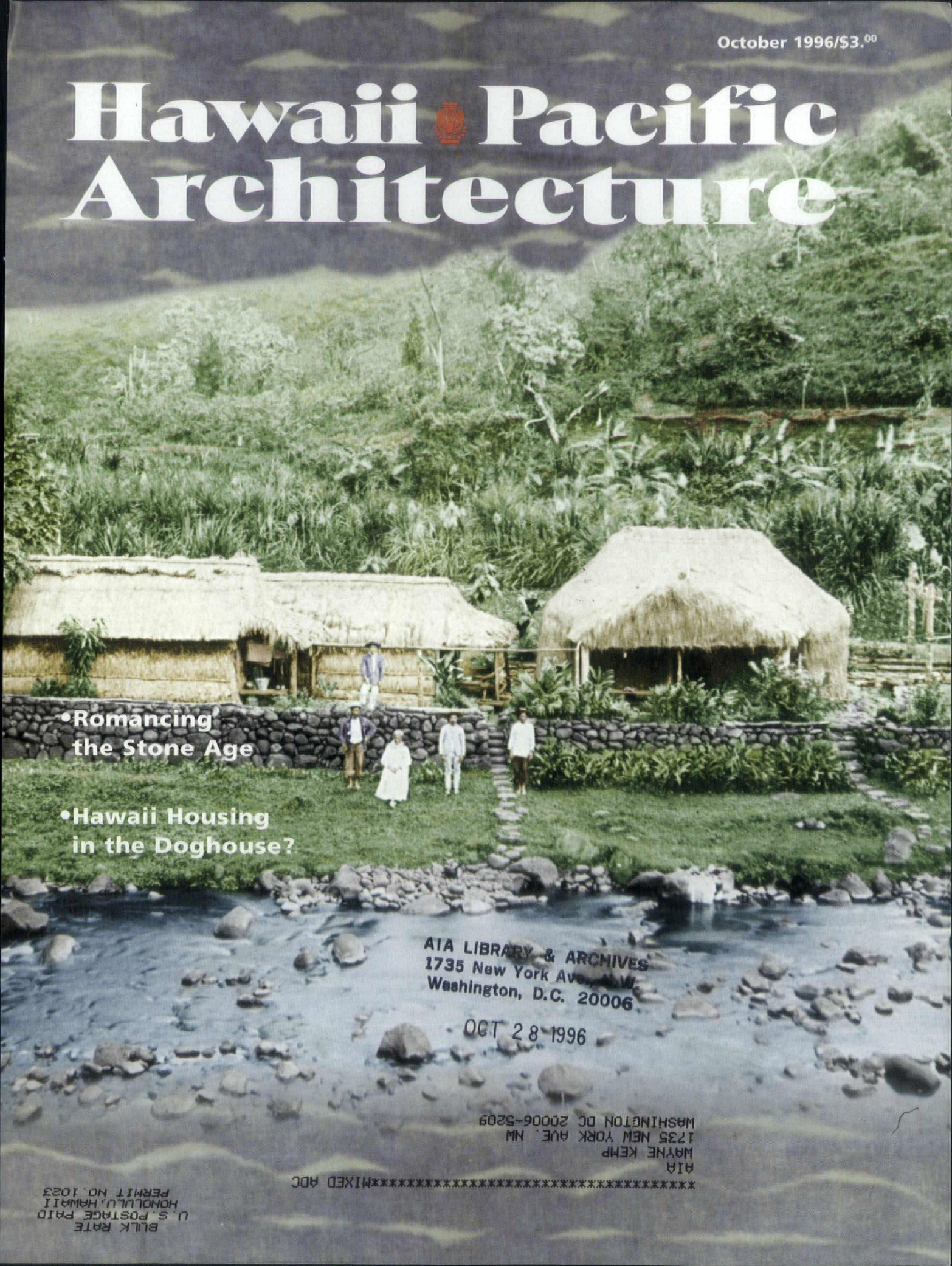
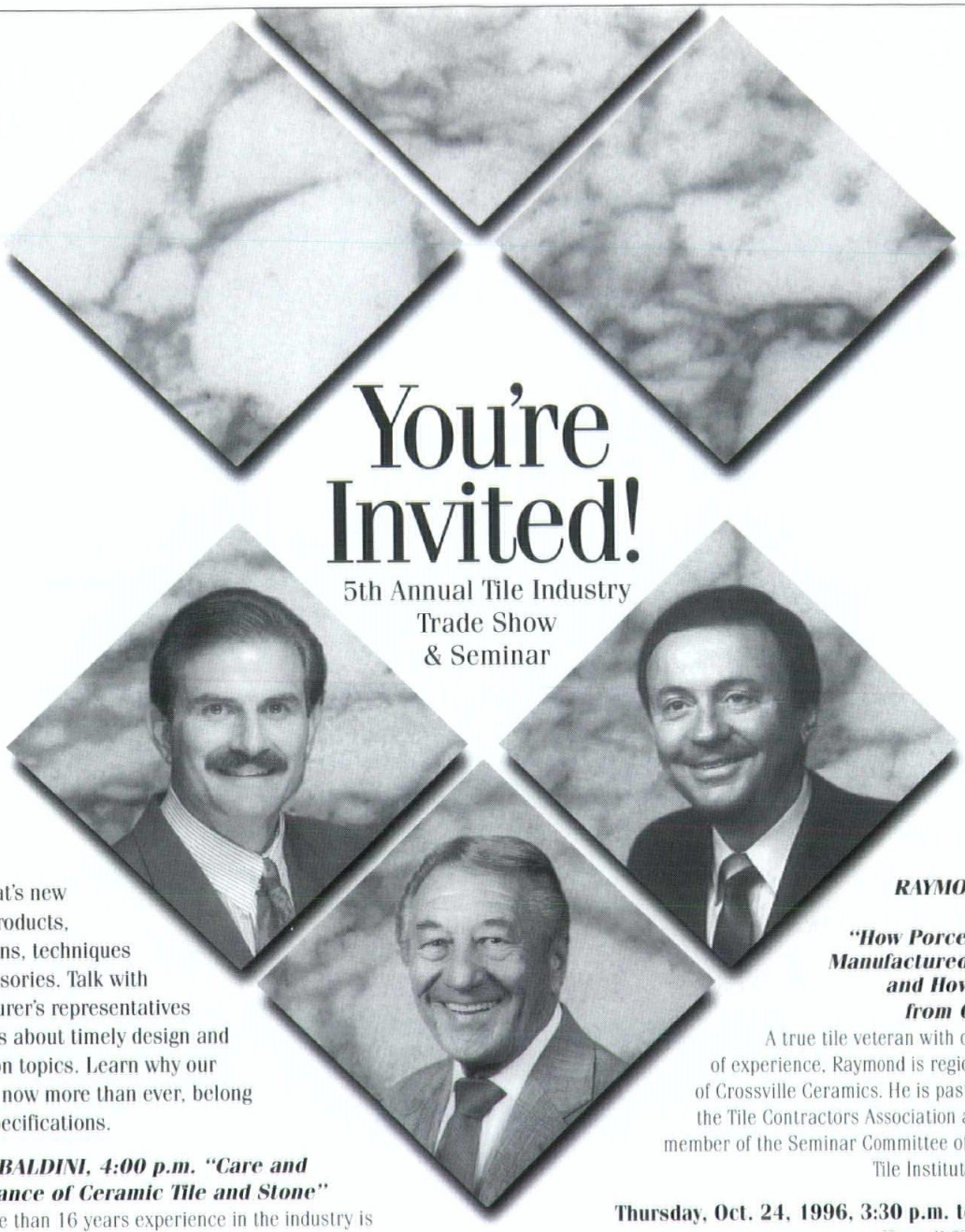
October 1996/$3.00

Hawaii Pacific Architecture



- Romancing the Stone Age
- Hawaii Housing in the Doghouse?



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Rick's more than 16 years experience in the industry is highlighted this year by his recent appointment as president of Aqua Mix, Inc. He is past president and chairman of the board of the Ceramic Tile Institute of America and currently serves on the Western States Ceramic Tile Association board of directors.

HANK HINMAN, CSI, 4:30 p.m. "Everything You Should Know About Sound Rated Floors"
Hank is a senior consultant for Akzo Nobel Geosynthetics Company and vice president/sales for Park Pacific Noise Control. A WWII veteran with more than 40 years industry experience, he is chairman of the Sound Rated Floor Committee of the Ceramic Tile Institute of America.

RAYMOND LOWE, 5:00 p.m. "How Porcelain Tile is Manufactured, Installed and How It Differs from Other Tile"
A true tile veteran with over 28 years of experience, Raymond is regional manager of Crossville Ceramics. He is past president of the Tile Contractors Association and a current member of the Seminar Committee of the Ceramic Tile Institute of America.

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STONE AND CONCRETE

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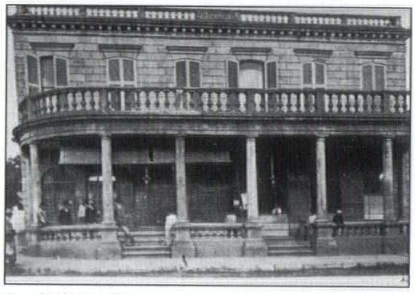

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Hawaii Pacific Architecture focuses on the use of stone and concrete in architecture. Joseph Kennedy examines the early use of stone in Hawaii. Paul F. Morgan looks at construction from the post-contact days through the 1930s. Franklin Gray discusses the concept of modular housing.

This month's cover features a colorized photograph of a Hawaiian house *mauka* of Kalihiwai taken in 1890. The photo and Hawaiian *tapa* design is courtesy of Bishop Museum.

Hawaii Pacific Architecture is the monthly journal of the AIA Hawaii State Council. Subscriptions are $36 per year. Opinions expressed by authors do not necessarily reflect those of either the AIA Hawaii State Council or the publisher. The appearance of advertisements or new products and service information does not constitute an endorsement of the items featured.

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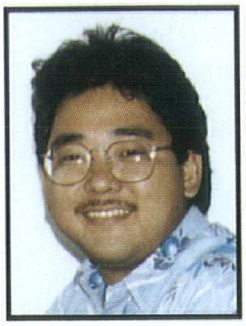
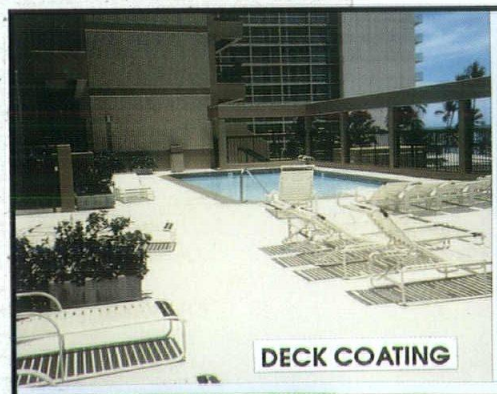
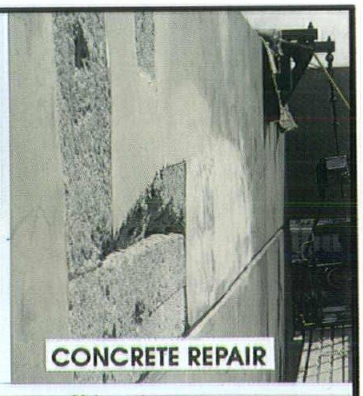
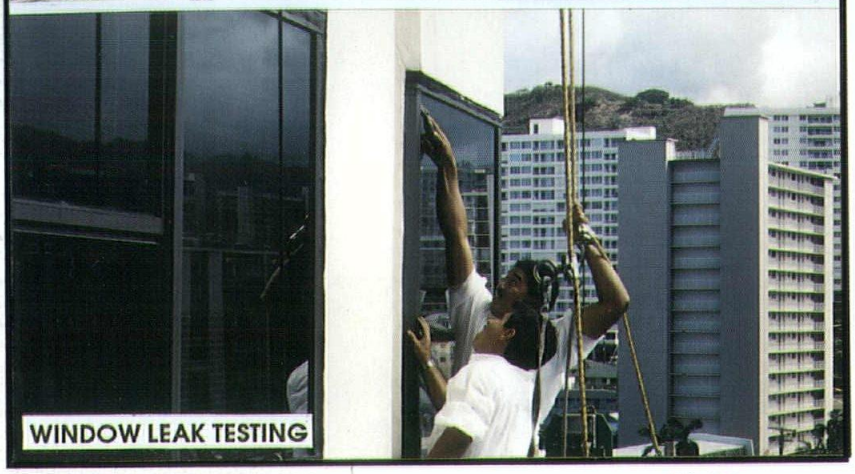
Meet Alvin Nishikawa.



