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Hawaii Pacific Architecture

• Designing for Hawaii's Climate

Market Place

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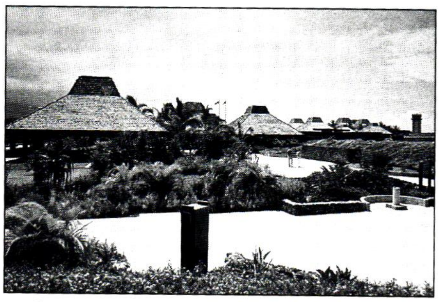

8 Big Island Design

IN THIS ISSUE ...

From the thatched homes of the ancient Hawaiians to Honolulu high-rises, *Hawaii Pacific Architecture* examines how island structures have been designed for our tropical climate. Guest Editor Virginia Macdonald, AIA, takes us on a tour of Big Island buildings that respond well to the micro-climates where they are located. She also describes how solar design can be used to make homes and offices cool and dry.

This month's cover showcases the Hawaii Medical Services Association Center, considered one of the most energy-efficient high-rise buildings in Hawaii.

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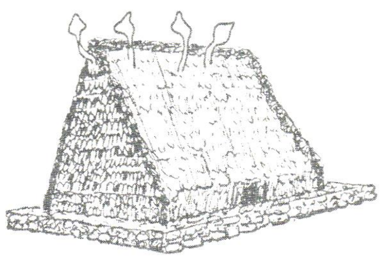

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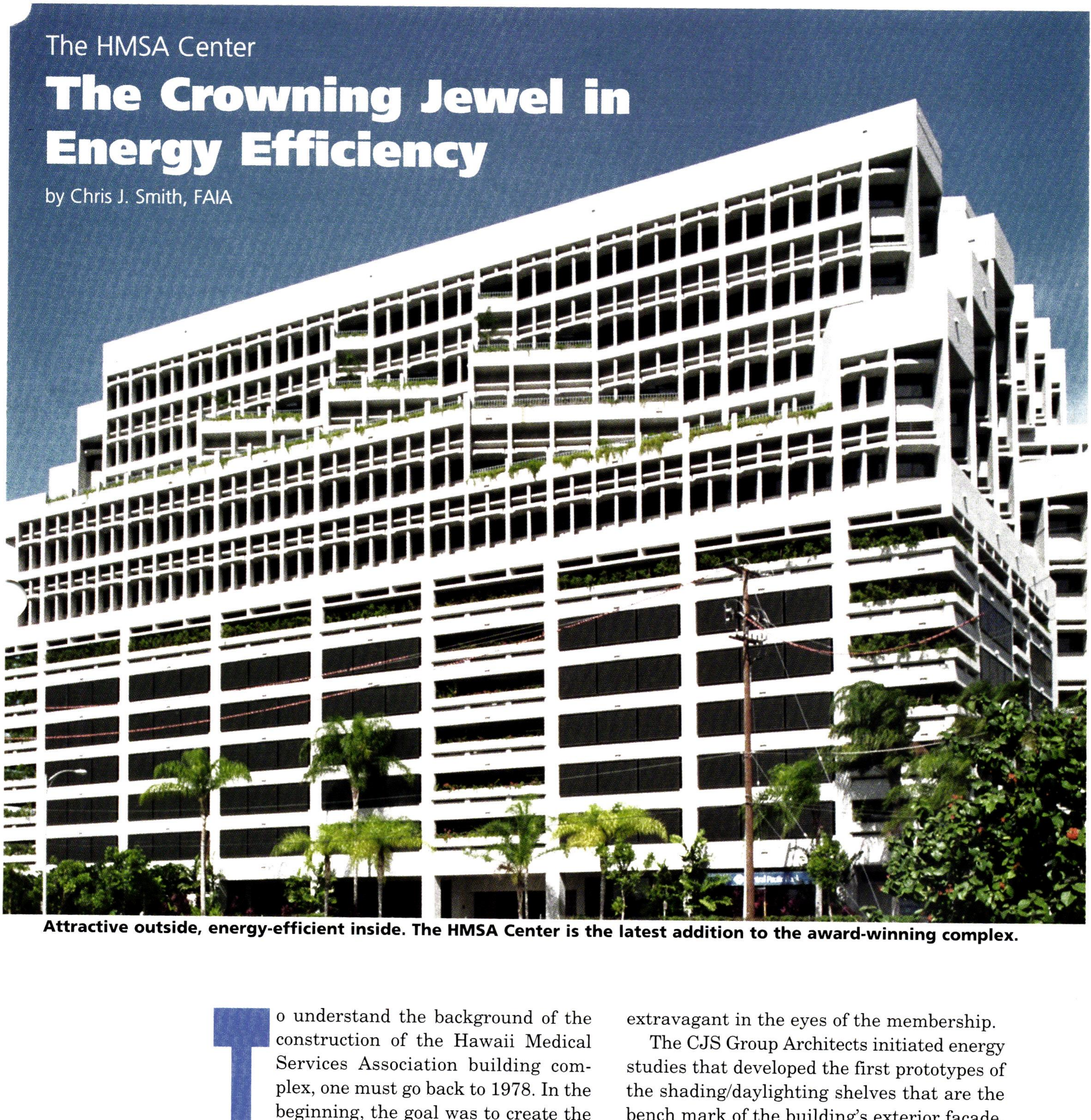
The HMSA Center

The Crowning Jewel in Energy Efficiency

by Chris J. Smith, FAIA

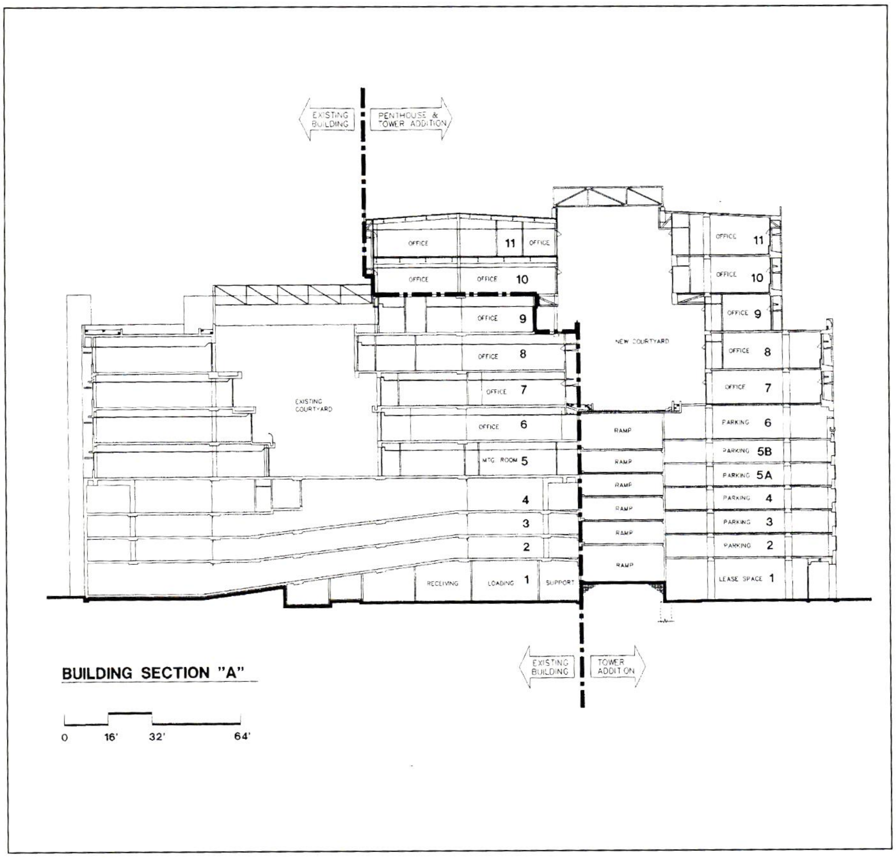


Attractive outside, energy-efficient inside. The HMSA Center is the latest addition to the award-winning complex.

To understand the background of the construction of the Hawaii Medical Services Association building complex, one must go back to 1978. In the beginning, the goal was to create the most energy-efficient building ever built in Hawaii.

At the time, HMSA executives believed this approach was relevant, especially during the oil crunch. They also felt the responsibility to develop a building that would be user-friendly for the employees yet not viewed as extravagant in the eyes of the membership.

