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WORKING HANDS OF THE MAKAʻĀINANA 2014

PROTECTING OUR PAST STATE OF HAWAIʻI • DEPARTMENT OF LAND AND NATURAL RESOURCES

THE HONORABLE
NEIL ABERCROMBIE
GOVERNOR OF HAWAI'I

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Dyke basalt, South Coast of Lāna'i
Exposures of dyke basalt, shown here, provided local sources for manufacture of stone adzes. This practice is memorialized in the local place name "Kalua Ko'i" meaning "adze pit". The storied island Pu'u Pe'e lies in the background.

Hawaii Heritage Center

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TIDE CORRECTIONS

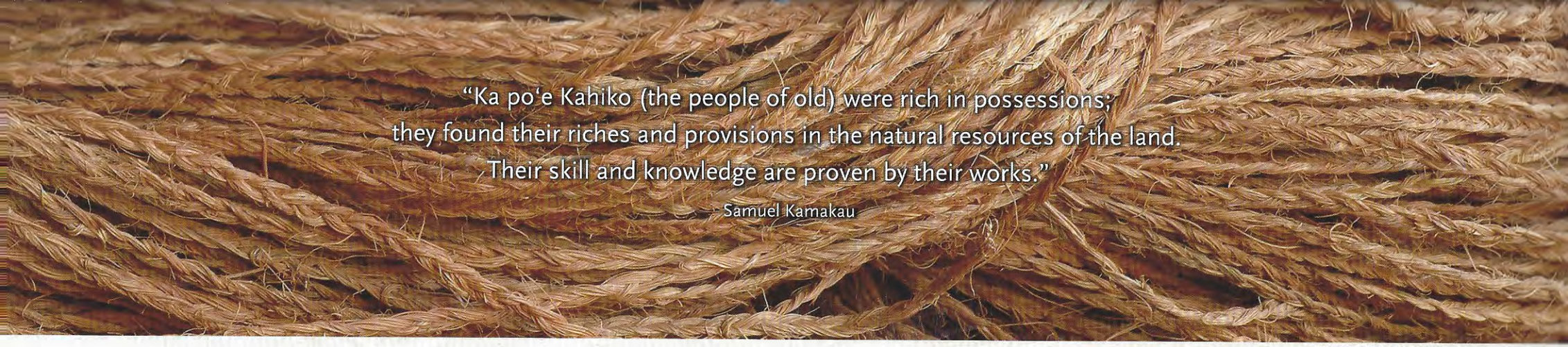
The tidal predictions are based on the high and low tides at Honolulu Harbor, O'ahu. To find the correct times and heights for other locations, use the chart below to adjust the times and heights.

Tidal corrections are listed in hours and minutes. A plus (+) sign means that the tide will occur later than in Honolulu, therefore, add this number to Honolulu time. A minus (-) sign indicates that a tide will occur earlier than in Honolulu, therefore, subtract this number from Honolulu time. For tide times at the following places, add or subtract from Honolulu time.

SPECIAL MAHALO
Special mahalo to Hiroshi Kato, Sebastian Marquez of Papahana Kuaola, Pua Case, and Ron Ida and members of the Order of Kamehameha, Kaumuali'i Chapter, Hui Ku Maoli Ola, as well as Hal Hammatt, Auli'i Mitchell, Andrea Kay, David Shideler, Allan Haun, Ted Blake, and Tanya Lee Greig for their invaluable assistance in preparing this calendar.

PORTS	HIGH WATER HR/MIN		LOW WATER HR/MIN	
KAUA'I				
WAIMEA BAY	-0	20	-0	07
PORT ALLEN, HANAPĒPĒ BAY	-0	36	-0	22
NĀWILIWILI BAY	-0	27	-0	25
HANAUMĀ'ULU BAY	-0	17	-0	21
HANALEI BAY	-1	28	-1	47
O'AHU				
HALE'IWA, WAIALUA BAY	-1	02	-2	05
WAI'ANAE	+0	20	+0	18
HANAUMA BAY	-0	59	-0	45
WAIMĀNALO	-1	15	-1	09
MOKU O LO'E	-1	24	-1	14
WAIKĀNE, KĀNE'OHE BAY	-1	46	-1	18
LĀ'IE BAY	-1	45	-1	46
MOLOKA'I				
KOLO	+0	05	+0	01
KAUNAKAKAI	-0	05	-0	08
KAMALŌ HARBOR	-0	37	-0	16
PŪKO'O HARBOR	-1	03	-0	48

