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Abstract

The Relocatable House

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This proposal, citing three regional Queensland vernacular buildings as case studies, will evaluate the social, environmental and architectural benefits of relocatable building stock.

With the imperative for environmental responsibility, a recycling industry has emerged, manifesting itself in a variety of ways regionally. In Queensland, Australia, one of these manifestations is the "removal house" industry.

The basis of this industry is the "Queenslander". Its' timber framed construction enables cost effective removal of a house from its' site and its' relocation to another site. This generates an exciting array of possibilities, encompassing cost and environmental benefits, architectural possibilities of improvement and reinterpretation, and historical continuity through reuse.

The flexibility innate in this type of construction and the suitability for transportation allow for re-configuration to suit the new user and readaptation to a new site as illustrated by the three case studies.

Perhaps future housing designs should consider similar structural themes allowing for the re-transportation and manipulation of homes to meet modern day needs?

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The Relocatable House

Introduction

Over half of the world's consumed energy currently exists in building and associated industries and transport. The re-use, renovation and re-adaptation of existing vernacular housing offers a sustainable alternative to building, allowing for the re-location, manipulation of function and form for the contemporary user.

Australia's western history is relatively short. Changes to the continent and culture have been rapid over two centuries and continue to be so, with an ever increasing population and a consumer culture that demands individual attention. Price (1998:vii) suggests that 'movement is implicit, together with change, of the surrounding conditions existing at the time'. This is pertinent, both globally, and, for the purposes of this study, locally to Queensland.

The intent of this paper is to illustrate this change and movement through an analysis of the removal house industry in Queensland, an industry bound with social and cultural history and embodied in a vernacular building type. [It is important to note here, that the timber vernacular home was not designed as a portable house in the sense of the caravan or trailer]. It will examine this phenomenon (the practice of detaching the body of a house to the back of a semi-detached vehicle, and moving and fixing it to a new location), together with the associated benefits, as a potential model for future housing. Social, cultural and economic factors will be identified and examined in order to understand the conditions within which this practice is successful. These will be illustrated through three case studies.

Queensland and its vernacular housing

South-east Queensland is located in the sub-tropics. When first settled in the early 1800's, it was apparent that timber, predominantly hoop pine and eucalypt hardwood, was in abundance and, suiting the sub-tropical climate, subsequently became the standard material used in vernacular residential buildings. Gregory (1994:3) writes, 'economy- the quantity of available materials at low cost and ease of construction- has been identified as an important factor in the popularity of the basic style of the Queensland house. This had another dimension, in the thrifty use of the basic materials.'

Commonly referred to as 'Queenslanders', typical Queensland houses were built from timber and corrugated iron, raised from the ground and perched on stilts, with a pyramid

type roof and surrounded, or partially so, by verandahs. This accommodated for environmental conditions; providing protection from torrential summer rain and capturing cooling breezes. This model was widely adopted, then adapted or elaborated in later versions of the Queensland house. Adoption by the Queensland Housing Commission for programs to economically house the population assisted the perpetuation of the distinctive housing type.

The experience of habitation has resulted in a collective memory due to the domination of this vernacular over more than a century of western occupation of Queensland. The poetic and sensory nature of the Queensland house has been explored through literature, art and contemporary architecture.

The quality of light and patterning shadows on rich timber floors, decorative motifs, alike, yet subtly different between rooms and houses, the cladding modules of horizontal and vertical timber sticks and lofty ceilings are elements of detail and form from a rich palette. Eating watermelon on the front steps, children riding tricycles around the spacious verandah, thundering footsteps of sibling chases, lazy, hot afternoons on the verandah and the drumming of sub tropical rain on an iron roof are representative of experience and memory of occupation of this housing type.

The Resourceful Pioneers

'Moving house has been a feature of life in Queensland from the days of the first convict settlement at Redcliffe. Prefabricated huts were dismantled and moved up the river to Brisbane when the settlement was relocated from Redcliffe in 1825. Later in the century, the use of stumps allowed a house to adapt to a different topography; the old stumps could be cut to the requisite height or new ones procured for levelling all around. Some houses were shifted in a spirit of high adventure. When the Crouch family opened their kiosk and holiday resort on Bishop Island at the mouth of the Brisbane River just before the First World War, their house was moved from McConnel Street, Bulimba by barge to the island. As the resort closed in the 1930's, the house sailed back the same way, which was fully reported in the Courier Mail of 2 May 1934.' (Gregory, 1994:8).