The CJS Group Architects initiated energy studies that developed the first prototypes of the shading/daylighting shelves that are the bench mark of the building's exterior facade. Other components included natural ventilation, night air flushing and computer monitoring of all aspects of the complex. The completed building garnered several design awards, including the first U.S. Department of Energy award for energy innovation in 1984.



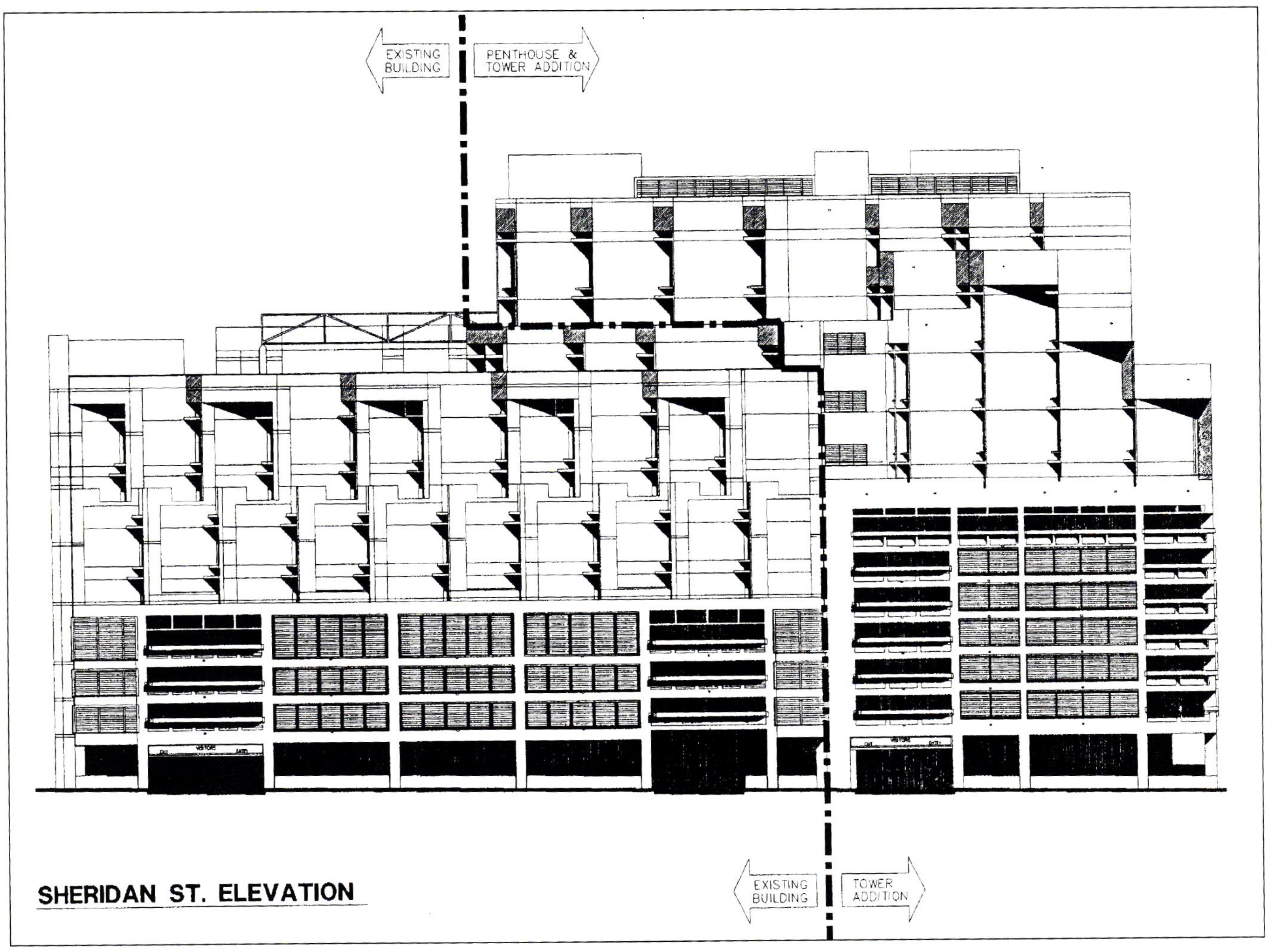
The Latest and Greatest

The new HMSA Center, completed in the summer of 1996, is the most recent building to be constructed on the Keeaumoku site. It has added over 110,000 square feet of new office space, 8,500 square feet of commercial space and 325 parking stalls to the existing structure.

The new structure enjoys the advantage of using as a guide what 10 years ago was the cutting edge of energy-saving technology. Thus, the latest theories in daylighting, natural ventilation and management systems have been incorporated.

Key design elements of the new exterior are fresh interpretations of the historic shading and daylighting shelves. A sophisticated Honeywell computer system controls climatic conditions, state-of-the-art security, fire protection and elevator service.

The total approach to energy efficiency starts with the logical site



layout and orientation of the building. It was imperative to configure the structure in such a manner to avoid intense heat gain from the sun. Other key design issues focused on window treatment, shading protection of the open spaces and proper insulation, all designed to lessen the impact of solar heat gain.

Sunlight Versus Artificial Light

The ability to use daylighting to minimize the use of artificial lighting is very important in the overall design scheme. Daylighting utilizes Hawaii's bright sky to naturally light interior office spaces. Natural daylight is augmented by ambient and task lights only when necessary. The result is a substantial reduction of energy demand from reduced lighting and air conditioning needed to offset heat generated by lighting fixtures.

The new complex also employs operable windows. They have been located around the center's exterior perimeter and interior courtyard to allow the building to use natural ventilation if critical electrical shortage should occur, as it did during Hawaii's rolling blackout a few years ago.

In addition, HMSA is regulated by federal security guidelines. Consequently, all operations which involve movement in and out of the complex are monitored by highly-sophisticated security technology.

Everyone Benefits

As befitting the nature of the organization, employee wellness has also become part of the building design. Thus, two outside courtyards, a large cafeteria and exercise floor provide sensitive amenities for staff members.

Since HMSA growth has been programmed to be gradual and controlled, the remaining space not presently utilized by HMSA personnel is being leased to various tenants. Tenants enjoy use of the adjoining landscaped lanais off their office suites in addition to access to the interior courtyard. Assigned parking, specially designated entrances and high-speed elevators complete the building's amenities.

The HMSA Center, to us as architects, is a joy. It is not a signature building focusing purely on design, in fact it is quite the contrary. It is a bench mark structure exhibiting the energy-efficient possibilities capable of being constructed here in Hawaii. The credit belongs to the client, the pioneering architects who designed the initial structure, and those who have continued to work to make this complex a reality.

Chris J. Smith, FAIA, is president of The CJS Group Architects Ltd., Honolulu, a multi-disciplinary firm that works with energy and technological projects, museums and hospitals.

Using nature as a guide...

Big Island Micro-Climates Addressed in Design

by Virginia B. Macdonald, AIA

The Atkinson-Jarvie home/office stays cool and dry without using air conditioning.
Photo by Jim Buckley Productions

"Visitors believe Hawaii has a uniform climate, warm sun, gentle breezes and occasional windward and mauka showers. The kamaaina, however, realize there can be dramatic changes from one part of an island to another, and noticeable changes throughout any 24 hours."

So says Gary Barnes, a Meteorology Department professor at the University of Hawaii. And nowhere is this statement more true than on the Island of Hawaii, where the sunny, arid climate of the Kona coast contrasts sharply with East Hawaii's frequent rain.

A number of Big Island structures showcase architects' responses to these micro-climates. The buildings have been designed to take advantage of favorable climate aspects while mitigating high humidity and temperature. These efficient designs prove it's possible to be cool, dry and comfortable, wherever you are on the Big Island.

Comfort in the Rainforest

Project: Atkinson-Jarvie Home / Office
Location: Volcano
Architect: Virginia B. Macdonald

The average annual rainfall in the Royal Alii Estates subdivision at 3,300 feet elevation in Puna is 200 inches. Even when it's not raining it's often cool and cloudy outside.

The clients are scientists who often work in cool, wet climates. However, after a week in the Hawaiian rainforests or at the summit of the highest mountain on Kauai they wanted to return to a snug, dry home.