PORTS	HIGH WATER HR/MIN		LOW WATER HR/MIN	
LĀNA'I				
KAUMALAPAU	+0	02	+0	03
MAUI				
KAHULUI	-1	53	-1	41
HĀNA	-1	13	-1	23
MĀKENA	-0	32	-0	32
KĪHEI, MĀ'ALAEA BAY	-0	01	-0	22
LAHAINA	-0	35	-0	40
KAHO'OLAWE				
KŪHEIA BAY	-0	09	-0	09
SMUGGLER COVE	-0	15	+0	03
HAWAI'I				
MĀHUKONA	-0	26	-0	17
KAWAIHAE	-0	04	-0	03
KAILUA KONA	-0	26	-0	22
NĀPŌ'OPO'O				
KEALAKEKUA BAY	-0	16	-0	12
HONU'APO	-0	26	-0	16
HILO	-1	04	-0	59



"Ka po'e Kahiko (the people of old) were rich in possessions;
they found their riches and provisions in the natural resources of the land.
Their skill and knowledge are proven by their works."

Samuel Kamakau

PHOTO: ©MONTE COSTA

TRADITIONAL HAWAIIAN KNOWLEDGE AND INNOVATION

The first settlers to land on the shores of Hawai'i brought with them certain tools and implements, as well as a number of essential plants and animals which they deemed important to propagate in the new environment. However, more importantly, they brought with them the knowledge and traditions of their ancestors which guided them in their survival on these remote, islands at least 2500 miles from any other human presence. They faced the challenges of adapting to a new land with different climates, terrain and natural resources including flora and fauna and water sources, the Hawaiians not only adapted their traditions to suit their new environment, but also constantly innovated to enhance their quality of life and develop a distinctive Hawaiian culture, based on their intimate relationship to this land.

Assigned dates for the earliest occupied site areas indicate preference for well watered, near-shore environments with plentiful marine resources including well developed reefs. Fishing predominated as an early source of protein, requiring manufacture of fishhooks from bone and shell and encompassing great variety of sizes and shapes effective in certain marine environments and specific to the behavior patterns and sizes of fish. Fishhook craftsmen carefully selected certain portions of the shell or animal bone for natural curvature and strength.

These early settlers searched the islands for outcrops of fine grained basalt to shape stone tools, especially adzes for felling trees, shaping wooden tools and weapons, building canoes, preparing poles for house construction and many other essential tasks. The basalt rock for these tools was carefully selected. Stone

The final polishing of implements was generally accomplished along the shoreline on smooth boulders where coraline sand was used for abrasion and polishing. Likewise outcrops of vesicular basalt, which occur on the surface of young pahoehoe lava flows, were carefully chosen for the correct hardness and texture to extract blocks to shape into abraders. These abraders were formed to comfortably fit in the hand and were used to provide the final finish to wooden implements and canoes.

Plants and trees provided material for a variety of uses. *Olonā (Touchardia latifolia)* was planted and cultivated in cleared, well watered areas on upland forests. The mature plants were harvested and made into strong flexible cordage, which had many uses on both land and sea. *Wauke* (paper mulberry), *mamaki (Pipturus albidis)* and young *ulu*

Steps in Traditional Fishhook Manufacture
[1] Having selected a shell, the craftsman searches for the strongest portion to create the hook and begins removing the unwanted parts with a coral file. [2] With a shell drill, the craftsman has cut a hole through the shell, beginning to define the inner curve of the hook. [3] The rough shape of the hook is apparent after the craftsman cuts through to the drilled hole and continues filing toward the linal shape he has intuited. [4] The hook is near completion and the craftsman refines the shapes of the point and the knob that will secure the hook to a line.