Alvin is Vice President of The American Coating Company. He is in charge of all field and estimating operations. Previously, Alvin was employed with an engineering firm in Chicago and Honolulu where he focused primarily on restoration and water infiltration problems. Alvin holds a M.S. and B.S. in Engineering from Purdue University.







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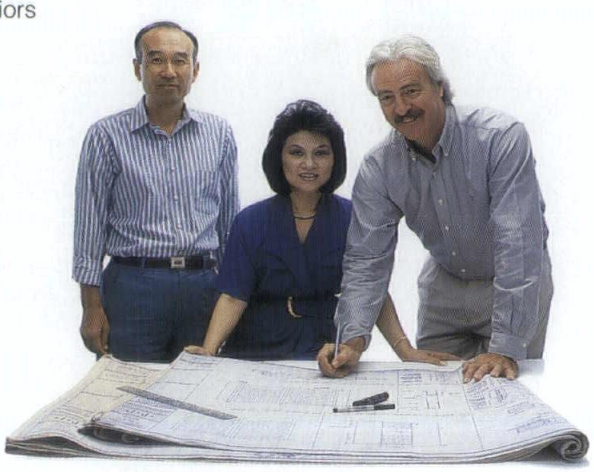

Architect Roy Yamamoto, Jetour's Manager Pat Yoshimoto, ABS Project Manager Jim Becker

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A brief look at early structural Hawaii

Romancing the Stone Age

by Joseph Kennedy

In the past few decades we have learned a great deal about the extensive relationship between Hawaiians and the sea. Everyone knows something about the Hawaiian monarchy, Hawaiian music and many other attractions that help make this place unique.

However, one aspect of traditional Hawaiian life that has not received much attention lately is its remarkable structural past. Simply stated, the Hawaiians were builders, and in this capacity they outdid all of their Polynesian cousins and just about everyone else in Oceania.

Utilizing angular basalt and dry masonry techniques, Hawaiians erected massive temples and fishponds and completed hydro-engineering projects of great sophistication. These undertakings were designed and supervised by a class of professional architects called *kuhikuhipu'uone* who enjoyed an elevated status in ancient Hawaii. This recognition was reflective of both the value their society placed on this craft and the importance of formal structures in their island world.

Stone temples, or *heiau,* of considerable size can be seen on the Big Island — at Kawaihae called Puu Kohola, 'Iliili'opae on Molokai and Pu'u O Mahuka on Oahu. However, none of these can compare to the magnificent Pi'ilanihale *heiau* on Maui that is arguably the largest prehistoric structure in the Pacific.

Archaeological research has determined that many of these temples were built and then expanded on the same site over the

Puu Kohola at Kawaihae is one of the largest heiau in Hawaii.

Kawaiahao Church on Oahu is one of the few remaining buildings constructed with coral blocks.

course of centuries. With the exception of Puu Kohola, it is believed that construction on the *heiau* listed above began sometime in the mid-17th century, or about the same time as the elaboration of the Ku cult.

While the Hawaiians normally fit stone together by eye and selection, there are some rare examples of them cutting and dressing rocks as the Inca in Peru did. The so-called Menehune Ditch on Kauai is one example of this work, as are the *heiau* of Kukuipahu and Maka'opio in west Hawaii.

The last example of cut stone work in precontact Hawaii is the *heiau* of Kuki'i, located near Kapoho on the Big Island. It has been said the stones there were so closely fitted that "... a spear of grass could not be inserted between." But that would be difficult to verify for this temple because, like so many others, it is now in ruins. Curiously, part of the destruction came at the hands of King David Kalakaua, who, in 1877, removed some of the stones so he could place them in the Iolani Palace foundation.

In old Hawaii, stone walls often ran for miles to mark *ahupua'a* boundaries. Hundreds of thousands of smaller constructions were fashioned as burial monuments, house platforms, animal pens, altars and agricultural terraces.

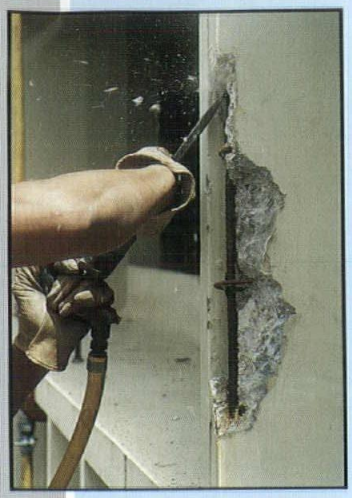
In the historic period, many Western-style structures appeared in the islands. A percentage of these were made from coral blocks, which were quarried out of reef formations at great labor expense. Remaining examples of this technique include Kawaiahao Church, some homes in Haleiwa, one of the Mission Houses and the basement of Washington Place. Coral was also burnt and used as an ingredient in the mortar that fastened the blocks together.

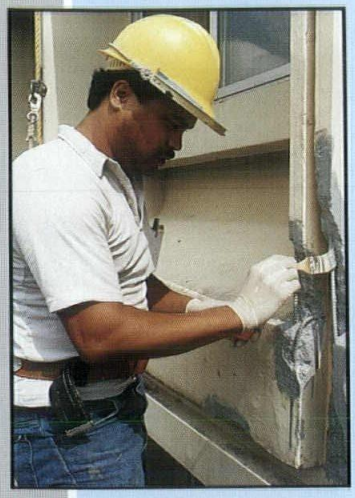
Adobe as a construction medium was also attempted in early historic Hawaii, as evidenced by the schoolhouse at the Mission Houses. It is likely that this experiment was short lived, as adobe does not do well in wet conditions.

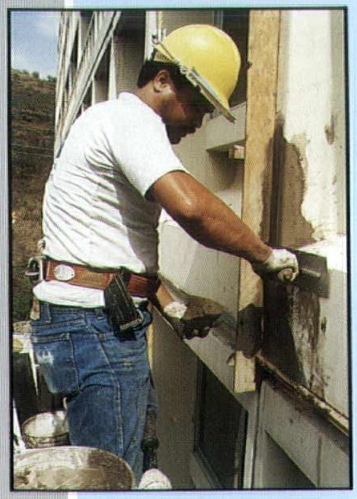
The architectural passage into structures made from reinforced concrete and steel is well-documented. Today, all islands are filled with examples of such efforts.

However, it is the modern works of basaltic stone that stand out and say they are Hawaiian. There are some left in Chinatown and others, including churches and private homes, scattered around the islands. These seem to fit into the built Hawaiian landscape like no others. Perhaps they owe their appearance to the architecture of ancient Polynesia and suggest a full circle return to the original and unique character of the island's primary architects.

↔ *Joseph Kennedy is a senior archaeologist with Archaeological Consultants of the Pacific Inc.*







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Post-contact masonry and concrete construction in Hawaii

Pili to Precast

by Paul F. Morgan, AIA

"The stroke fell with a desolating power upon our hearts," wrote the Rev. Elias Bond of Kohala. In 1849, a ferocious storm destroyed the thatched, wood-framed church that he and his parishioners had built. Within a week, they had resolved: "We will build a stone church with the help of God, and begin now to collect the material, stones, lime, sand and wood." Bond had found, as modern builders have, that when faced with hogs, hurricanes and hungry termites, there are certain advantages to masonry use.

However, he continued:

"It was soon evident that we had undertaken no child's play .... The stones were gathered from neighboring ravines and brought on men's shoulders to the site. The lime was provided as follows: men in canoes with ropes and sticks for loosening up the bunches of coral would go out in three, four or five fathoms of water, some diving with a stick to loosen the coral and attach the rope thereto, whilst those in the canoe would draw up the clumps into the canoe. After being piled on the shore, it was carried on the

Sacred Heart Church on Wilder Avenue is one of Hawaii's best known examples of artificial stone use.

shoulders of the people to the church site. And then the wood for burning, it was brought in the same way from eight to 10 miles *mauka*. A fathom pile of coral required the same measure of wood for burning. Then came the sand, hundreds of barrels. It was brought by women and children from all along the coast, from Kawaihae around to Pololu, in bits of *kapa*, in small calabashes, in rags, if they had any, in small *lauhala* bags, pints, quarts and gallons, from any and all places where it could be scraped up, on the shore .... And so little by little materials were collected during several years. I would not agree to beginning to build till we had all the materials on hand."

Coral reefs provided a readily accessible source of building stone. Many of the most prominent buildings, including Kawaiahao Church and Iolani Barracks — which are still with us — as well as the old courthouse (where the Amfac tower now stands) and the old fort at the foot of Fort Street, were cut from the reefs around Honolulu.

When it was difficult to obtain large quantities of lime, mud was often used. In some of the buildings at the old Kohala mission station, a thin layer of lime mortar covers the mud mortar in which the stones were laid up.

Blocks varied in size. Common blocks in the old courthouse measured 21-by-21-by-9 inches. At Kawaiahao, some weighed up to 1,200 pounds. A note from Gov. Kekuanaoa to Dr. Kauka Judd reported, "Aug. 6, 1838, the stones gathered for the *hale pule* (church) number already 10,656. To complete the structure, the number of 13,980 stones will be required. ..."

What a sight the construction must have been. A mission child later wrote that he could still see: "the lines of rude trucks, with their creaking wheels, loaded with coral blocks, cut from the reef at low tide, being dragged past our house into the churchyard; each truck fitted to strong ropes which were manned by six to eight pairs of partly clad stalwart Hawaiians with strong, willing hands, who, with a great deal of shouting, or accompanying the whole with a sort of chanting song, pulled together ... till they brought their loads within the church enclosure and piled them in various places all around the slowly rising walls. I remember the huge cranes with their pulleys and ropes, and often watched the gradual rising of the stone from the ground to its level on the wall, where a constant gang of native men worked patiently day after day laying them up in mortar, the sand for which was carted from the seashore, and the lime burned in kilns dug on the church premises, or in neighboring lots ...."

The early lime-sand mortars used for both coral block and volcanic stone were considered "soft" mortars. They acted as a cushion for the blocks, allowing some movement, which gave the building more flexibility.

