

‘Death and His Body-Servant’: Health, architecture and missionary endeavour at the Anelcauhat Mission House, Vanuatu

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ABSTRACT

Remaining healthy was a major consideration for both indigenous and European peoples in the New Hebrides (now Vanuatu) during early contact. While local communities were often devastated by introduced disease, new missionaries sought practical ways to overcome the impact of tropical ailments that they considered to undermine the effectiveness of their activities. From the early 1850s onwards, Presbyterian missionaries in the southern New Hebrides began to construct ‘healthy’ homes, of which the surviving masonry mission house at Anelcauhat, Aneityum (1852–3) forms the earliest standing example. This paper draws on the results of both above- and in-ground archaeological recording to examine how the surviving structure reflects nineteenth-century ideas about illness and well-being before discussing the wider trajectory of such house construction, and associated matters connected with local communities, health and architecture that potentially impacted on missionary endeavour.

Keywords: Health; Missions; Buildings archaeology; Vanuatu; Oceania

INTRODUCTION

In August 1850, missionary John Inglis visited the early Presbyterian mission station at Anelcauhat in the New Hebrides (now Vanuatu). Arriving on board the *HMS Havannah* from New Zealand, he was welcomed by two members of the settlement, including the station’s first European missionary, John Geddie, and a catechist from the Cook Islands. Intending to join the enterprise at a later date, Inglis was struck by the men’s poor state of health, which he subsequently recalled in stark terms:

Mr Geddie came on board, accompanied by a Rarotongan teacher. He [Geddie] had been suffering for some months from fever and ague, and...

was looking very ill; the teacher was still worse and died a few weeks thereafter...[They], with their pale faces and sickly haggard appearance, were such a contrast to the fresh, vigorous-looking men on board the man-of-war, that it looked as if we had been boarded by Death and his body-servant the moment we came to anchor, and if both were saying to me, ‘If you want to stay here this is what you may look forward to’ (Inglis 1887: 56).

As Inglis was made graphically aware, disease and ill-health were commonplace aspects of existence in the New Hebrides, and other parts of Melanesia, during early contact between indigenous and European peoples in the nineteenth century. First and foremost, many local populations underwent dramatic decline with exposure to introduced European diseases (Spriggs 2007). However, incomers such as missionaries were also affected, finding their endeavours curtailed by tropical afflictions, primarily malaria, to which they similarly had little resistance and limited or no understanding of how they were transmitted (Inglis 1887: 55–62; Miller 1975: 47–9; Miller 1978, 1986). In the 1850s, missionaries at Anelcauhat and elsewhere on the island of Aneityum sought to improve their survival from sickness – and the consequent effectiveness of their work – through the construction of ‘healthy’ mission houses that took account of Western medical views about the causes and spread of disease (Inglis 1887: 55–62).

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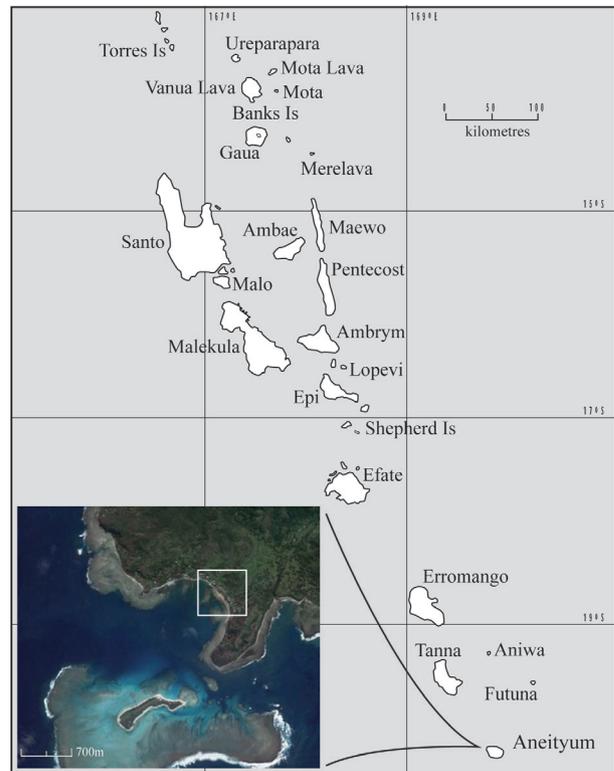
Of particular concern to early missionaries was the widespread and often deadly impact of maladies known by them as ‘fever and ague’ (Inglis 1887:56). Referring to symptoms that respectively included a high body temperature and intermittent fever, these are likely in a New Hebridean context to have been linked predominantly with the onset of malaria. Prior to major medical breakthroughs in the later nineteenth and early twentieth centuries, such afflictions were believed to have been caused by exposure to an unseen emanation known as miasma or ‘bad air’ that especially thrived in still, damp and unclean environments (Porter 1997:259; Thorsheim 2006). Missionaries in the New Hebrides consequently used improvements in architectural design linked with ventilation, dryness and cleanliness to create what they described as ‘healthy’ dwellings (Inglis 1887:55–62).

This paper seeks to examine the phenomenon with reference to recent investigations of the surviving mission house at Anelcauhat on Aneityum – built for missionary John Geddie and his family in 1852–3 – which is now Vanuatu’s oldest standing European building. Archaeological work between 2012 and 2015 encompassed both systematic examination of the standing structure (Jones 2013) and targeted excavation (Zubrzycka *et al.* 2018). The investigations formed part of a larger project undertaken by The Australian National University and the Vanuatu Cultural Centre, which sought to examine a variety of aspects of Anelcauhat’s missionary and pre-missionary past (see Bedford *et al.* 2016, 2020).

MISSIONISATION IN THE NEW HEBRIDES

The New Hebrides is an island archipelago that stretches almost 1000 km from north to south in southeast Melanesia (Figure 1a). Known as Vanuatu since Independence in 1980, it has a hot and humid climate ranging from tropical in the south to equatorial in the north (Siméoni 2009). Christian missionary activity in the islands began in the late 1830s and became increasingly extensive in the following decade. Initially taking root in the southern New Hebrides, it gradually spread to other islands in the late nineteenth and early twentieth centuries. Christianity is currently strongly embedded in ni-Vanuatu society, co-existing with traditional beliefs and practice represented by *kastom* (Flexner 2016:9, 12).