To discover these islands, the earliest settlers had to navigate an open ocean which covers one fifth of the entire surface of the earth encompassing 10 million square miles and includes 600 times more water than land. Accomplished in an era when most sea-faring on earth was confined to the sight of land, the Polynesians' ventured forth confident in their navigational skills based upon an intimate working knowledge of the patterns of the night sky, the winds, ocean currents, and identification and behavior of birds, as well as a cooperative spirit among voyagers.

outcrops, generally lava dykes, were tested for suitability and only the sources with the most homogenous and fine grained materials were chosen. The largest and most well known source for adze basalt was extracted from veins of *hawaiite* basalt above the 11,000 foot elevation on Mauna Kea. Here, as in other large quarries such as Pu'u Moiwi on Kaho'olawe, the basalt was preformed into rectangular blocks and transported to more accessible areas for final shaping, polishing and sharpening.

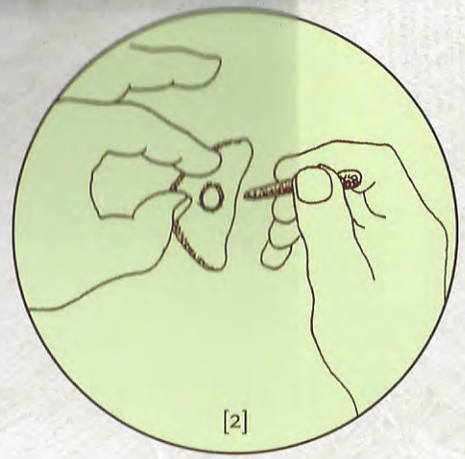
(breadfruit) trees yielded bark which was processed into *tapa* for clothing and other uses. *Ulu* and *Noni (Morinda citrifolia)* yielded sticky substances which had multiple uses as adhesives.

As the population increased, complex irrigated terrace systems were developed on every island in every valley with a reliable water source. The planning and skill involved in their conception and construction are truly impressive as witnessed today by their survival many hundreds of years after their abandonment. This is powerfully demonstrated in the rocky undulating lava lands of Kōloa which were transformed into highly productive irrigated fields watered by a complex dendritic system of irrigation channels *(auwai)*, tapped from a water source far *mauka*. This cultural landscape was intricately designed with water transported across low lying terrain by constructed stone and earthen aqueducts and even channeled under domestic structures for household use. These developments occurred nowhere else in Polynesia.

All of this knowledge was developed, advanced and maintained by specialists in each field who perpetuated their skills by training apprentices, sustaining their heritage through *ike lihilihi* – observation, *ike hana* – experience and *ike ka 'alana* – insight.

PHOTO: ©FRIENDS OF HOKULE'A & HAWAI'ILOA

Cover: Holo Moana Heiau, Māhukona, Kohala, Hawai'i Island. This structure was traditionally and is still today dedicated to perpetuating traditional Polynesian navigation and was likely used to view and study celestial patterns for wayfinding. The many strategically placed upright stones make this sacred place unique among heiau in Hawai'i. Haleakalā can be seen in the background.



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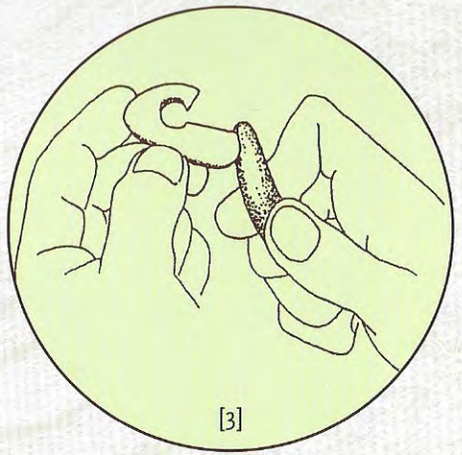

