

WELCOME TO THE STONE WEEKLY ...

The first and probably last issue of ^{THE} Stone Weekly is part of a traveling architectural study trip **The Grand Section**. Owen and Bobbie are both students from the University of Newcastle, NSW and are currently riding push bikes across the country from east to west to better understand Australia and how to design for it.

Out of their 25 (ish) stops, Birdsville is stop #7 and they have been fascinated by the stone architecture that scatters the town and surrounding area. This is the first town out west upon their route where they have experienced in such amounts, stone and masonry.

Within this booklet you will find a little bit about the Indigenous architecture, some buildings within the town itself, some interesting details and some ideas to think about when designing or changing your dwelling.

Delve into the following pages and enjoy some stone brought to you by The Grand Section.

If you want to know more about the trip or are procrastinating at work check out our work further - **www.thegrandsection.com**



A map of some of the 'layers' which comprise our country; rivers, fences, defined territory by the white fellas and Indigenous Australians..



STONE AND OTHER HARD BITS

Birdsville is located on the north eastern edge of the Simpson desert with fertile channel country to the east along with sand hills and gibber plains, apart of Sturts Stoney desert. Originally part of a north-south Indigenous trade route, Birdsville appropriately became a customs town for the early states and territories in the 1880's. Today the town is a tourist hub for those wanting the 'outback experience'.

This area lies on sediment which is four kilometers thick and 500 million years old. The deeper sediments contain deposits of oil and gas with the shallower layers containing the relied on artesian basin. On the surface are the infamous iron oxide coated 'Gibbers' (sandstone) and bull dust (fine dust). Temperatures in summer will often stay over 40 degrees for weeks at a time with a recorded 58 degrees in 1889. As you can imagine heat is a BIG issue!

Located on the Diamantina river, Birdsville forms part of the arid center of Australia. The geology of the area varies with unpredictable soil belts + conditions also making construction difficult. It's location though is the killer, freight brings the towns good in including houses.





GUNYAH'S AND MUCH MUCH MORE

Birdsville is part of the Yarluyandi and Wangkanguruu country. It makes up part of a north south Indigenous trade route which connected the Flinders Ranges to the Gulf of Carpentaria. There are stories of large gatherings happening in the area so appropriate shelter was crucial!

Below is some of the Indigenous architecture used in this arid region. Note the different cladding for the different climates. According to locals some of the shelters were even built into sand-hills to regulate temperatures. No systematic studies of architecture have been done in the lake Eyre basin.



Summer shelter used in the Birdsville area by the Indigenous mobs. The branches over the curved timber frame, keep flies out, provides shade, lets breeze through and reduces strain on the eyes to make it easier to see out. Essentially the early Bough shelter.



The **Winter shelter** used by some mobs a bit further south down near Lake Eyre. Timber dome construction with hardened sand shell acts as thermal mass to soak up heat from an internal fire and stay warm throughout the night. Exactly how thermal mass works today!

Source: Gunyah, Goondie and Wurley, Paul Memmott

SO WHAT ARE WE LOOKING AT HERE?

Lots of things. In learning about a place we look at its ENTIRE history; architectural, social and cultural. We start with the Indigenous history of a place, particularly the buildings they lived in and the materials and techniques they used. Generally, learning about the Indigenous architecture of a particular place is very telling of the climate with those architectural principles stretching into contemporary dwellings and living structures today ie. stone.

The following drawings are of remnants of some of the stone structures in the Birdsville area we visited. These are only a portion of the structures which stretch for approximately a kilometer. The function of these circle like remnants are still being speculated on, however they appear to be man made and extensive!

Speculated to be made by the Indigenous people of the area these stone forms vary in size but have many aspects in common. Medium sized Iron oxide coated Sandstone rocks are used extensively throughout these structures, with a consistency in size and distribution. The orientation on the north facing slope (away from chilly winds) remains consistent with openings prevalent on the north side, sites are roughly level where the stone walls appear to be consistently unbroken on the side of the prevailing cold wind. They knew what was going on!

Similar stone shapes have been documented in other parts of Australia that were thought to be used as a foundation for timber framed dwellings atop. Similar inter-joining circular forms and varying sized shapes have been recorded as dwelling and store houses with stories of grain silos (sometimes guarded from mice by a snake) or kennels for animals.

Sturt in his journals documents him coming across gatherings of up to 300 people in the area. Perhaps this site was an ancient party place! It is also documented that there were many permanent camps, inhabited seasonally, especially during winter. Clay was used prolifically as thermal mass to absorb heat from a fire and radiate this back onto people during the night.

The plans on the following pages are diagrams we have done from observing these structures. They are not to scale and out of their site context showing indicative stone placements only. Following this are diagrams stolen from a book on the Indigenous architecture of australia that illustrates possibilities of what these forms could be.







