places, Add or Subtract from Honolulu Time.

PLACES	MO. MIN.	POINTS	MO. MIN.
HAWAII BAY, HAWAII	-1 40	KAUNAKAI, MOLOKAI	-0 09
NAWILIWILI BAY, HAWAII	-0 32	KAHULUI, MAUI	-1 48
PORT ALLEN, MAUI	-0 32	KIHEI, MAALAKA BAY, MAUI	-0 34
HALEIWA, OAHU	-1 36	HONOLULU, HAWAII	-0 59
HAKAUNA BAY, OAHU	-0 56	KAUNAKAI, HAWAII	-0 24
KAMOEHE BAY, OAHU	-1 35	KAUNAKAI, HAWAII	-0 24
LAIE, OAHU	-1 48	KAUNAKAI, HAWAII	-0 24
MAUNALO, OAHU	-1 36	KAUNAKAI, HAWAII	-0 24
WAIMANALO, OAHU	-1 25	KAUNAKAI, HAWAII	-0 24



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