The design solution involved three separate areas. The first was a workshop that would include space for muddy boots and gear, a shower, laundry, two computer areas and extra sleeping space.

The second unit was to be a more conventional area for a kitchen, living room, bathroom, bedroom, and a wood stove for cozy evenings.

The third space requirement was an extra room for children, bird watching, or to enjoy the view of snow-capped Mauna Kea.

The result is two square spaces, each 30 x 30, and a 12 x 12 room above the entry. South and east roofs are full of skylights. Some of the skylights also serve as vents.

The sun warms the air, moisture is absorbed, and the hot, moist air is vented. Replacement air enters through low wall vents. The windows are seldom opened, and laundry is dried under the south skylights. An additional all-glass sunroom is also planned.

Better for Business and for Patients

Project: Medical office building for Dr. and Mrs. Richard Lee-Ching
Location: Hilo
Architect: Virginia B. Macdonald

Hilo has been called the "rainiest city in the United States" and it often deserves the title. It is also warm and humid.

The building was designed to be compatible with the long-established neighborhood of frame houses with metal roofs. In spite of the low-key appearance, the building would have to meet stringent criteria for interior air quality, humidity and temperature control.

Although an electronics engineer argued strenuously that the electronic equipment would be "ruined within a year without air conditioning and a good dehumidifier," the client was willing to take a chance that the architect could provide a natural means of ventilation.

The usual solution of open windows was out of the question for this hot, rainy location. The architect instead used an exemption from the Hawaii Model Energy Code which allows for deviation from the Code if the same results can be achieved by "innovative design."

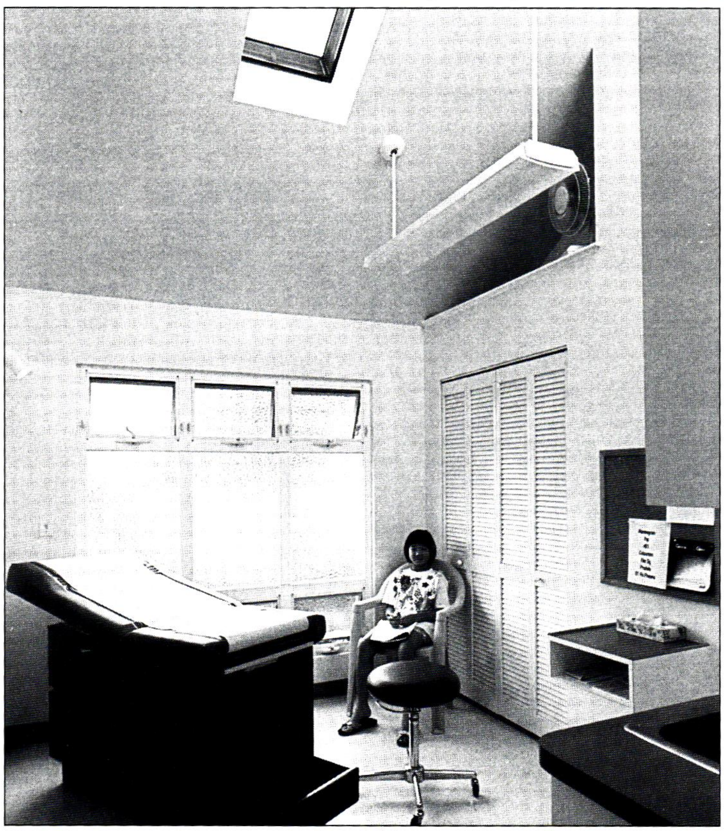
The solution was skylights mounted on louvers that allow the sun to heat the air just under the skylight. This warmed air absorbs moisture, and the warm, wet air is vented through the louvers. Cooler air is drawn in through low wall vents, which are shaded by carefully planned vegetation.

In this micro-climate, 60 degree air travels down the mountain at night, is admitted through the low vents, and cools the building. During the day, the sun triggers the outward movement of hot, moist air.

The entire building, except for three work stations, uses daylighting. The exterior walls utilize a reflective barrier.

Graphs produced by data loggers show temperature, relative humidity and carbon dioxide all to be within acceptable limits. Average interior temperature is 79 degrees, and average relative humidity 59 percent. The client's monthly electric bill is under $100.

A nearby doctor's office, with a building design typical for Hilo, was also monitored with data loggers. The building has window air conditioners in each room and a dehumidifier in the office. The average temperature is 76 degrees, and humidity 51 percent. However, the electric bill is about $500 a month higher than the building designed to use natural ventilation.



Thanks to natural ventilation, this medical office building saves hundreds of dollars a month in energy costs.

Photo by Jim Buckley Productions

The "Non-Building"

Project: Ke-ahole Airport
Location: Kona
Architects: Aotani and Oka

The Ke-ahole Airport, opened in 1970, was the first recipient of the Hawaiian Architectural Arts Award. Its innovative design has stood the test of time.

The airport is built atop the 1801 lava flow on the coast several miles from downtown Kailua-Kona. The site is sunny and dry, averaging only seven to 10 inches of rainfall annually.

The design goal was to "create an oasis" that would give visitors the true Hawaii experience, said Ed Aotani, AIA. Therefore, the airport was designed as a series of roofed structures without walls, taking advantage of trade winds to provide natural ventilation.

Hot air is vented out through the ceilings. The roofs are not continuous throughout walkways, allowing people to walk out in the open.

Natural materials including wood and lava rock were used in construction. A lava rock wall helps deflect noise from the airplanes.

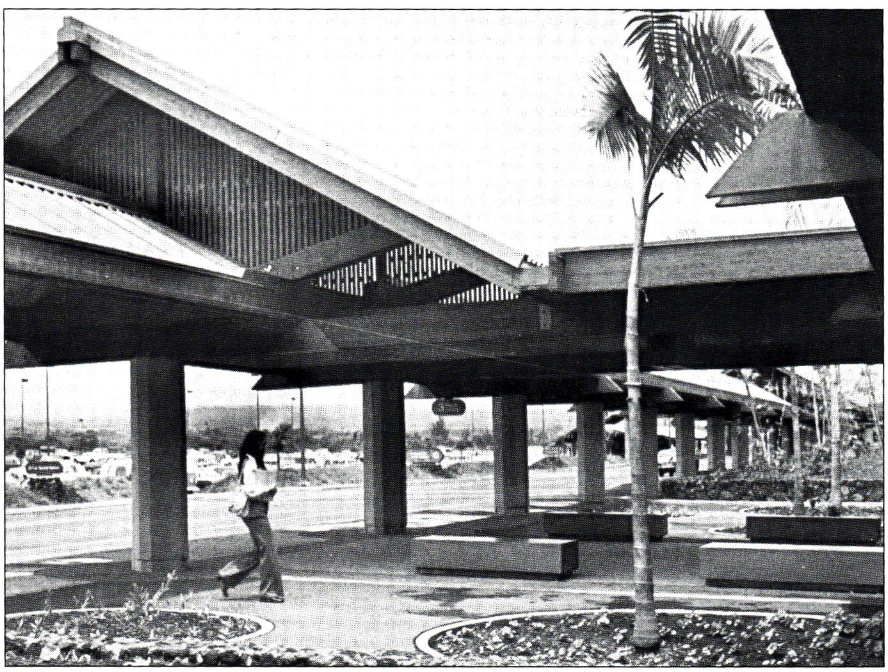
It required a monumental construction effort to transform a foreboding lava field into a safe and attractive airport. The project took 13 months of 12-hour shifts, six days a week to finish, but was on time and under budget.

Tropics in an Airport

Project: *Hilo Airport*
Location: *Hilo*
Architects: *McAuliffe, Oka and Associates Inc.*

After construction of the Keahole Airport in Kona, a second airport was built in Hilo. While the Ke-ahole Airport adapted well to the hot, dry Kona climate, the Hilo Airport faced a rainy micro-climate.

The Ke-ahole Airport is the "airport without walls" on the sunny, dry Kona coast.



In contrast to the Ke-ahole Airport, the Hilo Airport features roofs over all buildings and walkways to shelter visitors from the frequent rain.

At this airport, a large metal roof covers all the walkways as well the building itself. The roof is broken up visually by a number of openings that allow rain to fall onto the native ti and amau ferns below. This adds aesthetic appeal, reminding visitors of the beauty of this tropical environment.

