Masterclass: Fat Tony and the Art of Coursing: Part 1.

Sean Adcock. Photos and diagrams © the author.

I have never written about coursed walling, shying away from it as it's not something I do that much of. This does not necessarily deter me from writing about something, as the series on corbelling exemplifies, but that was as much about the theory and physics as the actual doing. Hence coursing and 'retaining' walls are subjects I have largely eschewed. However I was recently working with Eric Landman et al in Ontario, Canada working on a coursed wall for almost 4 weeks and was able to have a good think about what I was doing (mostly in a practical sense, although the heat led to a certain amount of existentialism at times).

Whilst my experience of coursed walling is somewhat limited I did enjoy some success at the Yorkshire Open walling competition which was essentially coursed walling, but not with entirely regular stone, certainly not brick like or large slabby flat stone. I never did that well in competitions on those stone types. The Yorkshire Open was often the only day in a year where I would 'course wall', I put the success down to the less regular nature of the stone, especially when the competition was held at Honley, which allowed me to work in a way similar to coursing a clawdd. Beyond the obvious difference that the courses in a clawdd are 'pitched' or 'book-ended', what is perhaps key to their coursing is learning how inexact you can be. In order to achieve the coursing you have to learn how much variation between stones you can accommodate (or put another way get away with). This approach is something I have written about in *"Clawdd Construction"* and the text there forms the basis for part of the following.[1]

Coursed Walls

Generally when I describe building, or explain principles, I refer to building in layers, or layering. A coursed wall is essentially a wall where the layering is more exact. The key becomes how to achieve this regularity, whereas in a random wall the key is often how to create and/or accommodate variations in the layering.

Fig.1. Coursed wall Stanton Staffordshire

It is fairly obvious when regular stone is coursed (Fig.1), but it can be less so when irregular stone is. From a passing look at (Fig.2) the walls might not look that coursed because the stone is less regular, however looking at the same wall from a more acute angle and the coursing stands out.

Fig.2. Two walls around 5500 km apart. Left: Bethesda, Gwynedd; Right: Erin, Ontario. Face on there is considerable variety in stone size and shape and at first glance it might not seem coursed, however looking along the wall the coursing is still obvious

The process of layering also necessitates a distinction between well structured and coursed.

Fig.3. Two sections of same random wall showing different levels of layering

Fig.3 is made up of slightly cropped versions of Figs 9 and 10 from *Masterclass:Problems and Planning Part 5*[2] . There it was pointed out that these were sections of the same wall, built at the same time but by different wallers. The right hand version is a well layered random wall, it might look more 'coursed' than the left hand wall, but it is not coursed per se, it just has a better, more regular structure. It is still random.

At this point it is probably worth mentioning another pattern - "random coursed".

Fig.4. Random Coursed wall. Chilton, Oxfordshire

This has nothing to do with irregular stone, rather it refers to a coursed wall where the course depth might occasionally increase compared to one or more below, rather than the usual practice of decreasing stone size/course depth, with height. This practice is most common in areas where there is little variation in the stone's bed thicknesses. Basically it is the thickness of subsequent courses (layers) that is random, not thicknesses within a layer (as can be seen in fig.4.)

Random and coursed patterns are dealt with in more detail in *Masterclass: Random Walling Part 1*[3]
Beyond the regularity of the layering, the principles: length in, crossing joints etc., are essentially the same in both random and coursed work, with only one or two changes of emphasis, as hopefully we will see.

Whilst much of what follows is for coursing with less regular stone the principles should apply equally to more regular stone types although not all the problems would be quite the same.

LINES & COURSING

With irregular stone the use of lines is particularly important. Ideally the line should be set to accommodate the available stone, not raised arbitrarily to a height and then trying to find stones that fit that. The nature of the stone and how accurately you build affects how you should adjust lines, and experience helps, but often you cannot really explain the hunch that makes you raise or lower the line a little. (With more regular stone of course you do not really have this leeway). The line is also an indicator of the required stone size, it does not prescribe it. With random stone you do not have to hit the line exactly with every stone, the line ensures that you do not deviate too far from it and maintain the required coursing. Without a line it is all too easy to gradually decrease (or increase) height along the course if you are just matching the last stone, the longer the stint the greater the problem is likely to be. Of course some wallers are more than adept at coursing without a line, but they tend to be the highly skilled exception rather than the rule.

