



Building Dry Stone Walls

A systematic approach saves time and turns beginners into artists

BY CHRIS KACHUR

You could consider stonework a dying art form or just dismiss it as "stacking stones." In New England, it's a little of each. In the span of a few hundred years, thousands of these stone walls were created—not by masons but by settlers who needed to know a little bit about everything to survive. As they cleared land, they unearthed stones that could be used to retain soil, build foundations and mark land boundaries. Today, the region gets a good deal of charm from stone walls that embrace the landscape and embellish old structures.

Building stonewalls is physically demanding. Yet I find few labors give me as much creative satisfaction as finishing a mortarless, or dry, wall (photo facing page). It doesn't take inherent artistic ability to build a wall. It's not rocket science. You don't even have to be Italian. A fairly strong back, a few inexpensive tools (photo right) and a pile of stone are all you need. Add to this a system of simple, steadfast rules (sidebar right) and a little practice, and you'll be well on your way to building structures that will outlive your children.

I prefer dry stone walls over mortared walls for a number of reasons. Water flows right through dry-laid retaining walls, so it doesn't pond and cause problems. Dry walls are cheaper, and the footing does not have to be solid concrete. If a dry wall moves or part of it falls, repairs are easy and undetectable. With no mortar to mix, you will spend a lot less time per work session on startup and cleanup chores. Finally, if you can tackle a freestanding dry wall, then building one with mortar is only a small adjustment. The opposite is not necessarily true.

Walls can be a mix of fieldstone and blasted stone

I use both fieldstone and blasted stone, often in the same wall. When I use fieldstone, I do little cutting but try to use the natural contours of the stone whenever possible. Even if the face of such a wall is imperfect, it has a lot of character. I often have to supplement supplies of natural fieldstone with blasted stone, as I did in rebuilding the wall featured here. Blasted rock is often easier to cut, split and shape. It comes in slabs, so it's easier to work with. Either way, stone is not cheap. Stone can cost from \$50 to \$250 per ton (there are about 1½ tons per cu. yd.). In the wall that I built in the photos featured here, I used fieldstone that was already on site, and then ordered a few pallets of blasted stone to augment it. A 3-ft. high wall would require a yard of stone per 3 ft. of length. This plan allows for extra stone.

There should be plenty of Yellow Pages listings for stone in your area. If you are lucky enough to have a quarry nearby or a farm that is selling old walls, you can cut out the middleman and save some money. If you have stone at the site, you can go to a stone yard and try to match it. However you do it, always get a little extra. In that case, you won't have to pay a delivery charge for just a little bit if you run short. You can also save money by using bricks, broken flagstone or concrete as the filler inside the wall; it won't show when you are done.

A wall is a series of interlocking horizontal platforms

I like to think of a wall as a series of platforms (drawing p. 77). Each one consists of large, medium and small stones. Build the

outsides first, then backfill so you have a strong, flat base for each stone you lay. The idea is to bring the wall up as a series of horizontal planes with staggered joints that distribute weight evenly. The most important thing is that a stone sit well; it should overlap other stones and not rock back and forth or wiggle. It's fine to set stones that do not create a horizontal plane, but the stones set on top of a nonhorizontal surface ideally should have a contour that will correct the lean. Always try to work toward creating a horizontal plane to build on top of, whether it's on the face or in the middle of the wall.

Beginners often stare at a specific spot and weed through the pile looking for the stone. This technique is time consuming and frustrating. Don't look for a stone to fit a spot; look for a spot to fit the stone. You inevitably

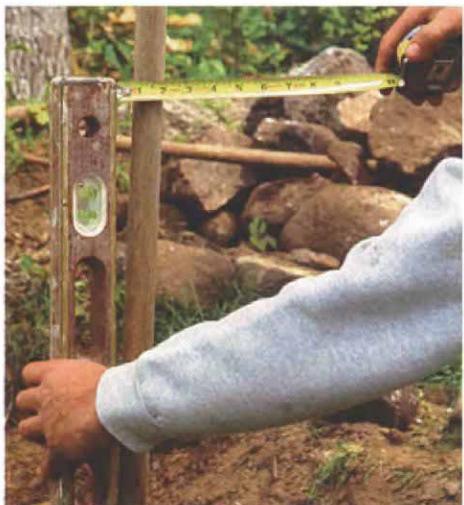
Wall-building basics

You can buy plans to build anything from a garden shed to a tea cart, but when it comes to a stone wall, you're on your own. Walls are built one stone at a time, so they allow a great deal of spontaneity and freedom of expression. Still, observing a few fundamentals will help to ensure a wall that stays together for a long time.