Near the lounge area, water draining from the roof is collected in gutters and funneled through a Japanese chain down-spout over a rock splash basin. The water then flows along the side of the lounge area and drains to a catch basin at the end of the lounge.

Only the departure lounge and restaurant are air conditioned. Check-in counters and baggage claim areas are visible from the street, adding to the open feeling of the design.

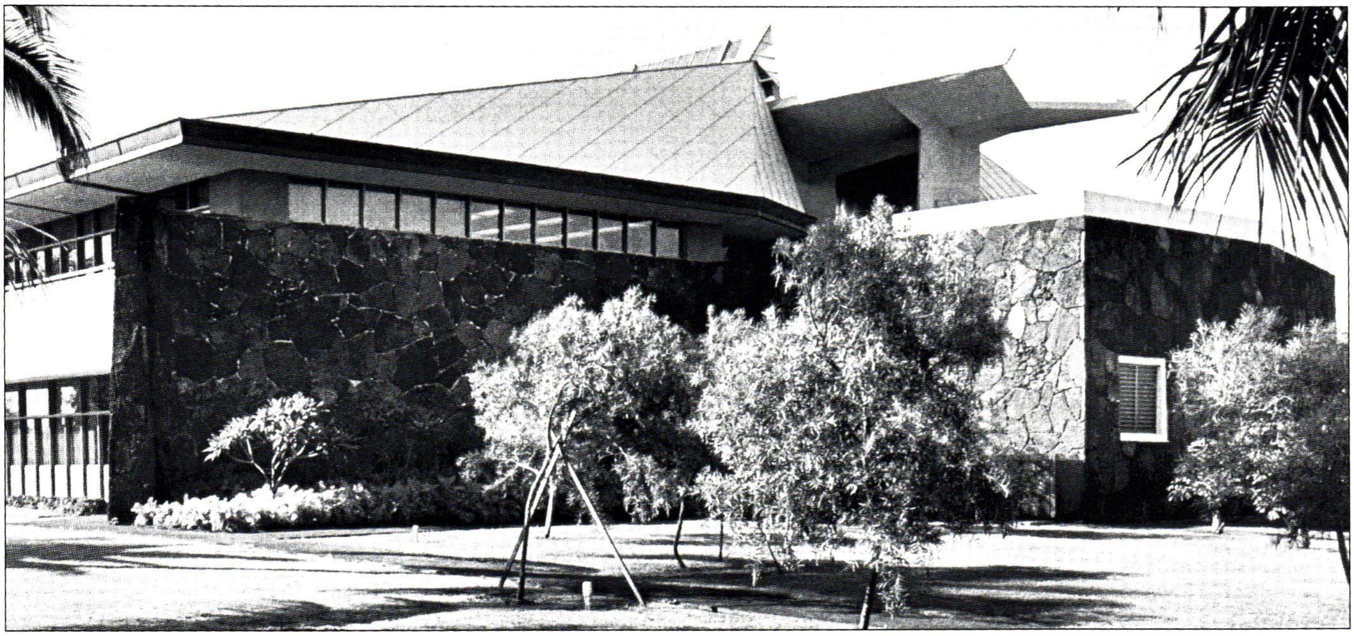
Bringing the Outdoors In

Project: *Hawaii County Building*
Location: *Hilo*
Architects: *Wilson Okamoto and Oka*

There is perhaps no other government building quite like the Hawaii County Building. The offices line either side of an interior courtyard and look either into the courtyard or the gardens outside. The courtyard is open at each end and side.

The courtyard is cool despite not being air conditioned. It is used for plant displays, including anthuriums and orchids provided by local nurseries on a rotating basis. This has made it uniquely attractive and highlights an important aspect of the island's economy. Translucent roof panels furnish light for the plants.

Office interiors are air conditioned during the day because of aircraft noise from the nearby airport. However, simply opening office doors can often provide com-



The canopies and skylights provide interesting architectural elements to the Hawaii County Building.

fortable temperatures. A large lanai on the second floor provides a relaxing open space for informal gatherings.

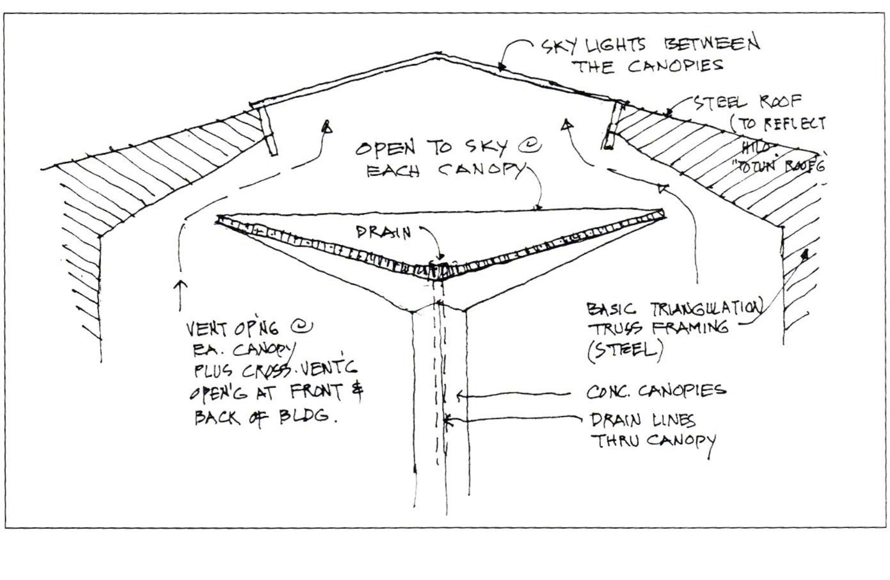
The building's energy use runs just over a million kWh a year. Given the total area under roof, the energy use is relatively low. Plans are to further reduce it by approximately 30 percent by means of an upcoming energy efficiency retrofit.

Author's Epilogue

In preparing this article an interesting fact emerged. Although all major architectural projects require a dedicated team effort, three of the buildings selected because of their response to the micro-climates where they are located had one architect in common — Shizuo Oka.

Oka, born on 1918, seemed destined for plantation life, but World War II changed that. After the war, the G.I. Bill enabled him to study architecture at the University of Arkansas. Upon graduation he was awarded a Fulbright scholarship and studied in Japan. He says he looks for ways to "orchestrate the elements of natural light, plants and structure in architectural design."

•• *Virginia Macdonald, AIA, specializes in the use of natural energy and ventilation methods in architectural design. She is based on the Big Island.*

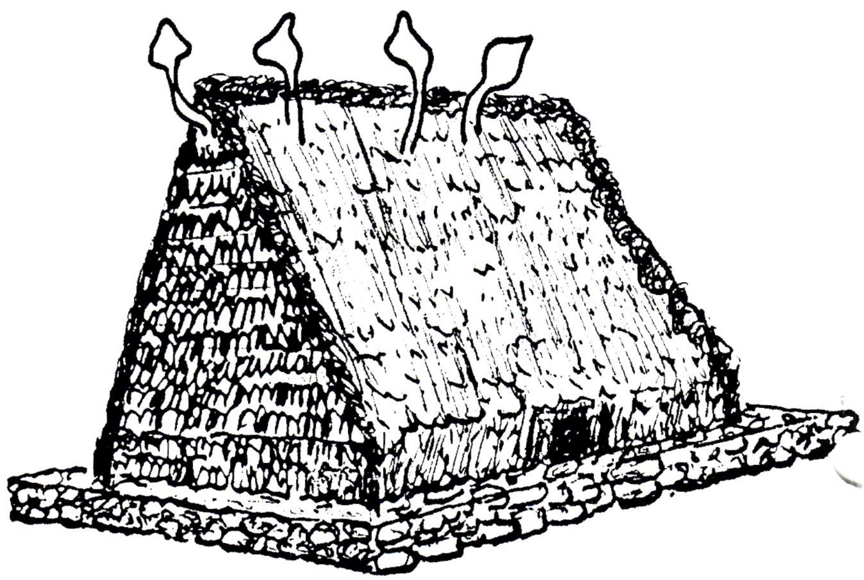


Office workers enjoy views of tropical plants.

The ancient Hawaiian thatched house:

A Design That Worked

by Russell A. Apple, Ph.D.



Ancient Hawaiian builders were masters at designing structures that took into consideration the islands' climate long before Western ways contaminated and finally eliminated indigenous Hawaiian architecture.

