

## Field Report

# Social and Material Influences on the Kelabit Dwelt Environment

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**Relations with the environment are key to the ways rural people pursue dwelling practices. But the complex processes of globalization now challenge the isolation of such groups, affecting their perception and use of the environment. One place this can be seen is the Kelabit Highlands of northern Sarawak (Malaysian Borneo), where the recent arrival of commercial logging has allowed local people to make wider connections via the logging roads. In the Kelabit Highlands, cultural and historic traditions are being reconstituted in light of new material relations with a dynamic environment, bringing changes to customs of house building.**

The Kelabit people are one of the smaller ethnic groups in Borneo, numbering perhaps 5,000 individuals, many of whom migrate between their traditional interior homeland in Sarawak (Malaysian Borneo) and larger industrial towns on the coast. While contacts between the Kelabit and the wider world have historically been sporadic, in the last fifty years or so these have increased enormously, especially since the arrival of commercial logging. The logistics of logging require a network of dirt roads, which have gradually penetrated the Kelabit Highlands since around 2005. Travel for local people has therefore become much easier, both locally and further afield, providing access to a greater range of resources and creating the conditions for a vibrant exchange of ideas and the introduction of new materials.

In this report I suggest that adopting the concept of a dynamic environment allows us to more successfully engage with ideas about the relation between materials and the world we live in. Material change can be viewed as a response to new environments rather than diminished affinity to a “natural” environment. In this sense, ongoing devel-

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opment and engagement with an extended environment have brought changes to Kelabit material culture — especially, as discussed here, in their houses.

I begin by adopting a historic perspective, describing some of the key events and customs of traditional Kelabit society and how these helped shape traditional notions of house building. I then move forward to the present day to describe the impact of recent social trends on modern Kelabit housing, including the innovative adoption of new materials. Focusing on conditions in the village of Pa' Dalih, the report draws on data gathered during ethnographic fieldwork in the highlands of northern Borneo from 2008–2010, as well as archival research in Borneo and the U.K. (FIG. 1).<sup>1</sup>

#### A HISTORY OF CHANGING TRADITIONS

In recent years the Kelabit Highlands has been a place of enormous social and physical change, which has drastically altered traditional lifestyles and relations between local people and their immediate environment. Access to new materials, migration to work in paid labor, demographic change within villages, use of modern tools, attitudes toward traditional materials, and evolving perceptions of the forest are all immediate and ongoing issues for the residents of the village of Pa' Dalih. Yet, while the process of change may appear rapid and unsettling today, the history of the region offers earlier examples of external influences that have altered local social life.

Engagement with the interior populations of northern Borneo dates to the late nineteenth century. The adventur-

ous James Brooke (the first “White Rajah of Sarawak”) and his nephew and successor Charles Brooke were the first Westerners to exploit contacts with these peoples, including, by about 1890, the Kelabit.<sup>2</sup> They introduced a series of reforms to persuade local people to maintain peaceful relations, including a determined assault on the practice of headhunting, frequent government-sponsored raids, and the sponsorship of formal peace treaties between local tribes. In 1908 the region was fully incorporated into the British colonial sphere after a famous peace treaty in Pa' Mein between the Kelabit and neighboring tribes. The treaty was instigated by the district resident, R.S. Douglas, the first European to visit the Kelabit highland plateau<sup>3</sup>; it was ratified at a ceremony hosted by the chief Ballang Maran, “a notorious headhunter.”<sup>4</sup> Some 700 to 800 people gathered in his longhouse, a pig was slaughtered, and the chiefs exchanged blood, swearing to abide by the terms of the treaty.<sup>5</sup>

As the influence of colonial rule spread to the Bornean interior, it brought a sense of accessibility to an assortment of administrators, explorers and missionaries, some of whom left descriptions of Kelabit longhouse life. Among these were reports by the seminal Torres Strait Expedition in 1898–99<sup>6</sup>; A.B. Ward, a government official, in 1903<sup>7</sup>; R.S. Douglas before the 1908 peace treaty<sup>8</sup>; and in 1922, by Eric Mjoberg, curator of the Sarawak Museum.<sup>9</sup>

Until the 1930s the relationship between the Kelabit and the wider world was primarily one of extraction. Goods were taken from the forest as tax payments, while explorers and representatives of the newly created Sarawak National Museum collected cultural objects. Some objects did make their way in the opposite direction into Kelabit households —

**FIGURE 1.** *The village of Pa' Dalih in 2010. In the center is the football pitch, with the school at the bottom left and the church on the opposite side. The main longhouse is beyond the church. Irrigated padi fields are on the right. Photo by author.*



in particular, large *belanai* (“dragon jars”) and various metal items — but the vast majority of Kelabit material culture was indigenous and relatively local.<sup>10</sup> But this began to change in the period leading up to World War II; instead of being a place from which the outside world procured, the Kelabit Highlands became a place into which it could impart new ideas and materials. The earliest efforts to bring new ideas to the region were unsuccessful attempts by missionaries to establish Christian outposts there in the 1930s.<sup>11</sup> Indigenous religious practices were animistic, and the behavior of birds, in particular, was seen as ominous, causing work to be halted and farms and houses to be moved.<sup>12</sup> With the eventual adoption of Christian practices, however, this link to the surrounding forest was fractured, and the relationship between the Kelabit and the forest became, as it is today, more prosaic and no longer filled with spiritual significance.