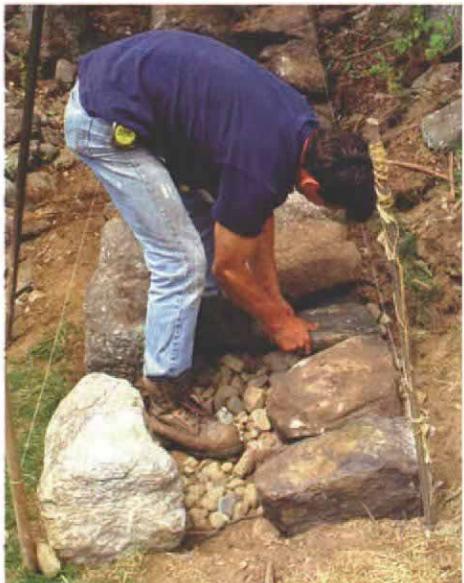


Tools are simple. A basic tool kit includes an 8-lb. sledgehammer, a 3-lb. sledge, a stone hammer, a chisel and a pry bar.

- **Joints should overlap stones. The ultimate no-no is when joints form a four-corner intersection. Vertically, no joint should run for more than three stones.**
 - **Stones aren't perfect, so don't kill yourself trying to make them perfect. Worry more about wall strength than having perfect joints.**
 - **Level off a layer and backfill before continuing up in height. No part of the wall should be more than a foot higher than any other part as you work.**
 - **Have more than enough stones to work with. The better selection you have, the quicker you will go, and the better the wall will look.**
 - **Step back from time to time and look at your work from a distance. This step will help you to pick out flaws, and it will make you feel good.**
 - **If you think a stone will look better in a different spot, move it. If it looks like it may fall someday, then it probably will.**
 - **Remember, gravity is your friend. When moving stone, use it whenever you can.**
- C.K.



A tapered wall will stand up longer.
Outside faces of a wall should taper inward equally on both sides. Mason's line tied to inward-leaning corner stakes guides construction.



Space big stones evenly along the line.
With corners in place, the author moves large base stones to the line, spacing them evenly along the face of the wall. Smaller rock fills in the voids.

The first horizontal plane takes shape.
The author now works on the middle of the wall, forming a roughly level platform. Larger stones that break this plane will help to tie layers together.



will have to find stones to fit certain empty spaces, such as when you tie separate platforms together. But you should not limit yourself to working on a small area. Try to work the whole wall at the same time by finding a spot for whatever stone you pick up. Most of the time you will be able to tell whether a stone is good or bad without picking it up. Even so, you almost certainly will have to split some rock, or at least clean up some rough edges as you go (sidebar p. 78). As you work, remember to distribute large stones and stones of different colors evenly throughout the wall; consistency is everything. If you have to mix different types of stone, do it from the beginning of the job.

Create a solid footing, lay out the wall, and then sort the stone

I start by marking out the wall with mason's twine. I take some long stakes or poles and hammer them into the ground just past where the corners of the wall will be. Free-standing walls should be wide enough for good stability and should be well proportioned. The base should be almost as wide as the desired height and taper in anywhere from $\frac{1}{2}$ in. to $1\frac{1}{2}$ in. for every 12 in. in height (photo top left, facing page). Make sure both sides taper in equally when you set the stakes. I tie some twine onto the bottom of the poles to use as a guide for digging the footing. At this point, the twine doesn't have to be tight.

A dry-wall footing need be only 8 in. to 12 in. deep for every 3 ft. of wall height. Should you be rebuilding an existing boundary wall on your property, the footing can consist of small stone already on site. If you are building a new wall, try using a 6-in. bed of $\frac{5}{8}$ -in. to $\frac{3}{4}$ -in. crushed rock, leaving at least 2 in. of the wall below grade.

Before starting to set stone, I try to organize the pile a little. Ideally, good stones will have at least two flat faces that are somewhat perpendicular to each other. Set those aside. Cornerstones are obviously more cubic and should be stockpiled near the corners. Stones with one good face will be used quickly, and some flat ones should be saved for the top. Also, look for large base stones. They should be moved toward the lines you have set up. Stones with no real faces can be used to fill in the middle.

