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SECRETS IN THE RAFTERS: A TRADITIONAL CHIEF'S HOUSE IN POHNPEI

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ABSTRACT: This study examines the construction of an ihmwenei, a traditional chief's house, constructed from 1974 to 1976 in Wene, in the district of Kitti (Pohnpei, Micronesia). Such a house had not been built on Pohnpei since the late 1800s. Construction of the stone foundation and timber framing and manufacture of the roof, walls and floors are described, along with details pertaining to the acquisition of materials and the names and purposes of particular house features. The study of the construction of a Pohnpeian house also provides an avenue for the exploration of the sociopolitical role of chiefs on the island, as well as traditional ontological frameworks which privilege secrecy and protection as a critical aspect of the chief's dwelling.

Keywords: Pohnpei, Wene, lashings, traditional building practices, magic, chiefs

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Anthropological research on Pohnpei has benefited from the inquisitive attention of an Indigenous anthropologist (Mauricio 1987, 1993) and dedicated ethnographers and archaeologists (Ayres and Haun 1978, 1980; Hambruch 1932, 1936; Hanlon 1988; Haun 1984; Petersen 1990, 1999, 2006, 2009; Riesenberg 1968). Stemming from the collection of oral histories and archaeological research, these studies have emphasised the importance of Pohnpeian ideology in the trajectories of the five polities that developed on the island and in the inner workings of society over the previous centuries. As described by Mauricio, these items represent the sanctity of leadership institutions, which for islanders is organised into a complex system of chiefly titles that are delineated by inheritance and personal advancement (Mauricio 1993: 7).

The context of these titles is the island of Pohnpei itself, which has a rich record of habitation, as evinced by dense archaeological sites and deposits (Ayres and Seikel 2014; Falgout 1990; Morgan 1988; Seikel 2011), ranging through natural outcrops, earthen mounds, stone platforms used as the foundations for houses, and tombs constructed with prismatic basalt (Mauricio 1993: 222–74). Although under dense vegetation today, the archaeological remains of Pohnpeian society structure much of the physical

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landscape. Some of the more important sites are stone platforms that are identifiable by modern Pohnpeians as the remains of dwelling houses (ihmw, imwalap) and meeting houses (nahs). As important locales of residence and social activity and spaces are tied to the succession of chiefs and titles, these "symbolized the sanctification of the power and authority vested in the title" (Mauricio 1993: 346).

This research explores the features of a traditional Pohnpeian chief's house, an ihmwenei, which was constructed by the author (TM) and the community of Wene from 1974 to 1976. This was the first such house to be constructed since the late nineteenth century, and its manufacture relied upon the memories of individuals whose parents and grandparents had built and lived in traditional imwalap. The construction of this chief's house employed their memories in its design, as well as their expertise in the sourcing and manufacture of traditional materials for the foundation, walls, floor and roof. This research examines how such houses were built and how the requirements for their location, design and construction sequence were embedded in, and served to renegotiate, Pohnpeian social structures and chiefly influence. It also explores via the modern construction of an ihmwenei the expression of Pohnpeian ideology, ontology and social processes.

POHNPEI = SAHPW SARAWI (THE SACRED LAND)

Located in the Eastern Caroline Islands, Pohnpei (Fig. 1) is a high volcanic island of approximately 130 square miles (~334 km^2) and is considered one of the rainiest places in the world with an annual rainfall of 200 inches (~5 m) in the coastal areas and up to 400 inches (~10 m) on the highest inland mountains. The island is the product of ancient volcanism and later subsidence; mangroves flank the shoreline, and the interior is densely forested. Archaeological evidence indicates that Pohnpei was colonised approximately 2,000 years ago as part of the expansion of populations into Remote Oceania from Western Micronesia and Western Polynesia (Athens and Stevenson 2012: 37; Ayres 1990: 189; McCoy *et al*. 2016; Rainbird 2004). These communities spoke Austronesian languages and likely had hereditary systems that allowed for social differentiation and stratification. They also relied on imported crops and animals to colonise distant Pacific Islands. As one of the few high islands in the region, Pohnpei could support the growth of a large population. It was also a critical node in a vast oceanic network of atoll communities (Petersen 2006, 2009).

Archaeological evidence suggests the growth of populations over time and the emergence of a stratified society that included chiefly lineages and aggregated communities by AD 1000. Oral histories described the rise and fall of the Saudeleur dynasty, a line of chiefs associated with the archaeological site of Nan Madol, an impressive residential complex constructed with columnar basalt (Ayres and Scheller 2003). After a decisive

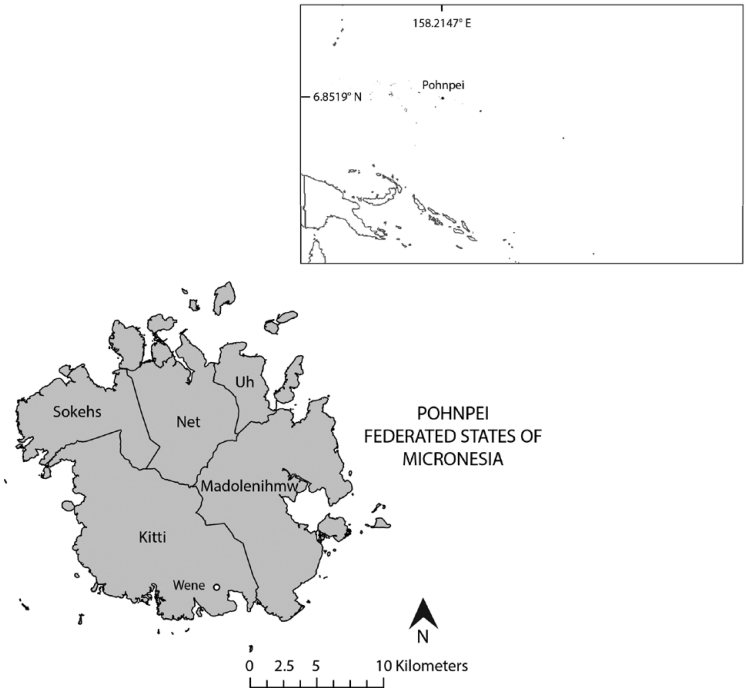


Figure 1. Map of the island of Pohnpei showing the district boundaries and location of Wene.

battle with the conquering chief Isohkelekel, who invaded Pohnpei from overseas around AD 1628 (Hanlon 1988), the land was divided into five ancient states; power struggles ensued between competing polities and chiefs on the island, resulting in conflict that lasted into the nineteenth century (Riesenberg 1968: 60).[1] Modern Pohnpei is organised into five municipalities that are descended from the ancient states, with Madolenihmw ranked the highest, followed by the municipalities of Uh, Kitti, Sokehs and Net. Pohnpeians also recognise two chiefly lines, which are descended from the time of Isohkelekel, and reflect the restructuring of society that occurred following his installation as the first Nahnmwarki, of the state of Madolenihmw, which by Pohnpeian custom is the highest title of all chiefs on the island. Individuals in the modern chiefly families can ascend in status via a succession of titles. Importantly, these lineages are connected to communities and land within the ancient states, and further to their ancient houses of dwelling.