In contrast, later "hard" mortars that used Portland cement were often stronger than the blocks themselves, causing damage to the blocks when the building moved. Therefore, preservation architects preferred lime mortars when patching old masonry. When it was difficult to obtain large quantities of lime, mud was often used. In some of the buildings at the old Kohala mission station, a thin layer of lime mortar covers the mud mortar in which the stones were laid up.

Adobe offered another material from which bricks could be made. "Adobe" indicates that the brick is sun-dried rather than fired. Deposits of workable adobe clay in various spots around the islands provided the source for this material.

The Rev. Cheever, who visited Lahaina in the 1850s, found adobe construction commonly used in the construction of garden walls, as well as houses. He cautioned that the finished buildings should be whitewashed to prevent water damage. No doubt that water damage is responsible for the paucity of surviving adobe buildings.

The old school house near Kawaiahao — adobe with stucco — is probably the most well-known adobe building. Hawaiian children attend school within its walls today, just as they did more than a century and a half ago.

There were some complaints in the late 1840s about the adobe walls bordering many of the lots in Honolulu: "... the adobe walls that enclosed most houses drew curse on more than one count. Posters announcing the arrival of new goods plastered them. ... Their

Opened in 1871, the Kamehameha V Post Office was the first all-concrete building in Hawaii.

decay under wind and rain deposited grime ankle-deep in the streets. Strangers were often heard to say that these scabrous walls destroyed the seaport's beauty ...."

Two significant adobe buildings — now gone — were an earlier Kaumakapili Church and the first classroom building on the Punahou School campus. This first classroom building was shaped like an "E" — facetiously said to stand for education. It was one-story high and 200-feet-long with two outer wings about 50-feet long and a 91-foot-long middle wing.

"The foundation," wrote Levi Chamberlain after a visit to the classroom building, "is of stone — the walls are to be of adobes. The boxes are made but not the dobies (sic)." The boxes were the forms into which mud from nearby taro patches was placed with *pili* grass as a binder.

On Aug. 9, 1841, the Rev. Daniel Dole, architect, contractor and first principal of the school, sent for, among other things, "hatchets, if you have them for the purpose of cutting the adobes into proper dimensions. We wish to have the small adobes as near a foot in width as possible .... Please pay the bearer $16 for the manufacture of 1,600 adobies ...."

Like most adobe structures, the classroom building was plastered both inside and out. This structure seems to have survived into the 1880s and was said to be a "'purely native product.' Its timbers and rafters of wood had come from Manoa Valley, the pili grass for its roof from Rocky Hill and the plaster and whitewash from the Kewalo reefs."

When researching historic sources, terminology can often be confusing. A "brick" house reportedly was built in Lahaina by Kamehameha for Queen Kaahumanu sometime in the first or second decade of the 19th century. This may have possibly been the first Western-style house in the islands — brick or otherwise.

Whether the house was adobe brick, fired brick or both has never been proven. However, an excavation in 1964 revealed "a sturdy coral platform and a large supply of somewhat crumbly, partially fired red bricks, probably part of the foundation." Perhaps whale ships, fully laden and homeward bound, sold off bricks from their whale oil try works, providing an early source of fired brick.

The first fired brick building in Honolulu may have been in the Makee block on the north corner of Queen and Kaahumanu streets, where the Harbor Court Tower presently sits. In 1910, *Thrum's Annual* reminisced:

"This three-story building, the cellar of which was being dug and foundation laid on the writer's arrival in May, 1853, was the first pressed brick structure erected here, and with its granite doorways, sills and steps; its slate roof, iron doors and shutters, was the

Built in 1853, this building, located where Harbor Court Tower sits today, is believed to have been the first pressed brick structure and fireproof building in Honolulu.

first fireproof building of the town. It was said to have been designed in Boston to the order of Makee & Anthon, and the materials all prepared and shipped out here ready for erection."

This claim is strengthened by a tally of buildings taken in January 1847 for the newspaper *Polynesian* which counted buildings in categories — grass, adobe, stone, coral, wood and "stone or adobe below, wood above." No mention is made of brick. In subsequent years, fired red brick gained popularity partly due to the Chinatown fires of 1886 and 1900. Many buildings survive today.

Native volcanic stone, basalt and blue rock were forms of masonry used by native Hawaiian builders and the Westerners soon after they arrived. However, it was usually undressed and often hidden with stucco; the later technique continued in buildings such as the C. Brewer Building and the Honolulu Academy of Art as recently as the 1930s.

There was a short period — 1889 to 1906 — when buildings exhibited beautifully dressed stone as a finished face. It is possible that this rusticated stone preference grew out of H.H. Richardson's Romanesque Revival style, popular on the mainland at the time. The first, best-known example is at Bishop Museum, built of bluish-lava rock quarried from the hill slope back of the Kalihi premises. Many other fine stone buildings still exist downtown and in Chinatown, including the Progress Block on Beretania and Fort streets and the Nippu Jiji Building on Nuuanu Avenue.

The last major building in Honolulu to be built using this method was the McCandless Building. It was designed by architect H.L. Kerr. Located on King and Bethel streets, the building was completed in 1907.

Apparently, the most knowledgeable contractor working in bluestone was R. Lishman who, along with Portuguese stone masons, constructed many bluestone buildings.

The brief use of this masonry form may have been due to several causes. For one, the labor and expense involved must have been prohibitive. *Thrum's Annual* of 1893, in an article titled "Possible Industries for Hawaii-Nei," states that the appearance of these buildings is very impressive but, "... however desirable the material, its uses will be extremely limited, unless skilled labor and improved machinery is brought in to facilitate both the quarrying and dressing process."

In addition, it was discovered in the Chinatown fire of 1900 that the dense basaltic stone could explode when hot enough — something that anyone who has been around pig imus can tell you. Finally, a cheaper, easier-to-work material was becoming readily available at the turn of the century — concrete.

Knowledge of concrete, an ancient material known to cultures as diverse as the Romans and Mayans, had largely become forgotten as a major building material. In the early 19th century, with the discovery of Portland cement and subsequent improvements in the manufacturing of cement, concrete became cheaper and more available.

The first all-concrete building in Hawaii, and possibly the United States, was the Kamehameha V Post Office, opened in 1871. Designed and built by an English brick mak-

er, J.G. Osborne, the post office was actually formed of cast concrete blocks (12-by-14-by-24 inches) laid up like masonry. Aliiolani Hale, often known as the judiciary building, was constructed in the same manner several years later. However, concrete block did not become the ubiquitous material that it is today until after 1900, with the refinement of cement and the development of small, cheap block makers.

The modern hollow block industry started in the United States in 1900 with Harmon S. Palmer's patenting of a cast iron block making machine. Though he tried to enforce his patent, within a few years he had hundreds of competitors. Sears, Roebuck and Co. was advertising a machine for $100 in 1905.

In 1906, one writer noted that, "Concrete blocks were practically unknown in 1900," but that six years later there were, "more than a thousand companies and individuals engaged in their manufacture." We can surmise that it didn't take long for these machines to work their way over to Hawaii.

One reason for the block's popularity was that any number of ornamental faces could be produced. Sears' most popular was rockface, the imitation of natural pitched stone. It became the standard unit on all Sears' machines and was the face most in demand from the manufacturers. It came to be called "artificial stone." It was cheap, easy to make and looked like something more expensive.

Linekona School at Thomas Square is perhaps Hawaii's most well-known example of artificial stone use. As one starts to look for them around town, more and more become evident — the Hawaii Building on Bethel Street across from the Hawaii Theater, Sacred Heart Church on Wilder Avenue and the newer portion of St. Andrew's Cathedral. Although blasted by architects such as Frank Lloyd Wright who called it "... abominable as a material when not downright vicious," artificial stone was popular nationwide until the 1930s.

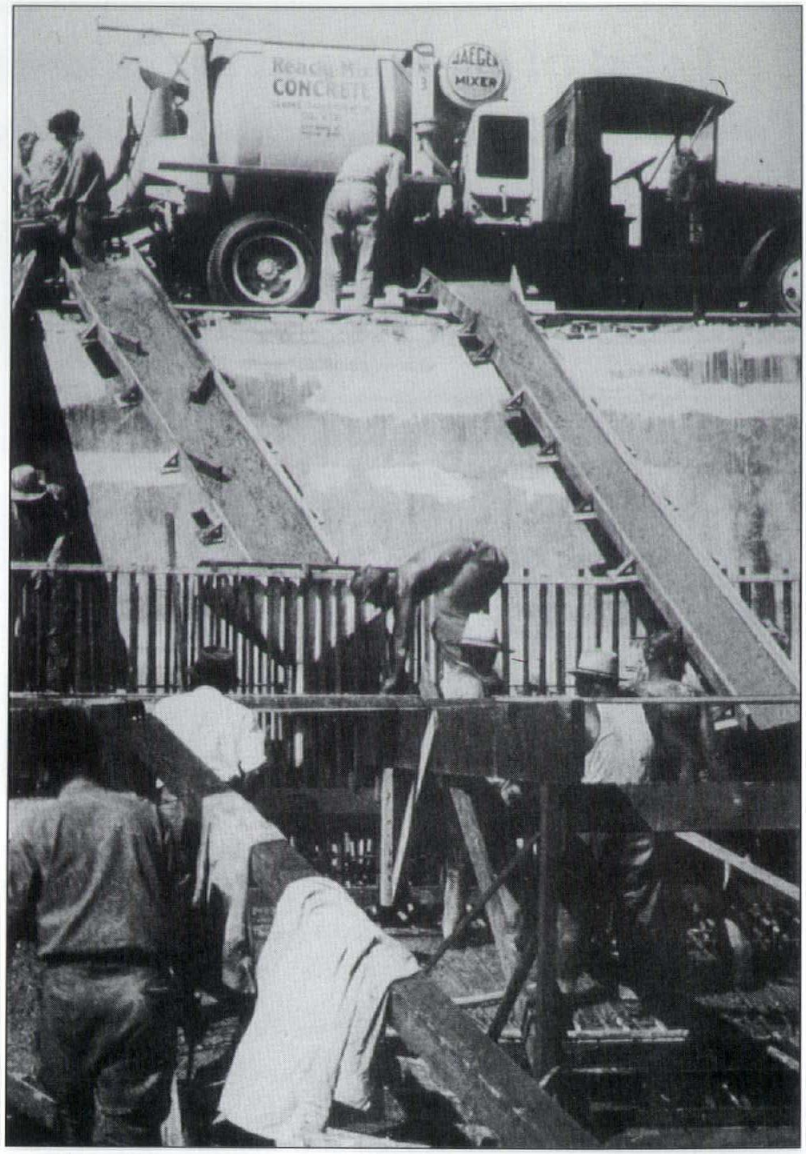
C.W. Dickey included a section on "Cast Stone" in his specifications for the J.F. Morgan residence in Manoa in 1930. A portion of it reads:

Materials for Cast Stone:

White Medusa waterproof cement and Monolith cement

White coral sand or crushed Hawaiian sandstone free from salt, loam or impurities

Natural ground rock of necessary color to produce the desired shade



The pouring of Punchbowl reservoir in 1935 was one of the first ready-mix concrete jobs in the islands.

The color and finish shall be as selected by the architect. All color shall be produced by the admixture of natural ground rock or sand.

Moulds:

Moulds shall be of wood or plaster. They shall be made from models approved by the architect.