Early missionisation in this part of the Pacific developed at a time when there was general anxiety about the physical well-being of both European missionaries and island communities. Initial missionary contact occurred simultaneously with widespread engagement between local peoples and other newcomers, including sandalwood traders and whalers connected with global mercantile networks. The introduction of ship-borne diseases such as measles, whooping cough and smallpox devastated local populations, particularly between the 1830s and late 1860s (Miller 1986:29–30), and contributed to wariness of



Figures 1a and 1b. Location of Anelcauhat, top (1a), and the mission house [1], printing house site [2] and stone church [3], below (1b). The northern boundary of the mission station is represented by a dashed line (S. Bedford).

outsiders by island communities. Suspicion was frequently applied to missionaries, whose promulgation of different belief systems often in opposition to traditional *kastom* further added to layers of mistrust.

Many European missionaries similarly came to view contact with the islands as a threat to their well-being. Prior missionisation in the South Pacific had generally focussed on places with healthier environments, including Aotearoa New Zealand, Rarotonga and Samoa. With high levels of endemic local disease such as malaria – at that time known

as fever and ague – the New Hebrides came to be seen as a more forbidding prospect. This perspective was compounded by wider narratives portraying the islands as ‘dark’, dangerous and governed by black magic and death (Flexner 2016: 22).

Early attempts to spread Christianity were strongly impacted by such issues. Initially, Samoan and Rarotongan teachers settled by the London Missionary Society (LMS) in the southern New Hebrides met significant local resistance and many died or were rendered ineffective due to chronic ill-health (Liu’ana 1996; Inglis 1887: 40, 56). European LMS missionaries on Tanna in 1842, and then French Catholic Marists on Aneityum in 1848–50 were similarly forced to leave due either to illness or indigenous populations who blamed them for the introduction of disease (Inglis 1887: 38–41). Adopting an alternative approach, Anglican authorities sought to remove young boys from geographically diverse islands for Christian instruction in New Zealand and, later, Norfolk Island before returning them to Melanesia to spread the gospel (Flexner 2013: 15), although many died of illness while overseas (Hilliard 1978: 63, 185; Ross 1983: 8–9, 16–17, 34–5). During the early stages of proselytisation in the New Hebrides, Presbyterian missionaries alone persisted in creating a network of permanent mission stations, seeking strategies that would enable them to survive and function healthily.

In 1848, Anelcauhat on Aneityum became the first station to house a Presbyterian missionary family, that of John and Charlotte Geddie. Aneityum was the southernmost inhabited island in the New Hebrides, and Anelcauhat was considered the healthiest of those places previously settled by Polynesian catechists (Liu’ana 1996: 48). From this base, activity expanded to other parts of Aneityum, and then other islands. By 1870, further Presbyterian stations in the south included Futuna, Tanna, Aniwa, Erromango, in the centre on Efate and Nguna and in the north on Santo (Miller 1985: 4). At its peak in 1903, the New Hebrides Presbyterian mission employed 36 missionaries throughout the islands (Miller 1986: 6).

Presbyterian missionisation promoted both the conversion of souls and other ideas linked with western ideology and practice (Flexner 2013: 15). Purpose-built architecture such as mission houses, churches and schools played a critical role in spreading these perspectives, helping to structure as well as reflect ideas, and providing specific locations in which such concepts could be taught. Mission houses, in particular, were central to this process, often being the first structures erected in a mission station, and utilised in adaptable ways that combined a multitude of functions – domestic, religious, educational and other. Through such mechanisms as construction, layout and appearance, as well as use, they modelled a multitude of ideas, including those linked with family structure, gendered activity and Victorian domesticity (Choi 2014; Flexner 2013: 16; Latai 2014). In a Pacific context, they also formed fundamental parts of an idealised and tamed landscape

within missionary complexes, where western concepts of tidiness and order were imposed on what was otherwise considered to be ‘uncivilised’ wilderness (Flexner 2013: 16).

Archaeological enquiry about missionisation in the New Hebrides has to date only focussed on Presbyterian mission stations and their local contexts in southern Vanuatu. In addition to Aneityum, work has been undertaken on Erromango, Tanna and more recently, Aniwa. Investigation has included the excavation of mission houses at Dillon’s Bay and Potnuma on Erromango, and at Kwamera on Tanna (Flexner 2016). Standing building remains have also been examined as part of the investigations (Jones 2013; Flexner *et al.* 2015; 2016; Zubrzycka *et al.* 2018). Integrated approaches combining evidence from standing fabric with associated excavated material can be seen as having particular potential for gaining insights into past activity and meaning.

ANELCAUHAT MISSION STATION AND THE DESIRE FOR A ‘HEALTHY’ HOME

Anelcauhat mission station is situated at the southern end of Anelcauhat Bay. Established by two LMS Samoan catechists, Simeona and Pita, its numbers increased with the arrival of John and Charlotte Geddie and two other European families in mid-1848 (Inglis 1887: 42; Miller 1975: 30–32). For a short period, the mission neighboured a sandalwood operation and the soon-to-be-abandoned French Marist mission, both located in the northern part of the bay (Inglis 1887: 41–2; Turner 1861: 434). At this time, Aneityum supported a large indigenous population although there were already signs that introduced disease was having a significant impact (Spriggs 1997: 253–4).

Prior to departing his homeland in Nova Scotia, John Geddie had trained in relevant missionary skills including house construction, printing and medicine. Staying in Samoa *en route* to Anelcauhat, he undertook additional preparation including learning about ‘native diseases and their treatment’ and creating a prefabricated timber frame for a residence (Miller 1975: 16, 26). The Geddies and other missionaries accompanying them were initially housed in the ‘little plastered cottage of three rooms’ vacated by the Polynesian teachers (Turner 1861: 433, 457). One week after arrival on Aneityum, John Geddie began erecting a mission house that drew on other knowledge acquired in Samoa (Miller 1975: 41–2; Inglis 1887: 58). Measuring 9.75 × 5.49 m (32’ × 18’), this structure combined the pre-cut frame with wattle and plaster walls, a thatched roof and a floor of broken coral. Other mission buildings were also erected (Miller 1975: 41–2; Murray 1863: 36).

