the Dry Stone Walls association of Australia inc.

The Flag Stone

Issue No. 43,September 2018 ISSN 2204-8316 Editor: Bruce Munday

An invitation: be part of a broadening perspective

Machu Picchu with Huayna Picchu

This issue

Greetings

This Association was founded in Ballarat in 2002 and incorporated in 2003. Some members will remember the Association's impressive 'Inaugural Dinner' held at Werribee Park Mansion outside Melbourne in 2006. We were delighted that the dinner was under vice-regal patronage, with Professor David de Kretser AC, Governor of Victoria, attending.

The first DSWAA Committee included several members of the 2018 - 2019 committee: Andrew Miller, Raelene Marshall, Geoff Duggan, and myself.

Looking back at the topics that drew the Committee's attention in its early years it is interesting to see themes emerge which are relevant today. In 2004 the Committee was engaged in discussions about such topics as enhancing the awareness of wall owners that they are custodians of valuable parts of our farming history, of encouraging local governments to identify and protect dry stone walls in their areas, of raising the image and profile of dry stone walling as a craft, of conducting events for our members, and of obtaining external funding for research. That these topics remain on our agenda today indicates to me that either we are slow to act, or that while we have made significant steps in some areas, these are enduring tasks that will always require attention and action. In a companion piece I have outlined the broader agenda that has emerged as the DSWAA has matured.

Your Committee is conscious of the importance of involving our members in the Association's activities, and this is achieved through our website, this journal and the conduct of occasional events including our Annual General Meeting. Most of Australia's dry stone structures are in Victoria, South Australia, Tasmania and New South Wales and, not surprisingly, the majority of our members are from those states. We will continue to hold field trips and workshops beyond our home state of Victoria on an occasional basis.

Your Committee is most appreciative of the support that you give the Association through your membership fees and attendance at events. Your active participation in our activities is welcome and the Committee is always keen to receive comments, suggestions and any feedback from members as we continue to implement our Strategy and, hopefully, provide you with some pleasure and interest as a member. Do contact us if you want to make suggestions or become actively involved in any way.

Jim Holdsworth

Key Issues for DSWAA *Jim Holdsworth (DSWAA President)*

As the DSWAA matures and becomes better known, the range of topics that we address is broadening. The adoption of a Strategy, and setting up eleven Portfolios as a way of managing our work and implementing our Statement of Purposes reflects the much wider scope of topics and issues to pursue than we had fifteen years ago.

This scope will increase as we continue to pursue the many tasks that are set out in our Strategy. Critical among these is the massive job of identifying and recording the most representative **examples of dry stone walls and structures** across the country. We're developing a process to do this and one key means of collecting data will be to draw on the local knowledge of our members and that of members of local historical societies and similar groups. We anticipate that we can use volunteers to record basic data about walls in their area and we are developing a field data sheet for this purpose.

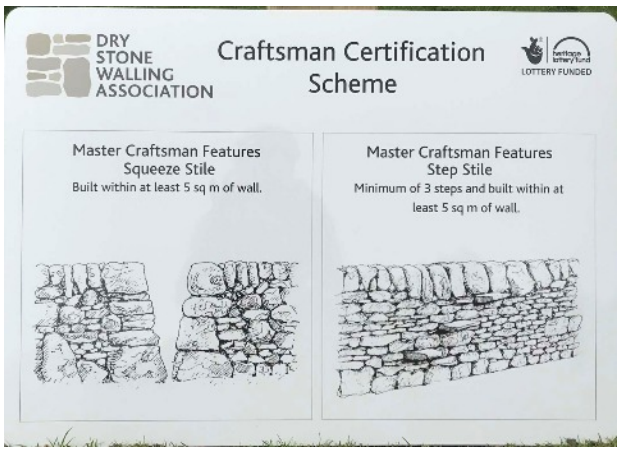
A fascinating sub-set of the process of recording dry stone structures is the tracking down of those structures built by indigenous peoples.

Limestone wall near Emu Bay, Kangaroo Island; possibly one of the first extensive walls built in South Australia

A sub-committee has been established to explore the issues around **training, accreditation and qualification** of professional wallers, and to make recommendations to the Committee on how these matters can best be managed. There is some understandable concern among professionals that the standard of construction of dry stone walls is sometimes well below what should be achieved, and the reputation of the industry could be diminished unless standards are set and enforced.

Training opportunities are currently very limited in Australia and the sub-committee is exploring means to redress this deficiency.

Quality wall built by an accredited DSWA(UK) waller



DSWA(UK) guidelines

The Association's vision is that dry stone walls and dry stone structures are widely accepted for their unique place in the history, culture and economy of the nation and for the legacy they represent.

Our goals are:

- *That governments and the wider community recognise the significance of dry-stone structures built by indigenous peoples, European explorers, early settlers and modern craftspeople as valued artefacts of our national identity.*
- *That this acceptance is manifested by appropriate statutory protection and landowner and community respect and celebration.*
- *That the craft of dry-stone walling grows as a modern reinforcement of the contribution that dry stone walls and structures have made to the culture of Australia.*

Hammond Island *DSWAA member Alison Hastings*

There's nothing unusual about a Catholic church built of stone on top of a hill. But Saint Joseph's on Hammond Island, population 209 about 50 km north of Cape York Peninsular in the Torres Strait, is unique. It is dry stone! The story behind this church is even more remarkable.