Samples:

Samples of finished cast stone materials shall be submitted and approved by the architect as to color, texture and hardness before any material is manufactured.

In the 1930s, the popularity of artificial stone waned, possibly due to the spread of modernism and Art Deco. However, concrete block as a utilitarian building material was too useful to give up. After 1930, the 8-by-8-by-16 block became standard, and lighter "cinder blocks" were developed. The backyard phase was over and block making became a large industry.

Paradise of the Pacific's June 1946 issue

contains a snapshot of concrete block use that lead to the building boom of statehood. It reported that HC&D Co. Ltd. had the latest automatic block making machines, the Besser "Vibrapac." Plant output was 225,000 units per month. The plant was running one month behind on orders. The new Tripler Hospital alone had contracted for 1.5 million units of HC&D's "Holl-o-block."

Concrete masonry units known as "Cind-R-Brik" were also being produced by Hawaiian Gas Products Co. These units, considerably smaller than other masonry units manufactured locally, lend themselves well to home construction, garages, patios and barbeques.

Clarke-Halawa Rock Company Ltd. was producing a buff-colored unit called "Hollow-Stone." It had an irregular surface which results in light shadowing and irregularities. "A big future is anticipated for this buff-colored, fire and termite-proof building unit," according to producers.

Monolithically poured reinforced concrete was still relatively new on the mainland in the 1880s. Critical to this construction method was the development of off-site ready mix plants and the ability to get concrete to the job site without it setting up. The motor truck made this possible.

Just prior to World War I, concrete was delivered in regular dump trucks. The trial and error process, which resulted in today's concrete trucks, would be a study in itself. Some amazing contraptions were created.

In Hawaii some of the earliest monolithic concrete structures were the Randolph battery at Fort DeRussy (1909) and two Kauai bridges between Kalihiwai and Haena (1912). Concrete street paving was also gaining momentum.

The ready-mix industry in Hawaii really dates back to 1935 when Chester Clarke, whose firm, the Clarke Transportation Co., was

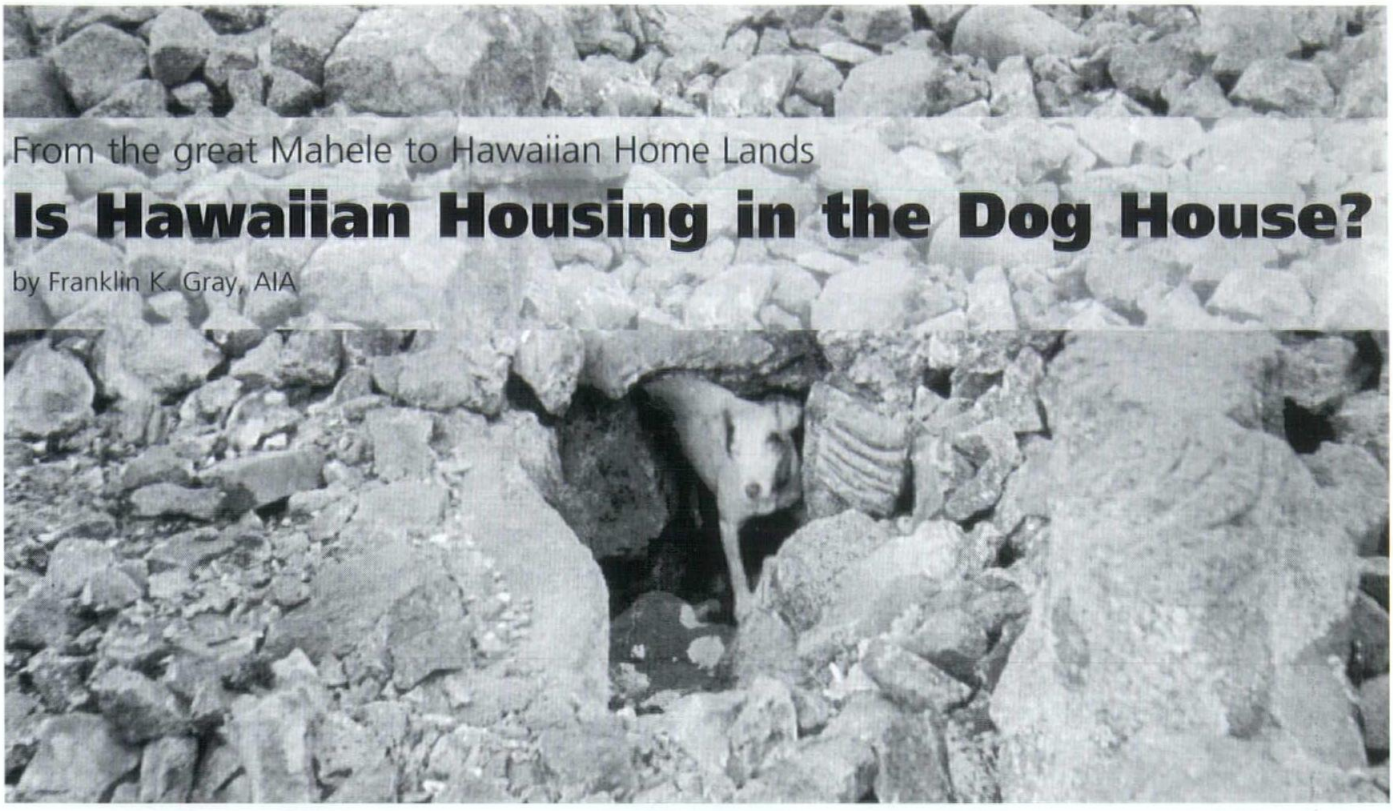
the agent for Fageol trucks, heard about a method of producing and delivering concrete. He ordered four Fageol trucks equipped with Jaeger 2 1/2-cubic-yard mixers and built a batch plant on Ward Street. Aggregate was hauled from a quarry that later became the Waialae Drive-in.

Two of the first ready-mix jobs were the pouring of the Punchbowl reservoir and the construction of a Dairyman's plant on Sheridan and Rycroft streets. In those days, the cement came from the mainland in colorful cloth bags that were to be returned for a refund. Apparently, many of them disappeared, turning up later as aloha shirts.

In 1939, Kaiser Cement, with its pioneering efforts in bulk cement shipping, was the low bidder for the cement in Pearl Harbor's new dry docks. Bulk cement was unloaded at Pier 32 with pneumatic unloaders moving 400 barrels of cement per hour. In the process, severe dust problems were created. Nevertheless, the availability of bulk cement was a very important step in the advancement of the ready-mix industry in Hawaii, eliminating the time-consuming process of opening many cement bags for each batch of concrete.

Space doesn't permit telling more about concrete in Hawaii — of the advancements in precast concrete technology made by the world-renowned structural engineer Alfred Yee and other interesting tales. For example, there is the story of concrete block — its history here is now long enough to have emerged from that 30-plus year shadow of recent "unhistory" that seems to precede what we consider "history." Given their effect on Hawaii, these industries certainly warrant serious documentation, especially as many of the early players are still alive today.

Paul F. Morgan, AIA, is a principal with Suzuki Morgan Architects.



From the great Mahele to Hawaiian Home Lands

Is Hawaiian Housing in the Dog House?

by Franklin K. Gray, AIA

Hale o Lono *heiau* at Keokea.
Photo courtesy of Bishop Museum

The great Mahele Ka Mahele of 1848 spelled the end of the Hawaiian traditional land system, as well as altered the people's ancient social and cultural practices. In response to the demands of foreigners who wanted the right to own land outright, Kamehameha III and his chiefs enacted the Declaration of Rights in 1839, granting the protection of land and property of all people as well as that of chiefs. This allowed foreign ownership of land for large scale development of sugar cane, ranching and other agricultural enterprises, all of which interfered with the finely balanced Hawaiian social and economic structure.

The Mahele divided the land as follows with the resulting outcomes:

• Crown Lands (1 million acres) — retained by Kamehameha III.

Considerable lands were sold, with the remaining Crown Lands becoming part of the public domain in 1893.

• Government Lands (500,000 acres)

In 1886, 170,000 acres remained; the rest had been sold.

• Konohiki Lands (1.5 million acres)

Most of the land was sold prior to 1893.

• Fort Lands

The land was later sold at public auction.

• School Lands (one-twentieth of government land)

Most all of the land was sold by 1881.

• Kuleana Lands

The Legislative Act of 1850 allowed citizens to claim ownership of lands they were living on and cultivating. About 30,000 acres were awarded to tenant farmers. In 1936, only 6 percent of the original Kuleana lands was possessed by Hawaiians or part Hawaiians.

In 1921, when the Department of Hawaiian Home Lands was created, the Hawaiian population had decreased to 22,500. The Hawaiian Homes Commission Act allowed people of Hawaiian blood to again get possession of land in Hawaii. The act called for 200,000 acres to be made available.

Unfortunately, the land granted to the Hawaiians was marginal land that had been rejected by the sugar planters and ranchers. The act excluded all cultivated sugar lands and public lands under lease or agreement. Obviously, the intent of Prince Jonah Kuhio Kalanianaole, the father of the HHC Act, had been subverted.

The record of bureaucratic inaction in improving and transferring these lands, however poor, to the Hawaiian people over the past 75 years has been appalling. The Catch 22 in the HHC Act is that the commission is not externally funded to improve the lands with

roads and utilities. These funds must be raised internally from land lease proceeds, causing more than half the land available to be leased to nonhomesteaders.

(For further reading regarding this matter, refer to "Resource Units in Hawaiian Culture" by Donald P. Kilolani Mitchell, 1992.)

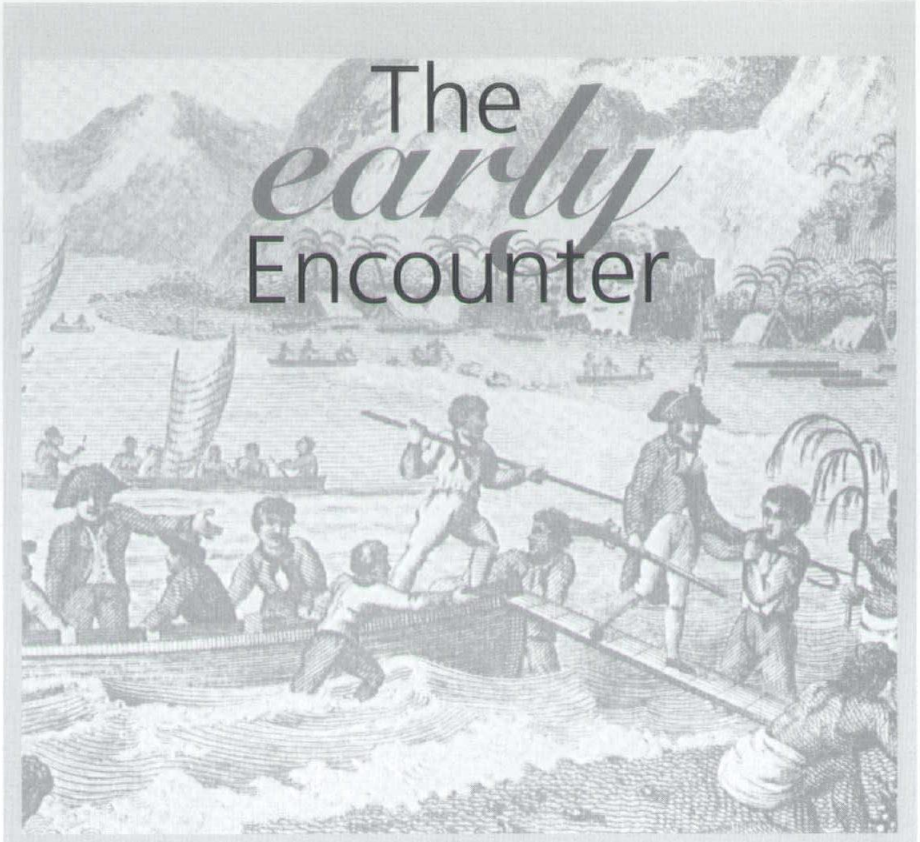
The DHHL, probably due to the focused political spotlight of the Hawaiian activists in the '80s and '90s, did develop a number of projects. Unfortunately, these developments were cost conscious and attempted to take as many people off the large waiting list as possible by making ill-advised cost "savings" throughout the development process.