Chiefly families on Pohnpei resided in a complex of houses, each of which had a particular function, such as for cooking, meeting, servants' dwelling and the high chief's residence (Riesenberg 1968: 67).[2] A Pohnpei high chief's house, ihmwenei, meaning a cherished or precious house, was a sign of wealth, power and prestige in Pohnpeian culture. According to Riesenberg, the dwelling of the Nahnmwarki was passed to the next Nahnmwarki (Riesenberg 1968: 33). The dwelling went by other names including tehnpas, ihmw en lapalap, ihmwalap and ihmw en soupedi (Hambruch 1932; Rehg and Sohl 1979: 13; Riesenberg 1968: 67; Roberts 1997). A chief's house would be significantly larger than any commoner's dwelling, standing as an imposing structure with an immense stone foundation and a high, steep roof. Combined, the house and foundation might reach 18 feet (~5.5 m), and was constructed like a fortress, with narrow doorways that limited entry and screen-like walls that could deflect spears. Photographs from the German South Seas Expedition from 1910 (Hambruch 1936, vol. 2: 2–8) and other sources (e.g., Christian 1967) show what these dwellings were like in the historic period (Fig. 2). In the Pohnpeian ontology, the ihmwenei's stone foundation is a metaphorical reference to the island itself, as "Pohnpei" is translated literally as "on the stone altar/structure" (Riesenberg 1968: 9). Pohnpeians also called their land sahpw sarawi, the sacred land; therefore the chief's house was the embodiment of the sacredness of the island itself.

Throughout much of Micronesia, kinship is organised within matri-lineages, with land tenure and political title tied to genealogy. On Pohnpei, chiefs are recognised as territorial leaders of a particular region, but social and political processes emphasised democratic, participatory and egalitarian attitudes, which restrained chiefly authority. Petersen describes social processes that on the surface appear to be contradictory: a chief could appear modest and humble and visibly participate in competitive gifting but also mobilise labour via subtle influence (Petersen 1999: 369–73). However obtained, titles were tied to particular places and landed kin groups. In the Pohnpei context, the construction of an ihmwenei was a mechanism of continuity for the local lineage and a renegotiation of social ranking for the chief. Its construction demonstrated that the chief could mobilise competing lineages and clans to produce the required labour and materials and show that he also had the ability to influence social processes. This is because the construction an ihmwenei required a large volume of raw material and labour. Massive amounts of stone for the foundations, a considerable number of trees for the house's superstructure or framing, many ivory nut palms for the thatching, thousands of reeds for the flooring and walls and several kilometres of handmade coconut twine for all the lashings would be produced by the community for its construction. At the chief's direction, a nanuolosom (master builder) would supervise the project (Hambruch 1936, vol. 3 (translation):

I–III). Once constructed, maintenance of and residence at an ihmwenei would store and protect the chief's wealth and be part of the perpetuation of the family line and the succession of titles (Riesenberg 1968: 33).

The construction project sought to build an ihmwenei using local Pohnpeian materials and techniques. Construction was organised by the first author (TM) and Salter Salvador, a chief with the title of Noahs, in the Nahnmwarki line of Madolenihmw district. The Noahs was greatly respected in Wene for his kindness, humility and generosity. He also had a deep interest and engagement in traditional culture (tiahk en saphw) and educated himself in meing (high language) and Pohnpeian chiefly protocol. In subsequent years he ascended the ladder of titles from Noahs to Doahk, and then Wasai. In 1980 he became the Nahnmwarki. TM was a US Peace Corps volunteer on Pohnpei from 1970 to 1976 and served as a teacher at the Ponape Agricultural and Trade School from 1970 to 1974, where he taught high-school mathematics, science and construction. He learned to speak the Pohnpeian language fluently (e.g., contributing to the *New Pohnpeian-English Online Dictionary* [Sohl *et al*.]) and was fully integrated into Pohnpeian culture, gaining the titles of Oundol en Pein Iap and Oun Pohnpei Wasai. TM's Pohnpeian host family had adopted one of the Noahs's older sons, Enter, and the Noahs and his wife, Nahnado, would periodically visit the host family to spend time with their son. TM and the Noahs developed a relationship during this time and frequently discussed Pohnpeian history and culture, leading to a shared desire to construct a traditional chief's house made completely of local materials. In addition, the Noahs and TM conceived of the construction project as a way to demonstrate and express Pohnpeian expertise and craftsmanship and as an opportunity to bring back a traditional dwelling for the community. In this modern case, the Noahs had the authority to undertake such a project and was also willing to permit the house to be built on his land in Wene, in the state of Kitti. Wene was also known as a community that served as a repository for traditional Pohnpeian culture (Malinowski 1976).

The Noahs was a critical component of the project's completion, as his wife, sons Alwis, Kenter, Linter, Sohder, Alson and Paulus, and extended family members provided labour for construction. Brothers-in-law (mwah) Loren Hepel and Soulik of Rehtu lent their expertise in lashing to the project. The Noahs's social network also allowed for the production of the raw materials used to make the ihmwenei, some of which required months of manufacture, in particular the coconut fibre sennit and the palm thatching. TM carefully recorded the construction processes, along with Pohnpeian recollections for the words, actions and magic that were required to properly build a house.[3] This information has not been preserved elsewhere and is an important (and now exceptionally rare) component of Pohnpeian culture (tiahk en saphw).

SITE SELECTION AND MATERIALS FOR CONSTRUCTING THE IHMWENEI

Wene was formerly known as Onohnleng, and it was one of three religious and political centres on Pohnpei. Wene served as the residence for the chief whose title is Soukise Leng, going back at least three centuries. It has a considerable density of archaeological sites, including nahs (feast houses), chiefly dwellings and other features (Falgout 1987). At the time of this project, Wene retained a community of elders and a high degree of cultural knowledge, as well as a structured chiefly system, which was also present throughout the municipality of Kitti.