Geddie’s medical knowledge was insufficient to prevent members of the mission from experiencing severe ill-health from soon after arrival. By early 1849, many were suffering from ‘remittent and intermittent fevers’ and those spared were busy tending to the sick (Miller 1975: 47–9). The two other European families soon left the mission for

reasons that included extreme or recurrent illness, one member having been close to dying (Miller 1975: 49–57). Geddie, himself, had at least two debilitating bouts of sickness variably described as island fever and ‘fever and ague’, including when John Inglis personified him as ‘Death’ during the visit of *HMS Havannah* in July 1850 (Miller 1975: 55, 71; Inglis 1851: 56).

Like Geddie, Inglis had participated in medical study as part of his missionary training and also had artisanal skills, having worked as a stonemason before ordination. Visiting the New Hebrides before requesting formal transfer from his position in New Zealand, he expressed concern at the extent to which the climate was affecting missionary work. After temporarily returning to Auckland, he researched approaches that would alleviate the impacts of illness on himself and missionary colleagues after his relocation was approved. To this end, he consulted British military doctors with experience of tropical climates, and also drew on medical knowledge he had previously acquired in Scotland (Inglis 1851: 29; 1887: 55–62; Parsonson 1990).

Inglis considered the main threat in Aneityum and the New Hebrides to be from fever and ague (Inglis 1887: 43). In the nineteenth century, these terms referred respectively to the onset of ‘increased heat, frequency of pulse, loss of appetite, general debility, pain in the head and a difficulty in performing some of the vital or animal functions’ and an intermittent fever that included ‘weariness of the limbs, coldness of the extremities, stretching, yawning, with sometimes great sickness and vomiting; to which succeed shivering and violent shaking’ (Buchan 1821: 128–43). In a New Hebridean context, these can be largely regarded as symptomatic of malaria, although potentially also encompassing other conditions. Prevailing miasmatic theory in Western medicine held that a major cause of fever and ague was ‘bad air’, or miasma, which derived from decaying organic matter that emanated from swamps, standing water and other sources (Porter 1997: 259). Miasma caused the bodies of those who came into contact with it to internally decompose and ferment (Thorsheim 2006: 10). It was considered especially prevalent in regions of luxuriant vegetal growth such as the tropics (Thorsheim 2006: 11), and particularly dangerous when concentrated in closed or still atmospheres – such as inside buildings (Porter and Porter 1988: 159; Buchan 1821: 68–70).

Western antidotes to the threat of miasma were many and varied. Woollen garments were thought to prevent absorption through skin pores and also remove poisons from the body through heavy perspiration. Consuming red wine was a popular recourse in some countries, sanctioned both by tradition and medical opinion (Snowden 2006: 34). However, as miasma was considered an environmental problem, environmental solutions to its impacts were also proposed. At Aneityum, Inglis suggested an architectural response, applicable to the setting and design of mission houses (Inglis 1851: 31).

As later published in the 1880s, Inglis (1887: 60) suggested minimising the effects of miasma by keeping decaying organic material away from each mission house interior; reducing the proximity of moisture; and increasing the flow of air through the building. Specifically, he recommended:

- A dry, elevated and open site;
- construction of a building one room wide, ventilated by casement windows on each side;
- a closely jointed, boarded floor, two feet above the ground; and
- closed foundations, incorporating small ‘windows’ of perforated tin or zinc.

Some of these ideas, including plentiful ventilation and raised floors to prevent direct contact with miasmatic ground, were directly influenced by popular British manuals such as Buchan’s *Domestic Medicine* – studied by Inglis in his youth (Buchan 1821: 68–72, 118–19; Inglis 1887: 55). However, the concept of a structure one room wide with opposing casements was of immediate Pacific origin, being ‘borrowed from some of the Samoan brethren’ (Inglis 1887: 59).

On returning to establish himself on Aneityum in mid-1852, Inglis created a house for himself and his wife Jessie at a new station at Aname, on the north of the island, using these principles. A timber frame of imported materials was erected on top of a stone foundation that was two feet high and which contained ‘two little windows of perforated tin or zinc’ beneath each room. The structure was a single room wide with opposing two-sash, hinged windows to allow the free circulation of air from one side to another (Inglis 1887: 58–9).

Based on missionary residences in Samoa, the Geddies’ earlier, purpose-built dwelling erected in 1848 used some of these concepts, including windows that allowed local breezes to pass through the building (Inglis 1887: 58). However, it was now considered ‘far from being healthy’ having a damp floor in the rainy season and being ‘too small in this warm climate’ (Geddie & Harrington Geddie 1908: 27). According to Inglis, Geddie resolved to erect a new mission house on the same principles used at Aname, although employing masonry rather than timber (Inglis 1887: 59). After stone was obtained from the nearby sandalwood station in November 1852, Inglis helped mark out and lay the foundations before construction was completed by Geddie and Aneityumese helpers in or soon after October 1853 – at which time Geddie wrote, ‘In the site, plan and construction of the building, health has always been kept in view...’ (Patterson 1882: 345–6; Inglis 1887: 59; Miller 1975: 146–9).

Images of the finished structure show a single-storey residence of broadly symmetrical Georgian appearance, with a central front doorway, flanking windows, and a thatched roof that was hipped at each end (Figure 2). The structure is known to have been used until at least the 1930s (Cheesman 1949: 155–8), and had its roof removed in 1941 (Zybrzycka *et al.* 2018: 42). Internal graffiti on an



Figure 2. Anelcauhat mission house, c. 61860–1 (State Library of New South Wales PXA 1056).

internal wall face dated ‘16/8/44’ reinforces the view of general disuse during the latter part of the Second World War.

ARCHAEOLOGICAL INVESTIGATION OF THE ANELCAUHAT MISSION HOUSE

The masonry remains of the mission house currently lie within the modern Presbyterian compound in Anelcauhat village. Still roofless, they are situated close to the foreshore of Anelcauhat Bay, in the southern part of the former mission station complex. They lie within a small open area, which also contains the site of a mission printing house to the northeast. Further north are extensive remains of the stone Anelcauhat Church, erected in 1858–60 (Figure 1b).