The mortarless rock platforms are an example of the architecture's integrity. The large platforms still standing are preserved in county, state and federal parks. The surface structures the foundations held included thatched houses, altars and carved wooden images of the gods.

Smaller rock housing platforms, many still hidden under vegetative cover, came in graded sizes and heights. The higher, larger ones held the tall gable-ended houses of the high chiefs, to illustrate the principle that a high chief merits a high ridge.

Lesser chiefs had smaller, lower platforms and corresponding smaller houses — down to the pup tent-size thatched houses of commoners. Commoners slept under thatched roofs with rafter ends rested in small, low platforms. In chiefs' houses, roofs were held aloft on poles embedded in higher platforms.

Skilled Craftsmanship

Thatching was smooth sided. There was no visible evidence of thatch rows in a well-constructed job, from upper ridge pole to where ends of the lowest row of thatch bundles rested on the small pebbles of the finished platform surface.

Ridges, gable roof corner edges, and the sides of houses of the highest chiefs were trimmed with amau fern fronds. This trim dried to a rusty red, the color of royalty, to mark the royal houses.

Fern trim continued to symbolize rank well into monarchy times, even though frames often forsook the indigenous gable and took on the introduced hip. Thatch houses of members of the reigning Kamehameha family carried this traditional symbol until the late 1800's.

Ridges for the high chiefs' thatched houses stood up to 22 feet above their rock platforms. Practical length and other limits were set by the logs available, since key framing members such as wall plates and ridges were single pieces and not spliced or joined.

A high platform permitted a high house. Since the depth of post end embedding was directly related to wall height, a high platform permitted deep embedment. This was essential because no tie beams existed between walls or rafters. Any pressure on the walls or roof had to be directly resisted by the post ends.

Dry-masonry house platforms, with rocks held together by careful fitting without mortar, permitted rainwater to drain away from post ends and air to enter. Thus, dry rot was kept to a minimum.

The upper two feet of each gable end were left unthatched, probably to foster ventilation. This opening was concealed behind the fern trim, which probably also kept out rain. The houses also featured diagonal roof bracing and an arched ridge supported by a center post. The fern trim atop the ridge was trimmed to emphasize this arch.

After Westerners arrived, the introduced hip roofs be-came popular because of their shorter ridges. Ridges were difficult to rainproof. Experienced thatchers who knew how to bonnet grass bundles to rainproof the ridges were dying out, and many Hawaiians could only afford to rainproof with introduced materials such as tar paper or a few sheets of corrugated "tin." A short ridge to rainproof was less expensive than a long one, and a leaking short ridge was better tolerated than a leaking long one.

Natural Cooling and Heating

Air moved in and out through thatch, which was pneumatically permeable. Fresh, cool air also entered through the interstices of the house's rock platforms.

On the Kona coast of the Big Island — the most populated in ancient times — winter temperature variations at beach level were such that the houses provided warmth at night. They also were cool and comfortable during summer day heat and well-insulated against direct sunlight.

In the chiefs' houses, certain rules were followed in the selection of principle timber materials. All house posts had to be of the same wood, while rafters could be of a different wood. Sophisticated lashings and joints locked each frame into a structural whole. Each house was an individual entity. There were no interchangeable parts, nor mass-produced tolerance-standards.

Thatch purlins were of two types. The fixed thatch network was lashed directly to posts and rafters. It could be used for climbing and standing upon when working aloft.

The floating thatch network consisted of horizontal and vertical support rods bound to each other and to the fixed network. A house under construction with thatch networks attached looked like a birdcage.

Nature's Building Materials

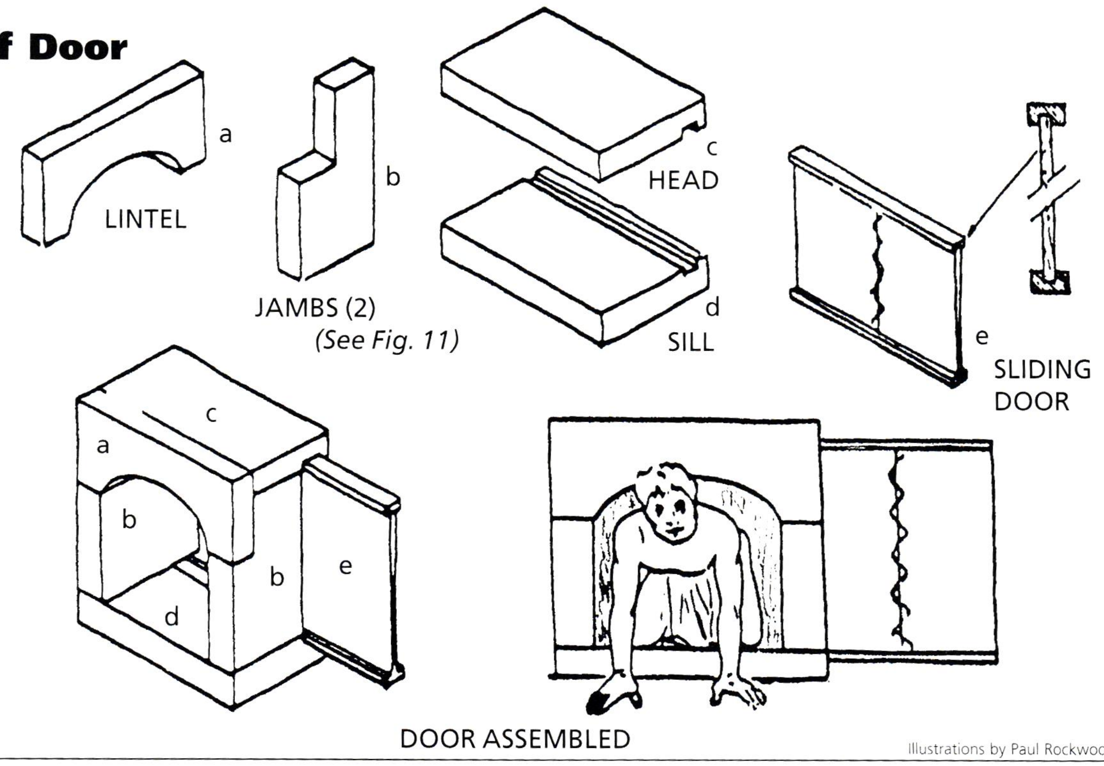
Thatching materials included grass (pili); sedges and bulrushes; lily palm fronds; and lama, banana, pandanus, ti and sugar cane leaves. Each material required a different construction technique. In most techniques the thatch purlins, house posts and rafters were visible from the interior. Some thatch materials, such as ti leaves, were reserved for use by the highest chiefs. Commoners used pili.

Doors were crawl-in size. A commoner's house required no more than a plaited lauhala mat for a door closure. But a high chief's house featured an elaborate door assembly interlocked with the fixed thatch network. The door slid open and closed parallel with the wall (see illustration).

Today's building codes may preclude the return of the thatched house. However, for the ancient Hawaiians materials found in nature allowed for efficient design solutions appropriate to the islands' climate.

Russell A. Apple, Ph.D., was responsible for the restoration of Heiau Hale-o-Keawe in the Puuhonua-o-Honaunau National Historical Park, Kona, in 1953. He subsequently wrote his doctoral dissertation on the ancient Hawaiian thatched house.

Details of Door



Illustrations by Paul Rockwood

News Briefs

Symposium on Asia Pacific Architecture Scheduled

"The Making of Public Places in the Asia Pacific Region" will be the theme of an upcoming seminar sponsored by the University of Hawaii School of Architecture.

The Second International Symposium on Asia Pacific Architecture: The East-West Encounter, will take place April 9-12 in Honolulu. The four-day event will examine the creation of current public places in evolving cities throughout Asia and the Pacific and explore probable future scenarios.

For more information call 956-7084; e-mail: archsymp@hawaii.edu; or visit the web site at http://web1.arch.hawaii.edu/event/apca/ew97.htm.

Canadian Lumber Restrictions Add to New Home Cost

According to the National Association of Home Builders, the recent agreement restricting lumber exports to the United States from Canada has sent prices to near-record levels and can add more than $2,000 to the cost of building a single-family home.

