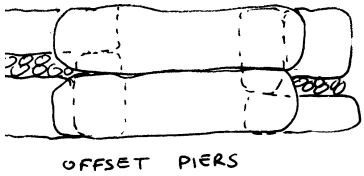
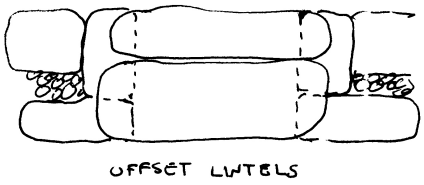
PROFESSIONAL COLUMN: *Waller and Dyker, Spring 2010*
Passageways

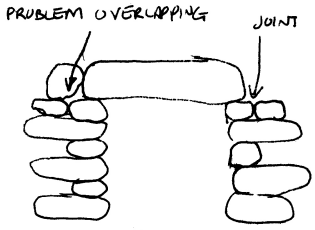
Having looked at the various techniques involved in the construction of wall ends/heads we can now look at those more advanced features which utilise them.

Passageways, that is sheep holes, lunkies, hog holes, cripples, smoots or whatever local terminology applies are essentially two short ends or piers bridged by a lintel or lintels. As *"Dry Stone Walling"* (BTCV p.95) notes you should construct the inside faces as smooth as possible so there are no projections on which stock could catch, destabilising the wall." It continues "There is some debate as to whether the piers should be finished with runners or tie-stones. Each can present problems, and the choice is usually dictated by the stone available.", which is as good a place as any to start.

With many, especially where you are not working with regular bedded stone, the chances are the passageway will be built essentially of broken ties. In this case try to have opposite structures on either pier, then each lintel will sit on one tie and one runner. If you have one wide and one narrow lintel, then they should match so that you can use the wide lintel to hold the runners.







When you sit a lintel on a tie stone there can be a problem with overlapping joints (especially with less regular shaped stone) unless the lintel is long enough to sit beyond the tie. It is however unlikely (assuming the tie is sitting solidly) that the lintel will destabilise the tie. The weight and friction created by the lintel is actually helping to stop the runner becoming displaced into the opening in a similar way to a tie holding it into the body of the main wall. For this reason sitting the lintel onto a tie is arguably preferable to sitting it on a runner where you are effectively stacking traced stones. That said if you are placing runner on runner, should then tie runners with through (a pair of lintels should always be tied with a through).

The nature of these passages is that they concentrate stock, the ground is likely to be churned and the foundations of each pier can be undermined. For this reason it is probably a good idea to have a floor to the passage if it is ever to have anything more than occasional use, although in reality this is often a rare practice. It should also be born in mind that creating a mud bath which every sheep in a flock has to pass through can harbour and spread foot rot, a stone base avoids this.

There are several methods of forming a base, depending on the available stone. The simplest is a slab or slabs as shown right. You can run the footing across the gap, although this does have drawbacks if more of the footing is in the passage than within the wall it is more likely to be displaced slightly destabilising the wall. Another alternative is to pitch the gap (i.e. set stones with a long axis into the ground) with smaller stone; this is often the best option if you are rebuilding a passageway which doesn't have a base. As long as you can gather a couple of barrow-full of stone you'll have plenty. Reducing the height of the wall by only 25mm or so over 10m should 'liberate' plenty of stone for the purpose. It is easiest to pitch before the wall is finished, but there is of course no reason why you shouldn't leave it until it's finished and then use left over stone – assuming you've remembered to leave enough!

If the base is left as soil it is very important that both piers start with a pair of runners. If you use ties or broken ties then there is a very good chance that over time they will in the very least become partially undermined and under considerable risk of moving.

The passage in the photo is being prepared for an Advanced Test. Presumably the frames are in place to ensure the vertical – complete with associated problems as noted in last Summer's *"Waller & Dyker"*. It would be more normal to just run lines across the gap and use a level (and frequently just by eye given the truncated nature of the 'ends') for the vertical.