While the Kelabit were coming to terms with a new religious environment in the 1940s, they also came face to face with a very different group of Christians, in the form of British and Australian paratroopers, who used the Kelabit Highlands as a base for guerrilla action against the occupying Japanese. Along with military personnel came new materials: corrugated tin sheets, wire rope, steel nails, sheets of plywood, saws, hammers, and other metal tools — all of which were rare or new to the Kelabit. Unlike the preceding fifty years of external contact, the Kelabit were now confronted with these things in a direct and explicit way, one that demonstrated new potentials and that offered alternatives to the materials on which they had hitherto depended.

The formation of the Malaysian nation in 1962 and the subsequent military “Confrontation” with Indonesia brought another batch of troops to the Kelabit Highlands, this time to patrol the nearby international border. Those living closest to the border were resettled in the village of Bario, which grew to become the Kelabit capital. And instead of the makeshift logistics of the World War II guerilla campaign, this engagement involved a large-scale military presence based in the village of Pa’ Mein — which received regular supplies of cement, corrugated metal sheets, tools, nails, petrol, generators, chainsaws, clothing, and, of course, guns. At the end of the Confrontation, when the troops were withdrawn, remaining supplies were distributed locally, introducing these materials into circulation in significant quantities for the first time. Kelabit engineering was profoundly changed by the new possibilities: bamboo bridges were replaced with ones using wire rope, for example, and new forms of housing began to emerge (FIG. 2).

#### THE TRADITIONAL KELABIT LONGHOUSE

Although they contain some information on traditional dwellings, reports from early visitors to the highlands were as concerned with the difficulties of the terrain as they were with describing the place itself. For a government official or



FIGURE 2. An early wire-rope bridge in the Kelabit highlands, 1962. © Sarawak Museum.

private explorer in the early twentieth century, a visit to the region required travel along unpredictable rivers and over grueling mountains, and took from three weeks to three months.<sup>13</sup> As Major Tom Harrison wrote in 1949: “the extent and scope of different influences on the Kelabit highlands are complicated by the substantial efforts required to get there.”<sup>14</sup>

Some of these early visitors did, however, describe the mix of structures in a typical village, which consisted of small bamboo and thatch field huts, dominated physically and socially by a central longhouse.<sup>15</sup> From the outside, the longhouse was an imposing, closed structure, raised three to four meters off the ground on sturdy poles, sunk into the ground or supported on large flat stones.<sup>16</sup> It was roofed with a thick thatch that extended down almost to floor level, and beneath this broad expanse, walls of wooden planks or split bamboo were held together with rattan (FIG. 3).

The longhouse was typically entered by means of a large log with steps chopped out, which provided access to the main public space, the *tawa* (FIG. 4).<sup>17</sup> Peering down the smoky gloom of this common hall, which might be 100 meters long and five meters wide, it would have been hard not to be impressed by the sheer size of the longhouse structure. On one side of the *tawa* was a full-length wooden wall that shielded the family area (*dalim*) from view and concentrated attention along its length (FIG. 5). The busy, open *tawa* was where visitors slept, people chatted with neighbors, children played, possessions were stored and displayed, and household objects were made and repaired. Hanging from the rafters above would have been all manner of baskets, nets and trophies — the odd skull or two, antlers, tusks, and the like (FIG. 6). Overhead could also have been seen the horizontal laths supporting the roofing thatch, worn thin after

FIGURE 3. A traditional Kelabit longhouse, 1940s. © Sarawak Museum.



FIGURE 4. "Pre 1945 Kelabit longhouse." Drawing by Robert Lian-Saging, from the collection of the Sarawak Museum.

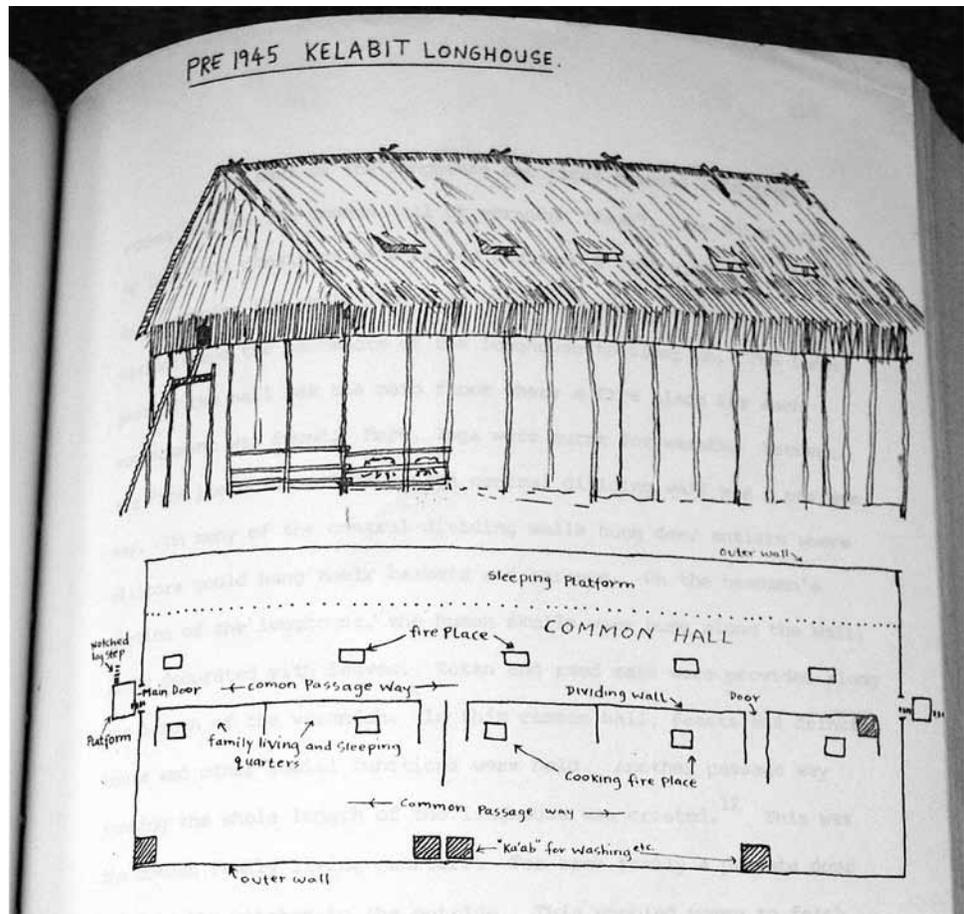




FIGURE 5. Interior of a Kelabit longhouse, 1947. View down the tawa. Note the thatched roof and full-length dividing wall on the left. © Sarawak Museum.