Detailed investigation of the mission house took place seasonally in 2012–15. Recording included the hand-drawing of scale ground-plans, all external and internal elevations, and notable details of the standing fabric. Stratigraphic observation guided the formulation of a phased chronology. In addition to excavation in 2013 reported elsewhere (Zubrzycka *et al.* 2018), targeted cleaning in 2015 revealed further detail of associated surface features. Due largely to the well-preserved nature of its masonry, the building retained considerable evidence about the creation of a ‘healthy’ missionary home in the 1850s which is presented here in relation to the main principles set out by Inglis, as well as additional aspects that were identified.

A dry, elevated and open site

Still largely standing to roof height, the building occupies a locally elevated position on a beach terrace running parallel to the Anelcauhat foreshore. It sits towards the southern end of the terrace, which consists of a consolidated sandbar up to 80 metres wide (Hope & Spriggs 1982: 88). Excavations in 2013 revealed a sand-rich soil directly beneath the building’s masonry footings, forming a relatively dry and free-draining surface. To the west, the terrace falls sharply

away towards the foreshore, and a short distance to the east, it similarly slopes down towards lower ground, enabling the run-off of surface water to occur. Further north was extensive marshland known as the Anawau Swamp, considered in the nineteenth century to be a major source of malarial miasma (Inglis 1887: 41). The house lies further from the swamp than the 1860 church and other non-residential buildings within the broader Presbyterian mission station site.

Rectangular in plan, the masonry building remains are orientated approximately north-south, with their front elevation facing west towards the bay (Figure 3). The building’s position at the seaward edge of the scarp is likely to have increased its exposure to local breezes from this direction (Inglis 1887: 58), as well as benefiting from improved drainage away from the building. The rear of the building faces the southeast trade winds. While Inglis believed the latter to have directed miasma from Anawau Swamp towards the Catholic mission premises, contributing to its abandonment on health grounds in 1850 (Inglis 1887: 41–2), the mission house’s position to the south of the marshland could only lead to receiving beneficial breeze.

The full extent of the openness, in general, of the site is unclear other than its proximity to the sea, although Geddie is known to have felled coconut palms around his earlier house (Miller 1975: 41). An illustration published in 1882 also represents land beside the beach as relatively well-cleared (Patterson 1882: frontispiece).

A building one room wide

The surviving masonry outlines a structure measuring a maximum of 17.37 m long \times 5.86 m wide (57' \times 19'3"). The walls are made of shaped coral and basaltic slabs, bonded with a hard, coral lime mortar. All walls above footing level are 465–485 mm (1'6"–1'7") wide. They retain substantial evidence of layout and use, including that provided by door and window apertures; successive layers of wall plaster and whitewash; and other surviving features.

Vertical stubs and scars in the wall plaster represent the position of internal, wattle and plaster partitions which, in combination with the building dimensions, suggest internal spaces generally one room wide. Specifically, they indicate an initial design incorporating a central hallway, flanked by two rooms of equal dimensions to the south, and a similar arrangement to the north – although the northernmost room may have been subdivided at an initial or early stage. The main rooms each measured some 3.67 \times 4.89 m (12' \times 16') internally. The hallway was 1.15 m (3'9") wide.

Vertical scars for a timber wing extending eastwards from the back of the masonry building were recorded on the external east elevation. The external width of this wing, 4.05 m (13'3"), coincided with dimensions provided in 1853 which referred to a single room measuring 5.79 \times 3.96 m (19' \times 13'), creating an overall T-plan (Patterson 1882: 346).

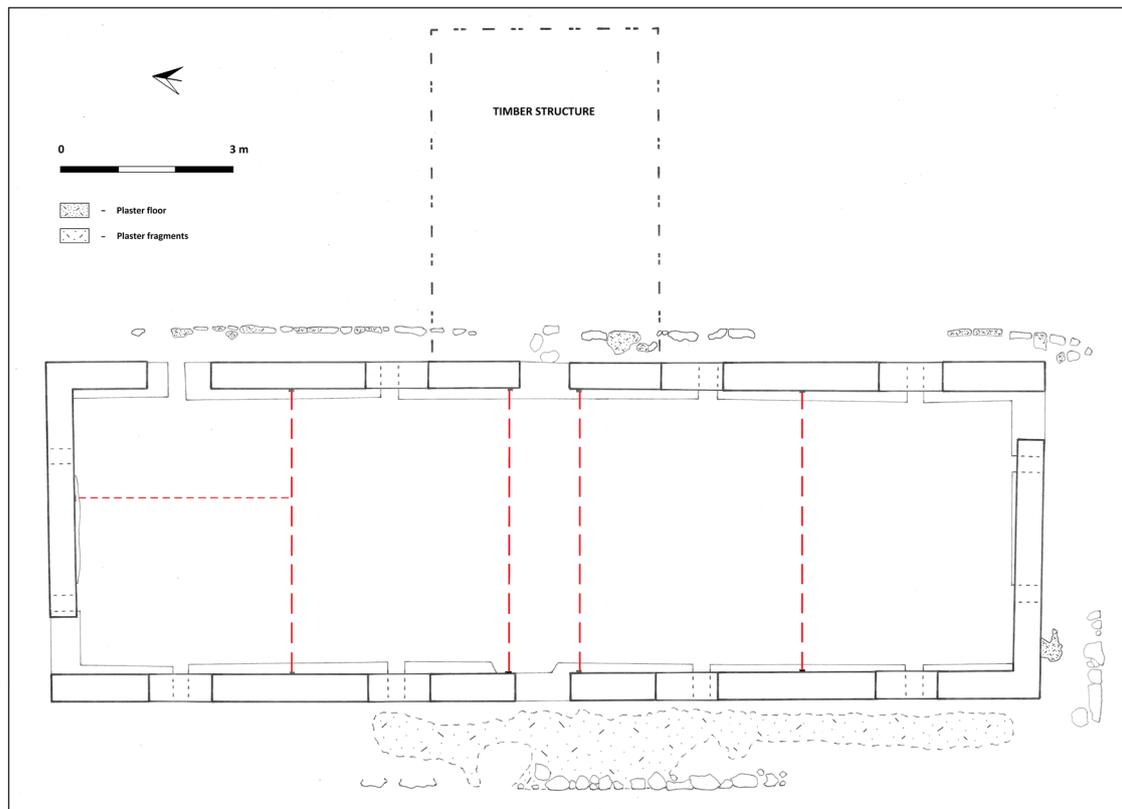


Figure 3. Ground-plan, including position of removed rear or east wing. Removed early internal partitions are indicated by red dashed lines (M. Jones and J. Flexner).