The original timber-framed church had fallen victim to termites and cyclones and finally neglect when the locals fled the threat of imminent Japanese invasion in the 1940s. Building the new church commenced in February 1952 under the active management of Father Tom Dixon who diarised the next two years in a manner that has as much character as the church itself. Anyone who has built a large dry stone wall will know that it takes considerable skill and great perseverance. Try this in the tropics, with all labour drawn from the congregation, and fetching all your stone from across the island (much of it in wheelbarrows).

The easiest part of this venture was the decision to build the church with stone, timber and concrete prohibitively expensive whereas there were 'acres of stone' on the island. The floor plan was a T-shape, perimeter 295 feet (~90 metres). All of the work was performed by unskilled locals, 'to employ tradesmen was well outside the ambit both of our dreams and pockets.'

It is not clear that Fr Dixon had experience with stone but he nevertheless knew what he was doing. The following paragraphs are extracted from those pages of his diary reproduced in *Stone on Stone – Story of Hammond Island Mission*, compiled (with photos) by T.C. Deere:

> We made sure that our building would be square. Also, we made certain that the first two feet of wall be constructed of very large and flat stones with larger stones at the comers. Smaller stones, referred to as "footballs, coconuts, and apples", according to their size, were used to fill all spaces and wedge the larger stones to prevent any movement. Two wheelbarrows were to do marathon work, carrying soil, gibbers and inoperable stones to all points of the buildings, till they wore through. We soon exhausted the ready supply of large, flat stones, and a widespread hunt with crowbars began. Most of the suitable stones were rolled by hand some twenty to fifty yards into position. Raising the hundred yards of 4 ft wall was tedious and difficult work, and my six workers were often very discouraged.
>
> The 68 ft of back wall dulled our efforts, since it was unrelieved by the two [door] spaces, 5 ft wide by 7 ft high, that broke the other walls and saved a considerable quantity of stone in a wall from 3 ft 6 in to 4 ft wide [thick]. The pattern of their positioning was actually a species of bonding, and not "crazy-wall", accord-

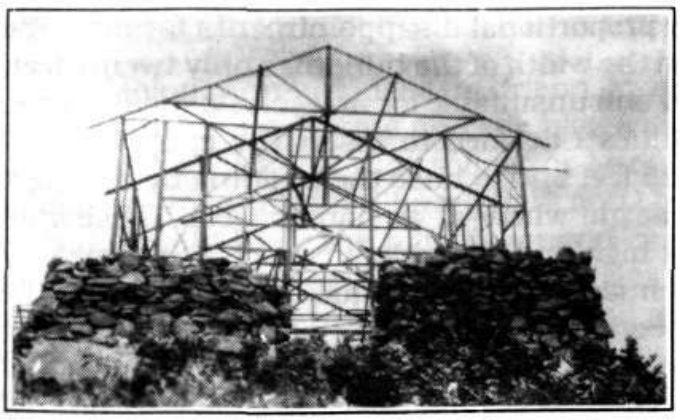
ing to those who know. As I was not to cement the external walls, both for economic and artistic reasons, I made doubly sure that the initial eighteen feet of wall be built of sturdy, wide, and flat squarish stones. It was difficult to gain true lines on the outside of the wall, as it bevelled in from a 4 ft base to 2 ft at the top of the wall of 14 ft. To gain these true lines we constructed at each end, from 3x2 timber, a frame work, giving us the exact proportions, and between them stretched a fishing line. But the strong trade wind made this impracticable, and the same source soon blew the frame work down, forcing us in the long run to judge with the eye, a practice that the coloured people have long indulged in through necessity and so gained peerless efficiency.

All this time our task amounted to procuring stones of suitable size and shape and carrying them to the scene of operations. Now we had recourse to new methods. I acquired three spalding [sic] hammers, each 12 pounds weight, and a stock of sledge hammer handles and began to knap the larger boulders to make them manoeuvrable, and other stones to obtain that clear, blue surface that would give colour and beauty to the outer walls.

As we built up the wall we interlaced the stones, and the interplay of large, larger, small and smaller stones locked the wall to prevent movement. A straight line was preserved inside and outside stones of clear blue surface were built up with a gradual incline.

By August we had raised the walls to four feet from the interior floor level without cementing. We had completed "Stage 2" of our plans.

Fr Dixon then acquired frames from two army huts which he sat on the 4 ft walls and which would provide a framework for the rest of the walls and trusses for the roof.



Steel frame on dry stone wall

It was important that we keep exact levels, as such it regulated the pitch of the roof, which is fixed and built according to certain proportions of stress and strain. Eventually we assembled the two sets of framework on the 4 ft wall, resting them just some inches on the inside edges. The problem now was to anchor them. We searched old rubbish heaps of "round steel", gathered up all the old bedsteads we could find, cut up the solid steel lengths and made a small right angle bend at both ends. We laid lengths of linear steel along the middle of the walls, and then hooked the steel lengths over the bottom plate of the huts, and over these heavy steel lengths tying on top of the walls. Over these and the plates we then proceeded to place rather large stones.

Front of church shows Filipino (Spanish) influence

Slowly, but always progressively, the stone walls crept up outside the steel frames, encasing it, giving it rigidity and the stones mutual support from the frames and themselves. As the height of the walls rose, 3/8 in round steel was used to tie the framework to them. The quest for stone became at times a frantic one. My aim was to reach window height, i.e. 8 ft from the floor level, before the Bishop arrived. The men were becoming more and more dissatisfied, and frequently showed signs of slacking and losing heart to the extent of murmuring. However, I doubled my efforts and worked alone or with Stevie Mallie, both getting stone and building up the walls. We climbed up on the 44-gallon drums and pulled the stones after us, and tossed them up into position, and slowly the walls rose.

