

CLEANING OF GRAVESTONES AND MONUMENTS

INTRODUCTION

The science of gravestone preservation is in its infancy. The first efforts at coordinated research, in this country, did not begin until the late 1970's. Some knowledge has been borrowed from the restoration of historic buildings, which has been ongoing for many years, but a great deal remains to be learned about the deterioration and treatment of outdoor stone objects. It takes years to evaluate the effects of various preservation efforts and much of what we do know, unfortunately, is the result of previous mistakes.

Stone is composed of minerals and salts. Gravestones in direct contact with the earth are constantly wicking water from the ground and evaporating it along its surface. Drawn with this water are dissolved salts and minerals present in, or introduced to, the surrounding soil. Industrial and automotive pollution are contributing factors. Another source of surface disfigurement is chemicals such as iron and copper in the water supply; even "soft" water may contain deleterious amounts of these chemicals. Chemical cleaners have other problems as well. Marble and limestone, for example, are easily dissolved by acidic cleaners, even in dilute forms. In addition, chemicals can react with components of mortar, stone, or brick to create soluble salts which can cause efflorescence, or worse, a build up of salts just beneath the surface of the stone eventually causing spalling.

The purpose of this article is not to encourage anyone to begin cleaning gravestones, nor to discourage the practice entirely, but rather to encourage caution and research. A thorough understanding of the physical and chemical properties of the specific masonry in question can help you to avoid the inadvertent selection of damaging cleaning methods and materials.

There are many aspects of graveyard preservation other than the cleaning of headstones and monuments. The information provided here is but a small part of that larger study.

THE BASIC STEPS

Evaluate the burial monument.

Determine that it is sound by gently tapping the surface with a finger to detect any underlying hollow areas, examine for flaking, scaling, cracks, or eroding granular surface. If any of these conditions are present DO NOT continue with the cleaning or handling of that stone. Seek professional help.

Determine the type of soiling present to remove it in the most effective manner.

Types of soiling could be carbonaceous or sooty soiling; urban grime-dirt; organic-algae fungi, lichens, mosses; stains-metallic, oils, or efflorescence (salts).

Initiate the cleaning process with the least aggressive method.

Evaluate if the stone really needs to be cleaned and to what extent. Start with a gentle clean water rinsing, progress to a soft natural bristle brush. Use approved cleaning agents only as a final resort.

Test selected cleaning methods before general application.

Test in a small inconspicuous area entire cleaning procedure you are contemplating and evaluate results when dry. The suggestion has been made that the test areas be evaluated for up to a year to allow its exposure to a full range of seasonal conditions.

Clean from bottom to top of stone to avoid streak staining the stone.

Periodically rinse run off.

Rinse thoroughly with water.

Residues from cleaning solutions can create a blotchy appearance, provide a medium for bacterial action, and cause staining. Do not allow cleaning solutions to dry on a monument.

Use of water should not proceed if there is the possibility of frost.

It will take a period of days, perhaps weeks, for the water to evaporate from the pores of the stone, and surrounding area.

Never, ever, use any type of sealant on a stone monument.

There are no approved sealants available for stone monuments.

If in doubt.

If there is any uncertainty about the condition of the stone, the necessity of cleaning it, or the correct cleaning method, consult with a conservation professional before proceeding further.

TOOLS OF THE TRADE

Approved "tools" include soft natural bristle (e.g. tampico) brushes, nylon brushes, tooth brushes, Q-tips, sponges (natural), soft wooden sticks (e.g. tongue depressors), plastic spatulas, spray bottles, and buckets. If using a hose, decrease pressure to a gentle flow.

Be certain of water quality and avoid overly mineralized sources. Do not introduce more of the minerals you are trying to remove. Avoid standing water sources such as a nearby pond that may contain concentrations of minerals, acids and pollutants.

Never use metal brushes, metal scrapers, or abrasive pads of any type, including but not limited to, "Brillo" and "Scotchbrite".

CHEMICAL SOLUTIONS

Household detergents are for use in the home. Detergents are generally chemically complex synthetic compounds that usually contain additives that may be detrimental to masonry. The one and only exception to this rule is plain household ammonia (see Ammonium Hydroxide).

DO NOT USE

Soaps (e.g. Ivory) are rendered insoluble by calcium ions present in masonry and hard water. They may also produce free alkali and fatty acid salts in masonry.

Hydrochloric or Muriatic acid may result in ferrous chloride (rust) staining and the deposition of soluble salts.

Sodium Hydroxide (e.g. "Borax") mixed with water forms a caustic soda and can cause the formation and deposition of soluble salts and cause ferric hydroxide (rust) staining.

Sodium Hypochlorite (e.g. "Clorox") can cause the formation and deposition of soluble salts. (There are safer choices - see "Calcium Hypochlorite")

Trisodium Phosphate (e.g. "TSP", "Calgon") is not recommended for cleaning masonry due to formation and deposition of soluble salts.

"Fantastic" contains 2-butoxyethanol (butyl cellosolve), alkaline builders, water, fragrance, and dye. It is not recommended for cleaning any porous substrates (masonry) or polished surfaces.

"Formula 409" contains ethylene glycol, a non-ionic detergent, alkaline builders, water fragrance and dye and is not recommended for masonry or polished surfaces.

"Spic and Span", abrasive cleaners, and products containing sodium chloride, sodium sulfate, sodium carbonate, sodium bicarbonate and ammonium carbonate will form and deposit soluble salts in masonry. Do not assume that the label of contents is a complete list of all the chemicals contained in a household detergent product.

USE WITH EXTREME CAUTION

Phosphoric acid (e.g. "Naval Jelly") is not recommended for general cleaning however may be used in a 10% (by weight) solution on granite and sandstone for the removal of rust staining.

Acetic acid (e.g. vinegar) is less aggressive than other acids, solutions have been recommended for the removal of general soiling from limestone.

Oxalic acid is not recommended for general cleaning but is recommended for rust staining removal on light-colored granites, one pound to one gallon of water.

Calcium Hypochlorite (e.g. Chlorine) is effective for the removal of biological growth, mix one ounce to one gallon warm water. Available from swimming pool suppliers. Requires water hose for thorough rinsing and Hydrion Paper test strips for pH testing.

Ammonium Hydroxide (e.g. "household ammonia") diluted 1:4, is recommended for cleaning light colored stones and is particularly effective for the removal of biological growth. Requires water hose for thorough rinsing and Hydrion Paper test strips for pH testing.

Quaternary Ammoniums (e.g. algaecides) are especially effective for the removal of stubborn black algae and biological growth. Also available from swimming pool suppliers.

PRODUCTS THE PROS USE

Non-ionic Detergents (e.g. Photo Flo - a Kodak Product, Triton-X 100, or Igepal) are recommended for cleaning gravestones. They are electrically neutral cleaning agents that do not contain or contribute to the formation of soluble salts. They provide better wetting of the masonry surface and, therefore, successfully facilitate the removal of general soiling. Non-ionic detergents are available from conservation, janitorial, and photographic suppliers. A suggested cleaning solution is one-ounce non-ionic detergent to 5 gallons of water.

WHERE TO USE THEM

Only water should be used on soapstone; water and a non-ionic detergent may be used on slate, sandstone, marble and limestone. Additionally, Vulpex (a soap available from conservators' supply houses), household ammonia, and Calcium hypochlorite in recommended strengths may be used on marble and limestone. Even careful professional cleaning will result in the removal of some surface material. A gravestone that has been cleaned should not be cleaned again for several years.

This article was compiled from publications and information provided by The Association for Gravestone Studies, The National Trust for Historic Preservation, and The National Park Service.