FIGURE 6. Storage and maintenance of objects in the tawa, 1947. © Sarawak Museum.

a few years of heavy rains and pierced in places by shafts of sunlight — patched up but still serviceable. To make sure torrential rains were shed quickly, the roof was typically quite steep, the eaves low and the ridge quite high, allowing plenty of overhead storage space.

The Kelabit longhouse was typically divided into family units, with each section delimited by its floorboards. These were cut to about the same length, three or four meters, but varied in width, some being up to a meter wide. The surface of each, rubbed smoothed by years of use, revealed clues to its method of production. Metal tools were rare in the 1930s, and saws did not arrive until the 1950s, so an adze was used to make them.<sup>18</sup> It would take a man about two weeks to hack through the length of a large trunk to free one plank from the center — perhaps a meter wide and three meters long.<sup>19</sup> The plank would then be smoothed with a wide-bladed adze, leaving a characteristic fish-scale pattern. A typical household would need about ten of these planks, or else it would need to rely on much less durable split-bamboo flooring.<sup>20</sup>

Behind the central full-length wall, each *dalim* (family area) was separated from the next only by low dividers. Running behind them was another open passageway, which allowed people to walk from one end of the longhouse to the other in this area as well as in the much wider and more public *tawa*. The open-plan family areas, with their low walls and connecting walkway, led Harrison to comment, “to the Kelabit, privacy is unknown and unwanted.”<sup>21</sup> His Britishness may have led to an exaggerated sense of the importance

of personal space, but this is a peculiarly Kelabit form of architecture; other Bornean longhouses tend to have a long open public space (like the *tawa*), and behind the central wall, a series of separate family spaces.

#### THE TRADITIONAL MATERIAL ENVIRONMENT

The historic Kelabit longhouse was not a fully permanent structure, since life required movement for three principal reasons: agriculture, animistic beliefs, and intertribal violence.

Kelabit agriculture was dominated by swidden-farming of forest fields (*late lu'un*) planted with hill rice and vegetables. Each year a new area would be cleared, burned and planted, leaving the forest around the village a mosaic of regrowth. A longhouse would be located where the villagers could exploit the immediately surrounding area, and then, after three or four seasons, it would be dismantled and moved a few miles.<sup>22</sup>

Religious beliefs were a second reason for moving. In the pre-Christian era, Kelabit relations with the environment were dominated by animistic beliefs that offered guidance on the timing of daily and seasonal activities.<sup>23</sup> Even if a longhouse had just been built, belief in the power of forest spirits was such that it might be moved after only a few months. According to Ramy Bulan, “Before they turned to Christianity in the early 1940s, bad omens, fear of spirits and curses pronounced on the longhouse, or quarrels between residents caused whole villages to move or split.”<sup>24</sup>

Finally, the village could be moved as a result of violent neighbors. Reducing tribal violence, especially through a ban on headhunting, was a key tenet of British colonial governance. Yet traditional features of the longhouse, built in response to potential violence, remained in place long afterwards — for example, raising it on stilts and providing entrance via an easily retracted log ladder. As with the needs of swidden farming and animistic beliefs, the threat of violence made easy dismantling and reconstruction of the longhouse a priority. Materials had to satisfy one of two fundamental characteristics: either they had to be easily obtained from the forest at the new site, or they had to be portable.

Since the longhouse might be moved every few years, it was engineered without heavy-duty components and long-term fixings. In line with cultural practices, it was as robust and durable as required, but it had to be easy to break down and carry away.<sup>25</sup> Materials were chosen accordingly. The thatched roof lasted perhaps five years with careful maintenance, but it offered protection to walls and floors — elements which could be transported and reused. Floorboards were laid and left unfixated. Walls were made of smaller planks tied with rattan to allow them to be dismantled — or of split bamboo, which could be discarded. Structural components, made from local hardwoods, lasted about ten years, and the best were saved and reused. However, stones, such as those used around the hearth or as post pads, could normally be left behind and new ones collected from a riverbank close to the new site.

The traditional Kelabit longhouse was thus literally a product of its environment. As such, it echoed sentiments expressed by Paul Cloke and Owain Jones (following Martin Heidegger and Tim Ingold<sup>26</sup>) in describing habitation from a “dwelling” perspective: “Dwelling is about the rich intimate ongoing togetherness of beings and things which make up landscapes and places, and which bind together nature and culture over time.”<sup>27</sup> For the Kelabit, connections to the outside world were circumscribed by the terrain and the dangers of travel across tribal boundaries, which limited their exposure to, and use of, external resources. Their houses were the accumulated result of practices of engagement with the immediately surrounding forest, requiring skills and experience that enabled material transformation.