Unless the stone is particularly level bedded, if a course has been built accurately to the line, then raising the line by say 150mm will mean using stones that appear on average less than 150mm high. Essentially some stones with irregular bases will sit slightly proud of what you might expect even more so if these irregularities sit on irregularities on the tops of the previous course. These irregularities can effectively reduce the size actually required. Consequently with less regular stone it is normally possible to achieve a thicker course than might at first appear. In addition there can often be a notable difference in size from the smallest to thickest in any one course. In cloddiau for example it is not unusual for this to be 20% or more although the variation is likely to be less with flat layed stones since the dips in particular tend to be less pronounced and more difficult to fill with more severe dips bridged, whereas a thinner vertical stone would drop in nicely into the dip as can be seen (Fig.5).

Fig.5. Clawdd, Tal y Bont Bangor.

It can be seen here that within any course the largest and smallest stones can vary considerably in height, and that many stones in one course would be suitable for use in the subsequent course. Whilst flat layed stone might not vary as much, the less regular the stone the more the likely variation within any one course as shapes are utilised to accommodate irregularities, accommodating dips and bumps as can be seen (Fig.6).

For less regular stone you might only set the line 10-20mm lower with each succeeding course; and often it will even be set the same for successive courses. Basically the variations in stone shape help accommodate variations in stone thickness.

Fig.6. Erin, Ontario

I noted earlier that the line was an indicator of stone height. In Clawdd Construction I put it this way....*"Once in place, the line is used as a guide to help keep the line and batter, and as an aid to the height of stone required. It is only an aid and a guide; it is not supposed to determine exactly what size stone is required, for example missing the line by an average of 1cm is unlikely to pose very great problems, The key is to ensure good complimentary shapes between the tops of adjacent stones facilitating the next course. This is as, if not more important than, being exactly the right height. The creation of distinct steps between stones of different heights rather than angled transitions will create problems in subsequent building ..."*[4]

As a rough rule of thumb something around the thickness of a finger is usually acceptable (should that be rule of digit rather than rule of thumb?). If you can fit your flat laid hand on the stone without fouling the line it's usually too much.

VARIATIONS IN HEIGHT WITHIN A COURSE
Steps

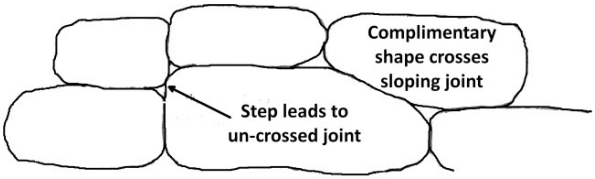

Fig. 7. Problem of steps in coursing

As with all walling avoiding creating small steps is very important, but here you are as well to avoid any type of step unless you deliberately need to break the course (if you have irregular footings for example or for some reason need to place a 'jumper').

Essentially you need a relatively even surface between adjacent stones in order to be able to set a stone in the next layer securely across the joint (Fig.7), and as avoiding running joints is quite important being able to actually cross a joint is too! Exactly how level it needs to be will depend on how irregular the stone is, the more regular the less the possible variation. Set 2 bricks next to each other and you can set most shapes within reason securely on the joint. If you only have bricks and the stones either side of the joint are not even (ie there is a step) then your next brick does not sit securely. Set two similar (but not necessarily identical) potatoes next to each other and another one of a slightly different size and shape will probably still sit on the joint, in effect 'cradled' by the stones either side if the joint. Essentially, flat stones over a stepped joint can pivot, see-sawing on the joint, whilst irregular stones over a relatively even/flat joint usually have the minimum 3 points of contact required for stability.

