

## Technical Tips: Rising Damp

Among the many kinds of moisture problems a building may have, rising damp may be the most mysterious. Unlike rainwater dripping from a gutter or washing down a slope toward a foundation, rising damp is noticed only through its symptoms. And since it occurs at the ground floor and lower portions of external and interior partition walls, it is not something that is regularly noticed.

Architect Baird M. Smith observes in his book, *Moisture Problems in Historic Masonry Walls*, that the "suction of ground water into porous building materials is always a likelihood in structures built on ground that is damp." Smith explains, "This suction, or capillarity, occurs both vertically and horizontally. The system is like a wick: the more moisture, the higher the rise; the more evaporation [from exposed wall surfaces], the lower the rise."

Slight cosmetic blemishes from dampness, such as dissolving plaster and peeling paint, can be tolerated and remedied with periodic cleaning or repainting. But moldy walls and rotted wood is unsightly and often correlates with a damp environment. When moisture reaches an impermeable layer, it may condense and lead to rot, or migrate to a spot where it can escape and evaporate.

Persistent moisture problems should be addressed in a systematic manner by a preservation architect who may call for a conditions assessment and scientific analysis by an architectural conservator. The overall perimeter drainage system, surrounding grade, soil type, and conditions of the exterior and interior walls should all be examined. Giovanni Massari points out in his publication *Humidity in Monuments* that rising dampness is often confused or combined with accumulating rain penetration at the base of solid external walls; but this dampness from rainwater alone is largely confined to the base of external walls and is most severe on the most exposed elevations, with no dampness showing up on interior partition walls. Proper diagnoses can take up to a year or a full cycle of seasons.

Causes of dampness can be difficult to isolate. Possible culprits include clay-like, water-retaining soil; a perimeter ground level that is substantially higher than the original level bringing too much moisture to the lower parts of the wall; and a hard perimeter surface which concentrates dampness on the lower wall. Dampness can be trapped by impermeable finishes or sealers; nylon carpets with foam, latex, or plastic backing or padding; or linoleum or vinyl flooring.

Rain and condensation problems should be treated before addressing damage from ground water, as reducing excess moisture from above may lessen the problem from below. As a temporary measure to reduce the climate for molds and fungi, Massari recommends ventilating closed rooms and moving furnishings away from walls.

The two most basic approaches for fighting rising dampness are: (1) preventing it from entering the foundation wall or (2) placing a barrier across the path followed by the moisture. The preferable approach is to improve perimeter drainage. Direct all surface rainwater away from the building through functioning leaders, drainpipes, culverts, French drains, and other measures suitable for the site conditions. Before starting, Massari advises to record water levels and water percentages on the walls so that they can be checked annually. Be patient in monitoring the effects of each step taken since lowering water levels will be gradual.

A last resort is to install either a physical or chemical horizontal damp-proof course. This may involve cutting the wall and inserting impermeable materials. Many chemically injected damp-proof course systems have been developed for almost any type of wall. Always have a conservator study the situation thoroughly before proceeding with a damp-proof course. Avoid ineffective and potentially detrimental techniques, such as Knapen syphons and their imitations (intended to speed evaporation from a wall), or passive electro-osmotic systems.