Unlike the masonry element, the position and orientation of the wing may have been less conducive for receiving prevailing through winds. Documentary information may indicate that it was used as a sewing room in which Aneityumese women were taught this skill. If so, this was extended eastwards in 1858 to include a closet for sewing equipment and ongoing work, and a storeroom for cloth (Geddie & Harrington Geddie 1908: 40–2).

Casement window ventilation on each side

Effective ventilation was encouraged by the central arrangement of windows to each room at front and back, and the use of casement windows. The windows directly opposed each other for maximum through-draft, with scars on the rebates indicating unusually large frames some 1.53 m high × 1.07 m wide (5' × 3'6") (Table 1). Confirmation of casements is indicated by the position of the window frames, flush with the external face of the masonry wall to enable full outward opening of each vertical sash. Unlike double-hung sashes, casements maximised ventilation by enabling the entire window to be opened simultaneously. They are known to have been imported from New Zealand (Patterson 1882: 345).

The central position of the timber wing at the rear of the building carefully avoided impeding the regular ar-

range of opposing windows, and consequent through-draft in the masonry structure.

Closely jointed, boarded floor, two feet above ground

The presence of a raised timber floor was demonstrated by high, internally projecting footings to support east-west joists. The position of overlying, north-south floorboards was indicated by the lowermost extent of plaster on all four internal walls, which was at the same general level throughout (Figure 4). The footings of the east and west walls were widest, at 630–660 mm (c.2'1"–2'2"), creating an internal ledge up to 220 mm (c.9") wide to support the joist ends. The 170–200 mm gap between the top of this projection and base of the finished plasterwork likely suggests joists some 150 mm (c.6") high, supporting floorboards 20 mm (c.¾") thick. The base of the plaster on the north and south walls, which would have received the board ends, was insufficiently well-preserved to unequivocally demonstrate close-boarding.

The raised floor separated household occupants from direct contact with the damp earth, from which miasma was understood to emerge and close-boarding, if present, would have impeded miasma from drifting upwards into each room. Excavation in 2013 indicated the footings to

Table 1. Window and door aperture dimensions.

Unit No.	Width (mm)	Height (mm)	Length (mm)	Comment
063	1100	>1370	460	W. elevation, N. end: front window
064	1080	1530	460	W. elevation, mid-N. end: front window
065	980	>1950	450	W. elevation, middle: front door
066	1070	1530	460	W. elevation, mid-S. end: front window
067	1090	1540	470	W. elevation, S. end: front window
068	930	>2090	460	S. elevation, E. end: side door
069	1100	>1100	460	E. elevation, S. end: rear window
070	1080	>1120	460	E. elevation, mid-S. end: rear window
071	880	2200	460	E. elevation, middle: rear door
072	1090	1530	460	E. elevation, mid-N. end: rear window
073	1110	>1400	460	E. elevation N. end: rear window, later converted to door (Unit No. 192)
192	930	2250	460	E. elevation N. end: secondary door
074	970	2200	460	N. elevation, W. end: side door

be 600–660 m (c.2'–2'2") in internal height (Zubrzycka 2014:38–9), creating a possible gap of up to 750–840 mm (c.2'6"–2'9") within the sub-floor.

Plaster levels on the external east elevation indicate that the timber wing had a raised floor at a similar height to that inside the masonry structure.

Closed foundations, incorporating vents

The enclosed base of the masonry walls prevented organic material from accumulating beneath the floor. The only

potential exception was where pierced by opposing, square vents at sub-floor level to stimulate cross-ventilation in the sub-floor. The front and rear elevations were each pierced by four vents, placed directly opposite each other beneath each window (Figure 5). Two further vents each pierced the end walls on the north and south. All vents had relatively consistent dimensions, at 300–320 mm high × 290–330 mm wide, or approximately 1' square (Table 2).

Although no perforated tin or zinc gauze to prevent ingress by organic material was directly evidenced, the interior of each vent was carefully plastered, perhaps origi-