I began to entertain fears of the corners falling, especially after a minor collapse of one corner, because of too many careless feet on the loose outside edge. I fancied also that I could detect some movement in one of the back corners after several severe deluges. I decided to buttress all the corners to make sure that

Hammond Island *(cont.)*

I should not regret it later on. The buttress was roundish like a bee hive, completely faced with knapped blue granite [actually basalt], rising some three to four feet high and eight feet wide. They added beauty to the outline of the building and gave all the corners superb strengthening. I furthermore cemented all the corners within the wall itself and decided to continue cementing them till completion.

The 21 window frames were concrete cylinders cast on the ground. Fr Dixon goes on to describe the casting, hauling up ramps to the top of the wall, and then the final stages of walling:

Windows in place as wall rises

As the cylinders arose the spaces between them were filled with stone, bringing the walls within a foot of the roof itself. The height of the walls and limited space between them and the roof made stacking difficult. The corners always worried us, as they needed specially picked stones, with blue on two sides, squarish and broad-based. Some days stones would "run" - that is, they would come up in such sequence that they would pack well and quickly. On other days nothing seemed to fit, and progress was slow and tedious.

We also rough-cast-cemented the interior of the raised walls to ensure greater solidity. How beautiful the windows looked with the cement around them, and the view from them all is something that might compensate for medieval leadlights!

We began the final stage of the stone work - the building up the three gable ends. We commenced immediately on the facade, seeking long and flat stones from the sea front, so that they could be laid lengthwise and cover the full width of the wall. This seashore granite [basalt] had a greyish tinge. Scaffolding was our concern, as the wall was already 15 ft high. The faithful petrol drums became our mainstay, and with our accustomed ingenuity we raised a series of platforms, looking like choir stalls in tri-platform style. With one man on each platform we juggled the stones until the topmost worker hoisted them above his head for the stone-pitcher himself, who, with a minimum of space to manoeuvre upon and a dizzy height to annoy his balance, placed them in position. Steadily the triangular opening closed up. Slowly and progressively the facade became what we intended it to be, an imposing wall overlooking seas and sands.

Nola Page, a fourth generation Thursday Islander, describes how 'us school children formed a human chain from the bottom of the hill to pass, from one to the other, the crates of brown beer bottles that were collected from the hotels on TI'. These filled the windows – Hammond Island's unique version of stained glass windows. 'I recall the nuns at school every day and the priests at mass on Sundays would announce prayers for the safety of the men building the church.' Their prayers were answered.

No sooner was the church completed than Fr Dixon was transferred to Santa Teresa Mission in Central Australia.

Dry stone walls built by indigenous people in the early settlement of SW Victoria *Raelene Marshall (DSWAA Committee)*

Issues 36 and 38 of The Flag Stone reported on progress towards UNESCO World Heritage listing of the Budj Bim Cultural Landscape at Lake Condah.

Thousands of years ago the Gunditjmara people of the area used Lake Condah and its surrounding wetlands to form stone channels to harvest eels. As one of the oldest aquaculture sites in the world, the remains of its intricate stone traps can still be seen at the site. However, less well known is that the local indigenous people were also instrumental in building dry stone walls on some of the early settler properties in the area.

In 2017 the DSWAA created a portfolio dedicated to further identifying Indigenous dry stone structures and locations and fostering new and existing relationships with their traditional owners.

In the May 2005 issue of the DSWAA Newsletter historian Dr Carlotta Kellaway (dec) wrote a detailed article entitled *Researching Dry Stone Walls: The Remarkable Serpentine and Blacks' Walls at Lake Condah*. Carlotta writes that:

> The origin of those walls, which have survived for more than a century, can be traced back to European pastoral settlement from the 1840s in the Lake Condah area, and later to the establishment in the 1860s of an Aboriginal Mission there. The Mission Reserve stretched from the south side of Darlots Creek and the nearby Serpentine Wall down to the north side of Blacks' Wall. The site of the walls covered five crown allotments. This land was later, in the early years of the 20th century, selected by the pioneer Dashper family. This followed the return of the Mission Reserve land (which contained the Serpentine Wall and part of the Blacks' Wall) to the Victorian Government. Assessment of the walls at the time of the transfer to the Dashpers confirmed that the original construction and maintenance of the walls was carried out by district Aboriginal workers. Today, most of the former Dashper land at Lake Condah, north of Blacks Wall, is under the management and control of the Aboriginal community.

Carlotta's research took place at the time I was developing an exhibition entitled *A Stone Upon A Stone* (*The Flag Stone*, # 34-40) about the role and influence of dry stone walls in the early settlement shaping of Australia's cultural landscape.

During her research Carlotta pieced together 'the story of the historic dry stone walls at Lake Condah from a number of sources. Most important was an examination of historical records held at the Public Record Office of Victoria (PROV), and published material concerning the Lake Condah area held at the State Library of Victoria and in other repositories. These publications included heritage studies and local histories.

In those pre-Google days we were both unaware of the rich dry stone history of the Gunditjmara people of south west Victoria. The rest, as they say is history, a story of happenstance and serendipity in what would eventually become an enlightening journey towards a better understanding and knowledge of an ancient culture, its craft and its peoples.