The price of 1,000 board feet of framing lumber was $480 in mid-November, up 36 percent, or $126, from the price in early April, when the trade agreement was announced. Each $100 increase in the price of 1,000 board feet of framing lumber adds about $2,000 to building costs for a typical single-family home.

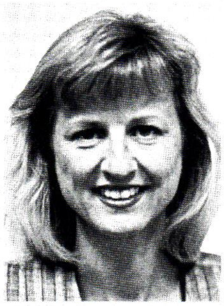
Under the agreement, Canada will restrict the amount of lumber exported to the United States to 14.7 billion board feet between April 1, 1996, and March 31, 1997, well below the 16.2 billion board feet shipped to the nation in 1995.

NAHB President Randy Smith has asked Rep. Phil Crane (R-Calif.), chairman of the Subcommittee on Trade of the House Ways and Means Committee, to conduct hearings to investigate the situation.

Builders are concerned because as much as one-third of the lumber consumed in the United States is imported from Canada, and more than 90 percent of homes built in the nation use softwood framing lumber.

A typical single-family home requires about 16,000 board feet of lumber. New home construction accounts for an estimated 40 percent of the softwood lumber consumed in the United States, while another 30 percent is used for remodeling and repairs.

Former Editor Returns to PMP



Jamie Kemp

Jamie Kemp has rejoined PMP Company Ltd. Publishers, Wahiawa, as associate publisher and editor of professional publications including *Hawaii Pacific Architecture.*

Kemp brings with her 14 years of experience in communications management. She was managing editor of PMP's professional and community publications, including *Hawaii Architect,* from 1986-1988.

She was subsequently director of communications for the Florida Engineering Society and editor of the association's magazine and directories. She also held advertising and marketing communications positions at Bush & Bishop Advertising, Guam; and pharmacy franchise company Medicine Shoppe International, St. Louis. She began her career as a reporter for the *Pacific Daily News,* Guam.

"I'm very happy to return to my adopted home of Hawaii and look forward to helping PMP maintain the high quality of its products and services," she said.

Kemp, her husband, Greg Mescan, and their daughter live in Mililani.

Historic Hawaii Foundation Names New Executive Director

David Scott

The Historic Hawaii Foundation recently announced the selection of David Scott as executive director.

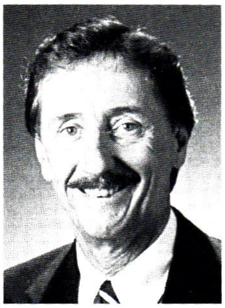
Scott served as executive director of the Historic Wilmington Foundation in Wilmington, N.C., for seven years. He has also worked with the Historic St. Augustine Preservation Board in St. Augustine, Fla., and the Henry Ford Museum in Dearborn, Mich. He holds a master's degree in historic preservation from Eastern Michigan University.

"I'm excited about joining Historic Hawaii and to be able to help them preserve Hawaii's architectural and cultural heritage into the 21st century," Scott said.

The Historic Hawaii Foundation is a 3,400-member, private, nonprofit statewide organization dedicated to the preservation of historic and archaeological sites, objects and cultural traditions of the islands.

News Briefs

WAT&G Selects New Director for Singapore Office


John Cropper

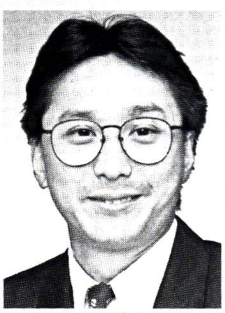
John Cropper, AIA, APA, has joined Wimberly Allison Tong & Goo as a director of the firm's Singapore office.

Cropper has an extensive background in resort and golf residential development design in the United States, Mexico and Asia. He's held positions of responsibility in several architectural and planning firms. Most recently, he was senior vice president and director of planning at Sandy & Babcock Inc., San Francisco.

His assignments will include condominium projects in Singapore and resort hotels in Malaysia and Sri Lanka.

AM Partners Promotes Yamamoto to Senior Associate

AM Partners Inc. has promoted Darryl Yamamoto, AIA, to the position of senior associate. He will be responsible for managing a staff of 20 architects handling local, mainland and in-ternational projects.


Darryl Yamamoto

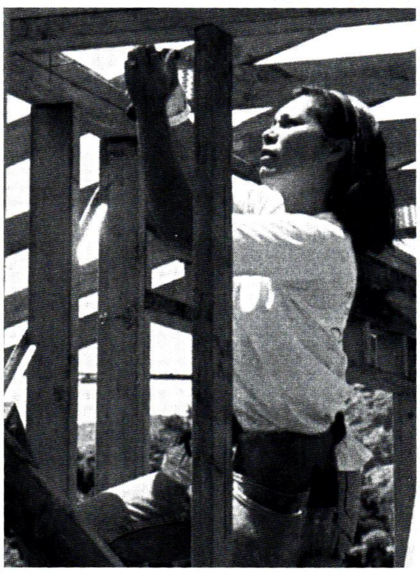
Yamamoto joined AM Partners Inc. in 1990 and has extensive experience in computer design technology. Projects have included Lani Huli Elderly Housing and 218 Plantation Club Drive. The Guam Shopping Center and Honolulu Emerald Tower are among his current assignments. He earned a degree in architecture from the University of Hawaii.

Nishioku Joins Kober/Hanssen/Mitchell as Senior Architect

Gary Y. Nishioku, AIA, recently joined Kober/Hanssen/Mitchell Architects as senior architect. Nishioku will be responsible for the design of Keaau High School on the Big Island and various international projects.

Prior to joining KHMA, Nishioku worked with other Hawaii architectural firms on commercial and residential developments in Hawaii, Singapore, Malaysia, India and Egypt.

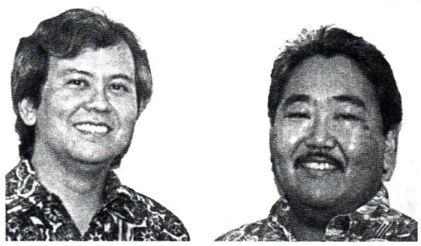
Community Development Program Honored by National Foundation


A volunteer works on new construction as part of the Ke Aka Ho'ona program.

Ke Aka Ho'ona, a program in which selected working-poor families work together to build homes and commit to safe communities, was recently recognized by the Peter F. Drucker Foundation for Nonprofit Management during the foundation's conference in November. The families, supervised by a licensed contractor, perform tasks from digging foundation footings to roofing, painting and finish work. Subcontractors handle masonry, electricity and plumbing. Honolulu's Consuelo Zobel Alger Foundation sponsors the program.

McKenzie Promoted, Uyeno Hired at Sansei Architects

Sansei Architects Inc., Honolulu, recently announced the promotion of


Hugh McKenzie III (left) and Ronald Uyeno

Hugh G. McKenzie III, AIA, from project architect to project manager; and the addition of Ronald T. Uyeno to the staff as production manager.

McKenzie graduated from the University of Hawaii School of Architecture and has 15 years of experience. He was project architect for Dole Cannery Square, Dole Office Building, and Mililani Mauka Sales and Information Center, among other projects.

Uyeno, with 18 years of experience, has worked on Kapaa Intermediate School, Emerald Tower and Waterpark Towers.

Person Named President of Honolulu Wood Treating

Hap A. Person was named president of Honolulu Wood Treating Co. Ltd.

(Continued)

Hap Person

effective Jan. 1. He replaces company owner Tad Ogi, who recently announced his retirement as president. Ogi will maintain ownership and influence as chairman of the board.

Person began his career with the company in 1988 as vice president of sales and marketing, and was promoted to executive vice president in 1994.

Ogi has been employed at Honolulu Wood Treating since 1956, and purchased the company in 1984. He is recognized as an expert in wood preservation and introduced HI-BOR pressure-treated wood to Hawaii.

The company is located in Campbell Industrial Park.

Market Place

Tropical Breezes At The Touch Of A Button

With Sanyo's Ductless Split System Air Conditioners, You're In Control.

In Hawaii, all Sanyo Split Air Conditioners are backed by the Servco symbol of service excellence. To find out where you can see the Sanyo Ductless Split System nearest you, on Oahu or the Neighbor Islands, call **848-2411**.

Island living is great, until the trade winds stop blowing. Then it seems like the summer heat and Kona winds will go on forever.

Trade winds every day of the year.