The pioneering spirit can be perceived in the practice of relocating houses. Rapid changes in regional populations and industry demands resulted in the shifting of residences to meet changing needs. Dying mining towns supplied the future residences for burgeoning rural industries. Gold rush towns swelled to thriving cities only to be reduced to ghost towns, the housing often reused by neighbouring cattle or sheep stations. The remoteness of the settlements from the current day technologies increased

the value of embodied resources, in this instance in the form of a ready built house, and generated ingenious solutions for relocation (Figure 1).

Figure 1: Traction engine with store in tow. Stringer,R & M.1986, *A Shifting Town-Glass plate images of Clermont its People,* University of Queensland Press, St. Lucia, Queensland.
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Architectural

'For the vast majority of Australians a house is a thing to own. It is the major member in that partnership of consumer goods' (McKay et al, 1971:13). This is the Australian dream.

The majority of Australians have lived in single housing units, graced with the Indian name of 'bungalow'. This is usually expressed in red brick walls, multi-colored tiled roofs, or constructed from sheet materials, such as weatherboards or fibro, with similar sheeting on the roof. Unlike the American pattern where the wealthy tend to live on the fringe areas of the city and commute to the central business district, in Australia this pattern is now reversed, with the lesser income groups jettisoned to the fringe, hence the Australian sprawl. Tanner, (1976).

Wide suburban streets are mirrored, with rows upon rows of look alike houses set back from their grassy verges, 'each set on its own block of land with a lawn out the front and a garden out the back and perhaps a garage along the side, with a picket or brick fence to divide it from the nature strip and a six-foot paling fence to give some privacy from the Jone's.' (McKay et al, 1971:10).

Public Housing Policies established by the Labour Party shortly after WWII, encouraged the belief that all Australians should own their own home, or at the very least have a home to live in. The State Housing Commissions' built low cost housing for lower socio-economic groups between 1937–1969, these were generally timber-framed constructions, clad in fibrous cement, and roofed in corrugated iron. For these people, unable to compete in the housing market, subsidised housing became the tool of social services.

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Today, in suburban Australia, evidence of Government housing policies of the 1950-60's still exists. It is these homes, these simple timber framed buildings, clad in fibro or weatherboard, raised off the ground and supported on stilts, that provide a resource for future housing. Where currently these houses are demolished, to make way for new development sites, consideration of their re-use should be given.

The Removal House Industry

A number of significant events were driving forces for the transition from a resourceful pioneering circumstance to a thriving industry. Post World War II expectations of casting off the old and embracing the new saw a decline in the construction of this building type and was perhaps the early catalyst for this industry, as vernacular buildings were replaced with their modern counterparts in the 1960's. The Queensland house came to symbolise 'old fashioned' style. Brick and tile houses were favoured by many as the convention and pre-war buildings were commonly hidden with contemporary cladding. Despite this trend, others still valued the history and quality embodied in the Queensland house.

When a development boom in the 1970's coincided with a 'vigorous broadly-based conservation movement' (Evans, I. 1994:101) in Queensland, the practice of house removal and relocation accelerated. Sites pegged for development were relieved of their structures making them available for relocation to new sites. This availability, in combination with economic, environmental and architectural benefits drove the development of the modern removal house industry.

This activity is not solely restricted to the State of Queensland, it also occurs in other Australian states, such as Western Australia, New South Wales and Tasmania. In these states fibrous cement houses were built as a response to the increase in migrant population in the late 1940-50's, and returning veterans from World War II. Families were faced with insufficient housing, a lack of materials, and little funds. They were forced to build their own homes, and due to the cost of materials, timber, fibrous cement sheeting, weatherboard and corrugated iron were generally used. The State Housing Commissions', built low cost housing for the lower socio-economic groups in the mid to late '50's, these were generally timber-framed constructions, clad in fibrous cement, and roofed in corrugated iron. The use of this type of construction has enabled the removal and relocation of timber framed dwellings to occur in a number of Australian states, and at a very low cost, can provide the new owner (assuming they have land) with a home within weeks.

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In Western Australia alone, large timber extractive industries, and state government authorities such as Conservation and Land Management, (C.A.L.M.), currently hold in stock, un-occupied timber houses that are for sale.

Economic Rationale

Today, housing options are limited for prospective new homeowners. The speculative house industry presents house costs, which are difficult for architects or designers to compete with. For those with an appreciation for the history and quality of the Queenslander, removal is an alternative, competing on far more competitive financial rationale. The economic benefits of reuse through relocation are that for the removal costs, relocation costs, upgrading to meet current standards, and required modifications, the result is a hand made, crafted dwelling from high quality materials, at a much reduced cost compared to other current low cost housing alternatives in Queensland.