The Budj Bim landscape is in Glenelg Shire and their first community meeting was hosted by Karl Hatton, the Community Cultural Officer. In that and subsequent group meetings were several people who would ultimately play key roles to assist with the search for evidence of dry stone walls built by some of the indigenous people in the area. These included representatives from Gunditjmara, one of whom took me to the Lake Condah fish traps the next day. Local Arthur Weston brought some original farming diaries dated between 1885 and 1889. Several mention the farmer neighbours 'working at the wall' including 'Johnnie' who according to Arthur's readings elsewhere in the entries he understood to be an aborigine.

Carlotta suggested I seek permission from farmers to research the Parish Map details of their properties. Again, luck was on our side. The second community meeting was hosted by Gunditjmara at the old school in Heywood. Among those present was Neil and Pat Muldoon. Originally the Muldoons owned a large percentage of the original Dashper land holdings that are home to both the Serpentine and Blacks walls, the topic of Carlotta's original article in which she points out: 'Although the early history of the Serpentine and Blacks Walls is somewhat different, an examination of Lands Department records confirmed that district Aboriginal labour was responsible for the original construction and maintenance of both of these long dry stone walls.'

The Muldoons have since sold some of their original Dashper holdings back to Gunditjmara, but Neil tells me that today they are still current owners of Blacks wall, one of my favourite walls. Steep, rugged and seemingly in the middle of nowhere, in some places it appears quite strange as it meanders across their land tapering into and out of an extremely large sink hole. In her DSWAA article Carlotta presents the findings of her research on both the Serpentine and Blacks walls as set out below.

Dry stone walls … SW Victoria (cont.)

The Serpentine Wall

All the information collected so far suggests that the Serpentine Wall is the older of the two historic dry stone walls at Lake Condah. This wall is located on the south side of Darlots Creek and extends from east to west for about 2,000 acres [sic] towards Lake Condah in an uneven, snakelike manner, hence its popular name. The wall probably dates from the pastoral era and may have been constructed as the northern boundary of the Ellengowan run. This 8,000 acre run was established south of Lake Condah in the 1840s.

Many Glenelg Shire pastoral pioneers used the local volcanic stones to construct dry stone walls to mark their boundaries and later to protect their properties from the rabbit plague, which spread across Victoria during the second half of the 19th century. According to the Victorian Fencing Acts passed from the late 1860s, boundaries of properties had to be marked by a fence (post and rail, paling or wire), by a hedge (a 'live fence'), a log fence, or a wall, provided it was of substantial material, at least four feet high and not less than two feet at the bottom, or by a combination of these. Occupiers of adjacent properties had to share the cost of construction.

Evidence found in Victorian Lands Department records suggested that the construction of the Serpentine Wall most probably pre-dated the passage of the Fencing Acts and that it was associated with early European pastoral settlement in the area. There was confirmation that this historic wall was constructed by Aboriginal labour. The Rev. Henry Stahle, in charge of the Lake Condah Aboriginal Mission from 1875, wrote in 1902: 'The Serpentine line of stone wall was erected before I took charge of the station but was kept in repair by the local blacks until the stony Reserve was handed back to the Lands department.'

Stockyard mentioned in 1880s diary note

Blacks' Wall

There is evidence in Lands Department Selection files (held at the PROV) that Blacks Wall to the south of the Serpentine Wall was constructed in c1875 by a team of Aboriginal workers from the Lake Condah Mission, supervised by the Rev. Henry Stahle, the Mission's superintendent. Like the Serpentine Wall it stretched across five crown allotments.

This wall was known to John Dashper from c1881, when he purchased Allotment 2 on the wall's southern side. Dashper was a stonemason from Devonshire who settled at Lake Condah in 1879. Although he was skilled in the construction of stone walls, most probably of the kind built in England, Dashper claimed no part in the construction of Blacks Wall and, in 1906, told how it had been 'ercted [sic] by blacks.'

This account of the building of the wall was confirmed by Stahle in November 1902, when he told how 'the amount of stonewalling which was done by me with Aborigines under my charge was something over 4 miles.' He described the wall as '3 feet wide at the bottom and 5 feet high and was valued at the time it was erected, at 35 pounds per mile.' He told how 'some places over which it had to be erected (were) very steep and very rough, so that if the work had been done by white labour it would have cost considerably more.'

After the Aboriginal Mission land was handed back to the Government, and was thrown open for selection, Dashper applied for the 2000 acres, which included both the Serpentine and Blacks Walls. By this time, Dashper was known throughout the district for his skills as a stonemason and had supervised many of the buildings and walls constructed for the Mission on the other side of Darlots Creek. This work included the historic bluestone St Mary's Church of England, opened in 1885 but now demolished.

The generosity of the Muldoons in sharing their records enabled Carlotta's research that arguably became the start of public interest in the hitherto dry stone structure gap in our knowledge of the Budj Bim landscape.

The Gunditjmara UNESCO bid originated at the Budj Bim World Heritage Symposium in 2011. DSWAA member, Dr Timothy Hubbard, and I presented a joint paper entitled Post Contact Heritage Values. Since then we have been the part of the committee and working party that culminated in a successful 2017 Paris submission.

Dry stone walls … SW Victoria (cont.)

Mission Station Lake Condah November 1st 1902

Sir,

In reply to yours of the 28th October I beg to state that the amount of stone walling which was done by me with the Aborigines under my charge, was something over 4 Miles.

The wall is about 3 feet wide at the bottom and 5 feet high and was valued at the time it was erected, at £35 per mile.

I may however state that some places over which it had to be erected are very steep and very rough, so that if the work had been done by white labour it would have cost considerably more.