The Sanyo Ductless Split System makes Island living even better. This unique air conditioning system provides quiet and efficient cooling in places you never dreamt you'd be able to cool. And, with one three-inch wall opening you can connect each room's cooling unit with the main exterior system.

It's easy and simple to install, with remote control from anywhere in the room!

There's no duct work, window obstructions or noise, and the Sanyo advanced computer system allows you to control room temperature from a wireless remote. Operation is easy -- simply choose your desired room temperature with the single touch of a button.

Features:

- Built-in Sensor Detects Heat Changes To Maintain Preset Temperature
- 24-hour Clock With On/Off Program Timer
- Room Temperature Indicator
- Night Setback
- Temperature Setting Indicator
- Fan Speed -- Low, Medium, High and Automatic
- Air Sweep (not available in all models)
- On/Off Operation
- Computer Control System Reduces Energy Consumption

SANYO

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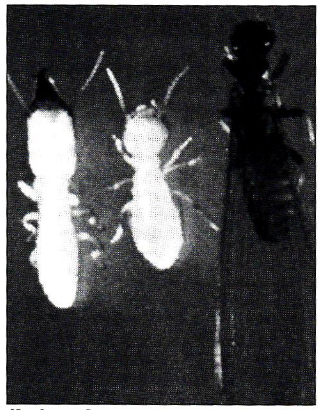


(l-r) Subterranean termite soldier, worker, and swarming reproductive.

When eradicating termites...

Barrier or Bait?

It's no secret that Hawaii's tropical climate provides a haven for termites, especially the destructive Formosan subterranean termite. But what many people may not know is that the methods and chemicals used to exterminate termites vary. What works in one location may not work as well in another, according to Ainsley Ahlo, president of Structural Pest Control Inc.

Ideally, termite prevention measures should be incorporated into the design and construction phase of the structure. Once a termite infestation occurs in a poor design it may be not be financially feasible to remedy the problem. A case in point is a house in an exclusive neighborhood which underwent repeated termite treatments and design modifications in attempts to arrest a severe termite infestation. In the end, the house was razed.

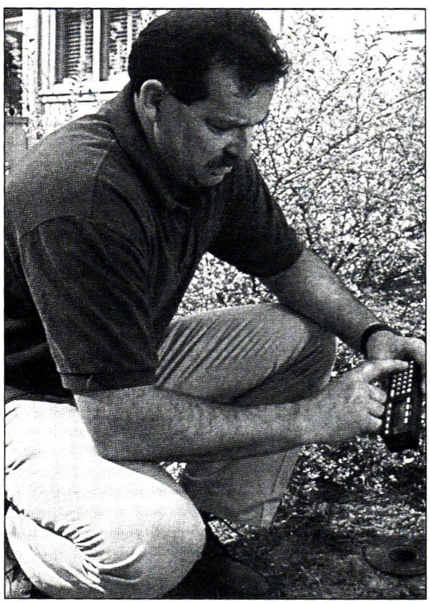
As for existing structures, the most common way to prevent termite infestations is to treat areas with chemicals that act as a barrier to termite penetration. However, "in some cases it's almost impossible to apply a chemical barrier," Ahlo said.

"Generally, the more complex the construction, the harder it is to reach the termite entry points. You don't have the access to get the chemical into the proper places."

In those cases, a termite bait system may provide a better solution. This system entails the use of monitoring stations placed in the soil around the home or commercial building. When termites enter the stations they are transferred to a device containing a slow acting bait. The termites spread the bait throughout the colony, and eventually all the termites in the colony will die off.

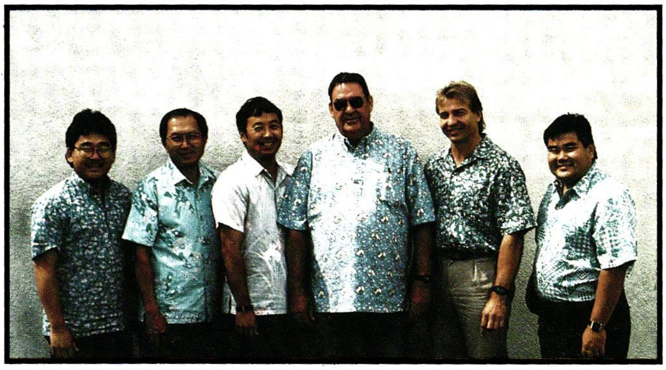
Ahlo said the bait system is only one of a number of effective tools in termite eradication. There are also very effective physical barriers, and devices such as removable baseboards which provide for thorough termite inspections.

However, he warns that no system is completely foolproof, so the more tools one can apply the better. The best way to get rid of termites is to consult with an experienced pest control professional who can suggest the most effective and economical solution possible after careful study of the individual situation.



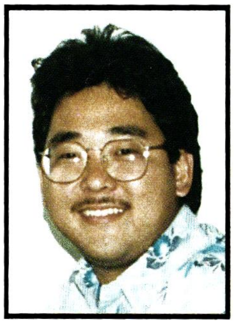
A termite bait system can kill termites in areas where chemical barrier methods may not be as effective.

A New Generation of Leaders.

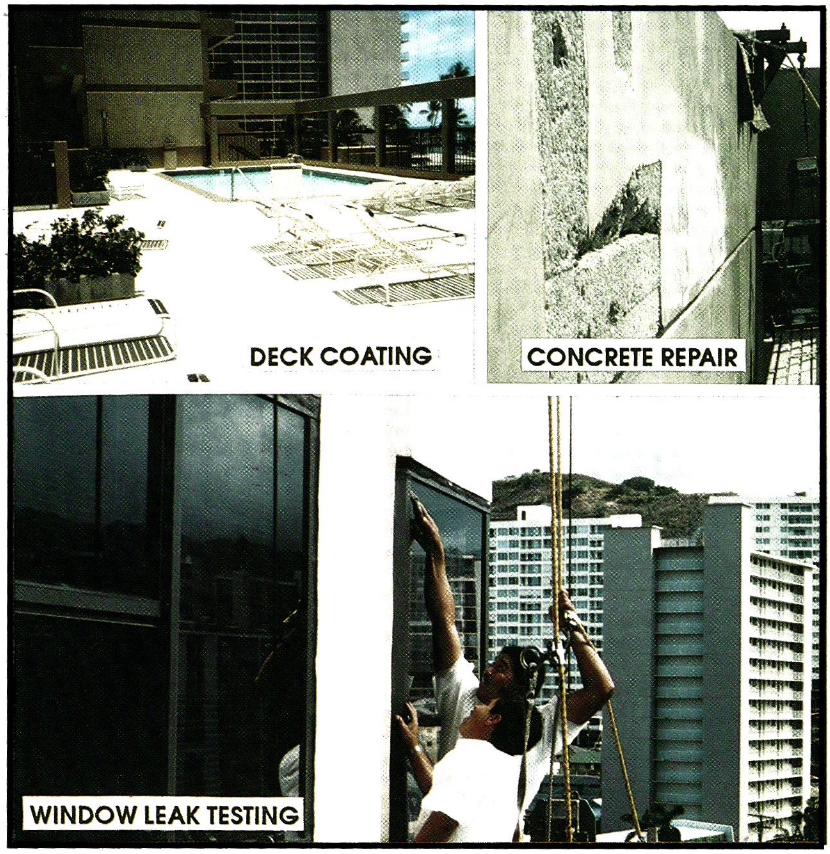


Heading a team of over 40 technicians are left to right:
Alvin Nishikawa, Ken Matusumura, John Kobayashi,
Al Gardner, Steve Kramer, and Jim Hiramatsu

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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A thermally-cooled wine cabinet in a Big Island home keeps wine at the proper temperature.