Henry Glassie (writing in the “folkloristic” tradition<sup>28</sup>) has accorded great significance to this type of direct physical connection to the environment, and adopted a Marxist view of its contrast to industrial technologies.<sup>29</sup> In a refrain familiar within vernacular architecture studies, he argued that a mastery of local resources was a key to successful housing:

*In the shift from local to imported materials, there is a loss in environmental efficiency and a loss in beauty. There is a gain in permanence, which is compensation for a loss of skill and social connection. The loss in pleasure taken from a job well done, and the burden of the need*

*for cash, must be set against the prestige that is supposed to accrue to the one who purchases expensive objects.<sup>30</sup>*

An alternative view, however, would be to consider the environment a shifting concept for both the observer and the local people. Rather than lamenting the loss of tradition, this allows us to accept that changes to housing (as demonstrated by the adoption of new materials, for example) come in response to new perceptions of the environment. For the Kelabit, as their landscape and their environment have changed, the ability to build a suitable house might thus be seen to require a renegotiation with what it means to dwell in a chosen area.

## THE DYNAMIC ENVIRONMENT

Remote regions tenuously linked to the wider world, such as the Kelabit Highlands of the 1940s, are now virtually non-existent; the world has become globally connected, allowing mass-produced commodities to flow from one continent to another. As Anna Tsing has pointed out, expanding global connections can be chaotic and uncertain — providing a very different picture than that of the simple, homogenous, global capitalism first described by authors such as George Ritzer.<sup>31</sup> The same messy creation of new relations is going on in the Kelabit Highlands, altering connections between its inhabitants and the wider world. These connections can be traced in the changing materials used in house construction and the different position of the forest in everyday life.

Within the last decade the expansion of commercial logging in Sarawak has enabled a widespread system of connection and communication using a network of logging roads. Composed of wide dirt tracks bulldozed through the forest to gain access to licensed logging areas, this network has provided a crude infrastructure linking the rural interior with more industrialized coastal towns, especially Miri (FIG. 7).<sup>32</sup> In 2010, with the imminent arrival of logging in the Kelabit Highlands, great efforts were being made to avoid the destruction widespread in other areas. Many Kelabit villages were marking and mapping their “cultural sites” (stone monuments, pre-Christian cemeteries, etc.), as loggers are not meant to disturb them — and even if they do, there is still a moral obligation owed to the locals.<sup>33</sup> Similarly, in response to the pollution of river systems by soil erosion, logging licenses are contingent on protecting sources of water used by rural villages. The Sarawak Department of Health is responsible for clean water supplies, and officially validates village sources and bans logging in their vicinity.

These measures may be enough to prevent substantial logging in the immediate area of Kelabit villages. But the paradox is that even if the residents of a settlement like Pa’ Dalih want to prevent such logging, they still want the logging roads. The roads provide access by four-wheel-drive



**FIGURE 7.** *The logging road going from Pa' Dalih to Pa' Mada and on to Bario. Photo by author.*

truck or jacked-up scooter; they make sourcing building materials from the forest easier; and they provide fairly reliable access to Miri, now a major source of materials (as well as jobs, higher education, and medical care).

By the 1970s the three factors that had once led to the movement of longhouses had effectively disappeared: Christianity had replaced animistic beliefs; intertribal violence had been stamped out; and agricultural practices had changed from transient swidden farming to permanent fields of irrigated padi rice.<sup>34</sup> Consequently, the choice of materials had also changed, favoring durability over portability. In addition to the now ubiquitous use of metal sheeting for roofs, the use of concrete (made by mixing Miri cement with local sand and stones) is now widespread. Thus, the traditional method of supporting structural posts on large stones has given way to concrete foundations combined with the use of *belian* — a nonlocal hardwood (FIG. 8). Whereas local hardwoods might last ten years, *belian* lasts twenty or thirty, but it needs to be brought in from outside the Kelabit Highlands. The nearest source is 30 kilometers to the southwest, where the lowland Kelabit live alongside a group of traditionally nomadic Penan.<sup>35</sup> The wood is harvested and prepared by the Penan, and it is typically brought to villages like Pa' Dalih in pieces that are four to five inches square, at lengths of up to twelve feet.<sup>36</sup> Access to *belian* is now not as difficult as it once was, since the logging roads connect Pa' Dalih with Long Peluan (from where the wood can be sourced), and large quantities can be brought in on a four-wheel-drive truck.

As a result of these influences, the traditional environment of the Kelabit has been extended and socially reconfigured. In an effort to prove cultural continuity, and hence protect and maintain control of the surrounding forest, new

emphasis has been placed on history and on reclaiming the past. Yet, although the forest remains vital as a place from which to gather food, it has lost much of its spiritual significance. The forest is also no longer as important as a source of raw materials — with the exception of an escalating desire for hardwood.



**FIGURE 8.** *Nonlocal belian hardwood foundation post, cemented in and bolted to locally sourced hardwood upper structure. New house construction, Pa' Dalih, 2009. Photo by author.*



**FIGURE 9.** A Chinese hardware store in Miri used by the villagers of Pa' Dalih. Photo by author.

The reality underlying these changes is that the resource environment is no longer just the local forest with its wood, sand and stones. The airstrip at Bario stocks up local stores, while the logging roads connect Pa' Dalih to regional resources such as *belian*, and further afield to Miri, where a four-wheel-drive truck can be loaded up with half a ton of whatever the world has to offer (FIG. 9). Conversely, local materials such as rattan and bamboo, once absolutely vital to the village,

are now of only peripheral importance, and are usually used only as stop-gaps. Globalization for the Kelabit is facilitated by fragile links to the coast, fed by the desire to make things more durable, and by a proliferation of information and ideas that provide this inventive people with new ways of engaging with their dynamic, lived environment.