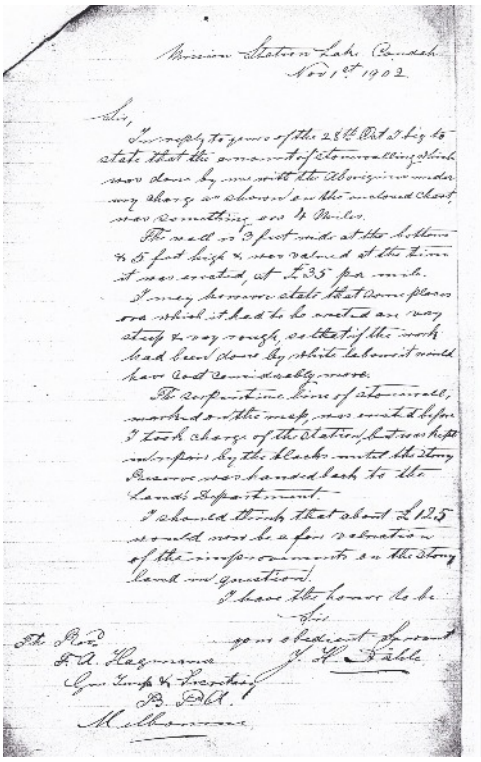
The serpentine line of stonewall marked on the map, was erected before I took charge of the station, but was kept in repair by the blacks until the stony Reserve was handed back to the Lands Department.

I should think that about £125 would be a fair valuation of the improvements on the stony land in question.

I have the honor *[sic]* to be
Sir

your obedient Servant
J. H. Stahle

The Rev
F. A Hagenauner
Gen. Insp to Secretary
B. P. A.
Melbourne



One of several letters between the Condah Mission and the Board for the Protection of Aborigines

Young talent - building a corbelled roof

Issue 42 of *The Flag Stone* introduced Lydia and Cuthbert Noble, exciting young walling talent in West Yorkshire. Here and on the following page Lydia explains how, with Adam Clarke, she built a wonderful folly for a client:

> It was in fact a kind of re-build. The clients had a little old stone building in their garden, it was perhaps originally a shed for hanging game birds or something like that, and there was a big storm and a big beech tree that was uphill from it blew over and knocked down the building. Apparently it wasn't much of a thing to look at before so they had no photographs of the building. When I went to look at the job to price it up, as you can imagine it was a big heap of sandstone with a tree on top. I tried to figure out how big the building was before; I could sort of see where the walls had been and so found the diameter. The original building had a slate roof but I saw the opportunity and showed them a photo of a corbelled roof that Andy Loudon had built and they loved it and asked me to do one. We built it the traditional way like we had seen on a Kazun built by Croations in Derbyshire, They had built the inside first and then the outside, to make it watertight. so we did that but with thinner stones more like the Trulli buildings in Italy.
>
> The stone on the outside was already there, the inside was from Johnson's quarry and the outside of the roof from an old field wall that we took down. The foundations is a mix of stone that my dad had from years of collecting and some from the quarry. We couldn't drive to the building so had to barrow most of the stone 50 yards to it, sometimes in snow and a lot of the time in the rain.

Building a corbelled roof *(cont.)*

New Hampshire dry stone arched bridges Bruce Munday

Jones Road Bridge

New Hampshire in the New England region of the United States boasts many great examples of dry stone structures. In particular are its many dry stone arched bridges of which a dozen were once to be found near the little town of Hillsborough. Eight of these bridges still remain although one is totally submerged in a reservoir and four are really two double-arched bridges. It is still a wonderful cluster.

Gleason Falls bridge was almost destroyed in 2007 by a flash flood, water was flowing right over the top. Miraculously, it survived and actually took little restoration

The State Architectural Historian (J.L. Garvin) researched the origins of these bridges:

> Dry-laid masonry was superior to mortared masonry in the age before the introduction of Portland cement or other artificial or natural hydraulic cements. If skilfully executed, a dry-laid arch has uniform compressive strength throughout its entire fabric, being composed solely of split granite. It has the further advantage of being self-draining. When stream water levels rise and saturate the bridge (and streams have sometimes risen so high as to overtop a number of these bridges), the water readily drains out of the structure as stream levels recede, preventing frost jacking or damage in cold weather.

Other bridge components in New Hampshire were also routinely built of dry-laid masonry until the end of the nineteenth century. Virtually all nineteenth-century abutments and piers for wooden bridges were constructed of split granite slabs laid dry, and many of these structures continue to support wooden bridges or their steel truss successors.

Dry-laid stone masonry employing split granite is, then, a technology that remained dominant for the better part of a century and proved its strength and

Bridges *(cont.)*

longevity in a myriad of structures, both in the form of arches and vaults and in the form of abutments and piers that support vertical loading. The arched stone bridges of Hillsborough are collectively an important document of the capacity and longevity of dry-laid stone masonry.

The American Society of Civil Engineers adds:

> Stone arch bridges were a solution to the weakness of timber bridges assaulted by spring floods and turbulent streams. The availability of stone from the many granite quarries and engineers experienced in building other stone structures such as dams, canals, and mill tailraces combined to make these stone arch bridges possible. Since the lime mortar available at this time was not suitable for this type of construction, the stones used for these bridges had to be carefully cut and fitted in order to create structures without the need for mortar. Having been built by different builders over a period of probably 30 to 40 years, they illustrate five different elements of dry-laid stone arch bridges: 1) spandrel walls of cut stone, 2) spandrel walls of field stone, 3) granite posts for rails (including keystones doubling as posts), 4) single arch and double arch structures, and 5) various span to rise proportions.
>
> Because these dry-laid stone arch bridges were more rugged than timber bridges and withstood the frequent flooding of local streams, they enabled the development of a reliable transportation network throughout New England both locally and along the intercity turnpike system.

