# Master Class- Arcane Walling.

I thought it might make a change for Masterclass to deal with something a bit more advanced than is its norm: globes and vases/urns.

Symmetrical rounded features – globes, urns and the like are all essentially distorted rounded pillars. So to start I shall run through the basic principles involved in building a round pillar.

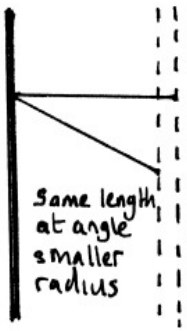
Pillar cairn, Birkdale, North Yorkshire.
© S.Adcock

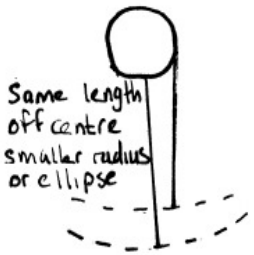
Assuming you want something a bit more formal and regular than would be achieved just by building by eye as with the cairn shown left, you need to adopt some form of method to ensure regularity/symmetry. You could always build a perfect circular base and then just work off that with a spirit level, although that is probably more fiddly and less precise than the perhaps more widespread method I outlined in "Dry Stone Walling". (*Dry Stone Walling, BTCV, 1996*)

First you set a metal bar set plumb at dead centre of your circle. It is very important that this is set true, anything else can produce some very 'interesting' results. Early in the process you should keep checking that it is true, until it is securely held by the lower courses of stonework. Even then it is best to check everything at the start of each day, (even the smallest feature will take several days) just in case.

A string is attached to the bar with either a loop or a washer (reduces friction). This line is then used to determine the curve of the face of the stone, and for positioning the stone. The string should be non-stretchy – brickline for example is not ideal, as a small amount of stretching and subsequent inaccuracies tend to have a disastrous (often cumulative) effect on symmetry.

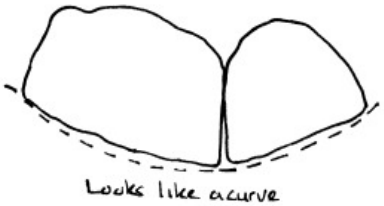
Care needs to be taken to ensure that the string is used level, and at right angles to the bar. Small variations are unlikely to show but lapses can create dips and flat spots. You are likely to notice any problems almost immediately with a regular pillar, but with more ornate shapes where subsequent courses are not necessarily in exactly the same vertical plane, problems tend not to emerge until several courses after they first occurred.

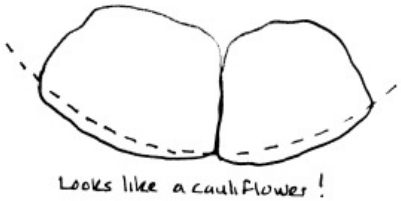


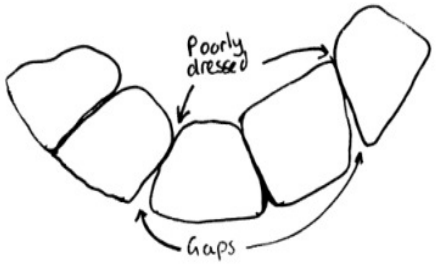

It can also be a good idea to cut a template to match the curve of the face for marking stones for dressing. This will save a lot of fiddling with the string, which only has to be used for checking the positioning of the stone, rather than marking a curve to be dressed.

The smaller the radius the greater the curve, and hence the more shaping is required. On larger radii you can get away with more, (i.e. less accurate dressing) as long as stones are positioned so that their ends are in place, and the face is not curved too much (leading to a crenulated cauliflower like face.)




As well as shaping the faces a lot of dressing of the internal edges will be required to get in the very least a reasonably tight fit between adjacent stones. Ideally each stone should be a segment. Structurally you should avoid just having minimal points of contact between the face stones (although you can get away with more if you have a mortar core).




Achieving this with just a hammer can be problematic, particularly on tight curves and for this reason many regard a saw-bench as a necessity; using a `stihl saw` is not really practicable (or safe) when you are going to be cutting hundreds of relatively small stones.