The resultant projects are at the lowest common denominator of planning and architecture. They have overhead utilities, minimum street widths and sidewalks, minimum lot sizes and small, single-wall houses lacking expansion capabilities.

On a recent visit to one of these projects, I encountered a luau in progress. Due to congestion caused by the small street width, the street was impassable. A *luau* of more than 50 people in a Hawaiian neighborhood is not an unusual or isolated event. A development plan that does not address this culturally related occurrence fails its purpose in a major way.

The DHHL has, in the last few years, under new leadership, made some significant headway in developing or assisting with new projects more in line with the original intent of Prince Jonah Kuhio Kalanianaole. One is the Kuleana Homestead at Kahikinii, Maui.

A volunteer-assisted homestead on 2,000 acres of Hawaiian home lands, the Kuleana Homestead is being developed with some state support. The project's initial stage will be the construction of a road system to access 125 pastoral lease properties. These properties will be available for a dollar a year to qualified Hawaiians who are willing to



In January 1778, two ships, the Resolution commanded by Capt. James Cook and the Discovery commanded by Capt. Charles Clerke, landed in the Hawaiian Islands at Waimea, Kauai. Their purpose was to acquire water, food and other necessities for continuing their quest to find a passage by sea from the Pacific to the Atlantic Ocean to the north of the American continent.

In the Hawaiian Islands, the captains found an estimated 300,000 people described as: "radiantly healthy and of near physical perfection. They were genial, affectionate and generous. A highly developed agricultural system and skillful and intensive fishing methods provided the food needed for a relatively large population. Their shelter and clothing were suited to the subtropical climate."

"The people were under the supervision of ruling chiefs who directed the activities of their industrious followers. Education was direct and effective. Artists expressed their ideas in the religious objects of wood, stone and feathers; in the symbols associated with royalty and in restrained decoration of useful household objects, tools and implements. Dances, usually accompanied by musical instruments, were dedicated to the gods, the chiefs or expressed love of family and nature. Exploits of the gods and heroes were recited by trained storytellers or chanted in poetical language." (Mitchell, 1992)

For Cook and subsequent European traders, the Hawaiians provided fresh water, sweet potatoes, coconut, breadfruit and yams, as well as fish, hogs, chickens and other sundries for ship provisions. Later, massive amounts of sandalwood were supplied for trade with the Orient. In return, the Hawaiians received highly prized items of iron, cloth and other European manufactured curiosities. Unfortunately, also included with these bartered gifts were mosquitoes, flies, cockroaches, centipedes, scorpions, fleas, ants, termites and other pests previously unknown to the islands. The larger animals in-

This grass house is just one of many in a Hawaiian kauhale.
Photo courtesy of Bishop Museum

troduced during this period also became a nuisance when the cattle, horses and goats began eating the pili grass and ti leaves used as thatch in home construction.

An additional lethal legacy was disease. The Hawaiian population was reduced from 300,000 to about 80,000 in the 70 years following Cook's arrival. Venereal disease introduced by Cook's sailors spread to all the islands, causing many deaths. This was followed by epidemics of cholera, influenza, whooping cough, small pox and diarrhea. It is estimated that measles killed between 10 and 25 percent of the Hawaiian population in 1849 alone. These dreary statistics are all the more deplorable since a typical precontact *maka'ainana* (working class man) averaged 5 feet 10 inches in height and was a healthy muscular and well-developed specimen. "A mature chief often was more than 6 feet tall and could weigh as much as 300 pounds." (Mitchell, 1992)

The working man and his family would typically live on an *ili* (strip of land), part of an *ahupua'a* ruled by the *ali'i ai ahupua'a* that would extend from *makai* (the ocean) to *mauka* (ridge top). The population in general usually lived in a single, one-room house or *hale noho.*

Families often joined relatives in a group *(ohana)* whose house formed a kauhale. A large group of *kauhale* or family houses were called a *kulana — kauhale* or village.

The various structures in a *kauhale* were designed to accommodate particular functions. The *hale noa* was for sleeping and sitting. The *hale pe'a* was for female occupancy during menstrual cycles. Men and women ate in separate structures called *hale mua* and *hale 'aina,* respectively.

A fisherman might have a *halau,* a long-thatched house where he kept his canoe, fish nets and other gear. An inland dweller or farmer would have a *hale papa'i* to store his crops and keep his farming equipment. There was also a *hale kahumu,* a thatched shed, one for men and one for women, in which to prepare the food — the man's job — in bad weather.

Even though the *kauhale* was the family's permanent home, there were often other dwellings as well. A farmer might have had a *papa'i,* or small house, in the upland forest where he did much of his planting. A canoe maker might have a *kamala,* or temporary house, in the forest for shelter when collecting the lumber products.

Many people built *papa'i* on the beaches for short-term use, much like they do now by erecting temporary tents on the weekends in Waimanalo and other beach areas.

"The activities of the people within the *ahupua'a* were under the direction of an appointed chief, the *ali'i 'ai ahupua'a,* or of the *konohiki.* Families occupied areas within the valley for their use. Each family might have a plot near the beach, not far from the fresh water stream, as a site for one or several houses. Another plot would be for taro in the rich valley floor. Lands higher in the valley might be assigned, or such areas might be used in common by the villagers under the direction of the *konohiki."*

"There was a constant sharing of food and useful products between the families. Traditionally, the families lived on their *ahupua'a* lands for many generations. The extended *ohana* might consist of many related households. When these families worked on communal projects they were under the direction of their *haku,* the eldest male of the senior branch. Such group activities would be house building, *hukilau* fishing and preparing feasts." (Mitchell, 1992)

develop the farm lots themselves.

This is certainly a step in the right direction for providing farm land. However, the majority of applicants — more than 60 percent — desire residential lands and more than 50 percent of them want to live on Oahu.

Another major project recently completed by DHHL, that is moving in the right direction, is the Princess Kahanu Estates in Nanakuli, Oahu. This project provides good-sized streets, underground utilities, landscaping and well-designed, well-constructed houses of varying sizes and configurations. The lot sizes, due to the expense of Oahu property, are intentionally kept small to provide more money for upgrading construction materials, site amenities and larger housing units.

The project is a successful undertaking and is certainly light-years beyond earlier efforts. However, there are certain areas I believe could be enhanced and expanded to better serve their restricted-end users — those of 50 percent Hawaiian blood.

The Princess Kahanu Estates project provides all the required amenities but, surprisingly, falls short in responding to the users' basic cultural lifestyle expressed in the concept of *ohana* and *aina*. The larger meaning of *ohana* is that no one stands alone — each individual interdependently exists in a past, present and future time continuum. This includes the *kupuna,* the elders, both deceased and living.

(See "The Polynesian Family System in Kau, Hawaii" by Mary Kawena Pukui, 1996.)

The very essence of the Hawaiian cultural experience seems to be in personal interrelationships. This is exemplified by the ancient annual festival of Makahiki, a four-month-long period dedicated to fun and games. This public communal event was supplemented throughout the year by more personal celebrations that included immediate and extended family members. The

point of all this is that a small lot topped with a large-sized home does not accommodate the kind of gatherings essential to the *ohana* of Hawaiian life.

In light of this, it seems the ohana concept would be better served by providing a larger land area to accommodate this extended family interrelationship. This could be accomplished by providing as large a lot as possible, hopefully, a minimum of 10,000 square feet.

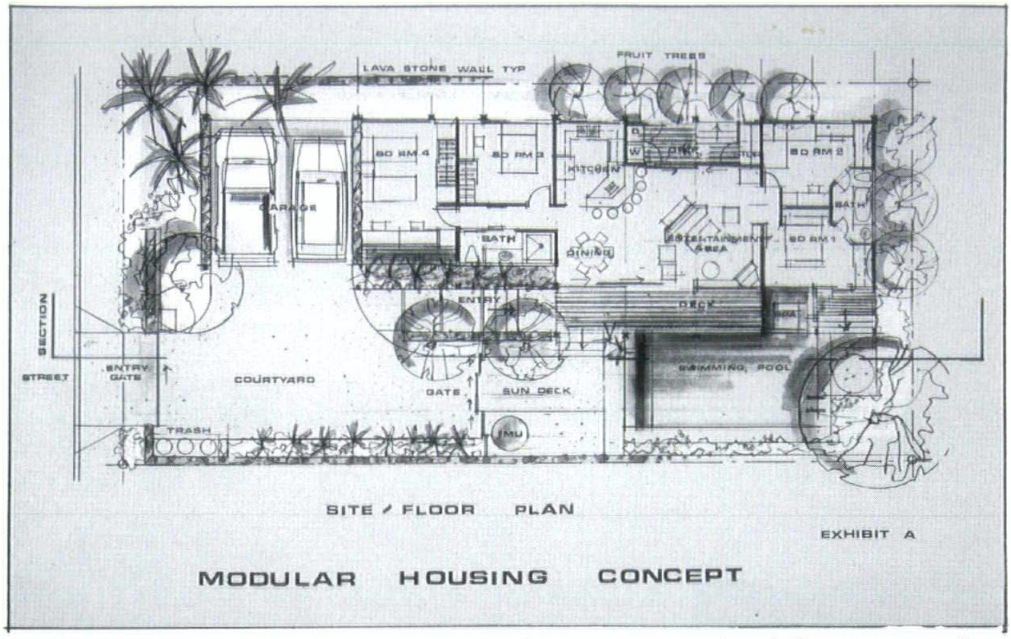
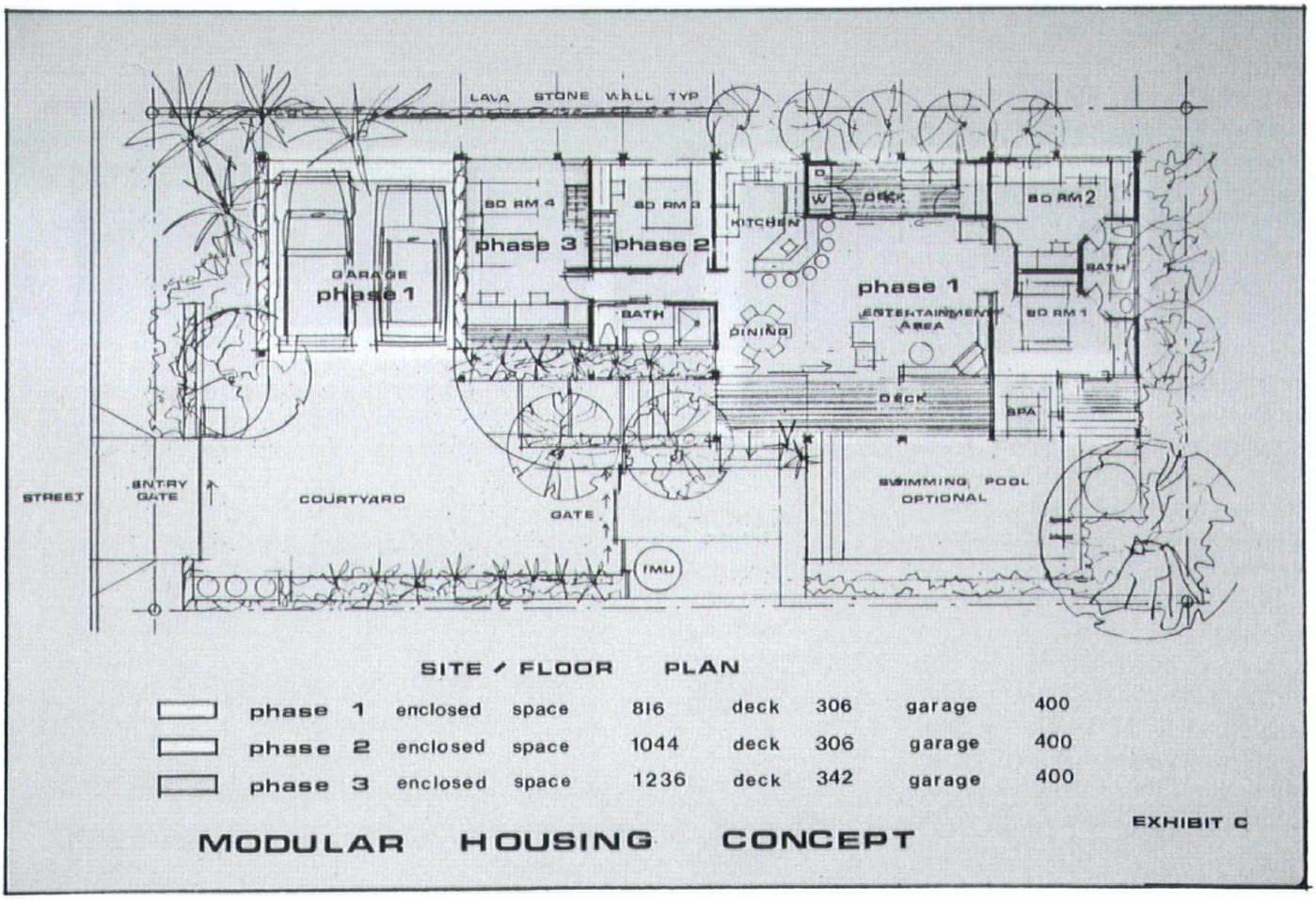