The selection of the construction site in Wene was based on a series of considerations. Most importantly, the site was located on land that traditionally belonged to the Noahs. This paleien sapw (section of land) may have been called Luwak. The kousapw (greater section of land) in which all of these dwellings are located is called Pehs (D. Hanlon, pers. comm.). This was land that they had resided on and that they cultivated and gathered materials from. By constructing it on their land, the house was a part of the Noahs's family holdings. It was also a form of regeneration for themselves, and an activation of their right and privilege to construct the ihmwenei. The physical house site was also relatively flat and had good drainage and exposure to sunlight. This is important because in Pohnpei's rainy climate, thatch roofs tend to last longer when the thatch can be dried in the sunlight. One large mango tree and several smaller trees had to be removed as part of clearing the site. The house was also relatively close to a stream that the family used for bathing and washing clothes, and nearby were stands of mangrove and inland trees for the beams and posts, ivory nut palms for thatch and the two varieties of reeds needed for the walls (ahlek) and floor (lirau). There was also an abundance of larger stones, which were required to build a foundation for the house. Approximately 10 cubic yards (~7.6 m^3) of stone were hauled into place for this purpose.

The ihmwenei was constructed without milled lumber, nails, screws or any other Western materials. The tools used were all non-electric hand tools and would have been available on Pohnpei from the mid-1800s when trading began with visiting ships. The traditional tools, such as adzes, would have had blades of either stone or giant clam shell (Ayres 1990: 189), and the time and expenditure of energy required to bring down a tree was considerably more than metal tools. Pohnpeians would traditionally light a fire around the base of a tree to help cure the wood, which would then resist decay for much longer than green wood (Liwy 2018). For expediency, this project used modern (ca. 1970) steel machetes, hand saws, shovels, steel-bladed adzes, steel hammers, chisels and knives. Locally made wooden needles were crafted for thatching, and bamboo was used for scaffolding. Wild hibiscus

bark was also used to tie the bamboo scaffolding together. Measurement was done using a length of sennit cord, which had knots tied in it to mark off ngahp (a measure of length consisting of two arm-spans).

Perhaps the most important component of the ihmwenei was the use of coconut fibre (sennit) lashing, which wrapped and connected the wooden beams of the structure and also tied together the reeds used to make the walls and floors. This material was truly the binding that tied Pohnpeian society together, and it was doubly symbolic of a chief's wealth, power and influence. The warasap, the high chief's canoe, and the rohpapiso, a carriage used to transport a high chief, were made using elaborate coconut fibre lashings (NGO Pasifika Renaissance 2017; Riesenberg 1968: 69, 91; Thompson 2015: 45). In addition to the obvious functional role of lashings to hold joints together in the wooden beams, reed floors and walls, there was a decorative element added to show the status and wealth of the chief. Chiefly lashings were intricate and beautiful, and only the chief's possessions could be decorated in this manner. This included the use of natural dyes to enhance the patterns. The more sennit that was required, the greater the sign of wealth and status. The chief's house would also have many balls of sennit (koansop) hanging from the rafters of their house as a sign of his wealth.



Figure 2. Image of a Pohnpeian house, from a photograph taken in the 1890s. Image shows the high stone foundation, floor joists, narrow doorways and overhanging thatch roof (Christian 1967: 140–41).

Sennit production was time-consuming labour that was performed by the community. A chief's house would require miles of sennit, representing the culmination of many months of labour and hundreds of pounds of material. Traditionally, men would sit up nights around a fire making sennit while watching over their families for security.[4] Made from the husks of green coconut that had been soaked in seawater, the fibres would be separated and twisted on the thigh to make the cord. Good-quality sennit has to be elastic in order to tightly bind things together.

Over 10 miles (16 km) of coconut sennit was made for the ihmwenei, the manufacture of which spanned a period of nearly two years between 1973 and 1975. On Pohnpei sennit is sold by the ngahp, the distance between a person's outstretched arms; therefore, the length of a ngahp varied depending on the producer's arm length. TM purchased the sennit using his monthly Peace Corps allowance. This amount determined how extensive and elaborate the lashings were in the ihmwenei, as well as the lashing style used to tie the floor and the walls together. This is a very critical decision for building a traditional Pohnpeian house, as the more elaborate lashing patterns require two to three times the amount of coconut sennit. For this project, the Noahs was able to call upon the families of his brothers-in-law, Loren Hepel and Soulik of Rehtu, to undertake the task of lashing the majority of the beams in the house.

Another part of the social processes involved in house manufacture, the construction of an ihmwenei would have also involved a number of feasts, as well as magical spells, which by design would aid in construction and help to mobilise the required labour and materials.

> House building, which is considered a very honourable occupation, is the occasion for all kinds of festivals. The first takes place when the foundation is laid, the second when the posts are set up and the third at the consecration of the finished building by the priest. The house consecration lasts about three or four hours. The priest murmurs prayers, sings in a monotonous voice and carries out all sorts of conjurations. The following also belong to these prayers, which are spoken when the posts are set up.
>
> *Beams here, beams there,*
> *Beams from here, beams from there*
> *I try once, twice, three times,*
> *I try four times, five times, six times,*
> *I try seven times, eight times, nine times,*
> *I try it the tenth time!*
> *May your foot adhere fast!*
> *May your arm adhere fast!*
> *Your whole body, may it adhere fast!*
>
> (Hambruch 1936: I–III, translated from the original)[5]

In addition to magic, spirits were also associated with houses. Although not much is known about pre-Christian Pohnpeian religion, the spirit Nahnolosomw had jurisdiction over the construction, and Pwukien Kerele and Pwukien Kerelong were guardians of the threshold and the floor.

CONSTRUCTION SEQUENCE

Historic measurements of dwelling houses on Pohnpei suggest that that they seldom exceeded the dimensions of 40 by 20 feet (about 12 by 6 m; O'Connell 1972: 127). For this project the ihmwenei was planned to be 28 feet long and 16 feet wide (about 8.5 by 4.8 m). To begin construction on the prepared building site, stakes were placed in a rectangle to designate the locations of the four corner posts. To ensure 90-degree angles on all four corners, sennit cords were used to measure the diagonals. Traditionally, this was how Pohnpeian builders would ensure they had a rectangular structure and not a parallelogram. The rectangular design allowed for eight vertical support posts, which were arranged in two rows of four posts each. The trunks of katar (giant fern, *Sphaeropteris* sp.), which were cut down nearby, were used for the posts. In the past mangrove trunks were used for this purpose and might be charred to prohibit the posts from rotting. The posts were placed in postholes that were excavated to a depth of approximately two and a half feet (0.75 m).