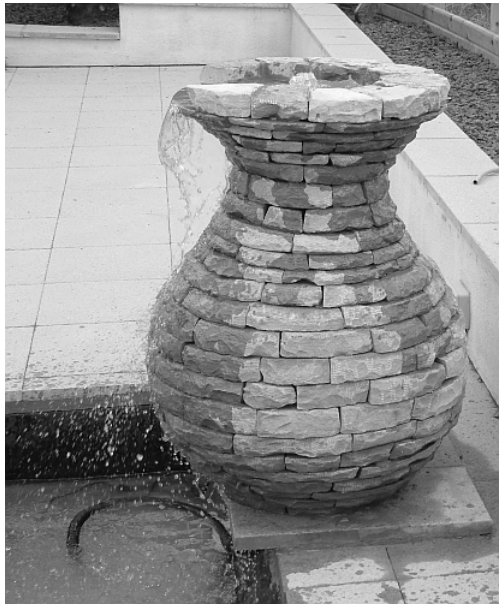
Thicker stones tend to be more problematic to work, and it is no coincidence that many pillars and their more complicated and ornate relations use thinner more workable stone.

Well dressed curves on large stones from Cairn above, note gaps between stones due to poorer shaping of internal edges..
© S.Adcock

## Here's one I prepared earlier….

So how do you vary the shape?

This is a water feature I built earlier this summer in Conwy.



I cut a template out of some hardboard I had lying around (ply wood is probably better) . This needs to be set absolutely true and somehow secured (are there right and wrong ways – how is likely to depend on the exact situation, but you must be sure that it can`t move.)

In this instance the central pin is in fact drain pipe as it has to act as a conduit for the water pipe.

Photos © S.Adcock

The major problem with this sort of shape is that the radius of the faces of each course of stone varies. In fact the top radius is different from the bottom radius. Coupled to this is the fact that the angle/batter of each course also varies.

A template was created for each course, marking a sheet of paper (pencil at required length of string) and cutting this. For the subsequent course the opposite end of the paper was marked. Thus the top and bottom of each stone could be cut to the required radius and the batter achieved by offsetting the radii by a suitable amount. With each subsequent course the bottom of the stone would need the same template as the top of the previous course, already on the 'template'. The opposite end of the sheet of paper was marked with the new top radius and re-cut.

As to the actual method of dressing that will depend on stone type and thickness and is beyond the scope of this article. In this instance (random york-stone crazy paving off-cuts) it was all achieved with a 25mm comb or scutch chisel.

The stone was then cut into a segment on saw bench, ensuring a reasonably tight fit on the outside face and within the vase itself.

It is very important with the earlier courses to ensure good length into the feature as you are effectively corbelling. In many instances you are not going to be able to build too many courses as you can easily reach a point where the weight of one course causes the course below it to tip.

This can be problematic with completely dry structures which shelve sharply. Whilst the whole finished structure might be stable the lower courses do not necessarily become stable until the upper courses are built to effectively hold them in place. This can be achieved with good length, temporary weight on the back etc. However it is more normal for a discreet amount of mortar to be employed… This is applied after each course, just around the tails of the stones and around the bar/conduit. It needs to be wet but not runny and very slightly proud of the coursing so that the tails of the stones in the next course bed into it, without it lifting them too much. Essentially a bricklayers mortar mix,of soft sand, rather than the stiffer masons mix.

Photo © S.Adcock

With this vase the underside of the globe part had somewhat less precise dressing than the top part because it is much less visible.

At the change in direction (i.e. the exact central course of the belly) the stones are dressed to a bull-nose. A degree of care has to be taken not to leave a flat spot, although how problematic this is going to be is more dependant on the stone size (depth of course) than anything else. Where the neck reflexes it would be nigh on impossible to curve the face stones and give them a concave batter. So for these changes in direction it is probably better (on reflection) to use thinner stone. On the whole more acute angles are more easily achieved with thinner stone.

The last 2 courses were fixed with beads of adhesive and silica on their undersides and silica between the stones. Additional silica was applied to the inside edges of all the joints. Finally a fillet of mortar was applied to the inside surface.