Exhibit A's modular housing concept would give owners the ability to expand with minimum professional assistance.

Another aspect of Hawaiian living addressed in the Princess Kahanu project — but in an economically painful way — is its provision of space to accommodate the large family unit. The project has, as is usual in commercial housing developments, provided all the normally required living space for a standard family unit — three bedrooms and two-and-a-half baths — or with minor variations. However, DHHL seems to be in a unique position for altering this balance to one that is more culturally



The modular housing concept's incremental phases are indicated in Exhibit C.

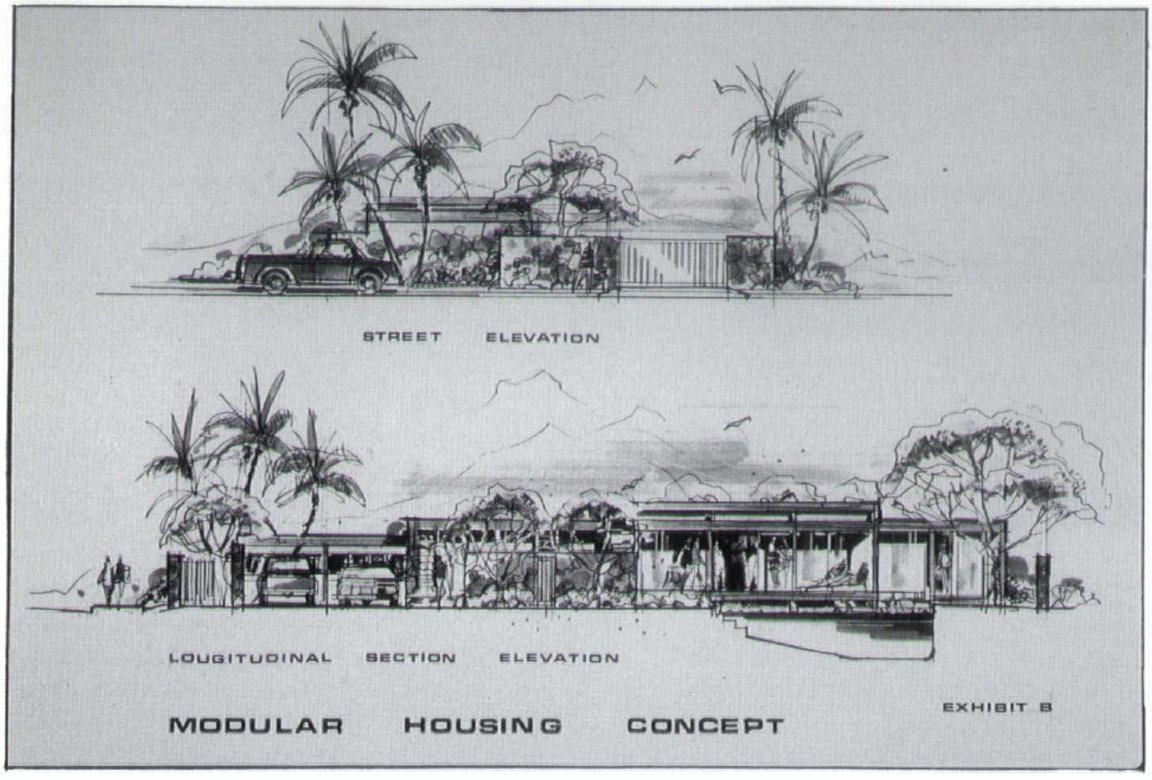


Exhibit B depicts the street and longitudinal elevations of the modular housing concept.

compatible to the Hawaiian people.

The initial house would be sized to accommodate the family's present needs. However, it would be sited for incremental expansion at a fixed cost, when the occupants would be closer to their mature earning capacity. This concept would also allow economic entry into the housing market for a larger group of people than accommodated in a typical housing development, while still providing the means to satisfy the future needs of a growing family, aging parents or additional *ohana* dependents. These structures could be designed in a modular system, allowing construction by the owners with minimum assistance from professional craftsmen. In a real sense, this would reflect Hawaii's historical method of building the *kauhale* with the help of families, neighbors and friends.

A conceptual modular housing unit that would lend itself to this type of development is shown in Exhibit "A." Street and longitudinal elevations are depicted in Exhibit "B." Exhibit "C" indicates the square footage of enclosed space provided in each incremental phase.

Please note that a proper space is provided in the courtyard area adjacent to the *imua* for the ubiquitous *luau*. *"E 'ai!"*

↔ *Franklin K. Gray, AIA, is president of Franklin Gray & Associates Inc.*

Flexible, durable and versatile

Concrete Examples

Kakaako Waterfront Park

The award-winning, 30-acre Kakaako Waterfront Park has been recognized both locally and nationally for having transformed an unsightly, inaccessible landfill site into a valuable public asset.

The primary concept of the park was to develop a green space for passive recreational activities within the context of an urban environment. The park was planned and designed as a welcome respite from the pressures and demands of downtown Honolulu and Waikiki. Another key consideration was to provide public access to the ocean, integral to the Hawaiian culture and lifestyle.

Concrete played a significant role in achieving the park's success. Long recognized for its many qualities, concrete was used in its many forms throughout the park for a wide range of functions. The selection of concrete for most of the park improvements was the result of two key characteristics.

The first is durability. Centuries-old structures attest to the strength and lasting qualities of concrete. The park is intended as a permanent public recreation and open space resource, therefore its features had to be planned for the long haul. In addition to longevity, Hawaii's environment, particularly at the shoreline, can be especially harsh on materials. The scorching heat of the sun and

Concrete allowed for various textures and decorative patterns at Kakaako Waterfront Park.

penetrative salt-laden winds can wreak havoc on unprotected surfaces.

Other factors such as tagging (graffiti) and vandalism have become significant factors in recent times. Long-term maintenance of a material, especially in a public facility where ever-increasing costs must come from public sources, is also a key consideration in selecting materials. For all of these reasons, concrete was found to be superior for its inherent durability.

Secondly, concrete was used extensively throughout the park because of its flexibility and versatility. Its fluid state before curing allows limitless opportunities in terms of form and scale. Textures and decorative patterns can easily be achieved using concrete. A wide range of colors is also available through color additives and aggregate material.

The following are some of the concrete applications used in the park:

The structural walls of the comfort stations were constructed of reinforced concrete. In addition, concrete was used for all flat work, such as grade paving — except for the asphalt pathways that were bordered with concrete bands. Site walls, sea walls and landscape edging were similarly constructed in concrete.

Certain elements of the park used precast concrete. These included the columns for the arbors (trellises) and the park sign. The primary advantage of precasting is quality control. The precast method was used where it was critical to achieve certain textures, finishes and patterns, such as the tapa pattern on the columns and the precise lettering on the sign.

The pedestrian promenade, along the length of the protected shoreline, was constructed with concrete unit pavers, or bricks, bordered with a band of poured-in-place concrete. The variety of sizes and colors enabled the tapa-inspired pattern to be used throughout the promenade. Other precast concrete products used in the park include picnic tables and benches, light poles, drinking fountains and trash receptacles.

There were several finishes and mixes used in the construction of this park. A standard mix with a smooth finish was used for the building and some of the precast furnishings. Exposed aggregate surfaces, such as the columns, pavements and walls, utilized special mixes with local materials such as crushed coral and red cinder incorporated to achieve the desired finish, texture and color.

