

THE LOGIC OF STONE

an advocate looks at the benefits of dry stone masonry.

Jane M. Wooley, ASLA

Dry stone masonry--the method, material, and process of combining stone into all manner of structures without the use of any mortar--is a disappearing craft in North America. Within the craft lies the promise to authentically restore thousands of historically significant dry stone structures that have survived the centuries. This sensible technique offers landscape architects one of the most responsible, expressive, and versatile building methods ever developed. Unfortunately, it is all too rare to find craftsmen, or design professionals, with a deep understanding of the principles and issues involved.

But in the heart of Kentucky's celebrated horse farm countryside, the nonprofit Dry Stone Conservancy (DSC) is spearheading an effort to preserve historic rock fence landscapes and the craft that built them. The DSC was formed as an outgrowth of a Kentucky Transportation project to train masons to relocate historic fences affected by road-widening projects, but its mission has become more ambitious: to "revive the craft [of dry stone masonry] and preserve its structures" nationwide. Partnerships with the National Park Service, Kentucky's Transportation Cabinet, the Heritage Council, local governments, and other organizations are already in place. The program includes extensive training of masons, technical assistance, and public education. The goal is a future in which design professionals turn often to dry stone masonry as the best practice for many needs. The craft has the potential to become a thriving industry if it is thoroughly underpinned by education, skills certification, specifications, testing, and standards.

Why should landscape architects and designers want to use dry stone masonry in their projects? To begin with, the versatility and aesthetic appeal of natural stone is unsurpassed. The variety of textures, colors, shapes, and sizes--



Dry stone bridge and channel lining. Cherokee Park, Louisville KY

and the adaptability to any desired geometry--make for an expressive building medium. Dry stone lends itself to the mundane and functional as well as to the fanciful and whimsical. "I like the flexibility of the craft," says Richard Weber, landscape architect and owner of Springhouse Gardens in Nicholasville, Kentucky. "Dry stone allows a designer to make changes and really work with a site in a way that, if you were working with footings or more stringent construction techniques, you wouldn't be able to do. It allows much more freedom in design, working with organic sinuous lines."

Dry stone masonry offers environmental and ecological benefits as well. Rock is a nontoxic building medium. With gravity and friction its only binding agents, the harsh chemicals, additives, and lubricants common in the construction industry are not needed. Most projects can be built without additional machinery or power tools, reducing fuel consumption during construction. Dry stone is fully sustainable and recyclable; because no mortar is used, a dry stone structure can be completely dismantled and its rock put to new use.

A skilled dry stone mason cleverly works with natural laws and forces. Gravity, water pressure, and ground movement are rendered harmless as structures are fashioned that

drain freely and flex benignly. They sit lightly on the land; foundations to frost depth are not required. "One thing I especially like about dry stone is that there is less site invasion with equipment and materials," says Bill Henkel, ASLA, owner/partner of Henkel Denmark, a design-build firm in Lexington, Kentucky. "All you need is to level a setting bed, then it is just stone and people. There is less tearing up the site, no gaping holes in the ground for foundations or footings, no concrete trucks, no steel, no footings to dig."

Because of its open architecture, dry stone is ideally suited for situations where water is a problem. The entire structure drains freely, making it ideally suited for retaining walls. Structures that are routinely inundated--culverts, head walls, streambank protection, channel lining, bridge abutments--are particularly appropriate for dry stone. When used as streambank lining, dry stone allows groundwater to filter into the channel, sustaining aquatic life through periods of drought. The interstices create microhabitats that sustain communities of plants, insects, and animals.

Practically and economically, rock--



This nineteenth century roadway retaining wall in Louisville's Cherokee Park was built with faults that led to its collapse in 1995.

the craft's only material--is often plentiful right at the building site, although retrieving it may require some effort. Few tools are needed, so start-up and overhead costs are low and access to remote locations is relatively simple. Hammers, some breaking and shaping tools, a shovel and axe, and a bit of string and wood suffice for most projects.