Sketch plans by Dr Heather Built of stone wall remains in the vicinity of Darlots Creek in Western Victoria. It is hypothesized that the circular spaces contained a combination of dwelling and storage spaces as part of a larger village complex.

Can you see any similarities...?





A hypothetical reconstructed illustration of the plan above showing a stone base with timber framed domes above.

- 1. Diurnal stone windbreak
- 2. Dog shelter
- 3. Main Shelter, outer room
- 4. Main Shelter, nocturnal room
- 5. Stone wall, 200mm wide, 900mm high
- 6. Rigid bark door
- 7. Sullage Pit
- 8. Surface drain
- 9. Pathway
- 10. Adjacent Structures

Source: Gunyah, Goondie and Wurley, Paul Memmott, page 193-4



Layout of a large Indigenous camp near Alice Springs, 1896. This analysis shows sub-camp clustering according to class identity.

Source: Gunyah, Goondie and Wurley, Paul Memmott, page 124

Layout of semi sedentary camp from 1939, near Ooldea Soak, South Australia. Showing a camp between two sand hills with the camp layout broken up into sub groups as labeled.

What will be found as more research goes on?

Source: Gunyah, Goondie and Wurley, Paul Memmott, page 117







BIRDSVILLE GETS STONED...

This old beast built by the famous Sydney Kidman in 1877 shows the tradition of stone buildings (started by the indigenous mob) in the hot climate continuing. Kidman must have got some serious workers in as this bad boy is standing over 100 years after it was built, it's some great quality stonework.





POINTERS FOR THE PUNTERS

The pub, The local! The bloody watering hole! Well this one is a ripper! The original pub shown built 1884 and shown shaded is made from hewn local sandstone. A bit rougher than the ol' Kidman building, this building has gone through multiple fires and has come out alright! The thick stone walls mean that even in summer once cooled by the ubiquitous air con it will stay cool, unlike many other buildings built today.

The ad-hoc plan lends itself to the rustic charm of an outback pub growing over the years whilst providing lots of different spaces for a range of activities. During the races all internal doors are removed, walls are stripped of memorabilia, the liquor license is extended to the opposite side of the neighboring roads and the town explodes from 120 people to 7000. Lucky stone is durable!





-DAB

THE HEAVY WEIGHT OF THE LAW

The local courthouse built in the 1880's uses local sandstone too as a response to the lack of local materials and trying to keep the oppressive heat of summer at bay. We found there are a number of features that are used to stop heat gain:

Ventilation is prominent not only in the old sections but in the add ons out the back too. Generous casement windows with internal fly-screens and louvers all allow lots of air into the building and through rooms without the bugs.

High ceilings throughout allows heat to rise to the top of rooms.

COOL BREEZE A small **step** up into the building could help to

reduce dust coming into the building.

The thermal mass of the stone work, will keep the inside cooler on a warm day if it is able to cool down at night. This can be helped by shading all the walls of any sun during the summer months just like on the main building.

Big Eaves/verandahs keeps sun off walls and creates more shade!



Note:

Screens on the Inside!

> rooms such as this with no eaves allows huge amounts of sun into the building. This section heats up and cools down very quickly! Louvers are great to allow breezes through.

house sun room



As measured in the heat of a day in may, shade created by eaves + verandahs is up to 15deg cooler than in the sun! All of these features mean that inside the Courthouse it is up to five degrees cooler than even the shade on the verandah! You beauty!

**Analysis carried out at noon, middle may

ROCK UP TO THE LOCK UP...

The old lock up at Birdsville is a prime example of the move away from labour intensive stone work to the more readily manufactured brick construction. A lack of local labour and skill though is the problem.

Double brick construction has good thermal properties. Heating up slower but also cooling down slower. This is due to the air gap between both skins of brick assisting in slowing down heat transfer from the outside to inside walls.

Cross ventilation to keep you cool only when the door is open. Make em sweat!

Eaves and small windows mean UV radiation is limited, keeps the timber ceiling looking prime! This also keeps a more constant temp. inside.

Ventilated eaves means heat stored in the roof can get out easily assisting in cooling the building. Plus it looks ace!





A STONE SPIN OFF...



The local petrol station managers house is pretty unique to Birdsville. It is made of rammed earth; a mixture of local dirt mixed with 10% cement, water and lots of elbow grease.

This construction system is a continuation of the masonry buildings throughout the town and area. This heavy weight building works beautifully in the cold winters, able to heat up during the day however in summer due to a lack of eaves and cross ventilation this bad boy can't cool down so is bloody hot!



RAMMED EARTH



Bough Shade pergola detail section, get some branches over ya!

A bough shade/shed was used in Indigenous architecture as shade structures using sticks and roofing material made of thatched grasses, branches and leaves. Many settlers dwellings employed these structures to create shade around the house or on the land. Modern versions still exist such as at Bedourie Racecourse.

Add a bit of water and you've got yourself a great evaporative cooling system!