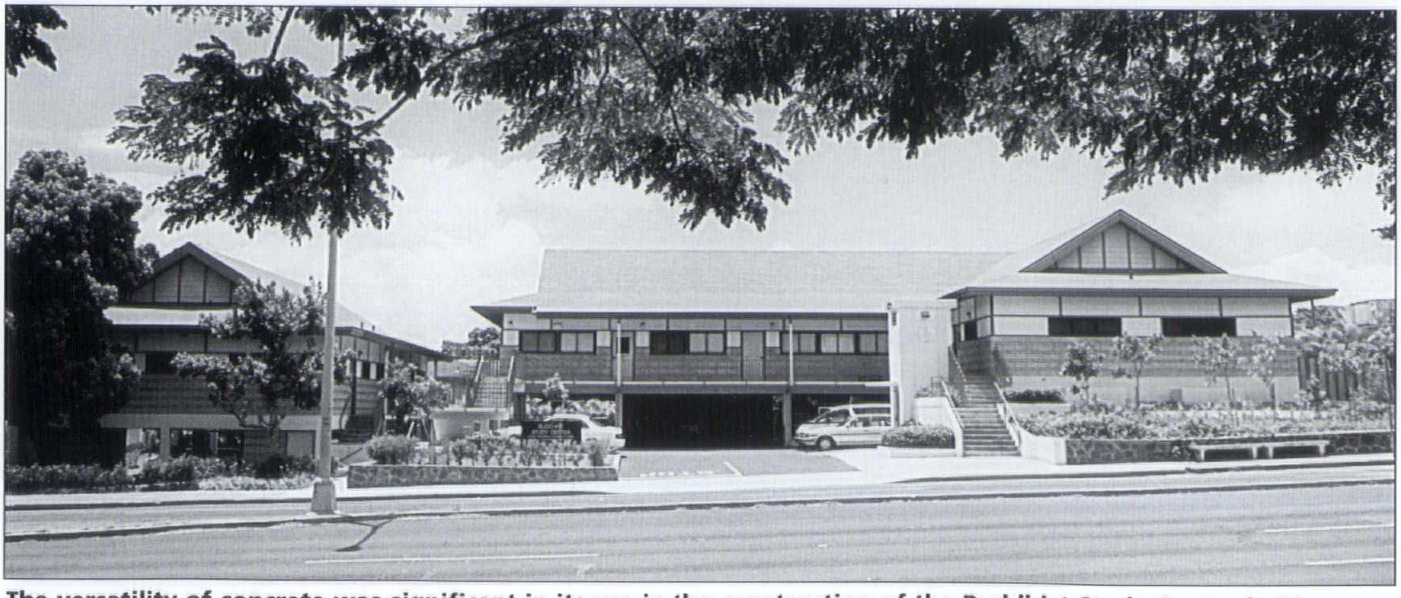
While the success of the Kakaako Waterfront Park is attributable to its transformation from a once blighted area into a boundless recreational resource, the use of concrete has contributed not only to the quality and aesthetics of the park, but to a lasting legacy for generations to come.

Credits
Landscape Architect
Miyabara Associates
Architect
Henry Reese, AIA

Buddhist Study Center

A research and study facility for Hawaii's Honpa Hongwanji Mission, the Buddhist Study Center (or the BSC as it is now called) was completed in early 1995 at 1436 University Ave., close to the University of Hawaii at Manoa.

Replacing an interim converted wood residence at the same ad-



The versatility of concrete was significant in its use in the construction of the Buddhist Study Center in Manoa.

dress, the new building is several times larger than its temporary predecessor and built of longer-lasting materials.

One of the materials selected was concrete, due to its versatility of use. Because off-street parking required so much of the property's ground area, the building was designed so that the parking requirements were met by using the ground level "footprint" of the building floor above.

The differing use between the ground-level parking and the BSC operation on the floor above mandated a two-hour fire separation between them. The use of concrete solved this requirement by providing long spans of open spaces needed for parking cars and by acting as a horizontal two-hour fire separation membrane between the two separate uses.

Credits
Architect
Arthur A. Kohara Architect Inc.

Campbell Square

There is no other natural building material that can be as effective in conveying an image of quality and permanence as well as stone.

The choice of material for the first major building in Kapolei was a combination of split-faced granite contrasting with neutral honed limestone. The combination of handcrafted stones provides a textural interest and an opportunity to play with shadows due to the strong sunlight in the Ewa Plains.

Various stone materials were researched before settling on the split-faced granite from Weymouth, Mass., and the honed Indiana limestone.

The granite provides Campbell Square with an image of informal elegance as well as conveys a crafted, handmade quality. The use of stone also eliminates maintenance requirements associated with painted surfaces. It allows the building to weather gracefully.

Contrasting natural stone is concrete. Concrete is processed stone that is heavily manipulated through the addition of various natural and man-made products to create a fluid material. Concrete can be used in just about every conceivable building product, from pipes and floors to walls and roofs to pieces of art.

Credits
Architect
Kober/Hanssen/Mitchell Architects

Split-faced granite and honed limestone were chosen to convey an image of quality with the Campbell Building.

A mixture of concrete and Molokai cinders compliments the Ko Olina Visitor's Center beach environment.

Ko Olina Visitor's Center

The Ko Olina Visitor's Center, utilizes concrete throughout the major areas. A special mixture of white cement and Molokai cinders provides a finish that compliments the natural beach environment. Color is added to the mixture to create patterns and interest within at the ground plain. The walls are plain to blend with the surroundings as well as provide a backdrop for the native Hawaiian plants surrounding the building.

Sensitive and thoughtful use of these natural products can provide an effective building image that will endure the effects of time.

Credits

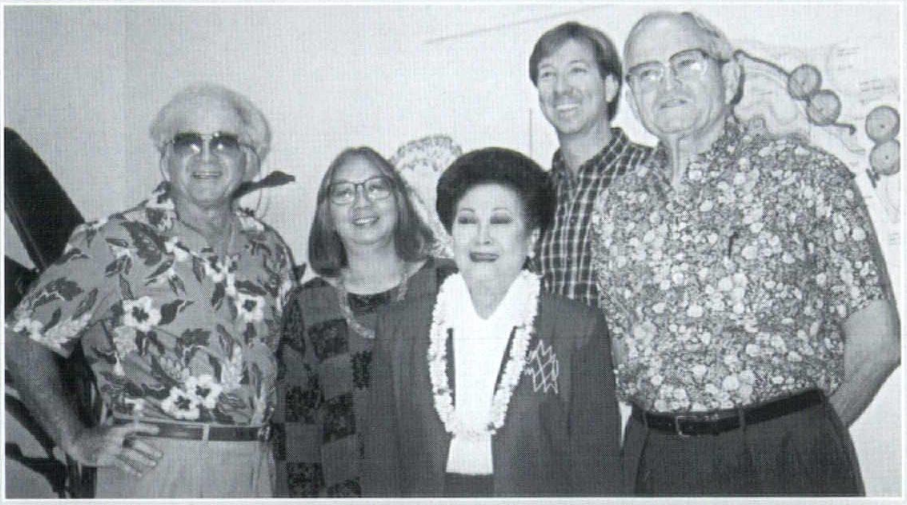
Architect
Kober/Hanssen/Mitchell Architects

•• *Compiled by Hawaii Pacific Architecture staff.*

News Briefs

Belt Collins Meets with the Philippines First Lady

Belt Collins' professionals recently visited with the Philippines first lady Emelita Ramos. Employees of Belt Collins, currently working on more than 20 resort and community projects in the Philippines, met with Ramos to discuss beautification projects for Manila in anticipation of the country's centennial celebration, being held in 1998.



Pictured, from left, are Ray Cain, Belt Collins vice chairman; Anne Mapes, Belt Collins president; Emelita Ramos, the Philippines first lady; Pete Geyer, Belt Collins project manager; and Jim Bell, Belt Collins chairman.

Nelson Named Rider Hunt Comptroller

Aneda Nelson has been named comptroller at Rider Hunt Ltd., Hawaii's largest cost and schedule consultant to the development and construction industry, said Julian Anderson, company president.

Nelson's new responsibilities include the supervision of all accounting and administrative staff for Rider Hunt's U.S. operations, including offices in Honolulu, San Francisco, Los Angeles, Phoenix, Seattle and Portland, Ore. Prior to joining Rider Hunt Ltd., Nelson was a senior auditor specializing in the construction industry at Deloitte & Touche.

Aneda Nelson

Nelson is a certified public accountant and a graduate of the University of Washington, with a bachelor's degree in accounting.

Goodfellow Bros., WAT&G Make Donations

Goodfellow Bros. Inc. and Wimberly Allison Tong & Goo recently donated a combined total of $40,000 to Diamond Head Theatre and the University of Hawaii Foundation.

According to company representatives, the contributions were made to reinforce a positive business climate, in appreciation of quality architecture, and to support culture and the arts in the local community.

A $34,000 donation to the Diamond Head Theatre Facilities and Capital Improvements Fund is earmarked for improvements to DHT's theater facility in Honolulu, including office and exterior renovations and reconditioning the theater's electrical system.

In addition, the UH Architecture Development Fund received $6,000 to help support a number of student enrichment programs, including the Internship/International Student Exchange Program that funds the placement of local UH students in notable architectural firms in Asian Pacific locations like Bangkok, Thailand, Hong Kong and Singapore. A portion of the donations will also be used to support ongoing lecture and research projects.

Goodfellow Bros. Inc. is a Maui-based construction company with operations statewide. WAT&G is an international architecture and planning firm specializing in hotel and resort design and development.

ASID Officers, Directors Elected

Audrey Tanaka, ASID, Remodeling Specialists Hawaii, has been elected 1996-1997 president of the American Society of Interior Designers - Hawaii Chapter. Tanaka replaces Linda Y. Ueda, ASID, Ueda/Seta Associates Inc., who remains on the board.

Joining Tanaka as officers are President-elect June Lee, ASID; Vice President Wayne S. Parker, ASID; Treasurer Frances A. Obayashi, ASID; and Secretary Karin Matsunaga, ASID.

Elected to the Board of Directors were Gary Batcheller, ASID; Bradford Camara, ASID; Nancy Peacock, AIA, ASID; Charles Black, ASID; and Karren Barozzi, ASID. Patricia Lindberg was elected the allied practitioners representative, Roxanne Okazaki, the industry foundation representative, and Mary Elise Kerley, the student chapter president.

ASID represents design professionals

and strategic partners who are dedicated to the growth and development of the interior environment.

CSI Hosts Tropical Environment Design Seminar

The Honolulu Chapter of Construction Specifications Institute will present "Tropical Environment Design & Construction Considerations: A Seminar for Design and Construction Professionals" from 8 a.m. to 4 p.m., Oct. 19 at the University of Hawaii School of Architecture.

Topics will include general considerations, corrosion control, high wind and seismic considerations and Formosan termites.

The cost is $45 for CSI members and $65 for nonmembers. The price includes program materials, lunch and refreshments. The course is accredited by the American Institute of Architects for eight continuing education credits.

For more information or a registration form, contact Sandy Tottori at 487-8291.

Philip K. White & Associates to Design Nature Center

The Hawaii Nature Center has commissioned Philip K. White & Associates to design a new 12,000-square-foot facility at its present site in Makiki Valley.

Plans for the new facility promise to exemplify the mission of the Nature Center — "to foster awareness, appreciation and understanding of the environment by and for the people of Hawaii and to courage wise stewardship of the islands in the future."

Another project under design by PKWA is the new campsite facilities for Molokai Ranch Ltd. PKWA is planning and designing the facilities to be environmentally self-sufficient. Composting toilets and photovoltaic electrical systems serve each tent structure, allowing campers many of the comforts of home.

Correction

In the 1996 Design Award Program booklet distributed in the August issue of *Hawaii Pacific Architecture,* the project identified as "Pearl Harbor Memorial" should have read "Pearl Harbor Memorial, Renovations and Alterations."