#### THE KELABIT LONGHOUSE TODAY

These fundamental changes to environmental relations have influenced the type of longhouse we see today. Looking down on in Pa' Dalih from one of the surrounding slopes, its buildings are now more numerous and more varied than they would have been seventy years ago (REFER TO FIG. 1). There are actually three longhouses (the main longhouse, the short longhouse, and the short-short longhouse) and fifteen or twenty other buildings, including a large school and Christian church, all now centered around a football pitch instead of the main longhouse.

The original longhouse, built in the 1970s, has been expanded over the years, a reminder of the change in Kelabit attitudes from portability to permanence. From the outside, facing the center of the village, it is now dominated by a modern-looking *tawa* structure, with planed plank walls, glass louvered windows, and a metal roof (FIG. 10). Behind this, the



**FIGURE 10.** Front of Pa' Dalih main longhouse in 2010, showing recently constructed *tawa*. Photo by author.



FIGURE 11. Rear of the Pa' Dalih main longhouse in 2010, now entirely used as a dalim, built in the 1970s. Photo by author.

original structure is entirely devoted to *dalim*, taking the form of a series of family hearths arranged down its length. Meanwhile, additional new *tawas* have been attached outward as a series of separate and largely unconnected buildings (FIG. 11).

Since the modern *tawa* was built in 2001, its style has become relatively common — incorporating increased size, machine-cut wooden walls and floors, louvered glass windows, and separate sleeping rooms (*telong*). Many of these features are repeated in other buildings around the village, to the extent that one might consider this to be a new Kelabit tradition. That perception is illusory, however, since the changes which have led to this type of design have been rapid

and are ongoing. The trend today is for the size of buildings to increase: the new *tawas* (public areas) bulge out and dominate the old-style *dalims* (family/cooking areas) (FIG. 12). Walls are also getting bigger, and (thanks to the dividing up of interior space) more numerous, meaning that much greater amounts of wood are required.

Despite these changes, there remains what Roxana Waterson, in her survey and analysis of Southeast Asian architecture, has called “a persistence of features.”<sup>37</sup> In particular, she cited a dominance of roof over walls and a raising of the entire structure on piles. Similarly, current Kelabit longhouse structures maintain some of the architectural and so-

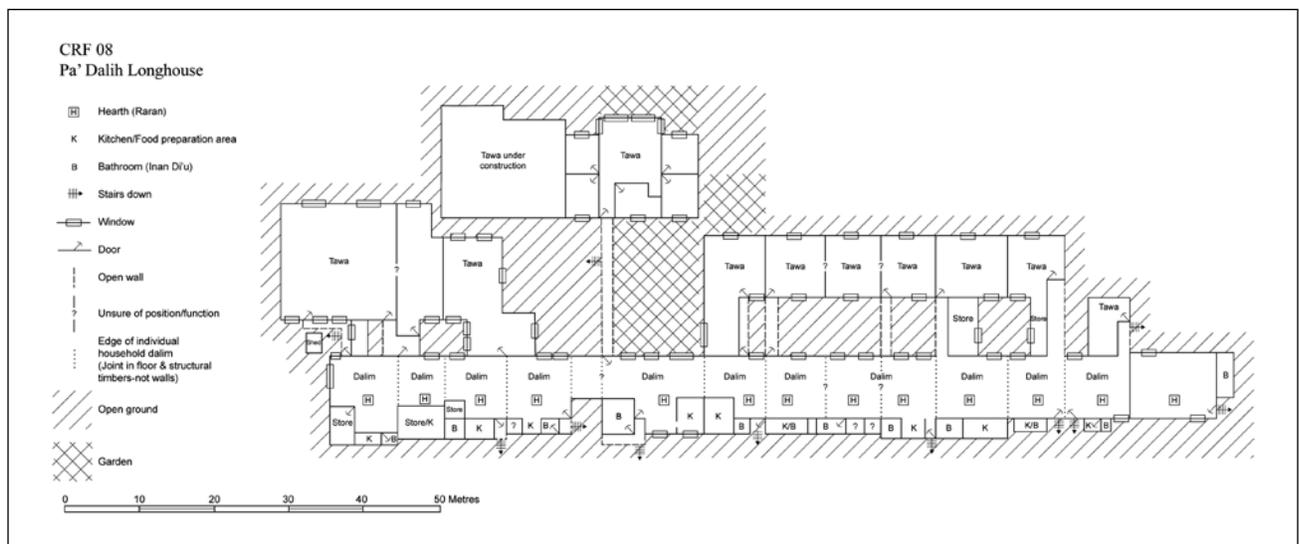


FIGURE 12. Plan of the main longhouse in Pa' Dalih, 2009. Drawing by author.

cial essences of their traditional predecessors. The *tawa* may be separate, but it is still used for display and as a space for hosting visitors. The raised floor may no longer be required as a defensive feature, but it is still useful for storing possessions and creating a space for animals.

Inside, the appearance of the *dalim* is reminiscent of the traditional longhouse. It is still characterized by rough plank walls, wide floorboards, and an atmosphere heavy with smoke from many fires. But the heat is stifling, beating down from the metal roof close above, blackened by soot; and the rafters are no longer decorated with the hanging odds and ends of everyday life, supporting instead a few fluorescent strip lights, with wires straggling beneath them (FIG. 13). New materials have provided new sensations of dwelling. The use of roofing sheets was one of the first changes to the construction longhouses, and it is still probably one of the most significant. Metal roof sheets offer a very different set of properties than the thatch that went before them. They are large, hard and heavy; they get very hot and radiate heat inside; and when it rains (and it rains often, and heavily), the sound is like thunderous applause, drowning out conversation.