Before the poles were put into the ground, the Noahs took a small rock and whispered a magic spell over it and then placed it into one of the postholes. The spell was winani en silasil, protective magic, and was meant to protect the project and ensure that we could see it through to completion.[6] After the posts were placed into the holes they were tamped in with soil and checked to make sure they were in alignment, vertical and the same height.[7]

The Foundation

Ancient stone house foundations are found in a number of locations on Pohnpei, including Nan Madol, Temwen Island, Sapwtakai, Wene and Nan Imwinsapw (Ayres *et al.* 2015; Esteban 2014; McCoy *et al*. 2015: 14; Thompson 2015: 41). The age of these sites suggests that stone foundations were a critical component of architecture on the island for many centuries. These foundations were practical in that they elevated the wooden structure from the saturated ground and reduced rot in the wooden beams. They were also durable and visible, manifesting the house and its related society as a permanent fixture on the land (Mauricio 1993: 7). On Pohnpei natural basalt prisms were used to make many structures, and these were considered to be sacred (Esteban 2014: 179). House foundations ranged from three to six feet (~0.9 to 1.8 m) in height and could also be made with stacked basalt boulders. Studying historic photos and notes suggests support for this range of height (Christian 1967: 141; O'Connell 1972: 125; Shineberg 1971: 184).

The building of the stone foundation for the ihmwenei was a massive undertaking that took several months to complete. Once the eight posts were erected, a water buffalo–drawn sled was used to haul the stones to the site. Prior to the introduction of draft animals the labour of an entire village would have been needed to create such a foundation. Approximately 10 cubic yards (7.6 m^3) of stone were raised to a height of three feet (0.9 m), and a large number of people assisted in this strenuous work. Many of the larger stones required two or more men to move into place. The stones were arranged in a truncated pyramid shape to form a foundation around the posts (Fig. 3). The corners were placed first to frame out the base and arranged in an interlocking fashion to make them secure and stable. This guaranteed that they did not move after the heavy floor beams were placed on them. The outer dimensions of the foundation was 30 by 18 feet (9.1 by 5.5 m). Smaller stones were used to fill in the spaces between the larger stones and to level off the upper surface. A final layer of gravel was brought from a nearby stream to further smooth the surface before the reed floors could be constructed.



Figure 3. The ihmwenei under construction. Photograph by Terry Malinowski, 1974.

Traditionally, the foundations of ihmwenei could have several features. At the centre commonly was found a sunken firepit (O'Connell 1972: 126) to be used by the household for cooking and light. A large sakau stone might have been placed in the corner and used for preparing the roots of *Piper methysticum* to produce the sakau drink. In some instances, under the floor in another corner was a hidden chamber called a lolong, which was meant for the burial of a chief (Ayres 1990: 201; Ayres and Seikel 2014: 129–35; Thompson 2015: 43). The deceased would be wrapped up in mats and placed in this vault. Similar to prehistoric burials elsewhere in the Pacific Islands in which the deceased were interred in the floor of a house mound (Abe 2001; Capell 1991; Kyle *et al*. 2009; Toren 1995), this practice physically merged the house and the family, making it the site of birth and death and the repository of the ancestors. It also allowed for Pohnpeians to communicate with their ancestors by verbal comments and questions posed to the deceased entombed in the lolong.

Ihmwenei foundations were also surrounded by a layer of loose stones, the purpose of which was to alert the occupants of the house that someone may be approaching as their feet trod on the clattering stones. Dogs also served this purpose, but Pohnpeians had a magic spell called kaukoan auwen kidi that could silence barking dogs.

Main Wall Beams and Roof Truss

In addition to the main posts, the wooden beams of the ihmwenei were hewn from mangrove trunks (weingal), which were the tallest and straightest trees available. Sourcing and transport of these beams was organised by the chief, who had his choice of best-quality wood. Many of these beams were very long and required a water buffalo to drag them to the build site. The construction is outlined in Figure 4, which also lists the beams by their Pohnpeian name. The sequence was dictated by the progress of the sennit lashing, which bound each beam to the next. Bamboo scaffolding was constructed and used as a ladder for the workmen, allowing them to reach the higher parts of the structure.[8] Two floor beams, ataut, that were 30 feet (~9.1 m) in length were laid on the foundation stones on the outer sides of the four posts that formed the long sides of the structure. Four other floor beams, lohpwu, were laid at the ends of the house and in the middle. A metal adze was used to notch the beams and fit them into place (O'Connell 1972: 125; Shineberg 1971: 184). Four smaller-diameter beams, lohlo, were then placed on top of the two rows of four posts, forming crossbeams that ran perpendicular to the main length of the house. These were lashed into place with sennit. The two ndape beams were then placed on top of the lohlo beams, running parallel to the floor beams (ataut) and extending the length of the house. Then the four lepin keidu beams were placed upright on the

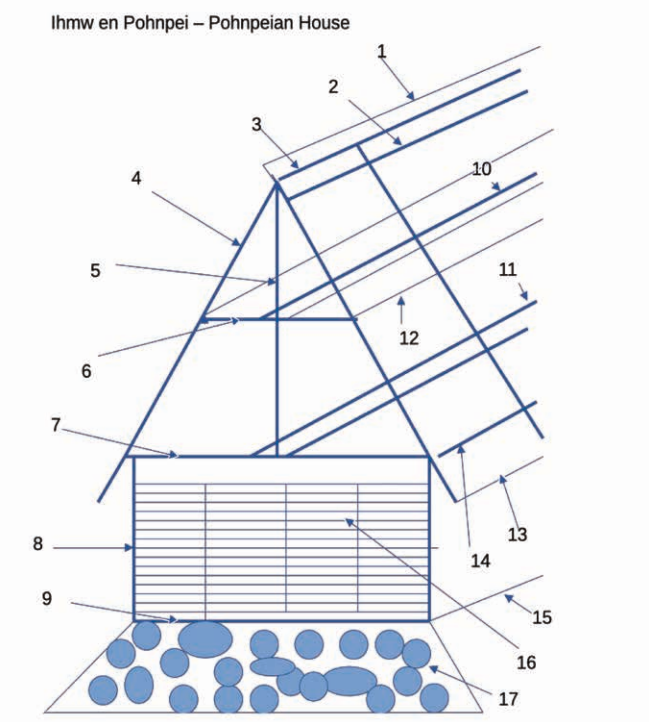


Figure 4. Diagram of the beams of a traditional Pohnpeian ihmwenei. 1. Kadingading; 2. Pwahla/pwahlala; 3. Soahrong; 4. Rehu; 5. Lepin keidu; 6. Lohlotik; 7. Lohlo; 8. Uhr; 9. Lohpwu; 10 and 11. Warong en mweleng; 12. Ndape pahn mwaramwar; 13. Kutoar; 14. Ndape; 15. Ataut; 16. Dihd; 17. Poahsoan, mwohn ihmw, pehi. Not shown: Pwarapwara; ahl en kitik (path of the mouse); sop kieil (path of the lizard).