Detail of the fantastic large openings



and HUGE outdoor space (right)

STONE GALORE (OLD + NEW)

One of the early stone buildings in Birdsville, much like the pub this house has been added on to over the years. This house has the thickest stone wall yet at a HUGE 460mm thick! The new additions were created in Hebel, another spin off of the original stone materials.

Great Cross Ventilation through rooms and across the entire house is a great way to keep temps. lower and cooler!

Large operable openings such as these door/windows are a great way to capture and control breeze at your will.

Large, shaded outdoor spaces are a great way to protect exterior walls of the house from the sun and hence it heating up. You can't beat a good, shady outdoor spot.

Plantings around the house are effective in creating shade and lowering ambient temperature around the house. Breezes are cooler tool



House + outdoor area elevation. Note the huge, shaded outdoor space.

CAVERNOUS CARAVAN PARK

The classic caravan park, a force to be reckoned with currently with cabins, powered + non powered sites to accommodate for a variety of travelers. This place explodes to over 700 sites during the Birdsville races. These hardy, durable cabins are built of concrete bessa blocks, awnings block out a lot of sun where it is orientated well(ish) to capture those cool southerly breezes through the space.



HOW MUCH DOES IT COST TO ROCK?

Due to Birdsville being the first town we've come across with such a large amount of old stone buildings and new masonry buildings we wanted to see if it was the cost causing this shift from demountable/relocatable buildings which seem to typify these western towns; lack of labour, freight, location, cost etc.

Looking at 2013 shire council buildings that were constructed in Birdsville we can see a rough cost per m2 that gives us an indication whether it is worth bringing back the stone age of old! We were told it was too expensive to build in brick as a good response to the climate, but the figures speak differently!





Owen's father Wayne has now joined us for the ride to help carry water. He's a keen observer and gardener so we've included some of his tips for better gardens in Birdsville rooted in his observations around the place.

Observations:

- 1) Often the shaded front verandah is the hang out spot for locals, or a camp fire out the back.
- 2) Individual plantings along fence-lines don't appear to do well, maybe its the heat or lack of water and TLC...
- 3) People tend to look at the edges of gardens, concentrate on that
- 4) Embrace the multi-trunk tree trend to create a larger shaded area underneath, like locally growing trees along the river. Away with the straight trunk!

Suggestions:

Get some bigger garden beds in ya yards. Rather than single plantings. Look at larger garden beds with a variety of plants of different heights and ground covers to create a micro climate and hence maintain themselves. He noticed a local example of an 8x8m garden bed where the plantings are flourishing! Grey water can also be used as a resource to create a constant water supply for plants in the yard.

Note:

Observed thriving plants include: *Sturts Desert Pea *Hibiscus *Salt Bush *Watti Trees







ROCK SOLID IDEAS

Below are some suggestions we've formed from conversations with locals, observations and data as to how to get the most out of your rock hovel. Some ideas are blatantly stolen from locals and others that we probably haven't proven but think are worth a crack.

1) BOUGH SHADE WALL

Stolen from generous local Nell Brooks, this bad boy works by using a bough shade but upright! A whole bunch of bushes/grasses is shoved a wire framed wall and is drenched. As the breeze comes through the wall it cools down via the water and hits you whilst you sit in the shade drinking a green lizard (refer to wall at the Birdsville pub) lowering ambient temperatures creating cool spaces!





2) HIGH CEILINGS

Lots of the old, cool buildings have thick walls and high ceilings. These are far cooler than their low, flat ceilinged counterparts as the hot air rises away from the height of the body. Get high and get cool!

3) SHORT SIDES TO EAST AND WEST, VERANDAHS!

Look at the primary school and copy, just like you did in primary school. Low verandah's to the east and west is a good way to go too. Keep the heat off your walls which means a cooler interior. Orientating (facing) your building with the long side North allows you to control how to sun's path works with your house. Best practice is to have generous eves to exclude high (hot) summer sin and keep sun off walls and windows, and to allow in low warming summer sun to heat up walls, the inside of the house and your cold toes!



4) TWIN ROOFS

Masonry construction works really well in hot climates as long as the walls are shaded! Why not go for a twin roof! This creates a ventilated cavity between the roof surfaces and with constant air flow heat can't accumulate keeping your house cooler!. Twice the amount of fun too!! Keep your west and east edges low and go go go....have a beer



5) PLANTINGS + VEGETATION

Planting, the unsung hero of so much! Lowering amient temperature around buildings, calming the soul (slightly paraprahased, however backed up by research showing that plants reduce stress and improve concentration), cool breezes, reduce dust, promote healthy plant and animal life, provide shade and capture moisture. Remeber what guru Wayne has taught us, bigger is better in this case. Deep beds maintain themselves better than smaller garden beds! Why not think about some veggie gardens!?



FIND OUT MORE....?

get in touch: dustyandthirsty@thegrandsection.com

borwse online: www.thegrandsection.com

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