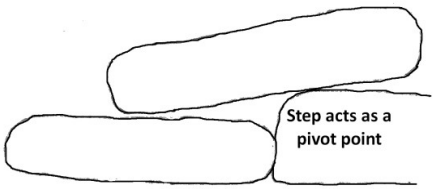

Fig.8. Steps can act as a pivot, dips at joints can 'cradle' stones

The DSWA Craftsman Certification Scheme allows for 2 stone joints, in that when 'Building and Packing' it requires: *"No running joints further than two rows of stones."* [5] Exactly why this is allowed is perhaps lost in the mists of time although I suspect it stems from the acceptance of 2 stone joints in some regions when walling with more regular stone. Generally I would see 2 stone joints as bad practice whatever the stone type and when working with irregular stone un-necessary and relatively easily avoidable. Generally where there are more than one or two every few metres they should be seen as an indicator of poor technique There is however a certain logic for accepting the practice with more regular stone where the alternative is shims and plates.

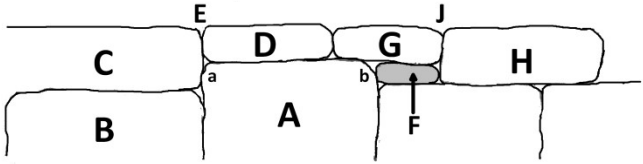

Fig.9. Two stone joints

In Fig. 9 there are two very similar steps(a&b) either side of 'A'. The problem of the step (a) has been solved by creating a 2 stone joint below E. B&C as a pair match A&D for height forming a good surface for bridging the joint at E. This is a 2 stone joint. The step at (b) is solved by levelling with a shim/plate (F). F and G then level with H forming a good surface for bridging the joint at J. This is not a 2 stone joint. In many random walls you will frequently have 2 stones alongside a larger one in order to accommodate the irregularities/randomness of the stone, however the use of thinner stone in these situations is not generally recommended and usually regarded as a weakness.[6] Hence in some, perhaps many, instances the ABCD solution might be better, depending on frequency of use. However you do need to take care to cross the joint at E, and where you find a proliferation of 2 stone joints in a wall you are more

likely to find 3 or even 4 stone joints. If you are not careful once you start 'not crossing' joints as one of your first thoughts then the 2 stone joint can easily be overlooked and become a 3 or 4 stone joint - or worse.

Varying thickness

Whilst avoiding steps is generally advisable it can be surprising how much you can vary the depth of a course of less regular stone, along its length. This said it is best to try and restrict variation to one stone or perhaps a couple of adjacent ones, generally keeping close to the line. It is all too easy to run half a dozen stones a little below the line and then half a dozen just above The result is that a noticeable dip will be seen looking along the line. Also bear in mind that if you keep "missing" below the line then you will need bigger stone than you might have planned for on the next course (and smaller if you are frequently above the line). This grouping can then look out of place within more regular coursing all around or cause subsequent problems. For example if you miss a length below the line and struggle on the next course to make it up there is a good chance that the next course will have a slight dip in the same place (or if you have built above the line and cannot find thin enough stones to compensate on the next course that too will be above the line) and then rather than just a dip a hump can develop. When viewed along the line this results in 'waves' developing within the coursing as can be seen in Fig.10.

Fig.10. Wavy courses

Towards the centre of this section of wall a wave has been created by less than accurate changing of course depth and a transition between stints.

Working on a long length, gives greater scope for good stone distribution and regular coursing. However you can cause yourself problems if the stint is in effect too long for the available stone, as you will sometimes require too many stones of a given size for the given course, and then if the length is too long you will struggle to complete the courses and spend a lot of time moving stone, 'borrowing' from the next stint and very possibly 'robbing Peter to pay Paul'. If you do a lot of 'borrowing', bear it in mind when setting the courses for the next section that you may well struggle without some form of adjustment. With shorter lengths there might be more scope to vary the course depth slightly in order to accommodate the stone to hand, but you have to be very careful not to create unsightly steps or waves in the coursing between stints. Essentially the shorter the stints the more obvious any variation in the finished wall will become. In practice, I prefer to work on 8-10 metre lengths. Getting this right is I think ultimately down to trial and error, the stone available, experience, and being aware of the potential pitfalls, and very possibly down to which side of the bed you get out of on any given day.