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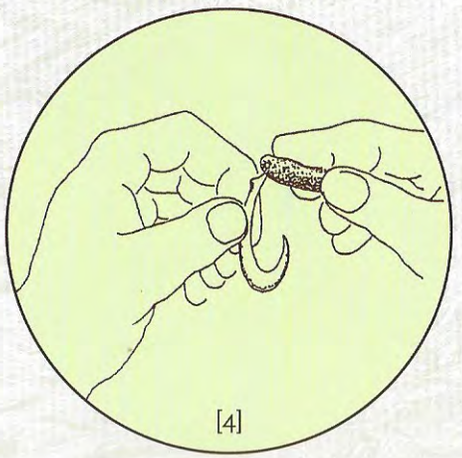

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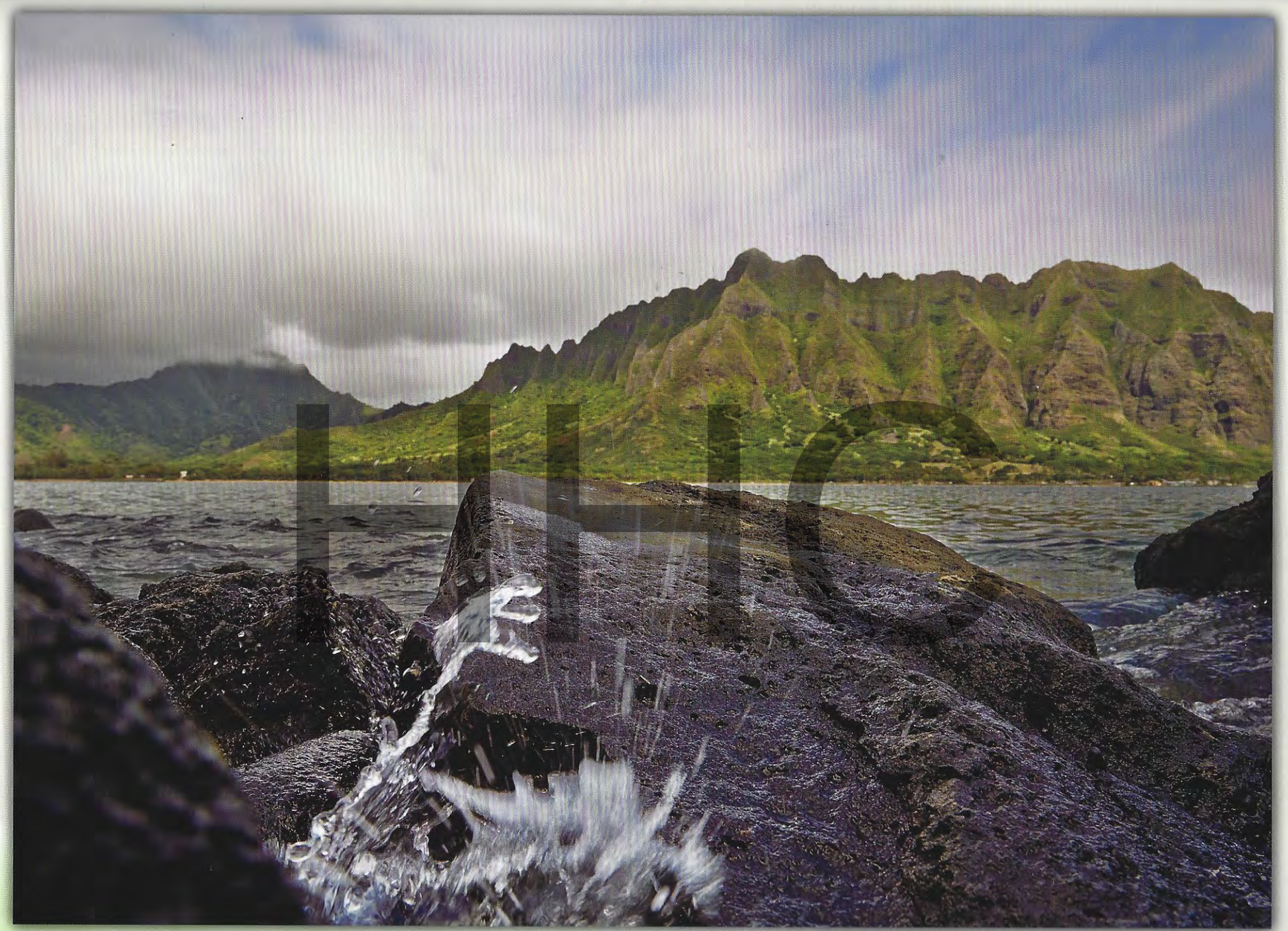