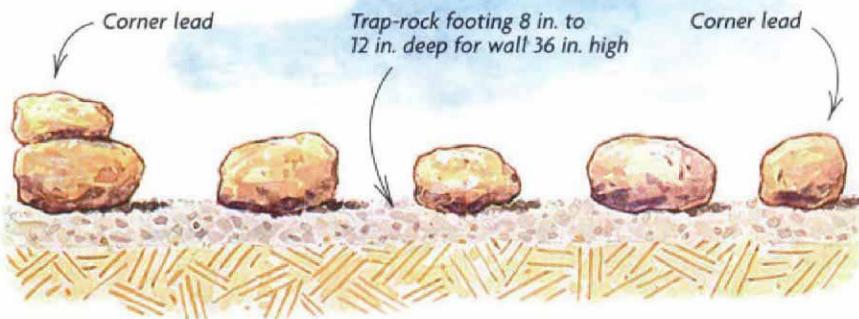
Start with the corners, then build the first platform

I clear a 3-ft. or 4-ft. path on the outside of the lines so that I'm not tripping over rock every time I walk past. When I have a half-dozen cornerstones and some big base stones

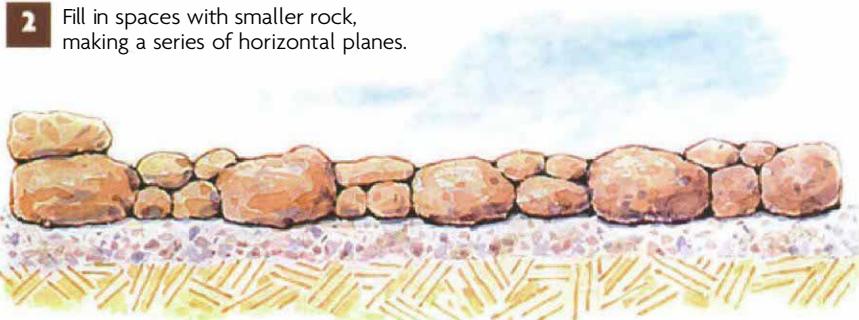
RAISING A WALL ONE LEVEL AT A TIME

Dry-laid stone walls will last for generations if they are constructed carefully. The author's approach is to build a wall as a series of interlocking horizontal planes, beginning with the largest stones at the base. Joints should be staggered and not line up horizontally or vertically for any great distance.

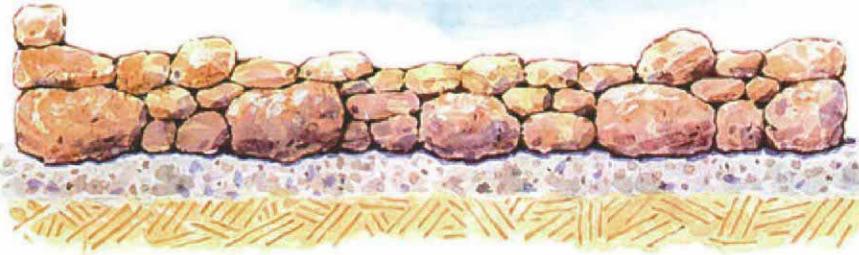
- Space large base stones evenly along the layout line.



- Fill in spaces with smaller rock, making a series of horizontal planes.



- Level off to large stones to make new platforms; larger stones help to tie platforms together.



- Continue up in a series of planes, bringing final level to the line with flat rock. Then chink.





Splitting stone

Splitting or cutting stone is probably the hardest part of building a wall. Each stone has different veins, densities and weak spots. It can be split with a stone hammer or a hammer and chisel, but there is no substitute for practice. If you see a stone that could be squared off, give it a try. But be careful: Stone shards are sharp. At the very least, wear protective eyewear.

As a rule, if you have to cut the face of a stone, the hammer should swing toward the bulk of the stone to avoid taking off more face than you want. Patience is a virtue. Don't try to take off too much at once. If you want to cut off 4 in., break an inch at a time so that the stone won't break at a weak spot. Use the hammer and chisel to take off unwanted nubs that prevent a stone from sitting well.

Blasted stone can be split by holding the sharp head of a stone hammer on a straight vein and striking the top of the head with a small sledge (top photo). Strike the head once each time as you run it along the vein (center photo). Do this on the same vein on all four sides, and the stone should open with a dull but satisfying pop (bottom photo). Again, be patient. If you hit too much on one side, the stone will not split all the way through. I was taught to split stone by a mason who gave me some Belgium blocks and told me to split them. Belgium blocks are dense, and this task was difficult and expensive. But once I was able to split one, splitting other stone was easy.