In Clawdd Construction I suggest that *"Whatever length you adopt, it can be an idea, in effect to work on two stints at the same time. Build two courses on one stint, then move onto the next stint and build a course, return to stint 1 and build the third course, then the second course on stint 2 etc. This can help with stone management and improved coursing, as you can move stone from one stint to the other, as required."*[7]

In practice this method might work best with shorter stints where you are not moving stone too far. It is an approach which I feel allows greater flexibility in building and gives better stone distribution along a length. It also means you are not looking continually for stones that are essentially the same thickness and you know that if the stone in your hand is a little too thin or too thick there should be a suitable place for it not far away. With Clawdd building against a bank this approach does not result in any compromise with stacking the courses as you can backfill if/as required. In a dry wall it is more problematic as you can only really build 2 courses on one side if the other side is initially one course higher, which can be difficult to facilitate unless you are working alone. It is less of a problem with the top 2 courses where length into the wall tends to be less pronounced. In the wall shown in Fig.11 the last two courses covered about 20cm. Initially this was 2 courses close to 10 cm each which was then amended to taper to 12cm and 8cm, and then reversed that tapering back to something close to 10 and 10. The variation in course thickness, tapered over around 10 metres, does not immediately jump out and it allows a greater range of thicknesses within the two courses than would have been facilitated just by variations in shape. If a stone is too big or too small at a given point it is saved. If it is only marginally the wrong size it will normally fit nearby, if it is 1 or 2 cm too

thick or too thin it can be saved and moved it to where it will fit once a few more are gathered. This approach can mean jumping around a little and building out of sequence, but if used judiciously you should get a better stone distribution, as long as you are careful with the gaps you leave. It is actually likely that you will have a reasonable choice of stones to close any gaps and so it should not compromise the build.

Fig.11. Varying the thickness of the top 2 courses is not necessarily obvious when viewed from more than a few metres away.

Random Footings and Jumping

When setting lines for coursing, you will often determine where the finished height is and measure down from this. If for example your frame is in a slight dip then the finished height wat this point would need to be slightly more, but your last course will be essentially the same height here as 10 metres away where you could even have a slight raise in ground level. Setting a top line/height and measuring down from it allows any variations to be accommodated within the foundation and subsequent course, forming a level springboard from which to start coursing. All well and good with regular stone but problems can occur here where the nature of the stone (large and or blockier random stone) dictates an un-coursed footing. In Fig.12 the wall top height is established and the footings are random, if the nature of the stone dictates say that you will have to fit 4 courses in the top 50cm the problem is that once the footings are in they leave between 8 and 30cm to get to the level which is 50cm from top line. Ideally you would have one course on top of the footings, but 8cm might be a little on the thin side and the undersized stone used here might have a knock on effect.

Fig.12. Random footings in a coursed wall

Sometimes you might be able to leave out thinner stone, and jump from the footing to the third course. This will break up the look of the footing and depending on how often you need to do it can detract from the overall look. Another consideration is that jumping might be fine where suitable large stones exist but where there is not suitable stone 2 courses will need to be squeezed in and you are generally better off having 2 similar thickness courses rather than one thicker and one thinner, as this (depending on the precise nature of the stone of course) tends to make jointing easier (there will be more on this in part 2).

It is best not to make the footings excessively random. Match 2 or 3 stones for height and then a step, rather than having a step by each stone. It is aso usually better to have big steps rather than shallower ones. Alongside a shallow step you will have to have a thinner levelling stone and you can easily end up with a run of two or three of these, whereas it would have been better to have a bigger step and a run of slightly thicker levelling stones. Setting a solitary over- (or under) sized stone tends to create problems which are difficult to solve as you have less room for manoeuvre/options. The exception to this is particularly over-sized stones which leave little space for the second course. With these you are generally better off separating rather than grouping them, thus avoiding the need for an agglomeration of thinner stones (there will be more on this in part 2). This said if you have a lot of oversized stones spreading them, where they will continually disrupt the coursing might not be aesthetically desirable.