centre of each of the four lohlo beams, forming the main support for the roof's structure. These beams were temporarily tied in place with bamboo poles beforehand to hold them steady.[9]

The ridgepole, the soahrong, was placed on top of the four lepin keidu and likewise lashed into place. Two beams, the longer rehu en disek (gables), were then placed between the soahrong (ridge-pole) and the lohlo (cross-beam), forming the triangular truss of the ihmwenei roof. Once the truss was stabilised, the main rafters, rehu, were attached on each side of the roof, extending from the ridge-pole (soahrong) to the cross beams (ndape)

along the length of the house. Then a small beam called a ndape pahn mwaramwar was attached to the rafters (rehu) to support the length of the roof, followed by the lohlotik, a series of beams that spanned the width of the roof on either side of the lepin keidu, and these rested on top of the ndape pahn mwaramwar. Next, the two warong en mweleng, lower beams that supported the roof, were added, and these ran on top of the lohlotik and the lohlo and on either side of the lepin keidu. Next to be added were the kutoar (eaves), which extended over the foundation and were attached to the bottom ends of all the rafters. Two pwahla, which run perpendicular to the underside of the rafters, were attached at the peak of the roof on either side of the soahrong. The kadingading is the final piece of the truss, which is used to fasten the pwarapwara, the woven baskets that cover the thatching at the peak of the roof.

The Lashings (Inou)

The lashing (inou) of beams for the ihmwenei was very time consuming and required master craftsmen with a thorough knowledge of the principles of lashing. Prior to their application, the craftsman prepared small bundles of sennit (kisin pwehl) called peioar, which supplied a manageable amount of sennit to work with and prohibited tangling. Lashings were started by fastening a closed knotted loop around one beam to anchor the sennit in place. Then depending on the joint, the craftsman decided what pattern of wrapping was appropriate to securely hold the beams together. A double strand of sennit was initially used to trace out the first complete lashing pattern, ending at the beginning and creating a closed loop. This pattern was then repeated, with the next layer of sennit placed on the outside perimeter of the first pass. This process was repeated until the craftsmen decided there was sufficient sennit in place to securely hold the beams. While the craftsman was lashing, tension had to be kept on the sennit so that the beams were snugly held together. Elasticity in the sennit was critical for this process, and this also added the quality of flexibility to the structure, allowing the ihmwenei to withstand the force of the wind.

Once the basic structural components of the lashing were laid out, additional lashing could be used for embellishment (Latu 2021). Criss-cross, diamond and geometric patterns are the results, and numerous patterns are known by Pohnpeians, including inou tehn pahr, inou Pahkin and inou iken arong. The visibility of patterns was enhanced by dyeing the sennit. According to Thompson (2015: 44–45), Pohnpeians used charcoal, red soil, burnt coral and ground turmeric to make the colours black, red, white and yellow. To highlight the lashing patterns for this project, a dye was made from shredded purple ditto paper, a common office product used by manual paper copying machines in the 1970s. This was a dramatic break from the natural

dyes used by Pohnpeians for centuries, but which were unavailable at the time (Fig. 5). The use of artificially dyed sennit added to the visual appeal of the lashings, and also served to highlight the social status of the Noahs.

During the lashing of the house, one of the master craftsmen died, leaving a considerable amount of work left to be done. TM was taught how to assist in completing the remaining lashings, and later reproduced all the lashings in a scale model of the house.

Roofing

Traditional Pohnpeian houses have thatched roofs, and thatching is made from the leaves of the ivory nut palm tree *Metroxylon amicarum* (auhs). Traditionally, ihmwenei had steep pitched roofs made with thick, mature leaves (Linton 1926: 74), which facilitated run-off from precipitation and allowed the thatch to dry quickly. Steep roofs also provided ample headroom for standing inside the structure, as the walls were traditionally around four feet (1.2 m) in height. Thatch production was usually initiated months ahead of house construction. The chief would assign a set number of thatch panels to be made by each household, using a length of reed as a measure. The lengths of completed thatch panels were stored under cover until they were needed.[10]

Roofing the ihmwenei began with cutting down the ivory nut palm and collecting the fronds. The leaves were then removed from the frond and transported to the site. At that point, the centre rib (nok) of each leaf was removed by biting through the fibres with teeth and lifting the rib off. These ribs then could be gathered into bundles later and were commonly used as a broom (kepennok).

A variety of reed called lirau (*Phragmites karka*) was gathered from wetlands to use as the support for each length of thatch. These were cut to a length of seven feet, and the palm nut leaves, which had been stripped of their centre ribs, were folded in half and placed over the reed. The row of leaves was made to overlap, and these were then held in place by stitching. On Pohnpei, a narrow strip of the outside bark of the ivory nut palm (ida) was used as the fibre stitching. The ida stitching was placed to run parallel and below the bottom side of the reed (Fig. 6).

The act of thatching is called ngkad in Pohnpeian, and it would only be done on a clear day. A magic spell called winani en ngkat was used to make the thatching go faster; Pohnpeians also believed that if the sennit tangled during the thatching of the roof, someone was casting malevolent magic and did not want the house completed. Indeed, the sennit did get tangled on more than one occasion in 1974. Bamboo scaffolding was erected so that the heights of the roof could be reached by the workers. Beginning at the bottom where the eave (kutoar) is located, each thatch panel is attached to



Figure 5. The lohlo and the lepin keidu with sennit lashing during construction. Photograph by Terry Malinowski, 1974.



Figure 6. Thatching in progress. Photograph by Terry Malinowski, 1974.

the rehu (rafters) using a wooden hooked needle (koahr). The needle is used to pull a sennit cord through the panel so it can be tied to the rafter. Once secured, the next panel was tied to the rafter immediately above, allowing for the ends of the leaves to overlap. From the inside of the house, the ida stitching can be seen. If the thatch panels are placed close on top of one another it is called mesen idatik or "small face of the ida". If the panels of thatch are placed farther apart it is termed mesen idalap or "wide face of the ida". The mesen idatik style roof will ultimately last longer but requires more labour and materials; thus it was rarely seen in commoner's houses.[11] A steep-pitched roof, which was more traditional, also required more thatch than a flatter-pitched roof. All of these elements are highly visible and further embed the status of the chief into the physical architecture of the house.