Partially completed top.
© S.Adcock

Ornate `pillars` tend to be coursed. Whilst regular pillars can be built random this would present all sorts of problems with the correct shaping of faces for more ornate structures and hence it is probably best to stick to coursing.
Whatever the structure you need to take care to keep the layers level otherwise maintaining the correct radius can be problematic. In addition when coursing you need to take great care to avoid `spiralling`. That is where a series of adjacent stones vary very slightly in size, with each getting very slightly progressively taller (or smaller). This leads to problems when you come to complete the course, with the last stone is 5 or 6mm higher (or lower) than the first.

Right, Random round pillar with herb planter in `crown`built. Nr Dalbeattie, Dumfries and Galloway by Garth Heinrich.
© S.Adcock

WRINKLES AND OTHER APPROACHES

The 'vase method' is only one approach, inevitably there are alternatives, although they tend just to be variations on a theme. A brief look at a number of other features provides a few useful pointers.

**Urn. Dumfries, Scotland,**

Built by Garth Heinrich this water feature is 51 inches high (69 courses in total) built out of slate from Elterwater, Cumbria (Burlington Slate Limited)

Photo © G.Heinrich

This urn was built with the template and central bar/pin method outlined above. Using thin slates means you do not have to worry so much about angle of face as long as it slopes (except around the belly and reflex). Thinner stone can also be relatively easy to shape to the correct curve, and as mentioned earlier facilitates more acute angles.

Garth prefers to use very fine sand (silver sand/playpit sand) rather than standard soft building sand. A relatively wet mix is applied on each course, proud of the building stones, and spread out well beyond covering just their tails. The stones of the subsequent course are then in effect slid into position. This method in effect fills up the nooks and crannies below the stones.

Garth also employs an improved method for measuring the radius, a length of bamboo cane rather than string. He makes a loop of tape places it around the central bar, and secures the cane tightly close to the bar. This in effect creates a "trammel", sometimes known as a "beam compass" - as opposed to the "dividing compass" known to most through their schooldays. The length of each subsequent radius is then marked on the cane as required. This method (which could of course be equally applied around a conduit) more or less eliminates the distortion problems that can occur with string through stretching, incorrect angling etc.

**Sphere. Tatton Park Flower Show**

This sphere was built by Andre Loudon out of Westmorland Green Slate. Andrew has become something of a garden feature specialist following his Gold Medal winning garden at the RHS tatton Park Show of 2003, of which the water feature left formed the centre-piece.

Photo © S.Adcock

Here the sphere was drawn on graph paper, a scale applied, and then the radius for any given height could be determined from the diagram and measured from the central conduit.

As a method this is fraught with potential inaccuracies (although in this instance it has obviously been expertly applied), however it is particularly useful for asymmetric shapes, (or those symmetric but not around a vertical axis), such as lozenges. That is where the measurement at any given height is not constant and so does not represent a radius.

The general observations on shaping thin stone noted earlier can also be seen here. There is an obvious, unavoidable distortion at the sphere's pole. It in no way detracts from this structure and it is not really possible with such thin stone to do anything else, it merely serves to highlight the problem presented by sharp batters.

Back to lozenges. At Tatton in 2005 Andrew built a lozenge water feature, a sort of squashed and elongated globe, with its top horizontally sliced off, which can be seen in the news section of his website (www.drystone-walling.co.uk/news.shtml ).

Also on this web page can be seen a huge sphere in his 2005 Chelsea Flower Show garden. Weighing several tonnes this was built off site, and then transported and put in place as the finished article! The 2005 Tatton globe was built in situ and following the show wrapped in cling film, a crate constructed around it, and then filled with expanding fixa foam, before being transported to a client's garden. It worked but Andrew's new improved method employs an engineered metal plate and tube (which acts as the central pin for measuring radii). The plate is supported off the ground, and sphere built on it. For transport a metal rod with an eye on one end and thread on the other, is inserted through the tube and nut attached at the base. A hi-ab lorry is then used to lift and transport the sphere. Andrew says a mortar core is essential to help hold it all together and he has had no problems during lifting or positioning, although one was severely damaged in transit.