To split fieldstone, I normally try to hit the stone with a sledge on the bulkiest part of the stone where I want it to split. If the stone is too dense, the hammer will bounce off without much reaction, and it's usually not worth the effort. If the stone begins to resonate with a hollow sound after a few whacks, then it's a good candidate for splitting.

—C. K.



with good faces, I am ready to begin building the wall.

The wall actually starts with what is called a lead. That means establishing corners at least two stones high. I try to make the first stone a relatively large one, and I place it at the front corner to help create a solid base. Then I set up the back cornerstones.

Once the corners are established, you can move to the first course of large base stones (photo bottom left, p. 76). The tops of these base stones will form the top of the first platform. Once the large stones are in place, you should find a spot for almost every stone you

pick up. Hold up a stone and study it for a few seconds. If it's a large stone, flip it around on the ground. Where is its center of gravity? Which side is the face, and which sides are top and bottom? Look down the line, and if the stone is not too large, walk with it and ask yourself where it could go. Ask yourself whether the stone should be used to level off another stone, overlap and break a vertical joint or be saved for the top. If it doesn't fill any of these needs, then find a purpose for it in the middle of the wall.

And so it goes, one stone at a time, as you raise the entire wall in interlocking platforms

8 in. to 12 in. (photo right, p. 76). Add large, medium and small stones, in that order, and then backfill in the middle of the wall. Stone walls are like a game of chess: A good player is thinking three or four moves ahead. With practice, you will begin to see ahead.

Backfill interior sections carefully, and work toward the cap

A good dry wall is not merely stacked. It's packed. Think of it as a moving van. You can get many more boxes into the truck by packing it tightly, neatly and methodically. In New England, the ground moves as it freezes and thaws. Walls that have hollows inside will shift, and maybe fall. If the wall is truly packed and if the earth under it shifts a little, stones should stay in place.

When backfilling, do not cover up caverns in the wall, and don't just throw backfill stones into the middle. Backfill stones also should create horizontal planes, fitting snugly together and overlapping other stones to distribute weight. I often take larger stones and shatter them with a sledgehammer. I'm left with lots of various-size stones for filling smaller spaces.

As you get to within a foot of the final height, reset the lines level and tight (photo left, facing page). If you are building a wall that goes up and down with the landscape, you can carry a piece of wood of the correct height up the line and check the wall. Outer capping stones should have at least two good faces that are somewhat perpendicular to each other. Prop the stones into place temporarily with other stones, but don't do the final backfill until you have placed all the face stones up to the line. Now take those stones with no faces that you have set aside and begin leveling off the top of the wall with them.

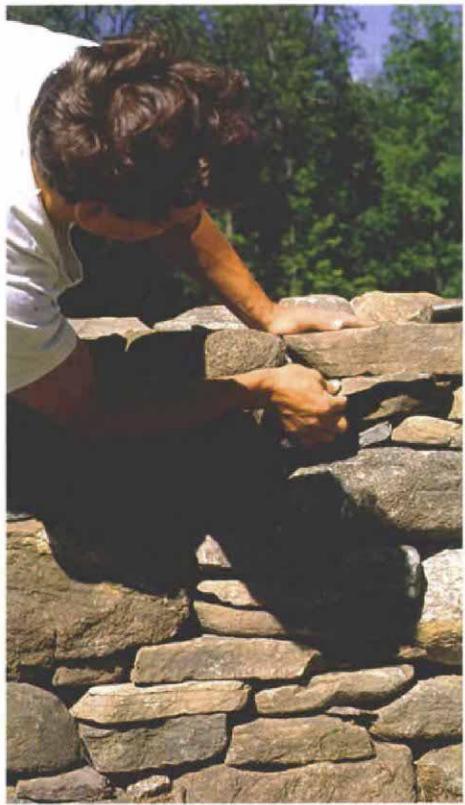
Chinking is the final step

Chinking puts the final touches on the wall, filling in all the small voids and spaces that larger stones have left. I fill a wheelbarrow with smaller stones and roll it up the line, chinking as I go. I take out stone a piece at a time, and find a spot for each one (photo right, facing page). Wedge-shape stones work well for this task. Consistency is important. If the wall is to have an even appearance, you shouldn't chink more in one area than you do in another. You can chink a wall more or less indefinitely—the longer you stay working at it, the more finished the wall will look. □

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Nearing the finish line. As the wall approaches its finished height, the author retightens the lines and looks for flatter rocks that will help the top of the wall end evenly and smoothly. Rocks brought to the line should be shimmed carefully.



Chinking is the last step. Remaining voids should be small, but chinking them will give the wall a more polished appearance and add stability. Don't chink one area more than another.