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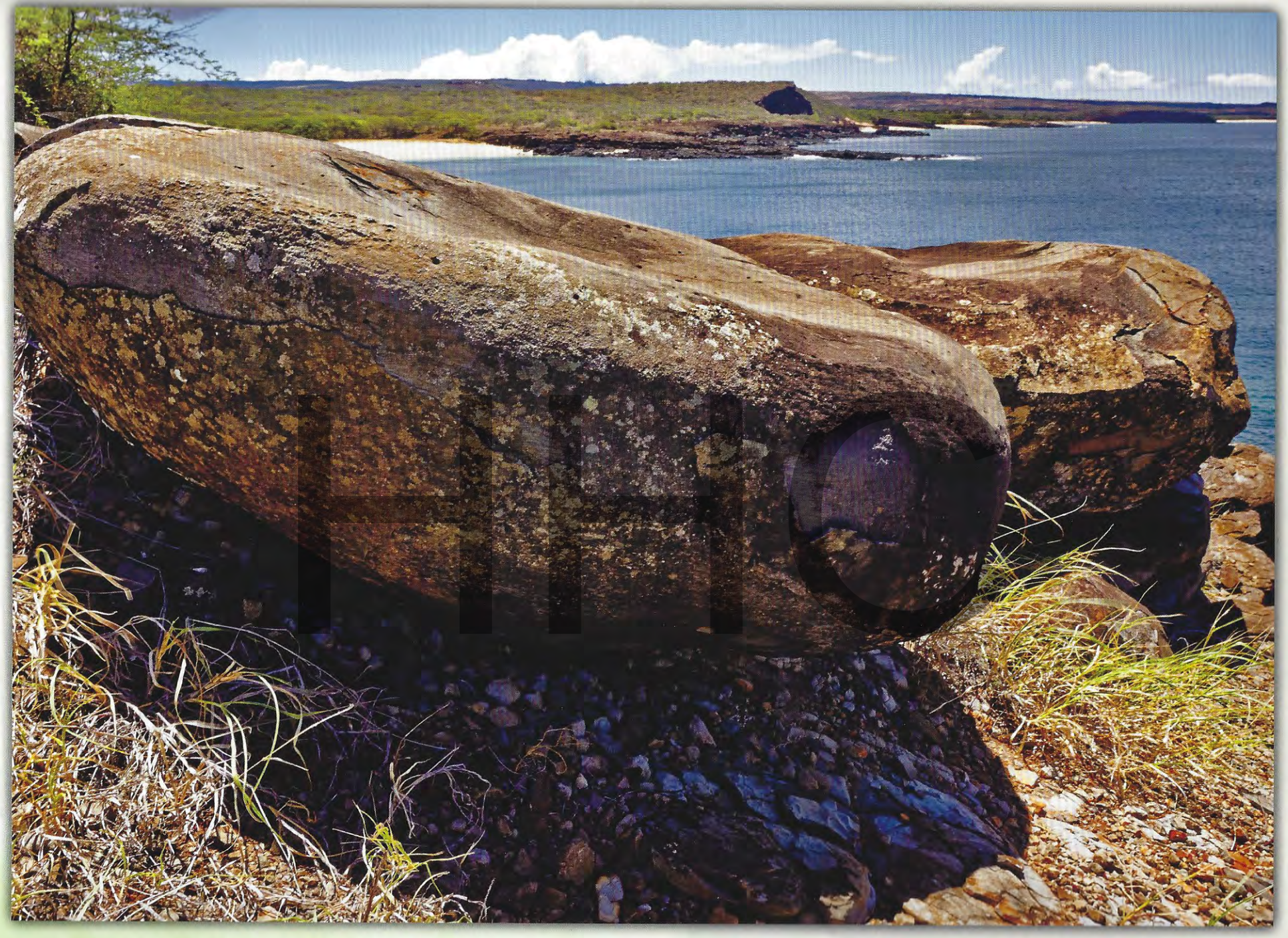
FEBRUARY