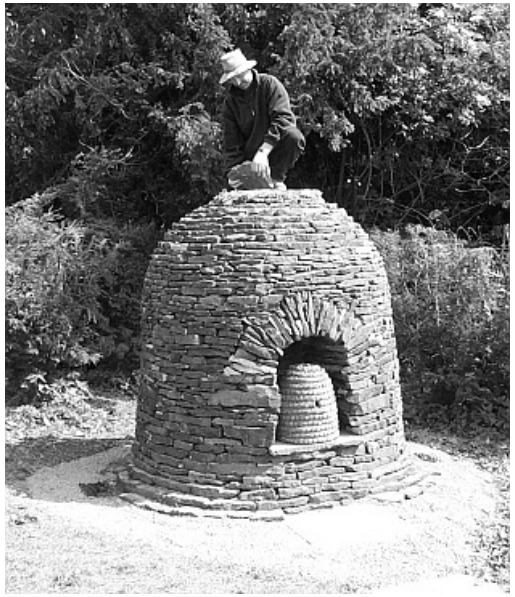
Andrew has yet to use this method for a water feature, but theoretically it ought to be possible to employ a second tube to act as a conduit, or to have a larger central tube. Its not clear if a thicker central transport rod would be needed to reduce potential movement within the sleeve.

With all the features seen thus far the stone used has come in slab form. This has the distinct advantage when building that one slab can produce several stones of a similarly thick bed, although it

is surprising how the thickness of an apparently regular slab can vary when you want a lot of stones of the same thickness.

Now for two features where the stone used was not of a slabby nature.

**Bee bole. Temple Newsam, Yorkshire**.



Topping out bee bole. © Simon Lumb

This bee-bole in the shape of a bee skep built by Simon Lumb, was commissioned in 2002 by the Leeds Beekeepers Association who just wanted a dry stone walling demo for the spring fair at Temple Newsam House, Yorkshire.

The bell shape (6 foot high and 6 feet wide) was achieved by using a central bar (12mm) with a washer welded on it, driven 2 feet into the ground. Then a second iron bar bent to half the bell shape with another steel washer on the end to stop it falling down the central bar. This second bar is moved with each stone placed to ensure it is in position. Care has to be taken to ensure the pin is knocked in and remains upright but it can be removed after construction.

Then when the bell shape was fully constructed the first iron bar can be removed.
The stone was rough field wall stone from Grange Moor, Huddersfield (sandstone). The small nature of the stone and large scale of the skep enabled shape to be maintained without dressing the faces.

Unlike the other features seen here the whole construction is essentially dry with only the capping stones mortared in place. It also employed buried concrete blocks as a footing.

It was constructed in the year of the Golden Jubilee celebrations, so the top stone was ringed with yellow flowering stone crop.

Photos of the bole under construction can be seen at:
http://www.leedsbeekeepers.org.uk/modules.php?name=coppermine&file=thumbnails&album=18

Bee bole profile © Simon Lumb

**Kiln. Cargen Bank, Dumfries and Galloway**

The kiln shown on the front cover built by Garth Heinrich (standing alongside it) is 3m high and has a diameter of 2m at the belly.

The profile method was used again, employing 2 sheets of ply, great care checking every day, and luckily an absence of strong winds

The scale of this construction, with its relatively large radii and gentle curves/changes in batter, means that in practice less precise dressing is required than for smaller structures. The stone, red sandstone from Locharbriggs, near Dumfries was random sizes in a 75mm bed, sawn on all sides. This was roughly dressed in quantity to an approximation of the required curve and then fine tuned for a specific course when placing.

A couple of final observations

You should also take care to provide a good solid footing, even small features can weigh around a tonne. If you're working on a patio alongside a pond make sure you check what the pavers are laid on! If it's sand then you will get half way up and then notice its tipping. It will have to be dismantled (taking care to keep everything in order) the slabs lifted, a concrete footing added, and the feature started again. With the vase the tipping was noticed towards the end of day 3. Once the footing was sorted it actually only took about ½ a day to re-set the stone. This suggests that around 80% of the construction time (allowing for mixing and faffing) was actually devoted to the dressing and cutting of stone.

As formal features you probably need a high degree of execution. It is however probably not crucial to get anything absolutely perfect otherwise might just as well have had the feature carved out of a solid block.
Thanks to Garth, Andrew and Simon for their help in the preparation of this article.

Arcane: *Hidden, secret; mysterious; abstruse.* The New Shorter Oxford English Dictionary (1993) *requiring secret or mysterious knowledge*. WordNet, Princeton University 2006.

Sean Adcock