Custom screen block masonry

Cast in Stone

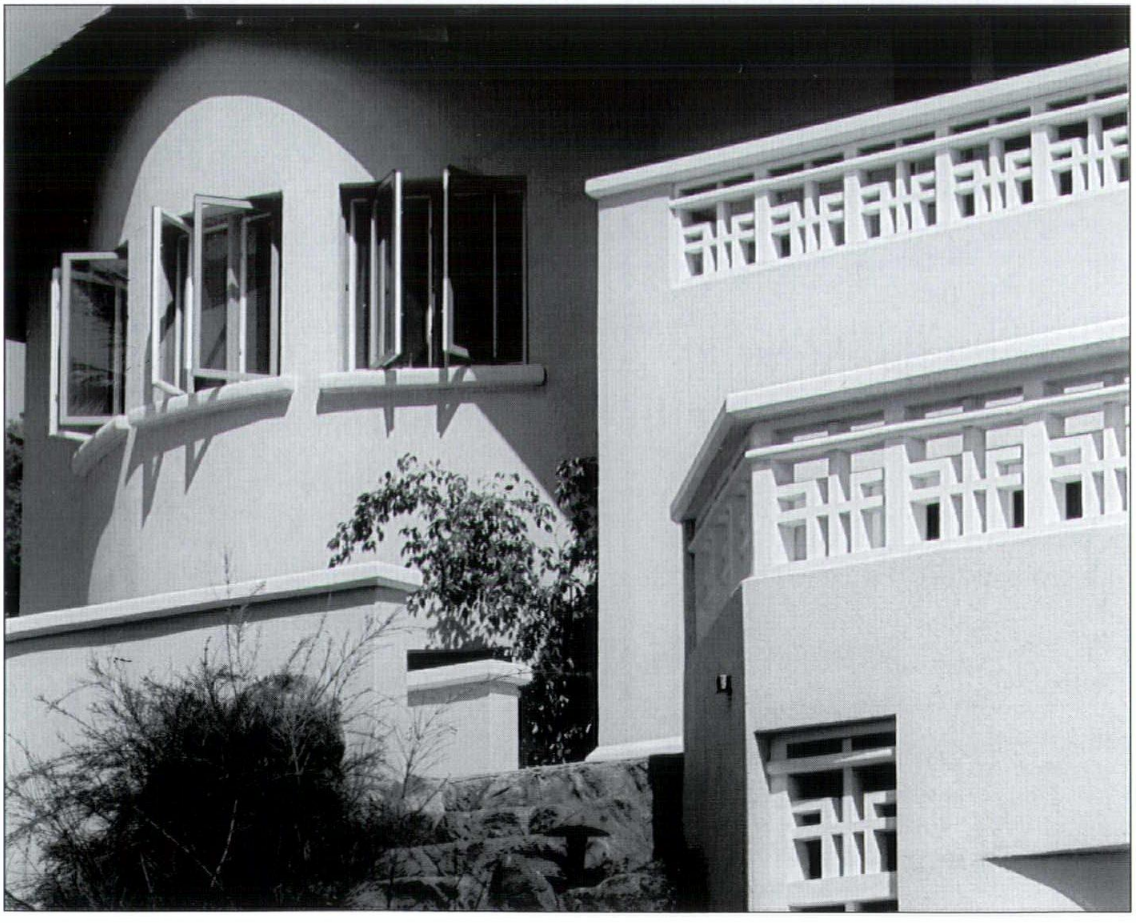
by A. Kimbal Thompson, AIA

Casting project-specific, custom concrete masonry units is nothing new. Professor Bruce Etherington, FAIA, of the University of Hawaii School of Architecture, devised a method for such construction of nontechnologically sophisticated villages in Thailand.

Frank Lloyd Wright devised the Usonion House building system on this concept and examples abound throughout the islands, from the 19th century forward, including the Honolulu Academy of Arts, Immigration Station, Kula Sanitarium, Kailua Community Center, C. Brewer and Company Building (second) Honolulu, Honolulu Hale, Alexander & Baldwin Building.

Projects from the 1950s, '60s and '70s often include more standardized perforated masonry block units or other variations in aggregate, color, shape or surfacing which are abundant in residential and commercial projects throughout the islands. However, the frequency of use and block design is more prevalent when the proximity of the project is closer to the source of the manufacturer.

Certainly, the opportunity exists for a



Custom screen blocks create an architectural detail for ventilation and light.
Augie Salbosa photo

Lightweight Cellular Concrete Technology

Isle CellCrete is a structural lightweight cellular concrete developed to provide additional performance and economic advantages to the many superior benefits of normal weight concrete.

Strength

Durability

Termite Resistance

Low Maintenance Cost

All the advantages of normal concrete and more:

- Lower Construction cost
- More economical foundation  an structural requirements
- Faster and easier placement and finishing.

- Lower shrinkage
- Greater sound control
- Improved insulation values
- Greater moisture resistance
- No honeycombing

Isle CellCrete

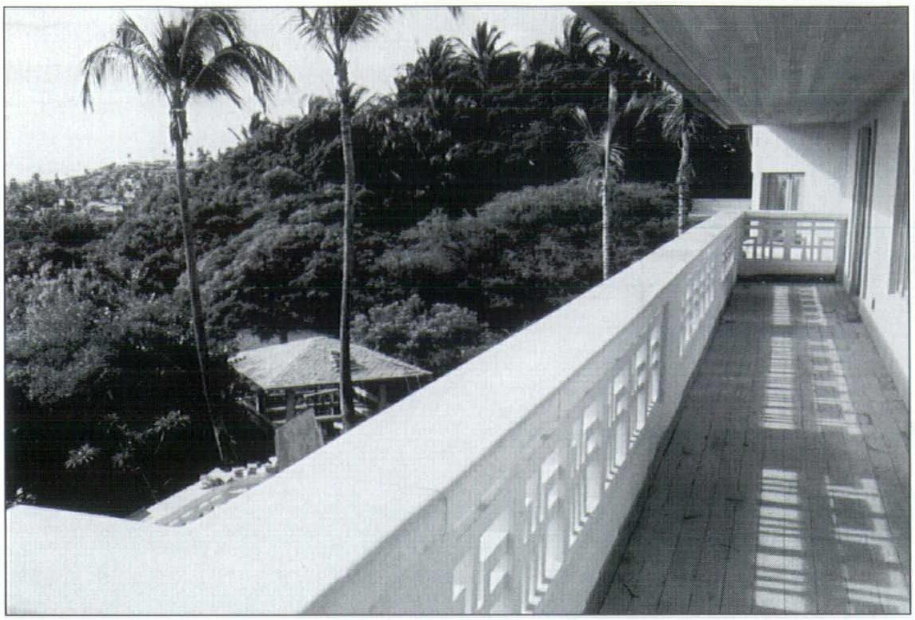
Manufactured in Hawaii by
Island Ready-Mix Concrete, Inc.
91-469 Komohana Street,
Kapolei, Hawaii 96707
Phone (808) 682-1305
Fax. (808) 682-4478

more in-depth investigation into the evolution of materials penetrated for air and light in tropical environments than is the subject of this article.

What we set out to achieve in the residence pictured was architectural detailing (or the artful use of openings) for ventilation and light consistent with the exterior cladding and the building's vernacular.

Initially, it was intended to adapt a standardized pre-manufactured block pattern. However, we discovered that, more recently, standardization of available concrete masonry units is attributable to consolidation of basic design "offerings" because of modern manufacturing techniques. Die costs for individual blocks are expensive and have reduced available variety.

A 32-inch square module was decided upon as a variation on the 8-by-8-by-16 module because it provided for fewer individual castings, and its base curb and top coping provided the desired railing height. The blocks were cast so they could be used horizontally for railings, vertically stacked for mechanical equipment room ventilation and to stand alone as wall penetrations. The four identical molds were made in the contractor's cabinet shop and lined with plastic laminate.

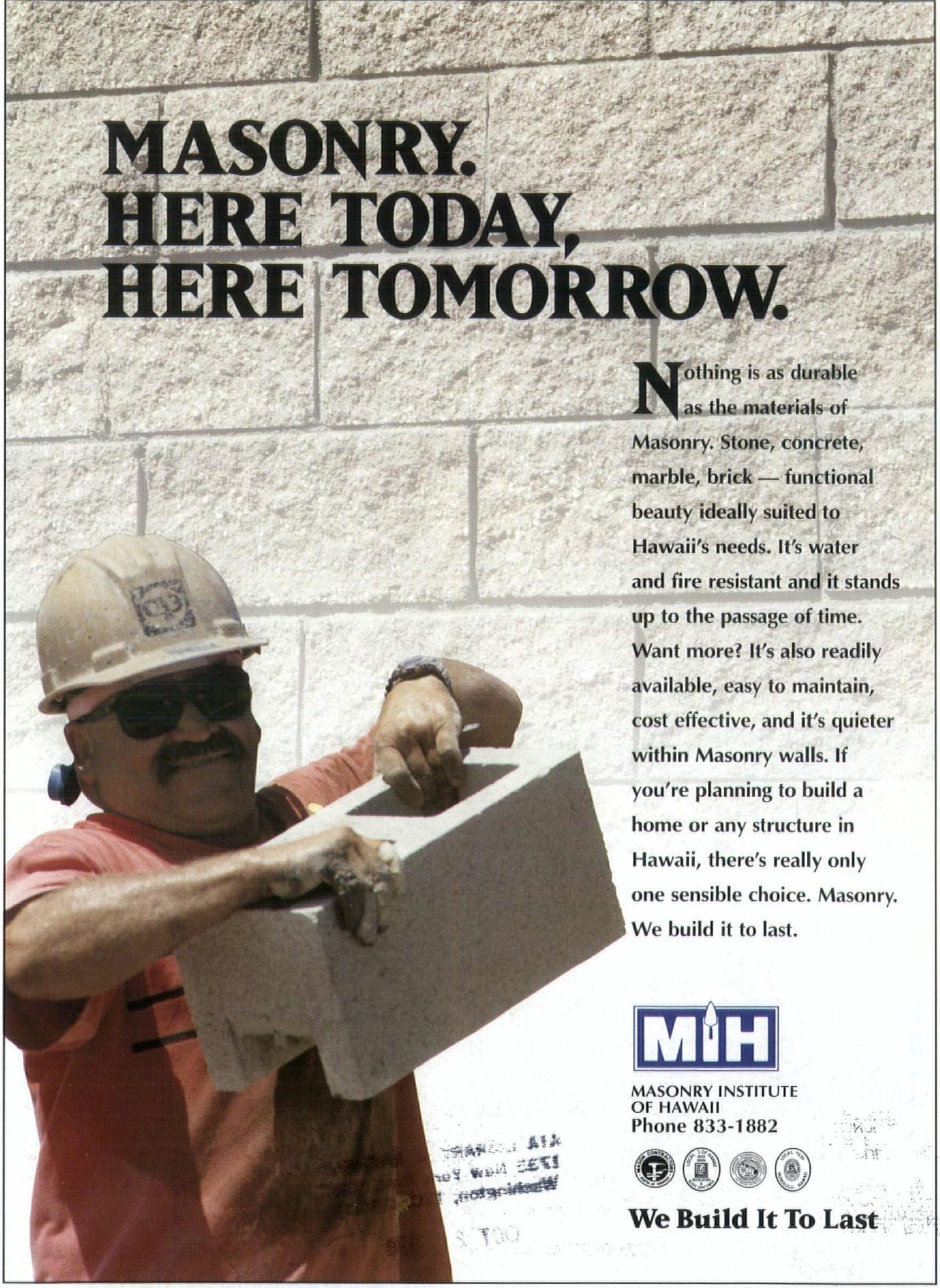


The blocks create interesting visual effects with light and shadows.

The specially formulated concrete design mix and steel reinforcing were stockpiled on the site so that sets of blocks could be poured in succession, popped, cured and finished, and then stockpiled for use at the appropriate sequence in construction.

•• A. Kimbal Thompson, AIA, is principal of Kimbal Thompson Associates.

Market Place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