The current cost of relocating an average Queenslander, consisting of two bedrooms, family/dining room, kitchen and bathroom ranges between $A8-12,000 for re-siting and attachment to stumps. Other modifications add to this cost.

Environmental Benefits

The impact of western occupation on the surface of the Australian continent has, in a relatively short time, been devastating. Land degradation through overuse and the unfortunate practice of clear felling has changed the face of a once abundantly forested environment. The population continues to rise and the demand for affordable housing is high. The environmental benefits of this system as a form of reuse and recycling are obvious and far better than the common practice of demolition and salvage. Careful matching of house and site can minimise required modifications. Additionally, this house type can sit lightly on a site as the stilts allow uninterrupted flow of land below the building platform. With the depletion of raw materials, the recycling of building materials becomes more relevant. ‘One of the most significant contributions that buildings can make to the reduction of greenhouse-gas emissions is to reduce their consumption of non-renewable resources through energy efficiency and improved conservation.’ (Richardson,H & Harris, J. 2000:44).

The use of recycled houses obviously conserves valuable timber and other environmentally expensive resources. Houses can and are reused several times and 'construction time’ can be a matter of one to two weeks from start to occupation. The opportunity for the demolition and salvage of current housing has been reduced due to practices such as use of adhesives and of non-recyclable, composite timber products.

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Material, Structure and Building Techniques

The building construction of Queensland vernacular timber houses relied on carpentry for fixings and tie down resulting in a robust, integrated structure. Physically, these buildings are relatively lightweight. They consist, generally, of timber stud wall framing, morticed to the floor structure, timber joist floor frame with tongue and groove flooring, clad with timber weatherboards or fibrous cement with a timber roof structure and corrugated galvanised iron roof sheeting. The junction details and integrated bracing provide a strong, light structure, which is capable of some movement and deflection when stressed, as occurs in the removal and transportation journey.

An opportunity exists with this type of building, raised from the ground level, to attach under floor insulation, and due to the large air space between the ceiling lining and roof pitch, easy access is available for the insertion of insulation, ideally sheep's wool or other natural fibre insulation, thereby improving the thermal insulation of the building by over 50%.

Case Studies

The first of these case studies describes the key stages of the relocation process, detachment from the old foundations, the move itself and resiting. The second presents a new dynamic in the spatial figure created with three separate structures, a new focus and relationship with external space. The third house is rich in detail and juxtaposition, recognising the clarity of the original structure and the reinterpretation of that structure to its new context and program.

Case study 1: Case Residence

The initial primary motivation for choosing a re-locatable house for the forested block was because of the cost benefits. The cost of removal, relocation and associated upgrades to the house was substantially less than the costs of speculative housing at the time. The owner perceived additional benefits over speculative housing including quality of material and crafting, the richness of its past and the relationship to its new context, and childhood memories of the occupation of similar house types.

The house was halved, moved 150 kilometers and reassembled in a matter of days. Brittle electric wiring required attention. A new waste disposal system and water storage tanks were installed; the minimum required to achieve approved habitable space.

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Case Study 2

Borgelt and Butcher Residence

Once again, this residence, located in the outer suburbs of Brisbane, Queensland, included cost as a primary motivator for relocated buildings. The spatial form, however, sets it apart from Case Study 1. It is a project, which has combined simplicity of the relocation process with a strong sense of community space. Using three separate buildings: two army barracks and a four room cottage, as the major elements to form a 'U' shaped figure ground plan which responds directly to the new context of adjacency to forest, orientation and the desired sense of focus. Little has been changed in the plan or structural forms giving strength and clarity to the idea and also achieving the result within a tight budget.

Case Study 3

Guthrie Residence

This house, located in the Noosa hinterland on the Sunshine Coast in Queensland utilised a simple fibre cement sheet clad house in the Queensland vernacular to test and explore the architectural potential of house relocation. It was moved in two pieces, and, rather than reuniting the two on the new site, a 'wedge' was inserted between them. The wedge; the fragile but dramatic light insertion, is perceived as the dominant spatial event, rich in space, light and detail, particularly when compared with the simplicity of the original house. (Figure 2 & 3).