Underside of Gleason Falls bridge

Thanks to Bill Asby (Boston) for alerting me to these bridges (and the photos) via the DSWAA Facebook page.

James Otis Follett

Some of the most significant dry stone arched bridges in New England were built by James Otis Follett of Vermont in the 1890s and early 1900s. Already an outdated method of bridge construction when he began, his bridges were remarkably precise, relying on the critical shaping and placement of the stones.

Negro Brook Bridge, built by Follett, has a span of 4.4 m and a height of 1.5 m; some of his bridges are much grander

Follett built his stone bridges with local material, using either nearby fieldstones or granite blocks which he drilled and split by hand. The bridge foundations were mud sills, hemlock logs sunk underwater where they are protected from rotting. To form the arch, he first built a wooden frame. The stones were lifted into place with a derrick and horse-drawn winch. The two sides of the arch were built up and the keystone lifted into place. Fill was laid in behind the arch and a gravel surface laid on top.

With no formal training in engineering Follett built durable and handsomely crafted bridges. Of his 40 or so bridges, eleven are still standing and most in very good repair. Some of them now carry loads which Follett could not have imagined, yet it has not been necessary to alter or reinforce them significantly. None of his bridges is known to have failed structurally; floods have destroyed some by undermining their foundations.

Currently the greatest general threat to the surviving Follett bridges is inadequate maintenance, both of the active and disused ones. The indifferent treatment of these bridges is partly due to inconspicuous locations on back roads, not widely known to the public. Several of his bridges are listed on the National Register of Historic Places.

The Stone Trust publishes a newsletter for members, the current edition of which has an in-depth profile of James Otis Follett.

More arches and related structures *Bruce Munday*

Entrance to slate mine at Stag Fell Quarries

The small town of Hawes in the Yorkshire Dales (Wensleydale to be precise) has an interesting local museum where I found a fascinating book: *Quarrying in the Yorkshire Pennines – an illustrated history*. Probably not a best-seller, but magnetic to anyone interested in stone.

Page 40 reveals a tantalising arched hill-side entrance to a slate mine: 'Stags Fell Quarries worked until around 1930 exporting good quality "Hardraw Slates" far and wide – although, geologically, the rock is fine-grained Yoredale Sandstone'. In the photo it looked gorgeous, but it took some finding. The opencast workings and huge discard piles stretch for about a kilometre along the contour along with several drives into the steep hillside leading to higher quality un-weathered stone.

Even the discards were splendid regular building and paving stone that left me wondering if I could take a shipload home. There were numerous relics of the quarry industry, apparently stone dressing sheds, stone-fetchers' shelters, a smithy for sharpening tools and other structures – of course all dry stone (see following page). But no sign of an arched entrance, until just as I was returning to my bike, after a two-hour search in freezing cold, there it was in all its splendour.

This beautiful drive runs 45 m into the side of the hill, then apparently opens out into an area of *pillar and stall* workings before turning east for a further 15 m, beyond which it is blocked by a roof collapse. It was a thrill to find this wonderful entrance and very tempting to venture inside – but I didn't.

A peak inside

More arches etc. *(cont.)*

My other 'arched thing' was the Hillcarr sough (pronounced suff), a photo of which I saw in the Peak District Lead Mining Museum at Matloch Bath in Derbyshire.

A sough is drainage tunnel driven through a hillside to de-water a mine already too deep for the pumps of the day. The Hillcarr Sough runs from the Derwent River near Darley Dale for about 4 miles (6.4 km) to de-water two mines. Commenced in 1766 it took 20 years to complete and a further 20 years to show a profit. Dug by hand, the outlet is a stone arch about 2 m across with a ring in the keystone to moor the boat used by the soughers when clearing the channel floor. Most of what we now know of this sough comes from cavers who have explored about 1 km from the outlet until stopped by an accumulation of silt and shale. Where it passes through shale, the sough is beautifully lined with gritstone and paved with flags. Further in it is dug through hard and contorted limestone. There are docks inside where boats loaded spill, then taken down to the river. The first 100 m of open drain is flagged and dry walled down to a lovely arched dry stone culvert. From there the water spills into a spoon drain and thence to the river.

The many soughs in this area have permanently lowered the water table and displaced huge amounts of water, often creating conflicts between different groups with varying interests in this water. While the miners wanted the water table lowered, farmers and millers at the surface lost water power and ponds. At the same time, new stakeholders were created at the tail end of a sough where it discharged. Several soughs were used for public water supply and others turned waterwheels.

Dry stone the Inca way *Geoff Duggan (DSWAA Committee)*

Inca stone work has fascinated me ever since I took up dry stone walling almost 30 years ago – Peru was my Mecca. So my wife Gen and I set off for a 1 month journey to Machu Picchu with side-trips to the Galapagos Islands, Cuzco and Lake Titicaca all of which featured an impressive array of dry stone work.

In the Galapagos Islands, tripping over and swimming with wildlife including sea lions, marine iguanas and giant tortoises was better than imagined, but dry stone walls weren't expected at all. However, wherever you find an abundance of stone in the world you will usually find dry stone structures. The islands are a result of recent and current volcanic activity, so when we arrived on Isla Floreana near Black Beach I was taken aback by the dry stone walls enclosing what appeared to be disused farm plots. The locals couldn't tell me much about them other than the offhand comment 'yeah there's lots of stone fences'. It is thought the first settler in the islands was an Irishman, Patrick Watkins in the early 1800s, who probably knew a bit about dry stone walls.