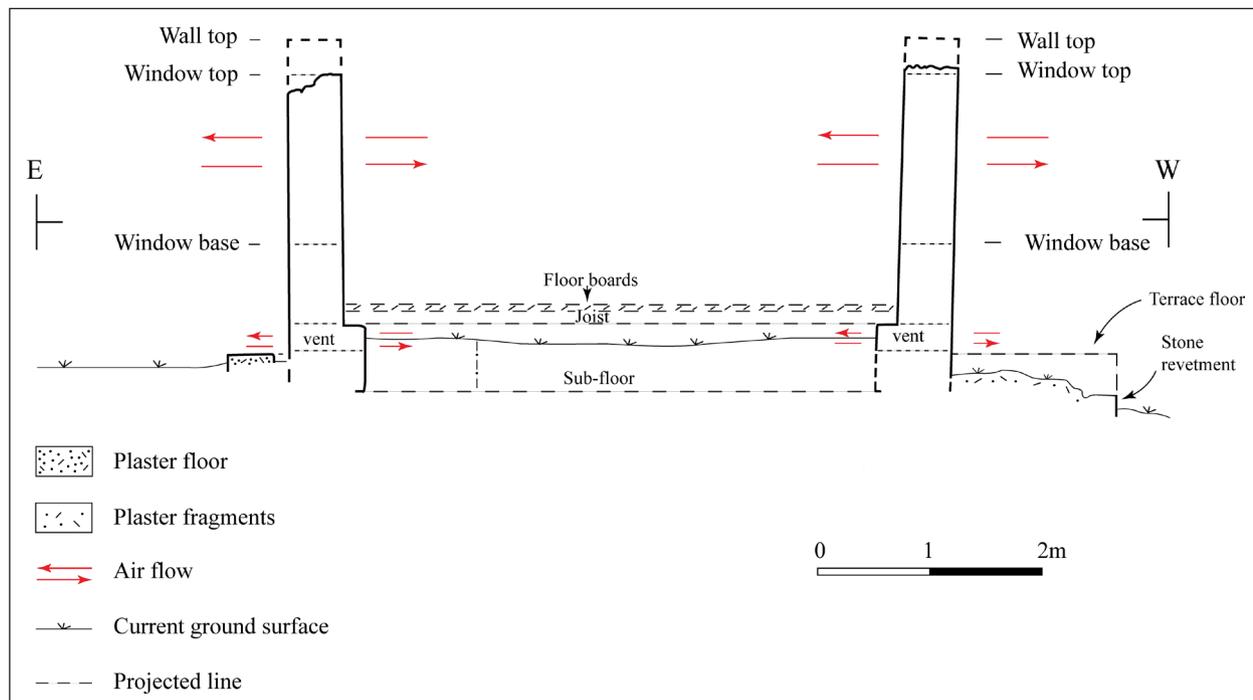


Figure 4. East-west cross-section. The internal floor and west terrace levels are indicated by the lower extent of internal and external wall plaster (M. Jones, L. Prossor and S. Bedford).

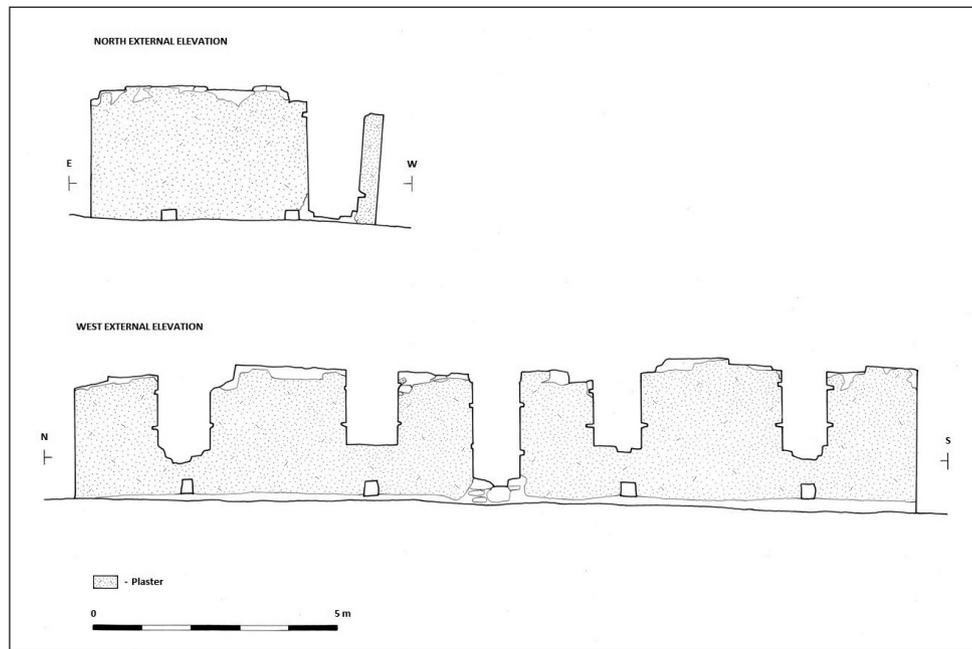


Figure 5. North and west external elevations (J. Flexner and M. Jones).

Table 2. Sub-floor vent dimensions.

Unit No.	Width (mm)	Height (mm)	Length (mm)	Comment
002	300	320	660	W. elevation, N. end
003	310	300	660	W. elevation, mid-N. end
004	300	300	670	W. elevation, mid-S. end
005	290	310	660	W. elevation, S. end
006	310	250	540	S. elevation, W. end
007	310	250	560	S. elevation, E. end
008	290	280	690	E. elevation, S. end
009	330	240	680	E. elevation, mid-S. end
010	320	>300	660	E. elevation, mid-N. end
011	300	>200	660	E. elevation, N. end
012	290	>200	520	N. elevation E. end
013	300	>200	560	N. elevation, W. end

nally assisting to keep a mesh in place. The plasterwork also formed a highly smooth surface, providing less potential for organic matter and other unhealthy material to become lodged.

Low platform or terrace

Investigation additionally revealed a feature around the outer base of the masonry building (Zubrzycka *et al.* 2018: 42–3; Jones 2013) that was not directly mentioned in Inglis' published precepts. This comprised a low platform or terrace around the building consisting of a level, plaster floor, retained or revetted in stone. The external floor was best preserved at the rear of the masonry element

and adjoining part of the south wall, where it survived at exactly the same level as the base of the wall vents. Elsewhere – where the current ground surface was lower than the contemporary ground level as indicated by the base of external wall plastering – it was more generally represented by concentrations of very small plaster fragments, interpreted as the base of the plaster floor that had worn away or been removed.

Around the east and south sides of the building, the external edge of the floor was retained by large and medium coral stones, set on their side edges (Figure 6). In some places, the floor plaster extended down the external face of these stones. Collectively, they defined a feature up to 610 mm (2') wide on the east side of the masonry structure,



Figure 6. Views of surviving terrace revetment outside the east wall (*top*, looking north) and west wall (*middle*, looking south). Also, (*bottom*, looking east) a view of the external facing of the west terrace in relation to the levels of a vent and wall plaster forming part of the west wall (M. Jones).

and up to 1.07 m (3'6") wide on the south. No evidence was noted on the north side, although members of the local community stated that they had previously removed many of the stones. To the west of the building, more substantial terracing survived, defined by a revetment of mortared stonework plastered on its external face. Occurring where the ground sloped away towards the foreshore, this defined a wider platform or terrace, some 1.55 m (c.5') across, which would have contained a plaster floor at least 455 mm (1'6") above the contemporary ground surface at the front of the building.