This brings us to the requirements of the Advanced Test. One of the reasons a passage is more 'advanced' than an end is that by their very nature the 'heads' will undergo considerable pressure over time from passing stuck rubbing on them. Consequently the corners need to be very well bound and the internal faces flatter than would be necessary for a 'bog-standard' cheek end – as noted at the very start of this article there should be no chance of stock catching stones. The other

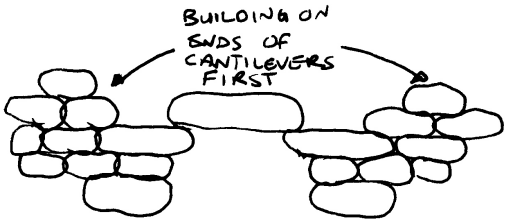
major consideration of the test is the lintel itself – whether it is strong enough basically not thin, "*Dry Stone Walling*" suggests 100mm, although in practice stone type and availability will be major factors. Just remember that if you are building your passage for a test then the test will be marking against an ideal, do not choose a passage where all you have available is a 50mm thick slate and then wonder why you fail. The other considerations with the lintel(s) is how well they overlap onto the wall and are subsequently tied into the body of the wall. With tying in the same principles as outlined for runners in the last issue of *"W&D"* apply. As to what is sufficient overlap onto the wall the answer is simply as much as possible! For the idealised tests 20mm is not gong to pass, 40mm probably not. Beyond that there are no hard and fast rules.

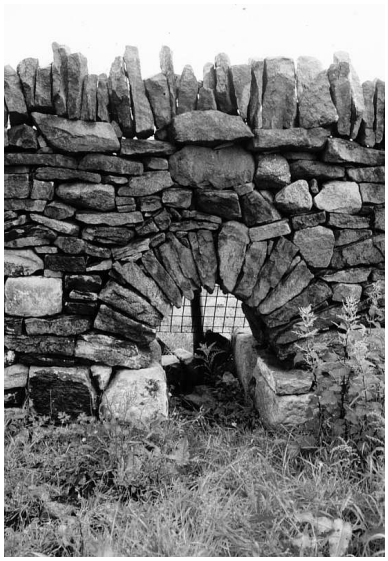
It is however worth bearing in mind that provided the lintel is sound the fact that it laps onto the pier by 100mm rather than 20mm makes little difference in terms of strength it isn't likely to crack. The problem with a small overlap is three fold. A lack of overlap means minimal contact, resulting in a lack of friction and relatively easy displacement (remember a lintel is by its very nature traced and potentially unstable). The second problem occurs where there is movement during settlement again minimal overlap means displacement is more likely. Finally a small overlap means that a lintel set on a tie is potentially placing more force onto the outside part of the tie, which could destabilise it.

A question arises as to how you should distribute the overlap between the two piers. Generally the answer given is to overlap them evenly onto each pier, but that might not always be the case. Obviously if the total overlap is 100mm it would be foolish to overlap by 25mm on one side and 75mm on the other. Beyond this there is little technical reason to even them up (although there might be aesthetic considerations). Basically if you have the luxury of long lintels set them to best achieve subsequent crossing of joints/tying into the main body of the wall.

Enough on theoretical and ideal overlaps, what about reality? With improvements in stock breeding it is often necessary to increase the size of the passageway if rebuilding it. Normally finding a few extra stones for the pier from within the wall is the least of your worries, widening the opening often leads to problems vis-à-vis the length of the lintel(s) (similarly if replacing a broken lintel), reducing the overlap onto the piers to a dangerously small amount.

This is often the case when repairing sheep pens in North Wales, and I have employed the following method on more than one occasion. I do not have any good photos of the technique, but it is similar to that used in passages and doorways frequently found in medieval castles (as shown left, in Beaumaris,). That is you finish the piers with 2 runners each of which projects slightly beyond the pier (in effect corbelling) reducing the distance the lintel has to bridge. The location of this projection is such that there is very limited risk of displacement through stock catching it.





If the lintel still slightly overlaps the pier then it can be placed straight onto the supports, however if it is narrower than the gap then the supports need to be cantilevered by building on their ends within the main body of the wall first.

One final solution to the lack of a lintel is to build an arch, such as this example from Burnedge Bent Farm, (near Oldham) but that's a whole new ball game and even though more technically complex than a lintel not allowed for the Advanced Test because there is no lintel to mark.

Finally by way of a diversion and whilst space permits… a competition. Taking the fine example of this wonderful wall end from the Cotswolds, come up with a caption, or maybe just list the faults with a little analysis, use it as inspiration for poem, whatever takes your fancy. The prize is any book, or combination of books, or DVD up to £12 total, from DSWA sales list, or a copy of "Dry Stone Walling". There might even be more than one prize if there a number of widely differing entries. Entries to Crooklands please before 14 June.

Craig Arbennigol