Giant tortoises in background camouflaged as rocks

Landing in World Heritage listed Cuzco, once the capital of the Inca Empire, we immediately felt the effects of 3400 metres high altitude. We spent a couple of days acclimatising in this beautiful city, walking around the streets, impressed by the remains of old Inca stonework. When the empire was conquered by the Spanish conquistadors, much of this stonework remained and was used as foundations for the current colonial buildings.

Meticulous stonework characteristic of Cuzco

Dry stone the Inca way *(cont.)*

The once-lost city of Machu Picchu was our next destination. I wouldn't say it was walking 45 km on the Inca Trail that worried me. It was the steps, especially downhill, at an altitude of 4200 metres at the highest point. Despite chewing copious amounts of coca leaves and coca lollies, I still managed to get headaches, nausea and slightly delirious at the highest pass. Luckily for me, it was downhill from here and I was rescued by a couple of elderly Californian women who gave me a protein bar and energy drink. Throughout the walk, the scenery was an amazing backdrop to the many stone ruins we got to explore.

Arriving at the Sun Gate on a clear morning, Machu Picchu lay before us nestled on a mountain ridge with a drop of 450 metres on each side to the valley below. Beyond the Urubamba River , the snow-capped Andes mountains climbed even higher giving Machu Picchu a bizarre sense of enclosure. The stonework is one thing, the setting another. We spent time exploring the ruins with our guide and another 2500 people.

Our guide explained how the stone was split using a technique I still use today (a version of plugs and feathers) and also talked about the different quality of stone work we were looking at. The finest work was for the buildings housing royalty, priests and astronomers. The Inca people and their predecessors were acutely aware of and celebrated seasonal change. They had superior agricultural skills supported by the stone terracing of the hillsides, complex irrigation, drainage and also advanced food storage methods. A combination of these factors and the labour obligations of the people of the empire, allowed them to invest so much time in creating such brilliant stone work, the ruins of which we see today.

On our day recovering back in Cuzco, we didn't rest. We walked to the hills north of Cuzco to the citadel, Sacsayhuaman (sexy woman). The remnants of this fortress demonstrate extreme dry stone walling construction using huge stones, the largest believed to be in excess of 200 tonnes. I was even more impressed by the stonework here than at Machu Picchu. I spent most of the time here in awe of such precision work on a massive scale. That the Inca had no written language (nor drawings) adds to the mystery of just how they managed to build such extraordinary structures.

Stonework at Sacsayhuaman almost defies belief

A homestay on the shores of Lake Titicaca was where I became a fully-fledged Peruvian dry stone waller. During the farm homestay you are expected to help with some of the work around the farm. We started cutting corn and feeding donkeys. Through my very broken Spanish, hand gestures and a couple of photos of my work on the phone I was able to communicate with our host. I had noticed the corner of a dry stone pig pen had collapsed and needed repair. When I offered my services, our host grabbed me by the hand and took me to a totally dilapidated pig pen further on. Not sure I signed up for this much work! She gestured me to wait and then promptly returned with a crow bar, mattock, tape measure and a traditional hat. So, there I was on the shore of the highest navigable lake in the world, happy as a pig in Sh*t.

Masquerading as a Peruvian waller

Ring of Kerry *by Allan Willingham (DSWAA Vice-president)*

Around Camperdown, and elsewhere in Western Victoria, we know that Irish wallers built a great number of the dry stone walls which abound in the region. Much of their craft work is distinctive and closely relates to the long-held often contrasting walling traditions found in the various Counties of Ireland. My first visit to Ireland with Jan in 2004 was predicated on the need to inspect the royal (real) tennis courts built by Cecil Baring on Lambay Island (off the coast of Dublin) in 1921-1922 and that much earlier erected on St Stephen's Green, Dublin, in 1884, for Sir Edward Cecil Guiness of Irish dry stout fame (later Baron Guiness and Earl of Iveagh). That done, a tour of the western Counties was then obligatory.

The rocky terrain of the Dingle Peninsula (above) in the south-west boasts some of the most massive dry stone consumption walls I have yet inspected in my wanderings in Europe. Our visit to several historic dry stone ring forts and protected cliff-top settlements dating from the Early Middle Ages on the Dingle Peninsula in 2004 was most rewarding, and the accompanying photographs are to whet the appetite of DSWAA members who have not yet 'done' the more remote counties of Ireland.

Dry stone walls on Dingle Peninsula (left) and Dunbeg Fort (above)

Ring of Kerry *(cont.)*

The Dunbeg Fort (*An Dún Beag*) is a promontory fort built in the Iron Age on a rocky headland which has now part collapsed. This relic displays terraced dry stone walls of impressive mass and scale as well as a nest of beehive huts (clochan) built nearby around 1000 BC.

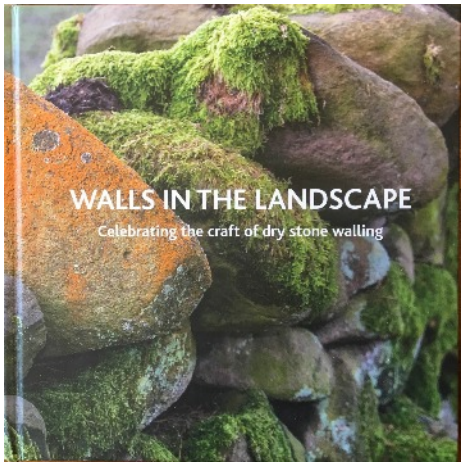
Cemetery on Skellig Michael

There may once have been as many as 400 beehive huts over County Kerry, including on the spectacular island Skellig Michael a few miles off the coast. But this particular group is considered the most remarkable in the country. The builders of these beehive huts meticulously stacked rings of stone one on top of the other, positioning each layer a little further inward until a snug, pointed roof was formed to cap the structure. This corbelling method partly explains why the huts are so difficult to date, as it doesn't belong to any one period when it was widely used in Ireland.