The platform or terrace contributed to the concept of a dry, elevated and open setting for the building. It ensured that the main masonry walls, including associated sub-floor vents, remained separated and raised from the wider ground surface – and consequently away from any water and miasmatic organic material around the structure. Plaster additionally had a reputation in some quarters as being anti-miasmatic in its own right due to its perceived imperviousness (Corbin 1986: 91), in this instance preventing miasma from seeping upwards around the building from the ground below. Plaster floors could also be swept clean. Contemporary images suggest that the feature broadly coincided with, but in places was probably narrower than, a verandah around the building, which would have thrown water from the hipped roof further away from the base of each wall. As well as retaining the plaster surface, stone revetments likely prevented water from seeping back towards the building.

It is currently uncertain if a similar arrangement existed around the rear, timber wing.

Plastered, whitewashed walls

Plaster was also applied to all external and internal walls of the masonry building. Internal undercoats bore criss-cross keying to bond a finer uppercoat. Whitewash was also applied, contributing additionally to anti-miasmatic effectiveness (Corbin 1986: 91) as well as visually emphasising the cleanliness of the structure. According to Charlotte Geddie the undercoating as well as internal wattle and plaster partitioning were created by Aneityumese workers (Geddie & Harrington Geddie 1908: 31). Such construction activity also functioned as an agent of instruction, not only in practical building techniques but also missionary concepts of cleanliness, tidiness and healthiness. In subsequent years, local Aneityumese built wattle and plaster schoolhouses throughout the island, described by Geddie as ‘white, airy and clean’ (Miller 1975: 211–12, 218–19).

Later phasing

Evidence of later modification to the building included the replacement of the rear wing with a narrower timber structure 1.68 m (5'6") wide, as indicated by secondary scars in the external face of the east wall. The lower limit

of associated wall plaster suggested that this had a raised internal floor at the same height as the previous structure. The external terrace floor at the back of the masonry building was resurfaced at this or some subsequent stage, and evidently extended towards the north and south walls of the new structure. Internally, the room arrangement in the southern half of the masonry building was modified to expand the south room adjoining the hallway. Of currently uncertain date, all of these alterations appear to have maintained the precepts for a 'healthy' home, and incorporating a narrower structure at the rear, may have improved draught through opposing windows.

A later stage of activity is indicated by removal of the narrow, secondary addition at the rear and its replacement by an extension at the north end of the east wall, converting the overall building from a T-plan to an L-plan structure. The northernmost window in the east wall may have been converted into a door to provide internal access to the extension. Documentary evidence currently suggests that this phase occurred as part of a sequence extending the building significantly to the rear and also to the south in the 1890s and early 1900s, when the roof of the structure was converted from thatch to corrugated iron (Anon 1903). A plan created in 1910, shows the L-plan in place (Zubrzycka 2014). This arrangement would appear to have impacted on earlier design concepts, restricting air flow through at least the northern part of the building.

DISCUSSION

Inglis' reference to 'Death and his body-servant' was intended to personify the ill-health of fellow missionary workers. However, he also saw houses as body-servants to illness if not designed to deal with the threat of miasma. Physical investigation of the mission house at Anelcauhat demonstrates the extent to which perceived remedies were accommodated in the early 1850s and perhaps maintained through at least much of the century within the same building. The focus on ventilation, raised floors, elimination of rising damp and a general concern for dry, free-draining surfaces surrounding the house are all exhibited. These approaches operated within broader design concepts linked with Enlightenment ideas, notably the construction of functional and symmetrical Georgian-style structures that symbolised order and reason (Johnson 2010:183).

Inglis claimed the design of the mission houses at Anelcauhat and Aname to have been a success. The principles used on Aneityum were consequently promoted for use elsewhere in the New Hebrides as Presbyterian missionaries established stations on other islands (Inglis 1887:59–60). Ideas may have been initially spread through the personal involvement of Inglis and Geddie in house construction for other missionaries, such as John G. Paton and John Matheson on Tanna in 1858. They are also likely to have been supported by the preparation of house frames and other structural elements by missionary-trained carpenters

on Aneityum (Miller 1981:26–7; Paton 1889:106; Miller 1975:246). Indeed, Paton mentioned that soon after arriving on Aneityum *en route* to Tanna he went to Inglis' station on the north coast at Aname and that: 'As he was making several additions to his house at that time, we received for the next few weeks our first practical and valuable training in Mission house-building' (Paton 1889:105). Unfortunately, as Paton ruefully notes of both his and the Mathesons' houses on Tanna, 'we learned when too late, that both houses were too near the shore, exposed to unwholesome miasma, and productive of the dreaded fever and ague, – the most virulent and insidious enemy to all Europeans in those Southern Seas' (1889:106–7).

In conjunction with historical information, recent archaeological investigation in southern Vanuatu has started to provide information about the adoption of some of these ideas beyond Aneityum. On Erromango and Tanna, early houses such as those of George and Ellen Gordon at Dillon's Bay (1861); and James Gordon at Potnuma (1868) are of similar or narrower width to the masonry element of the Anelcauhat mission house (Flexner 2016:26–31, 42–5, 161), suggesting that they adhered to being a single room across. A larger example, occupied by William and Agnes Watt at Kwamera (1869), evidently began as a small building of narrow width (Flexner 2016:98–101). Investigated buildings were generally orientated with their main elevations facing east or west, looking out towards the sea. At least one building, at Dillon's Bay, was erected on a flat terrace with its front side revetted with stone. Mortared stone footings at Potnuma probably supported a raised floor, with gaps in its front elevation possibly representing the position of large sub-floor vents rather than door and window apertures.

Investigations in 2016–19 on the substantial remains of John and Mary Paton's house on Aniwa have revealed similar features. Begun in 1866–7, this building was of narrow width (5.35 m or 17'6" across), faced westwards towards the sea and incorporated stone footings and vents to accompany a raised floor (Jones and Bedford unpublished data). As at Anelcauhat, the ground sloped away directly to the west of the building, providing drainage and greater exposure to air currents in this direction.

One variation to those on Aneityum represented by these buildings was their siting on higher ground away from the coast. This had occurred in reaction to the ongoing, and sometimes deadly illness experienced by some of the occupants of the earliest 'healthy' houses. Among the sufferers was John Geddie, who in spite of his new residence continued to experience severe bouts of fever and ague, including two occasions when he retired to small Inyeuc Island just off the coast of Anelcauhat for recovery. He eventually departed Anelcauhat in 1869, in broken health (Miller 1975:187, 214; Patterson 1882:500–1).