When the thatch panels reach the peak of the roof there will be a small opening left, which is covered with the pwarapwara, a mat woven from coconut palm fronds. Sticks are then poked through the pwarapwara every three feet, sliding under the kadingading to help secure it. Several V-shaped tree yokes are lashed down over the peak to hold everything in place. The gables, which are triangular and located at either end of the house, are usually thatched last. There are actually two sets of rafters in the gables; one set that runs vertically to cover the entire opening and another at an angle to overhang the lohlo. This creates a V-shaped storage space called the mweleng, which is hidden from view from the rest of the house (Fig. 7). The mweleng are large enough to hold an adult who might want to hide from an intruder, if necessary. They are also analogous to Pohnpeian conceptions of knowledge and the concealment of private information. The proverb "Mweleng ieu ohl" translates to "a man is like the mweleng", meaning that just like items that are hidden from view, one does not know what is concealed inside another person. This concept also conveys the respect for hidden knowledge, and is a cautionary note to be respectful of others, as you cannot know what knowledge they hold.[12]

Walls and Floor

After the thatching is completed, the wall studs are constructed using beams of ais (*Parinarium laurina*) wood. The beams were cut into tapering studs and placed into holes drilled into the floor beams (ataut and lohpwu), which were two feet apart (~61 cm). At the top, these studs were lashed to the ndape and the lohlo, creating a firm joint. A wider spacing was created for the doorways and a single window. A stabilising beam was then lashed to the ais studs, on the inside, running horizontally along the middle of each wall. Smaller pieces of wood were also inserted horizontally into holes drilled into the sides of the studs, made from ketieu wood (*Ixora casei*), which is strong and flexible.

The walls were constructed using the stalks of ahlek or litok menger (*Saccharum spontaneum*) reeds, which are relatively strong when mature



Figure 7. The mweleng, the hidden space in the roof of the ihmwenei. Photograph by Terry Malinowski, 1974.

and have tissue that varies in colour between yellow, red and brown. Over 10,000 reeds were used to create the walls and the floors of the ihmwenei, requiring many hours of processing and labour to harvest, clean and install. After being cut and washed in a stream to remove the outer layer, the reeds were sorted out by length. The longer reeds were arranged vertically to create the inner layer of the wall, while the shorter ones were placed horizontally to form the outer layer of the wall. Construction commenced by placing a series of vertical reeds between two studs and tying them temporarily in place with a piece of sennit near their tops and bottoms, forming a solid screen. A series of horizontally placed sticks were wedged into holes drilled into the wall studs, and the panels would be tied to them during construction. The outer wall was then created by placing reeds horizontally, stacking them up to create the complete surface. Each vertical reed was tied individually to each of the horizontal reeds.

Traditionally, wall reeds were tied with sennit so that the lashing was interwoven between the vertical reeds on the inside, creating a firmly bound construction. According to oral accounts collected at the time of construction, the tightly lashed double wall was impenetrable to spear attack (Fig. 8). However, the amount of sennit required to complete the walls in this fashion was beyond the scope of this project. A Pohnpei elder suggested a more economical approach that used less sennit, resulting in a pattern of tying that was staggered, producing a diamond pattern on the wall where the fibres crossed. This method resulted in walls that were six feet (~1.8 m) in height. Traditional ihmwenei had walls that were approximately four feet (~1.2 m) in height.

There were three doors and a single window in the house. The doorways were left as a gap between two wall studs, intentionally very narrow (less than shoulder width), so that an adult would have to turn sideways to enter the house. The narrow opening blocked potential enemies from quickly entering and catching the inhabitants off guard and also limited the amount of light, obscuring the view of activities occurring inside the house. The door was also partially covered by the overhang of the thatched roof, which required a person to bow down while entering, thus showing respect for the chief inside. The extended overhang of the thatch roof also had the practical function of keeping the walls dry during storms. Since the reed walls are somewhat porous, windy weather can result in rain passing through the walls and into the interior.



Figure 8. The walls, showing the tying of the reeds together, resulting in a diamond pattern. Photograph by Terry Malinowski, 1974.

Lirau reed were also used to create the floor (taht) of the house. Straight tree branches about an inch (~2.54 cm) in diameter were laid out about a foot (~30 cm) apart to serve as floor joists. A layer of the lirau was placed across the branches forming a flat surface, which were then lashed at the ends to secure them. Like the walls, a second layer of reeds was laid down crossways and lashed in a staggered pattern to the floor joists and the bottom-layer reeds (Fig. 9). The resulting diamond pattern extended across the floor panel and abutted the other panels that were lashed together in a similar fashion. The entire floor would be covered in this fashion, leaving gaps for the fire pit embedded in the stone foundation, and abutting the sakau stone. The stone crypt (lolong) would be hidden beneath the panels of the floor for later use.[13]

CHIEF'S HOUSES THEN AND NOW

The interior of the high chief's house would be rather dark by today's standards, with the only light sources being the doorways, the window and the light from the fire (O'Connell 1972: 75).



Figure 9. The interior of the ihmwenei, showing the lohpwu (centre) and ataut (background), both floor beams and the diamond pattern of the floor reeds. Photograph by Terry Malinowski, 1975.

Due to the lack of a chimney the interior of the house could also be smoky and coated with soot. The smoke served to obscure the view of the inhabitants to outsiders, deter mosquitoes and also keep the thatch dry and free of pests. The reed walls screened the occupants from being seen by anyone outside but did allow a low level of visibility for viewing out. The reed walls also provided ventilation, and the thatch roof and reed floor kept the house cool and comfortable. The reed floors were comfortable to walk or sit on, acting like a cushion. With the addition of a pandanus mat, the floors were comfortable enough for sleeping.[14]

A variety of items would have been found in a traditional house, and a chief's house would visibly display items that were the product of community labour and symbolic of his wealth and privilege. It would have been common to see balls of sennit (koansop) hanging from the rafters of the house, as well as beaded necklaces and kilts, as a sign of wealth. A traditional backstrap loom used by the women for making banana fibre cloth would have also been attached to a rafter.[15] Other items may have been more mundane. The literature also describes sleeping mats, gourd calabashes for carrying water, polished coconut shells for cups, and baskets as common household items (Hambruch 1936: III–5; Riesenberg 1968: 66–67, 71). There might also have been spears, clubs, bows and arrows and dance paddles. By the 1840s, however, muskets had replaced many of the traditional weapons on Pohnpei.