Yet, talking to older residents about thatched roofs leads to animated and lengthy conversations about how dirty they once were; how anything stored in the rafters would become infested with insects and covered with soot; and how sections of thatch were constantly having to be repaired or replaced. By contrast, complaints about the heat and noise from metal roofs are muted, the prevailing attitude being one of resignation. It seems time saved in reduced maintenance is worth the discomfort. Only recently, in the construction of new buildings, are these issues being addressed — through the

addition of extra insulation, or by installing an intermediary suspended plywood ceiling.

Adopting new materials has been a considered decision by the Kelabit. Recalling Glassie, quoted above, they reflect a change in the mode of acquisition — from the need for skill in selecting and manipulating thatch from the forest to an ability to provide sufficient cash for metal sheets. In the context of contemporary rural Kelabit culture, itinerant wage labor means the lived environment now includes aspects of the industrialized world. And the use of metal sheets for roofing has been one of the most significant changes to architectural traditions that has resulted.

It is one, however, that Waterson, as a scholar of the region, regards as enforced and alien. For her, local materials were better suited to local environmental conditions. She has cited a range of examples in Asia of local environmental adaptation, including structural flexibility to cope with earthquakes, increased ventilation through bamboo floors, raised floors to reduce mosquito attacks, and so on.<sup>38</sup> But in general terms she has regarded the use of metal sheeting for roofs as less effective than older methods, even if (agreeing with Glassie) it may be more prestigious. That, however, is not the case here. Metal sheets are a better fit to the Kelabit environment, which includes (among other things) distant places of work as well as local farms, sporadic electricity, the reality of rat and insect infestation, and (soon) widespread telecommunication and connections to the Internet. Materials are part of a lived environment; they help create a specific setting and form the basis for an ongoing exploration of the world by the people who experience it.



**FIGURE 13.** Longhouse interior in 2009, view of the *dalim*. Photo by author.



FIGURE 14. Ganang's innovative new house under construction, 2009. The roof shape is inspired by tourist images of Alpine lodges. Photo by author.

#### MODERN HOUSING

Today the trend in Pa' Dalih, and indeed in many local villages, is toward individual houses rather than a communal longhouse. One example is a house being built by Ganang, an experienced builder keen to try new materials and techniques (FIG. 14). While I use this house as a way of describing the trend toward individual houses, I do so without suggesting that it represents a typical Kelabit house. Indeed, it would be difficult to say what is "typical," since many traditionally common features are now being challenged — even some that have only emerged fairly recently. Ganang's house, for example, does not employ posts with the usual substructure of *belian* (imported hardwood) joined to an upper structure of local wood (REFER TO FIG. 8). Instead, Ganang formed raised concrete blocks with protruding steel plates, onto which he bolted locally available posts, making the use of imported *belian* redundant. Instead of raising the floor and using the underneath as storage, he also poured a concrete slab to provide a lower floor. He did this using a mixture made from bags of cement from Miri and local river sand and stones.

The roof of Ganang's house is made of prepainted tin sheets, also from Miri, set at a steeper angle than usual. He

had seen a poster advertising tourism to the Swiss Alps and been taken by the shape of Alpine lodges, using them as the inspiration for his design.<sup>39</sup> When discussing this feature later in the company of others, he added that he was also trying to reproduce the steep-roofed designs of the traditional thatched longhouse.

As Pierre Lemonnier has argued, technological choices are determined as much by cultural tradition as by physical attributes.<sup>40</sup> While material nature presents itself as the source of numerous technical possibilities, the choices people make are generally restricted. Materials are not chosen on the basis of physical properties removed from their place in social tradition, but depend on preexisting ideas and customs. Materials come from an environment, and it is from that environment that possibilities emerge. And yet, given the same ecological circumstances, different cultures choose to deal with the same problems differently — what Lemonnier refers to as "arbitrary choices." He is therefore equally critical of an ecological approach (that technical choices depend on what is locally available) as of an economic approach (that choices are made as a logical balance between effort and rewards). Choices are made as a result of a combination of these considerations, mixed with more whimsical factors derived from the social and historical background of the people doing the choosing.

The example of the reuse of drink cans as “building bricks” in Santo Domingo illustrates this balancing.<sup>41</sup> The proliferation of discarded cans has there provided local people with a potential new technical choice; but to successfully employ it, it first had to be proved materially and socially. This use of cast-off items should not be construed as a case where “Westernization” has reduced local people to scavenging waste heaps — environmental destruction having removed the option of natural resources.<sup>42</sup> Instead, the reuse of drink cans is entirely consistent with traditional forms of resource exploitation, as described by Waterson and Glassie: it embodies abundance, not scarcity. The difference is in conceptualizing the waste heaps as being as much a part of the “natural environment” as the forests in Borneo.

So it is for the Kelabit: choices are based on emerging concepts of durability, as well as on cost and availability. However, in giving primacy to one material property, other characteristics become less important and can be compromised. Metal roofing is now expected to last as long as the house, and not just a few months; but metal sheets are poor insulators, unlike thatched roofs. Concerns with durability and maintenance are thus replaced with concerns about noise and heat insulation.

Having accepted this compromise for thirty years or so, the Kelabit, ever resourceful and innovative, have recently gained access to new materials which have the potential to resolve it. To cope with the heat generated by the metal roof in the blazing sun, Ganang is experimenting in his new house with fiberglass insulation fixed to the underside of the roofing sheets. And since his novel steep roof has raised its height, he can also leave large areas of the upper gables open, like large triangular windows near the ridge. Protected by the overhanging roof, the openings will allow wind to pass straight through, hopefully taking the warmest and smokiest air with it. Many villagers doubt that the fiberglass insulation will work, believing it will become an ideal nesting place for all manner of pests. Instead, most prefer the idea of installing a suspended plywood ceiling, as was being done in the new *tawa* in the main longhouse.