The sculptural 'Stonehouse Restaurant' on the Ring of Kerry, near Ventry, completes the picture.

A future DSWAA field trip to County Kerry to traverse the Ring of Kerry and see the myriad dry stone walls and farmstead structures is almost a mandatory event.

Book Review *Bruce Munday*



Walls in the Landscape – Celebrating the craft of dry stone walling

96 pages

Full colour, large format

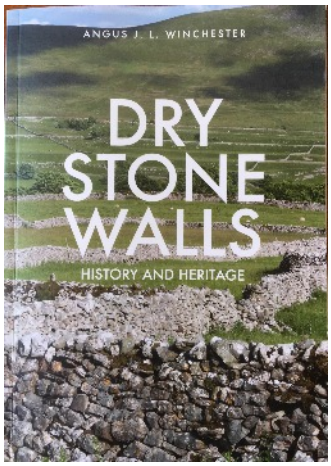
There are so many gorgeous coffee-table books about these days that there is scarcely room for the coffee. Most are easy enough to flick through, some occasionally throwing up an image that the reader feels 'I must show this to someone'. Rarer is the feeling that 'I must go there'. When I read this book I recalled fondly some of the places I had visited but also rued the classics that I somehow missed when on my walls pilgrimage to the Lakes, Dales and Peak country in May.

The images are of consistently high quality despite being from some 40 contributors, many of whom are not professional photographers. Some of the photos are truly magnificent. I particularly enjoyed how the person behind the camera captured the organic relationship between walls and landscape, something that perhaps a waller is well qualified to do. It is however also a characteristic noted by the DSWA Patron (Prince of Wales) in a particularly thoughtful endorsement of the book.

The book does not suffer by not being organised across themes or regions, perhaps just as well as the overwhelming majority of shots are from Cumbria. Perhaps this bias comes from the DSWA home base being in Crooklands (Cumbria). Had more space been given to the Yorkshire Dales (for example) we might then have seen more of the delightful old dry stone field barns.

A reader with little knowledge of the subject might appreciate more information in the captions, particularly identifying the type of stone and explaining terms such as cover bands, throughs and copes. There are several photos featuring 'Bursary trainees' without ever explaining this commendable scheme.

Book Review *Bruce Munday*



Dry Stone Walls – History and Heritage

A. J. L. Winchester

Amberley Publishing

96 pp; colour

Most casual observers of dry stone walls, if they notice them, ask who built them, when, why and (less often) how. The relatively low level of interest in 'the how' is because people who haven't tried it think building a wall is just stacking stones on top of each other.

Angus Winchester is an academic historian interested in 'landscape and environmental history, particularly of upland areas; and the local and regional identity in northern England, especially Cumbria'. Hence this book focusses on the first three issues – it is not a 'how to' manual. That said, nor is it a dry academic tome, but a richly illustrated tour through mainly Cumbria, Yorkshire and Derbyshire which, the author argues, possess some of the highest concentrations of dry stone walls in UK.

The first section of the book deals with the history of dry stone walls, tracing back to Roman times, but it was not until the Tudor Period that records were kept of the activity. Older walls are often recognised from the stone used (generally weathered field stone), a style that was distinctively regional, and a layout that meandered somewhat haphazardly across arable land. All this changed with the Agricultural Revolution and the wave of Enclosure Acts. Walls were then professionally surveyed, often built from quarried stone, and followed a basic template that we now know as the 'double skin' wall.

The second part of the book looks at dry stone walls as part of Britain's cultural heritage. The author explores the materials used and the construction methods, functional features, ownership and legacies of the past.

This book would be a very valuable travel companion for any walling buff venturing through a wonderful part of Britain. It is stacked with excellent half-page photos of walls, well captioned, although the quality of the reproductions is 'ordinary', perhaps a casualty of the quality of the paper. It is a pity that there is no mention of other structures such as arched bridges and barns and the absence of an index is a drawback.

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Membership

Annual membership fee

Corporate	$80;	Professional	$50
Single	$30 ($80 for 3 years)		
Family	$50 ($130 for 3 years)		

Cheque: DSWAA Inc. and posted to DSWAA Membership, 87 Esplanade West, Port Melbourne 3207; **or**

Bank Deposit at any branch of the ANZ Bank **or EFT:** BSB 013 373, Ac. no. 4997 47356

Clearly indicate membership identity of payer

New members

Complete the online membership form on our website: Alternatively email or post name, address, phone number/s, and area of interest (eg waller, farmer, heritage, etc) to the membership secretary (above).

Renewals

Annual fees are due May 31 after the first full year of membership. We send renewal notices prior to this.

Photos clockwise from top LH corner

P 1	G Duggan, J Holdsworth
P 2	B Munday
P 3, 4, 5	Diocese of Cairns
P 7	R Marshall
P 8, 9	L Noble
P 10, 11	B Asby
P 12, 13	B Munday
P 14, 15	G Duggan
P 16, 17	A Willingham