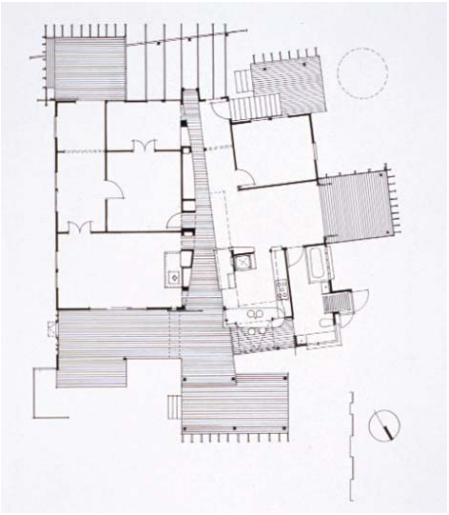

Figure 2
Guthrie Residence Plan
AUTHOR: STEVE GUTHRIE

Figure 3
North Elevation
IMAGE: BARK DESIGN

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Future housing

The nuclear family consisting of two adults and 2.4 children is no longer the norm. We are being confronted with new configurations of the 'family', including sole parents, single occupants, and family configurations involving three generations or more. The boundaries of work and home life are also becoming blurred; the notion of the home-office is becoming commonplace due to the information revolution opening up a range of possibilities. The inflexibility of many existing home models currently restricts the expansion or reduction of the size of the home and its function. With increasing unemployment figures, single parent families equating to half the proportion of married couples with children, longer working hours, stressful lives, reduction in government social benefits, increases in living costs- the family in the 21st century is struggling to cope with these forces, personally, and physically, in the sense of their housing options. In this context, the ability to expand and reduce the 'family' home becomes an interesting notion, as we are faced with the dilemmas of a changing and isolating community and loss of sense of place. Currently, families that outgrow the home (whether this is due to children moving on, divorce, death, disability or old age) are forced to leave their neighbourhoods, friends and community due to the difficulty and cost of house maintenance and increases in the cost of living. The opportunity exists, for the home to swell, through added components, attachments, or additional space such as the re-locatable home as required, and then, when the time comes, for the home to shrink by removing the components, attachments etc. With the re-locatable home, this can be considered to be a relatively easy task. Land can be sub-divided, or alternatively, separate dwellings can be sub-let, and the family and community bonds that have been formed over a lifetime retained.

A project which exemplifies the notion of adding an additional zone to increase the habitable space of an existing residence is Kalhofer and Korschildgen's design for a movable extension to a traditional timber-frame house. The addition is a lightweight and movable studio, which is supported on heavy-duty rollers on a steel track framework, and can be pushed into its required position by two people. The studio is rolled aside in summer to allow light to reach the lower parts of the existing two storey building. In winter, when the temperatures are very low, the studio can be rolled back against the outside wall, to become an integral part of the existing house. The materials are lightweight, with wind- and rain-proof plastic laminates for the outside skin, and heat-insulating wooden panelling inside with an air cavity between the two layers. As protection against the summer heat, the outdoor wood is coated with a thin silvery skin that reflects the light in summer. (Zerboni, M. 1999:36-39)

The notion that an extension can be movable, adds to the possibilities of the re-locatable timber home, lightweight in structure, manipulable in form, and low in cost and materials.

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There are a number of variations available to the way the vernacular home can be manipulated. Figure4, shows a typical plan of a vernacular Queenslander. Figure 5, pared down the centre with two halves offset, accommodating private balconies at both ends. Figure 6. describes the house pared down the centre, offset and rotated, allowing for a large communal deck area for summer entertainment.

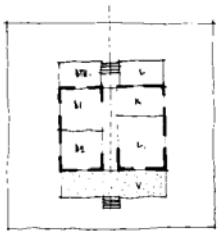

Figure 4

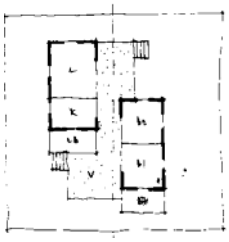

Figure 5

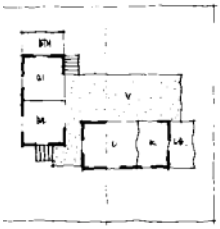

Figure6

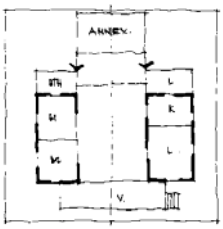

Figure 7

Author: Spanbroek, N. (2001)

All of the above scenarios allow for translucent or opaque sheet weather protection above the connection zones, or social/public areas. Figure 7, influenced by Kalhofer and Korschildgen's designs of a movable studio, suggests a movable component to the existing pared structure, this may be via an additional half building component, or via a new lightweight structure.

Conclusion

While the relocation of the vernacular timber framed house cannot address all the issues required for the future house, it does offer alternatives to costly new building or extensions, providing alternative spatial arrangements for the changing family.

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