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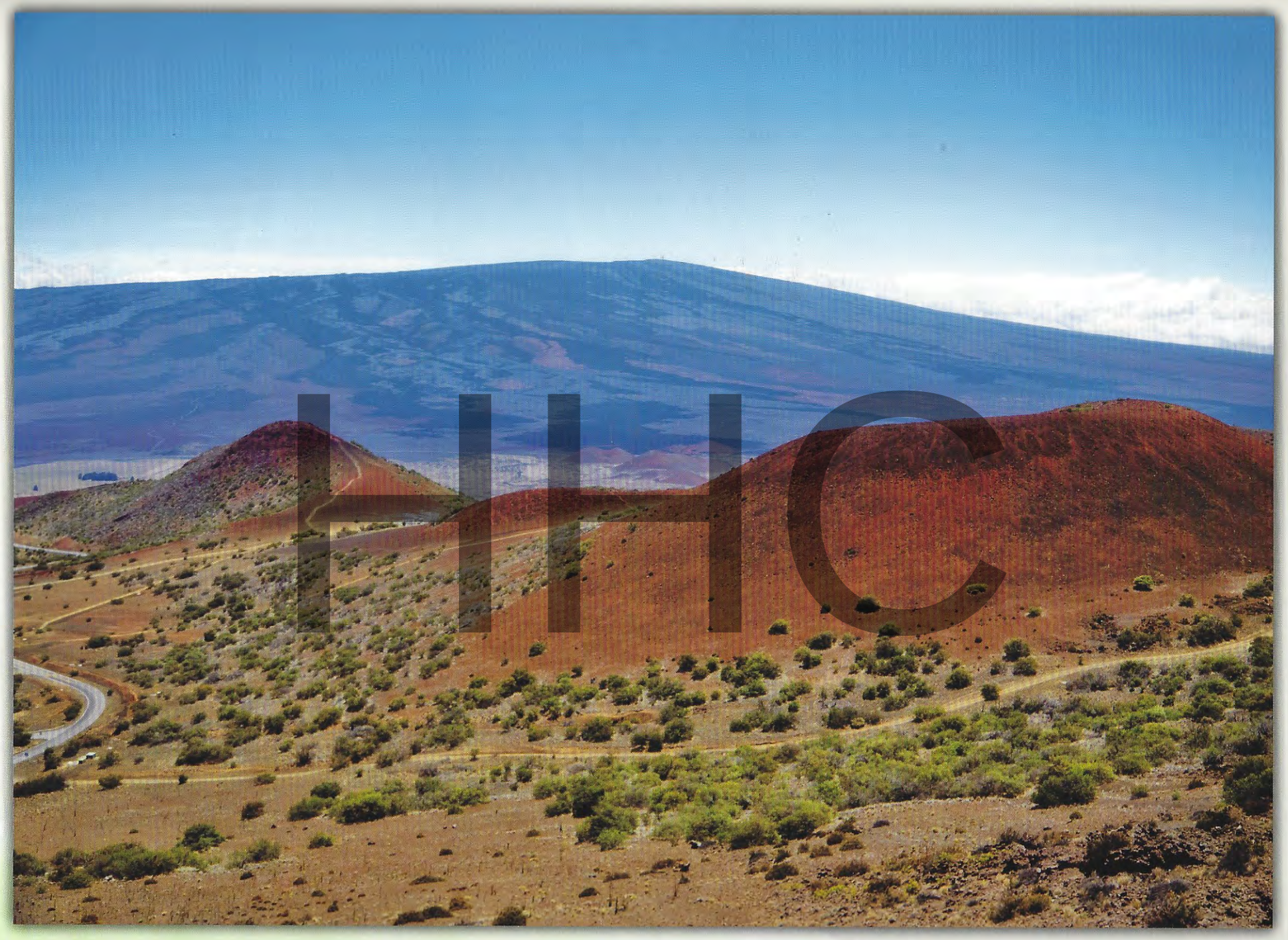

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