The first house to be built on higher ground was evidently that of John Paton on Tanna, who after the death of his first wife and child at Port Resolution in 1859 had con-

cluded ‘that health could only be found on the higher levels, swept by the breath of the trade winds’ (Paton 1889:175). John Matheson at Imua on Tanna (1860), and George and Ellen Gordon at Dillon’s Bay on Erromango (1861) soon followed (Flexner 2016: 80; Robertson 1903: 72–4). After Inglis himself erected a new dwelling on higher ground – probably his retreat or ‘sanatorium’ at Lolan-napij, constructed after his return from overseas furlough in 1863 – no missionary is said to have again built a house ‘in the fever-beds by the swamp or shore’ (Paton 1889:175; Inglis 1887: 193–4).

The extent to which this shift was based on overseas perspectives or other sources is currently unclear. In 1840, the British Army in Jamaica had begun to house its garrison at altitude specifically for health reasons (McNeill 2010: 79–81), and in the early 1850s, New Zealand’s Anglican Bishop, George Augustus Selwyn, advised Inglis to find an elevated spot near the centre of Aneityum ‘free from malaria’ to live healthily all year round (Inglis 1887: 57).⁶ However, Paton records being previously informed by a Tannese chief: ‘No Tanna-man sleeps so low down as you do, in this damp weather, or he too would die. We sleep on the high ground, and the trade-wind keeps us well’ (Paton 1889: 128).

Following this change, Inglis felt able to claim in 1887 that the improved health of missionary families in the New Hebrides in previous years was due in large measure to the greater care in adopting the principles of a ‘healthy’ home (Inglis 1887: 60). Although miasmatism was steadily replaced by germ theory and other advances in medical knowledge during the later nineteenth century, in the case of malaria it was only in the 1880s that parasites known as *plasmodia* were isolated as the cause; in 1898 that mosquitoes were conclusively identified as the means by which this illness was transmitted to human beings; and not until the First World War that the latter became medical consensus (Snowden 2006: 36–45). In practical terms, Inglis’ emphasis on dry and well-ventilated buildings may have been inadvertently effective by reducing the prevalence of mosquitoes and the consequent transmission of malarial disease within the domestic environment. At Anelcauhat, the indications are that adherence to the original principles was maintained until at least around the turn of the century. However, the wider chronology of design change to missionary dwellings in the later nineteenth century requires further investigation, particularly with the greater use of imported, pre-cut or prefabricated structures as the century progressed.

The primary aim of ‘healthy’ homes as expressed by

6 It is unclear if the reference to ‘malaria’ in this context is based on Selwyn’s terminology in the 1850s or Inglis’ later perspective, or both. The word malaria, meaning ‘bad air’ in Italian (Snowden 2006: 11), was used in nineteenth-century Britain as a synonym for miasma (e.g. MacCulloch 1827) before becoming more precisely ascribed to the disease now known as malaria as medical knowledge increased.

missionary sources was to enable energy and focus to be placed on spreading Christian ideas rather than on recuperating, looking after family members or dealing with low morale. However, in the New Hebrides missionary health was also important for other reasons in relation to the effectiveness of their work. According to missionary and other sources, local beliefs on Aneityum and other islands considered illness to be caused by spirits or ‘natmasse’, invoked by powerful individuals within local society referred to as ‘disease-makers’ (Miller 1975: 47; Geddie & Harrington Geddie 1908: 29; Flexner 2016: 22, 63, 164). Missionary sickness consequently demonstrated the power of such deities over the Christian god, inhibiting conversion and the acceptance of other ideas by local peoples (Flexner 2016: 11, 161). Conversely, if health was maintained, it helped to demonstrate the superiority of missionary perspectives (Flexner 2016: 52). The latter was particularly true within the context of widespread and devastating epidemics affecting local communities.

Maintaining health inside a missionary house may have been especially important. Missionary writings also record that if an Aneityumese person became ill they were removed from their residence and placed under an alternative structure, to prevent bad spirits from occupying the home (Miller 1975: 67, 90). Even allowing for exaggeration in the sources, it is likely that should missionary houses have been kept illness-free, they would have been seen as having greater spiritual safety and more effective in the promotion of the many ideas for which they acted as models.

Missionaries themselves were highly aware of the intersections between buildings and health in the process of conversion, including in the practice of western medicine. Mission houses held medicine chests and often acted as dispensaries for local people. Skills in undertaking both medical care and building construction were regarded as valuable tools for promoting the usefulness of missionaries to local communities, and consequently the effectiveness of their work (Inglis 1890: 79). The Anelcauhat mission house advertised both knowledge-sets, forming ‘the great centre of attraction’ after its construction, including for local people seeking medical help (Geddie & Harrington Geddie: 1908: 33).

Perceived missionary power in relation to health caused friction. Partly as a result of this, missionaries were sometimes cast as creators of the illness and death that devastated many communities. On Aneityum, the local population declined from an estimated 4500 people prior to contact to less than 1300 by the late 1870s, and continued to fall dramatically after that date (Spriggs 2007; Steel 1880: 127). Some members reacted by engaging in responses that included burning missionary dwellings. John and Charlotte Geddie’s earlier house was threatened with fire (Miller 1975: 98–9), and the stone Anelcauhat Church had its roof burnt in 1861 probably in response to a measles epidemic, leading it to be partly rebuilt (Miller 1975: 260–73)

– an event that remains evident in the building's current fabric. Excavations of George and Ellen Gordon's house on Erromango have similarly encountered evidence that it was put to fire at some stage after its missionary occupants were killed, having been blamed for causing illness during the same outbreak (Flexner 2016: 35–6; Miller 1975: 264). Just as influences on the initial design of 'healthy' mission houses were diverse, emanating both from Europe and earlier practice in Samoa, these actions reflect the complex agencies impacting on mission buildings in the New Hebrides, and the many strands of interaction that occurred between health, architecture and missionary endeavour during this period of early contact.

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