Surprising to most, dry stone masonry is quite cost competitive with modern alternatives. "The cost to authentically rebuild a seventeen-foot-high dry stone wall in Cherokee Park was significantly less than the alternate solution of a poured-in-place concrete and stone veneer wall," says Mike Smiley,

ASLA, of Environs, Inc., and designer of several Olmsted Parks projects in Louisville, Kentucky. Because the volume of dry stone structures increases geometrically in proportion to height, and because rock types vary considerably, it is impossible to assign a square-foot price for dry stone masonry as is customary for mortared work. To give some idea, however, experienced DSC-trained masons charge \$150 to \$200 per linear yard to rebuild a typical four-foot tall double-faced historic rock fence. This "yardstick" cost is based on an average lay rate of approximately two yards per worker per day, using randomly bedded limestone and building to internationally accepted standards for the craft. A new fence construction adds the cost of rock, approximately one-and-a-half tons per linear yard for a fence of the same specifications. "I haven't found the cost to be prohibitive," says Webber, "especially for the smaller and mid-sized projects. The way I view it, people are more willing to pay for something they view as art or a piece of sculpture." Henkel has found that dry stone "is just about the same price as rigid wall systems, within a few percentage points of each other."

The challenges in using dry stone

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This pre-civil War cemetery wall in Fayette County, Kentucky, was previously in complete ruins. The DSC restored it while training masons in the drystone craft.



The wall has been completely restored at a lower cost than that of modern alternatives.

masonry are many. The principles of dry stone use are not taught in professional design programs. Technical information is scarce and scattered. The technique is not supported by testing data or standard specifications. Historical remnants currently offer the only bona fide evidence of structural viability. Stone can be expensive if it must be purchased and transported. Masons and contractors are geared to mortar work.

The craft is completely unregulated. Anyone wishing to "stack rocks" can sell himself or herself as a dry stone mason. Skilled dry stone masons will be the first to attest to the problem they confront every day: The scores of semiskilled masons and opportunists impede the search for true craftsmen. Because dry stone masonry is material, art, craft, and trade rolled into one, its practitioners are a mixed bag of craftsmen, artisans, and tradesmen, each approaching the craft with a different focus. Some are devoted to the structural principles. Some are inspired by the material. Some just want to make a buck.

The craft is further hampered by the mistaken assumption that, because its principles are logically simple, anyone with a strong back can do it. The fundamentals of dry stone masonry are indeed straightforward, but it takes

years of practice to become a journeyman and many more to earn the title of master craftsman. Another prevalent assumption is that, because the material is stone, a reputable mortar mason is more than capable of doing dry-laid work. In fact, mortar masons find the transition quite difficult because they usually depend on mortar rather than interlocking stone for structural cohesion.

The DSC is taking action to meet these challenges as it develops and tests its model program for the revival of the craft. The DSC's partnerships with the National Park Service, Kentucky Transportation Cabinet, Kentucky State Parks, and other agencies have resulted in training courses, restoration and demonstration projects, standards and specifications for publicly funded construction projects, grant programs, job development initiatives, and preservation ordinances.

Dry stone masons are at the heart of the effort. The DSC is aware of no other formal training, testing, and registration programs dedicated to producing highly skilled and knowledgeable dry stone masons. In addition to training masons, the DSC represents their interests in trade issues, as well as maintaining and disseminating the only state-sanctioned Register of

Independent Dry Stone Masons in North America. Previously, there was no reliable source within the United States where one could find qualified dry stone masons.

To prevent the dismantling of old dry stone structures as a rock source, and to lower the costs to project owners, the DSC is developing reliable sources of inexpensive building rock.

The DSC seeks funding from a variety of sources. This year, for example, a General Electric Environmental Stewardship Grant (one of only nine awarded worldwide this year) will support an urban stream channel project in Lexington, Kentucky, and TEA-21 funds will support a project to train and prequalify dry stone masons to relocate a mile of endangered rock fence in rural Kentucky.



DSC training projects include relocating historic rock fences affected by roadway projects.

The DSC is producing and making available a range of high-quality training and information materials. As landscape architects become educated, we will settle for nothing less than high-quality workmanship. A firm grounding in the principles that underpin the craft will allow us to confidently design and specify dry stone projects and intelligently interview the masons who will build our creations. In Kentucky, landscape architects already specify dry stone masonry into their projects. "Before the Conservancy-trained masons I wouldn't seriously consider dry stone," says Webber. "I would think about it, maybe even suggest a good place for some dry stone work, but there wasn't anybody I could recommend to build it. Now we can run with it. We're designing beautiful projects that are workable and do-able."

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Resources

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We call dis crazy guy da stone messin, cuz he always messin wid da stones.