Access to the chief's house was restricted to certain family members, and it was treated as a private space for the chief's residence. In contrast, the nahs (meeting house) was a structure that was used for community events, such as feasts, funerals, kava drinking and other social gatherings. The nahs also has space reserved for the chief, located in the upper platform, near the back of the meeting house. Access to that space was through two back doors, one for the Nahnmwarki and the other for the Nahnken, a parallel chiefly lineage comparable to the Samoan tulafale (talking chief) (Riesenberg 1968: 49). The use-life of an ihmwenei would have been determined by the quality of the roof, which protected the rest of the structure from the elements. A roof that was steep pitched, was made with thick, mature leaves, had a high degree of overlap of the sections (mesen idatik) and was routinely treated with smoke from the interior fire tended to last the longest. With maintenance, a quality roof would have lasted 10 to 15 years. Modern chief's houses are made with concrete, milled lumber and metal roofs, which are cheaper and last much longer.

This research examined the expression of cultural memory in the construction of a traditional Pohnpeian house. Even though a traditional house had not been constructed in living memory on Pohnpei (ca. 1974), the process of acquiring materials, organising labour and directing the design and construction sequence for an ihmwenei, a chief's house,

had been retained. In building this structure, particular components of Pohnpeian culture and heritage were expressed, regenerating Pohnpeian ideology and ontology. These components included intimate knowledge of materials and construction and the reasons behind their use, including the correct sequencing of tasks, how each is related to the other, and the names, purposes and relationships of house elements. Just as importantly, particular Pohnpeian concepts (such as the mweleng) were re-created via construction, and the inclusion of proper rituals required to provide protection and ensure completion of the project were given a regenerative social role. Throughout the project, networks and social processes that are particular to Pohnpeian society were critical to obtaining materials, coordinating tasks and providing labour.

Serving as both a residence and a manifestation of chiefly power and influence, the ihmwenei of Pohnpei was also an expression of clan and lineage, connecting the individual to a social unit that endures over time. Its foundation—which also serves as a crypt for the deceased chief—also has an element of durability, using stone that retains its shape and is relatively fixed on the landscape. The newly constructed ihmwenei at Wene was also an expression of the Noahs's social position and networking, which stretched beyond the house and neighbourhood to the extent of the island (Fig. 10). It



Figure 10. The completed ihmwenei with the author Terry Malinowski and Onis, the oldest son of the Noahs, 1976.

endured for many years, leading up to and including the time when he was the Nahnmwarki. As demonstrated by this project, the construction of the ihmwenei using local materials reconnected different aspects of Pohnpeian knowledge and culture, preserving and perpetuating information for a subsequent generation. Similar reconstruction efforts could revitalise other aspects of Pohnpeian language and culture, e.g., canoe construction and navigation, oral history and political history, or magic and traditional religion.

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NOTES

1. TM was often told that in the past, the only thing a man could consume before battle was sakau (kava). It would be considered shameful to die in battle and be disemboweled and find food in the stomach. Pohnpeians also said it was pelsuwed (taboo) to have sexual intercourse before battle.
2. Possessing many pigs, sakau plants and yams (kehp) are all important signs of wealth, status and being a man in Pohnpei today. Added to this historically, having pits of aged, fermented breadfruit (mahr) and a considerable amount of sennit was also prestigious. The mahr was important to survival outside of breadfruit and yam season, and the sennit was used for a variety of purposes. Only more recently with the introduction of outside Western goods have sennit and mahr somewhat lost their place in Pohnpeian culture.
3. The task of collecting information was challenging for a several reasons. First, it took a couple of years for TM's Pohnpei language skills to be adequate for communication. Secondly, Pohnpeians can be reluctant to share information about their culture with outsiders. Petersen, an anthropologist who did research on Pohnpei, describes this as well: "Among the central tenets of Pohnpeian social life is the concept/value/practice of kanengamah. Nothing about kanengamah is straightforward; indeed, when Pohnpeian storytellers and historians speak, they sometimes state quite explicitly that their words are 'twisted.' In doing this they invoke one of the concept's principles: Kanengamah is about concealment and constraint, about not revealing more than a limited portion of what one thinks or feels or knows" (Petersen 2022; see also Petersen 1993). According to TM's informants, some Pohnpeians believe that if they tell someone everything they

know they will die. Petersen (1993: 343) likewise states, "Many believe that full disclosure of all that a person knows about a given topic (audepen aramas) is life-threatening." Given kanengamah, TM's challenge was considerable in trying to piece together how these homes were constructed and why they were constructed in this matter. As much as possible, he tried to verify what an informant shared by confirming it with other sources.

4. Riesenberg (1968: 85) mentioned a feast held around the making of coconut sennit, which further points out its important role in the culture. It was the largest feast of the season, with the elder men making the sennit and the younger men involved in the making of sakau. Making sennit was a routine activity done especially by older men and women. The Samoan and Tongan literature also describes making coconut sennit as an important social activity (Nonu 2016: 64; Te Rangi Hiroa 1930: 248). Sennit was also used to wrap adze handles and create grips for spears, clubs and bows, construct fishing nets and slings, string membranes on drums, and create holders for water gourd or coconut shells (Hambruch 1936, vol. 2: 358–61, 363; O'Connell 1972: 129).
5. The consecration festival ends with a kava feast at which roast pig and dog, dishes of yams and breadfruit are eaten. Frequently the district chief is present. In the past, however, women did not take part.
6. Riesenberg wrote a fascinating article in 1948 entitled "Magic and Medicine in Ponape". He describes a number of examples of magic spells used for a variety of purposes. Riesenberg mentions that there are two principal ways to send kaw or black magic to someone: to bury a peioar (a bundle of sennit used in lashing) or one or two river pebbles under a corner of the enemy's house; and to burn dried coconut palm leaves or stems of coconuts and send the flame to the enemy. Stones or pebbles seem to be a commonly used item when someone wants a vehicle to either hold or transmit magic. Magic also played a role in the construction of a Pohnpeian house and canoe; both benevolent and malevolent spells might be used. Hambruch (1936, vol. 2: 301) discusses some of these chants or spells in his volumes from his South Seas expedition. The Noahs Madolenihmw who spearheaded the project in Wene, Kitti, was aware of some of these spells.