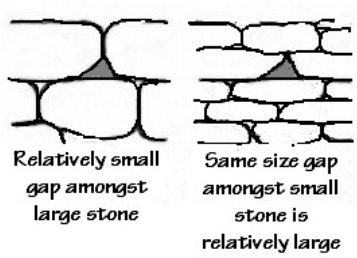

Fig.13. Gap size is relative to stone size taken from *Stonework* p.9

Using Shapes and Shaping

The more regular the stone, the easier it should be to produce a tight finish to the face. It is unlikely that irregular stone will produce as tight a wall as ore reular stone however hard you try. Fig.2. shows how shapes can be used to complement each other. Where there is a dip you need to fit it as well as you can in order to avoid unsightly holes. However you will not be able to fill all the V shapes that occur at the top of joints with irregular stone. These holes are not necessarily a problem as explained in Stonework

In all cases stones should be butting against their neighbours, but, for example, a wall built of regular/flat stone should be tighter than one built of irregular stone, and rounded stone is likely to appear slacker than squarer stone. Smaller stone should result in a tighter build than larger stone - a 5cm^2 `gap` is not a problem where the butted stones have 200cm^2 faces; where they only have 100cm^2 faces it is of far more concern'[6](see Fig. 13)

Essentially, as long as the stones sit securely and butt up, with good internal contact (not just point contact on the face) then any concerns about these gaps are more about aesthetics than structure. If there were no gaps then there would be less potential for movement during settlement but as long as the principles in the last sentence are met then this potential is likely to be minimal anyway. It also means you can in effect use different thicknesses in the same situation/ to solve the same problem depending on how well the stones sculpt to any dips as can be seen in fig. 14. (A) is definitely better and will all things being equal give a potentially stronger wall than (B), but if you cannot find A then as long as B meets most of the other criteria of building and maintains the coursing then it is far from being a disaster.

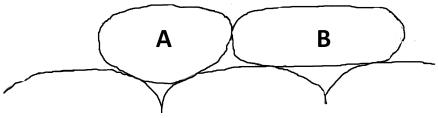

Fig.14. Different sized stones in same situation

This brings us to dressing/shaping. The extent to which should do this with irregular stone in order to achieve coursing is tricky to evaluate. There are a number of swings and roundabouts. If we turn one stone into a brick we tend to end up turning most into bricks, as we will (feel the) need bricks in order to get others to sit alongside and on them. It is also the case that if we reduce the size of a stone then the stone would have needed to be bigger than the course in the first place. With less regular stone it might have fitted in a dip somewhere on the selfsame course without dressing – had we left such a dip rather than squaring everything. Squaring the base pre-emptively might mean it doesn't sit, flattening the top might mean a flatter stone than was necessary is needed to sit on it. Also if you are struggling to find stones to make a course height then dressing is not going to help! Maybe you can dress things down, but what if that is dressing down from a thickness that might later be useful? Not a problem if it's just the occasional stone, but if it's every other stone you might just be saving up a load of pain for later. Squaring the sides of a face can have similar repercussions, you might get better contact but you will need wider stones to fit any given gap. Not necessarily a bad thing until you cannot find stones wide enough to close a gap or sufficiently cross a joint. Basically if you have a gap x cm wide then a stone bigger than that can be dressed down to fit, but a stone which is irregularly shaped might fit the width just as well with little or no dressing, the contact might not be perfect, but it is often good enough. Here dressing as a first port of call might effectively be reducing your choice. It is probably a case of everything in moderation, you will probably need to dress more in a coursed wall, but it does not necessarily need to be the driving force of your build especially if the coursing does not need to be 100% regular and/or unless incredibly tight contact/jointing is the order of the day. It takes longer, can make a rod or your back and in itself does not always produce that much better a result for the invested effort. Something we will return to with 'fuzzy coursing'.... next time when we finally get to meet who or whatever is "Fat Tony" and discover what he has to do with walling in general and coursed walling in particular.

NOTES

The complete set of past "Masterclasses" can now be found in the books section of www.dry-stone.co.uk

[1] *Clawdd Construction* . DSWA North Wales Branch. 2012.pp.11-13 . [2] *Stonechat* 30, Spring 2016. p.39.
[3] *Stonechat* 17, Winter 2009. [4] *Clawdd Construction.* p.12,
[5] Lantra Awards Accredited Craftsman Certification Scheme for Levels 1, 2 and 3. DSWA. 2014. p,6 .
[6] For more on shims and plates see *Stonework.* DSWA North Wales Branch. 2012. p.16.
[7] See *Clawdd Construction*. p.13 . [8] See *Stonework.* p.9.