Christian Coiffier described the irreconcilable move by rural residents of Papua New Guinea toward an urban way of life, concluding, “It would seem one cannot be both a bush man and a town man.”<sup>43</sup> I suggest that the bush man never existed, and neither does the town man. Both are categories on an illusory line of relative modernity. The relationship between people and the world is now, and always will be, fundamentally unstable. Ingold has referred to this as the “flow of life” — a continual and mutually creative engagement with the lived environment.<sup>44</sup>

All of the newer houses in Pa’ Dalih include various novel materials, and Ganang’s, as one of the newest, is a good example of changing relations with a dynamic environment. The bulk of the house is still made of locally sourced hardwoods; but with the addition of metal plates, cement, painted

roof panels, insulation, tinted windows, and the concept of a Swiss chalet, it is representative of how Kelabit housing is increasingly made up of a radically different set of relations, and represents a change even from the more recent longhouses.

#### CHANGING ENVIRONMENTAL RELATIONS

Relations between the Kelabit and their environment have been radically altered by the imposition of colonial governance, the introduction of Christianity, the extensive adoption of wet rice farming, and influx of new materials and ideas since World War II. This continues today through the impact of an extensive network of logging roads that link remote villages such as Pa’ Dalih to their neighbors and to large coastal towns. In the midst of these influences, the forest has changed from being a resource for subsistence, moral guidance, and materials of production, to being a local source for some food and raw materials, and a repository of cultural history. Meanwhile, the environment that the Kelabit inhabit has grown beyond the local; it now extends to the regional, and is becoming ever more global.

Social changes such as these must be seen in tandem with the material changes they bring, as reflected in new forms of housing in the Kelabit Highlands. Villages are no longer centered around the longhouse, constructed to be easily dismantled and periodically moved. And as the concept of the village has changed to one of permanent settlement, notions of structural durability have gained prominence, entailing a new set of material responses to the requirements of constructing a place to dwell. However, new materials come with new environmental relations: metal roofs become hot and noisy; concrete allows for a permanent ground floor; *belian* hardwood and metal bolts reduce maintenance. Sitting in a house in the heat or rain today is a different physical and social experience than was sitting in the traditional house with its insulating thatch.

The trend to individual houses, apparently at the expense of the longhouse, and the desire for durability means that the incorporation of new materials has become engrained into Kelabit society. The social implications of a move away from communal living cannot be discussed in any detail here, but as might be expected, new house shapes are influencing daily routines and interactions. New relations created by the extension of the dwelling environment beyond local forest areas, stretched along logging roads and on to the coast, create an indefinable social and material mix: messy globalism in action.<sup>45</sup> This is not the imposition of an overwhelming external culture.<sup>46</sup> Nor is it a heroic battle against nature.<sup>47</sup> It implies the discretionary adoption of new potentials in the context of a dynamic environment.

In this instance we should not lament the introduction of new materials as the death knell of vernacular architec-

ture.<sup>48</sup> Rather, we should recognize the intimate relationship between the environment and the people who use it as something not limited to the apparently “natural” world of forest materials. The Kelabit who used the resources of the forest in such a successful way prior to extensive contact are precursors to the modern Kelabit doing the same in their environment. New forms of buildings depend on a combination of possibilities that emerge from the development and introduction of

new materials and existing socio-environmental relations, accreted into the local population over current and previous generations. That this requires the Kelabit to be able to deal with chainsaws, petrol, and metal sheets instead of parangs, bamboo and rattan is of no consequence. Dwelling in an environment is a fundamental human activity, and as this example of Kelabit house building shows, this involves continual process of exploration, engagement, and mutual creation.

## REFERENCE NOTES

Thanks are due to the Kelabit people for their hospitality and patience, especially the villagers of Pa’ Dalih. Fieldwork was carried out as part of my doctoral studies at the University of Oxford, where my supervisors, Chris Gosden and Inge Daniels, have both been inspirational and highly influential in my thinking; I gratefully acknowledge their assistance and guidance. Thanks are also due to two anonymous reviewers who helped to improve the argument. My studies were funded by a U.K. ESRC studentship, and my introduction to the Kelabit came through participation in the U.K. AHRC-funded “Cultured Rainforest Project.” This report was written while I was employed by the School of Construction Management and Engineering at the University of Reading, where Rachael Luck has been supportive and ready to discuss ideas. I am also indebted to the State Planning Unit of Sarawak for permission to undertake fieldwork, and the staff at the Sarawak National Museum, and the National Library, for helping me search for and use archival objects, photographs and documents.

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11. An account, from the perspective of the early Christian missionaries, is given in S. Lees, *Drunk before Dawn* (Southampton: Camelot, 1979).
12. Some of these practices are described in E. Banks, “Some Megalithic Remains from the Kelabit Country in Sarawak, with Some Notes on the Kelabits Themselves,” *Sarawak Museum Journal*, Vol.4 No.5 (1937), pp.411–37; R.S. Douglas, “An Expedition,” pp.146–48; and T. Harrisson, “The Kelabits of Borneo,” *The Geographical Magazine*, Vol.24 No.1 (1951), pp.32–39.
13. Travel in the Kelabit region was described by the Torres Strait Expedition of 1898–99 (Haddon, *Headhunters*, pp.131–213); in 1903 by Ward (*Outlines of Sarawak History 1839–1917*, p.86); Hose’s 1904 expedition, scuppered when his boat was damaged in rough waters (Hose, *The Field-Book of a Jungle Wallah*, p.190); Moulton in 1911 (J.C. Moulton, “An Expedition to Mount Batu Lawi,” *Journal of the Straits Branch of the Royal Asiatic Society*, Vol.63 (1912), pp.1–104); Schneeberger’s trip in 1939 (W.F. Schneeberger, “The Kerayan-Kelabit Highlands of Central North-East Borneo,” *The Geographical Review*, Vol.35 No.4 (1945), p.545); and Harrisson’s World War II activities (T. Harrisson, “Explorations in Central Borneo,” *The Geographical Magazine*, Vol.64 (1949)).
14. Harrisson, “Explorations in Central Borneo,” p.133.
15. Descriptions taken from R.S. Douglas, “A Journey”; C. Hose and W. McDougall, *The Pagan Tribes of Borneo: A Description of Their Physical, Moral and Intellectual Condition with Some of Their Ethnic Relations* (London: Macmillan, 1912);