   Stories about magic to both protect the house or prevent its completion were common. For example, the sennit tangling up repeatedly during the thatching of the roof raised some people's concerns that someone did not want the house completed.
7. In some cases the main vertical posts may have been secured on top of the main floor beams using a mortise and tenon joint, rather than being placed in a posthole (Shineberg 1971: 184). In other words, the weight of the beams in the house would rest on the main floor beams.
8. Bamboo scaffolding is safer to use than wooden timbers, as it slowly sags rather than quickly breaking. While working on the house, TM experienced the bamboo fail and had time to grab something to avoid a fall onto the rocks below.
9. Early in the lashing of the main beams, there was a very experienced individual, Kaniki, who masterfully lashed some of the upright posts to the lohlo and then to the ndape. Unfortunately, he decided to leave the project before it was completed. Another man, Riting, also an expert lasher, decided to attempt to learn what Kaniki had started doing. Kaniki was the most experienced in house lashing;

Riting had previously only done lashing on outrigger canoes. So, in an effort to learn Kaniki's lashings, Riting partially unravelled some of Kaniki's lashing to see how it was done. Later on Riting developed numbness in one of his arms. Some people believed that Kaniki had played magic on his work to prevent anyone from undoing his lashings later on.

10. Only a high chief could have a house with four sections of thatching, called pakis. The number four is critically important in Pohnpeian culture. In the state of Madolenihmw, the first four cups of sakau are presented to the most important people present. Traditional medicine is also administered for four days, and magic spells employ the number four.

    Traditionally, the gathering of the reeds would be delegated to people in the village, similar to the assigning of making the thatching for the roof. The master builder would likely have the job of coordinating the delegating of tasks and timing of completion. In our project, TM worked closely with the Noahs in determining how to address each phase of the project. Many times these discussions took place in the evening while drinking sakau.
11. Over time one may need to go back to repair the thatch by straightening out the leaves or replacing some rotten thatch. This is called dilip.
12. Respect or wahu is a very important concept in Pohnpeian tradition. Another saying related to homes and respect is as follows: "Sohte me kin pahdok ohl likin ihmwet" (No one can plant a man outside this house). This is a metaphor that explains the importance of respect; showing respect requires acknowledgement and greeting a visitor, including inviting them in and offering them food.
13. TM lived in the house for about six months after it was completed. It was generally cool inside because the reed walls allowed a gentle breeze to pass through. The thatching being made of palm leaves gave the impression of lying under a tree's branches. The steep pitched roof made for a cathedral-like ceiling, making the house feel very expansive. The reed floors with a pandanus mat were always comfortable for sleeping at night. The proximity to a stream made it convenient for bathing in the evenings.
14. In the evening, a kerosene lamp cast dancing shadows on the thatched ceilings. In the past, the fire pit in the centre of the house would likely have had the same effect. TM noted that at the time he revelled in the thought that the house was made entirely with local materials, the way Pohnpeians had built for centuries prior. He felt a tremendous sense of history with the stone foundation, the wood timbers and the palm thatching, as though he had been transported into the past. He wondered what daily life would have been for the occupants, and the artistry and aesthetics of the lashing constantly stirred the imagination. As a keepsake and record of the work, TM spent the last months in Wene building a 10:1 scale model of the house, complete with thatched roof and lashed beams.
15. Backstrap looms were common in the Caroline Islands. In the summer of 1974, when TM traveled to Woleai atoll in the Western Carolines, he observed women still using these looms to make skirts from banana fibre.

GLOSSARY

The terms in this glossary are Pohnpeian unless otherwise stated. They are inspired by Sohl *et al*.'s *New Pohnpeian–English Online Dictionary*, which can be accessed at https://www2.hawaii.edu/~rehg/NPED.html.

ahlek	type of reed (*Saccharum spontaneum* or *Phragmites karka*) used as a building material
ahl en kitik	piece of wood that runs across the bottom of a wall, lit. path of the mouse
ais	type of wood (*Parinarium laurina*)
ataut	type of floor beam
audepen aramas	knowledge one has about a given topic
auhs	ivory nut palm tree (*Metroxylon amicarum*)
dihd	wall
dilip	the repairing of thatch
ida	outer bark of the ivory nut palm
ihmw	dwelling house
ihmwenei	traditional chief's house
ihmw en lapalap	traditional chief's house
ihmw en soupedi	traditional chief's house
imwalap	dwelling house; traditional chief's house
inou	lashing
inou iken arong	pattern used in lashing inspired by the tail of the bluefin trevally fish
inou Pakhin	pattern used in lashing originating on the island of Pakhin, near Pohnpei
inou tehn pahr	pattern used in lashing inspired by the leaf of a sprouting coconut palm
kadingading	type of beam
kanengamah	patience, restraint
katar	giant fern (*Sphaeropteris* sp.)
kaukoan auwen kidi	magic spell able to silence barking dogs
kaw	black magic
kehp	yam
kepennok	broom
ketieu	type of wood (*Ixora casei*)
kisin pwehl	coconut sennit
koahr	wooden hooked needle
koansop	ball of sennit
kousapw	greater section of land
kutoar	eave
lepin keidu	type of beam
lirau	type of reed (*Phragmites karka*) used as a building material
litok menger	type of reed (*Saccharum spontaenum*) used as a building material

lohlo	crossbeam
lohlotik	series of crossbeams
lohpwu	type of floor beam
lolong	burial chamber for a chief
mahr	aged, fermented breadfruit
meing	high language
mesen idalap	thatch panels spaced apart, lit. wide face of the ida
mesen idatik	thatch panels closely placed, lit. small face of the ida
mwah	brother-in-law
mweleng	hidden storage space in a roof
mwohn ihmw	foundation
nahs	meeting house; feast house
nanuolosom	master builder
ndape	type of beam
ndape pahn mwaramwar	type of small beam
ngahp	the distance between a person's outstretched arms
ngkad	act of thatching
nok	centre rib of a leaf
pakis	four sections of thatching
palein sapw	section of land
pehi	foundation, altar
peioar	bundle of sennit used in lashing
pelsuwed	taboo
poahsoan	foundation
pwahla/pwahlala	type of roof beam
pwarapwara	woven basket or mat made of coconut palm fronds used to cover roof thatching
rehu	main rafter
rehu en disek	rafter in a gable
rohpapiso	carriage used to transport a high chief
sahpw sarawi	the sacred land
sakau	kava
soahrong	ridgepole
sop kieil	a piece of wood that runs across the top of a wall, lit. the stomping path of the lizard
taht	floor
tehnpas	traditional chief's house
tiahk en saphw	traditional culture
tulafale	talking chief (Samoan)
uhr	post
wahu	respect
warasap	high chief's canoe
warong em mweleng	lower beam supporting a roof
weingal	mangrove trunk
winani en ngkat	magic spell to make thatching go faster
winani en silasil	protective magic

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