Using solar design to cool and dehumidify

Solar Design Creates Comfort... Naturally

by Virginia B. Macdonald, AIA

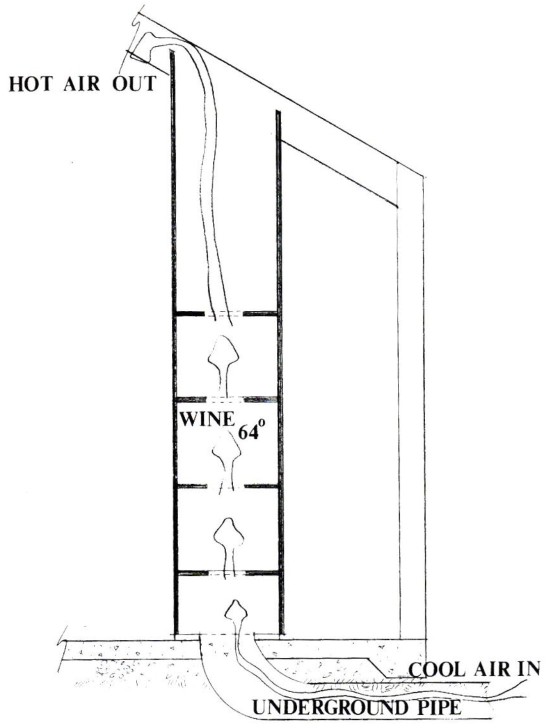
For centuries, mankind has used the sun to warm buildings. However, the sun can also be used to cool and dehumidify buildings with innovative architectural design techniques.

Delta T is the scientist's expression of the temperature differential between two similar things. The Delta T between two volumes of air creates an air flow from warm to cool. Warm air rises, but the addition of heat makes it rise faster.

A wood stove needs heat from a fire to impel the air to move up and out the chimney. Even 95 degree air outside is cooler than the heated air in the chimney or stack. The Delta T difference between the air inside the stack and the

Thermal chimneys are not only energy-efficient, they also can add an attractive design element, as shown by this model.

Photos by Jim Buckley Productions



Above: Illustration of the thermally-cooled wine cabinet. Hot air and moisture are forced out the top.

Below: Section of a thermal chimney building. The cool air entering through the bottom and the thermal chimney at the top propel hot air and moisture out.

air outside is accelerated by the chimney.

Architectural design can produce a similar upward air movement using the heat of the sun introduced, for example, through a skylight to jump-start air movement and a stack incorporated into the shape and design of the building. The hot air will move upward and out through high vents, accelerated by the stack.

As the air is heated it absorbs moisture. Thus moisture is also moved out of the building along with the heated air. This produces a partial vacuum which requires replacement air.

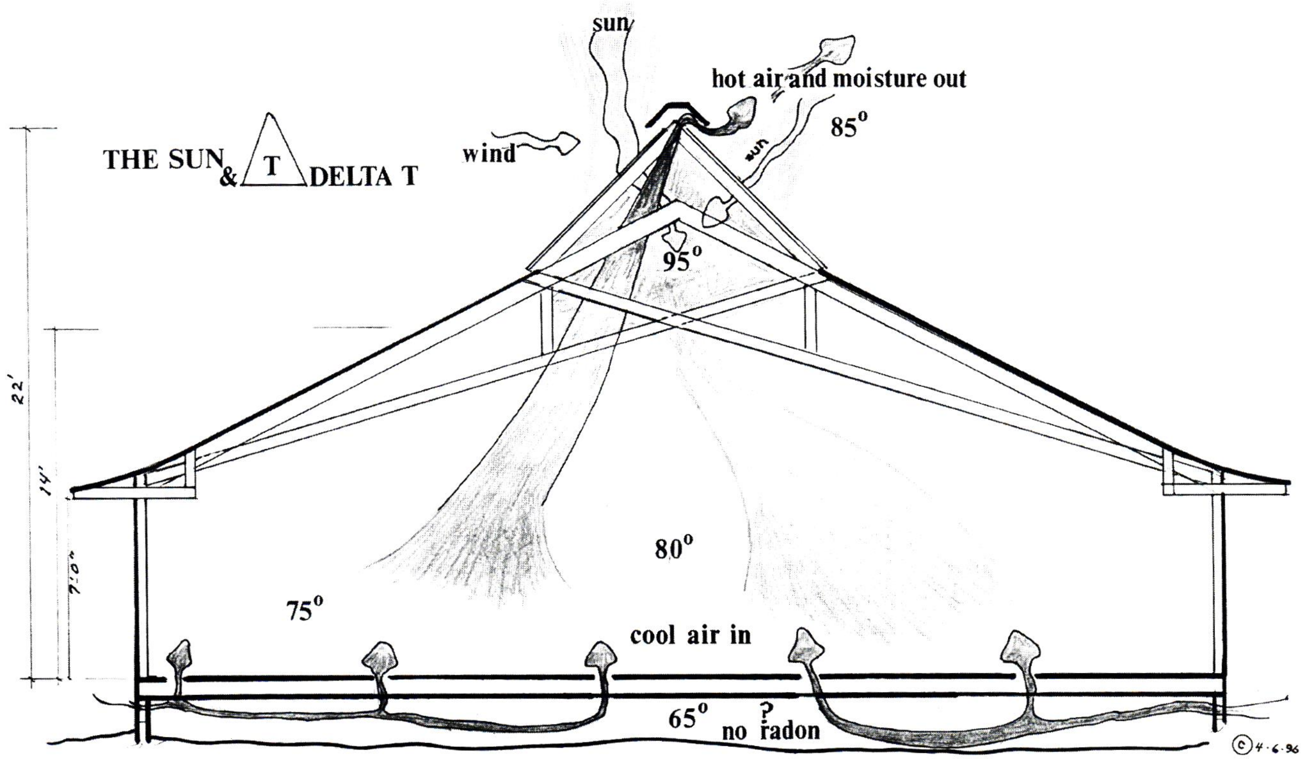
Warm Replaced by Cool

In warm climates, when a thermal chimney is included in the building design, the coolest possible replacement air is needed. This cool air can come up through the floor from an underground pipe, a basement, air surrounded by a stem wall, or from air cooled by vegetation and shade and drawn in through low vents. Outside air may be about 90 degrees, but under the floor the air temperature will be about 69 degrees.

Tools available to an architect in warm, humid climates include shading, reflective barriers and the new types of prescriptive glazing. The effectiveness of any technique, however, depends on an accurate analysis of the site, including the latitude and angle of the sun, the micro-climate and air movement patterns.

This passive solar design produces many benefits:

- Electricity consumption can be reduced by at least 30 percent and often as much as 80 percent.
- Such designs result in reduced operating costs. Air conditioning is expensive to install, operate and maintain, and has been associated with "sick building" syndrome.
- Skylights used to activate air movement can also reduce or eliminate the need for electrical lighting during daylight hours.



- Security concerns are more easily met than with designs that require open windows for fresh air. There are still windows, but if they don't open the screens can be eliminated. This offers better views and less upkeep.
- By admitting controlled amounts of air the introduction of dust, heat, and near the ocean, salt can be reduced.

Energy consultants Charles Ely Associates, San Francisco, have inspected some of my buildings and reviewed the hard data produced by my instruments. The instruments continuously record temperature and relative humidity inside and outside the buildings as well as inside a "control" building nearby. The findings were such that the consulting firm added an exception to the Natural Ventilation section of the Hawaii Model Energy Code:

> *"Spaces employing innovative natural ventilation designs which do not comply with this section, but which can be shown through analysis or demonstration to provide adequate air movement or temperature and humidity conditions for human comfort."*

Demographics indicate the warmer areas of the world are gaining in population. Passive solar design techniques could become of increasing importance worldwide by reducing air pollution and the need for fossil fuels to generate energy.

Once the physical principles of solar design are understood and the techniques for implementing them mastered, they enhance the architect's art by permitting the integration into the very structure of a building elegant and efficient solutions to problems presented by hot and humid climates.

Virginia Macdonald, AIA, is an architect based on the Big Island. She has designed numerous homes and offices using solar design techniques, including her own home/office.

Building Castles in the Sky...

Allied Builders System was pleased to be asked to execute the grand scale remodeling of businessman Robert Taira's 36th story 3,800 sf Waikiki penthouse. Architect Bruce Newell's unique design solution called for demolishing the aging interior and creating a stunning tribute to the *kamaaina* bakery king's many accomplishments.

Today, multi-function cabinetry showcases Taira's extensive art collection, triples home storage and hides infrastructure upgrades. A theater-quality entertainment system and new central air-conditioning, hidden under three-inch ceiling panels also helped pave the way for truly palatial living.

"With the children gone, we opted to have everything light, airy, free-flowing toward the panoramic ocean view," said Taira. "We were thrilled with the plans and even more thrilled with the results..."

Adds Newell: "Allied's reputation for professional organization, quality workmanship and client caring preceded our introduction. They performed as advertised. We look forward to doing business with them again."

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