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16. The use of post pads under structural supports may be relatively recent, dating to after World War II, as suggested by recent archaeological investigations. See G. Barker, H. Barton, E. Boutsikas, D. Britton, B. Davenport, I. Ewart, L. Farr, R. Ferraby, C. Gosden, C. Hunt, M. Janowski, S. Jones, J. Langub, L. Lloyd-Smith, B. Nyiri, K. Pearce, and B. Upex, “The Cultured Rainforest Project: The Second (2008) Field Season,” *Sarawak Museum Journal*, Vol.66 No.87 (2009), pp.119–84.
17. Lian-Saging, “An Ethno-History of the Kelabit Tribe of Sarawak.”
18. A tool something like an axe, but with the blade set at right angles to, instead of in-line with, the shaft.
19. As described by Ngulun Paran, aged around eighty, from the village of Pa’ Mada, approximately six kilometers from my base at Pa’ Dalih.
20. R. Bulan, in “Boundaries, Territorial Domains, and Kelabit Customary Practices: Discovering the Hidden Landscape,” *Borneo Research Bulletin*, Vol.34 (2003), p.21, wrote that there was a shift from split-bamboo floors to wooden planks around 1900. This is supported by the evidence from Douglas’s visit in 1908, when several hundred people gathered in one longhouse; bamboo would have struggled to support such a weight, so it is most likely that by then the longhouse (at Pa’ Mein) would have had wooden floors.
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22. M. Janowski, “The Motivating Forces behind Recent Changes in the Wet Rice Agricultural System in the Kelabit Highlands,” *Sarawak Gazette*, Vol.64 (1988), pp.9–21.

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24. Bulan, "Boundaries, Territorial Domains, and Kelabit Customary Practices," p.21.
25. This may be why Kelabit houses were sometimes seen as "flimsy" (Moulton, "An Expedition to Mount Batu Lawi," p.55); and of "a very uncertain construction" (Banks, "Some Megalithic Remains from the Kelabit Country in Sarawak," p.432).
26. See T. Ingold, *The Perception of the Environment: Essays on Livelihood, Dwelling and Skill* (London: Routledge, 2000), especially Chapter 10, "Building, Dwelling, Living: How Animals and People Make Themselves at Home in the World," pp.172–88.
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28. P. Oliver, ed., *Encyclopedia of Vernacular Architecture of the World (EVAW)* (Cambridge: Cambridge University Press, 1997), p.40.
29. H. Glassie, *Vernacular Architecture* (Bloomington: Indiana University Press, 2000), p.31.
30. *Ibid.*, pp.28–29.
31. G. Ritzer, *The McDonaldisation of Society* (London: Pine Forge Press, 1993); D. Miller, *Material Culture and Mass Consumption* (Oxford: Blackwell, 1987); and A.L. Tsing, *Friction: An Ethnography of Global Connection* (Princeton, NJ: Princeton University Press, 2005).
32. Miri, the nearest large industrial town, is located on the coast, about a ten-hour truck drive away. However, access to it depends on logging companies maintaining the roads, which are liable to collapse in frequent, heavy rains. Generally, the companies are willing to do this as long as they are active in an area, but once their license is complete, they leave, and their roads are abandoned to the elements.
33. Noticed and recorded in Banks, "Some Megalithic Remains from the Kelabit Country in Sarawak," pp.411–37.
34. M. Janowski, "The Motivating Forces behind Recent Changes in the Wet Rice Agricultural System."
35. There has been substantial political effort to force the Penan to settle and begin farming. Many suggest this has to do with the Malaysian government's desire to effectively divide up the land for logging licenses. To accomplish this, they need to deal with local people within a fixed area, rather than with people wandering over large areas of the forest, as the Penan are wont to do. See M. Colchester, *Pirates, Squatters and Poachers: The Political Ecology of Dispossession of the Native Peoples of Sarawak* (London: Survival International, 1992); and Bulan, "Boundaries, Territorial Domains, and Kelabit Customary Practices," pp.18–61.
36. Since the area was part of a British colony until the 1960s, most Kelabit measurements are in imperial units.
37. R. Waterson, *The Living House: An Anthropology of Architecture in South-East Asia* (London: Thames and Hudson, 1997), pp.176.
38. *Ibid.*, pp.74–88.
39. Several villagers remarked independently on the beauty of the Swiss Alps. It seems this is seen as the epitome of attractive countryside, with its snow-peaked mountains, abundant forests, and fast-flowing rivers.
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42. *Ibid.*, p.122. Westernization is portrayed in this example, and generally throughout the book, as an "impacting external culture": aggressive, imposing and uncompromising.
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46. Waterson, *The Living House*, p.46.
47. Glassie, *Vernacular Architecture*, pp.32–35.
48. Oliver, ed., *EVAW*, p.261.