

MORTAR, UNSUNG HERO OF HISTORY

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FORT SUMTER SURVIVED THE OPENING SALVOS OF THE CIVIL WAR IN 1861.

TODAY, LIKE FOR OTHER HISTORIC STRUCTURES, WATER IS ITS GREATEST THREAT.

IT'S ALSO A CONSTANT ONE.

RAIN DRENCHES THEM.

SNOW CLINGS TO THEM

SPRINKLERS SOAK THEIR SURFACES

WATER EVEN SEEPS IN FROM THE GROUND, ROOF LEAKS, AND AIR CONDITIONING.

WHEN THE SALTS IT CARRIES CRYSTALLIZE ON THE OUTSIDE OF BUILDINGS, THEY CREATE A BLOOM CALLED EFFLORESCENCE

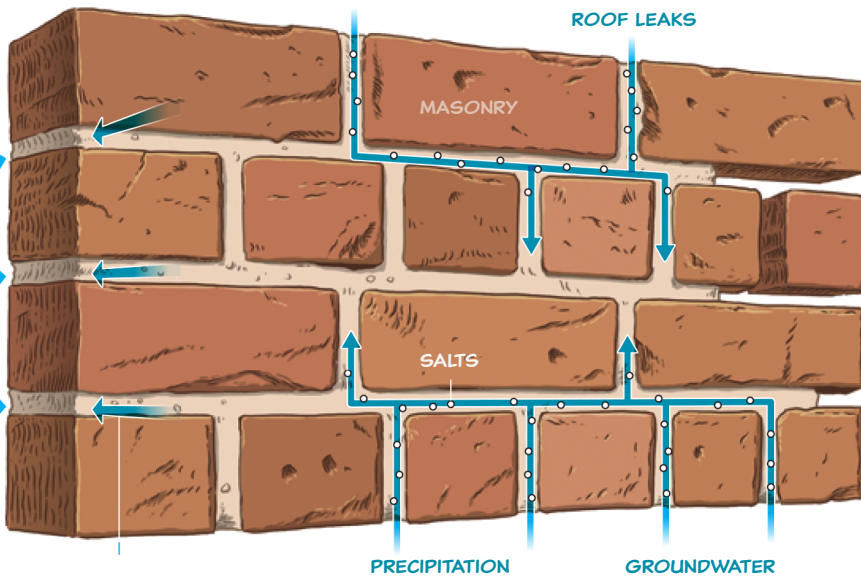
WHEN CRYSTALS FORM WITHIN THE BRICKS' PORES, AS THEY GROW, THEY BREAK DOWN THE BRICKS FROM THE INSIDE. THIS CAUSES SLICES OF MASONRY TO PEEL OFF, A PROCESS CALLED SPALLING.

IF LEFT UNCHECKED, THE SALTS AND WATER CAN CAUSE THE BRICK AND STONE TO CRACK AND CRUMBLE.

CRACK

SO A WALL IS BUILT TO BE A SYSTEM

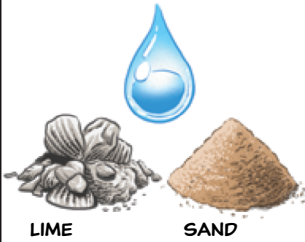
MORTAR IS THE SOFTER COMPONENT. BECAUSE IT IS SOFTER, IT LETS WATER AND SALTS PASS THROUGH INSTEAD OF MOVING INTO THE BRICKS AND CAUSING DAMAGE.



SINCE MORTAR IS REPLACEABLE, A PROCESS CALLED REPOINTING, IT SACRIFICES ITSELF FOR THE GOOD OF THE SYSTEM. BUT FOR THE SYSTEM TO WORK, THE MORTAR HAS TO BE SOFTER THAN THE MASONRY IT HOLDS TOGETHER

THE BASIC RECIPE FOR HISTORIC MORTAR IS SIMPLE

WATER



LIME IS MADE BY BURNING LIMESTONE OR SEASHELLS

THE INTENSE HEAT CREATES A NEW COMPOUND CALLED QUICKLIME THAT CAN THEN BE PULVERIZED



WHEN MORTAR IS NEEDED, SAND AND WATER ARE ADDED.

SAND PROVIDES STABILITY, WATER CATALYZES A CHEMICAL REACTION WITH LIME



THIS REACTION, CALLED CARBONATION, LETS THE MORTAR CREEP INTO THE PORES OF THE BRICK OR STONE

WHEN IT HARDENS, IT CREATES A LASTING BOND WITH THE MASONRY



FOR THOUSANDS OF YEARS, THIS RECIPE WORKED, BUT AS MASONRY MATERIALS GOT HARDER OVER TIME, OTHER THINGS HAVE BEEN ADDED TO MORTARS TO MAKE THEM COMPATIBLE

EARLY MAN CLAY AND MUD IS HANDMOLDED AND SUN-DRIED TO MAKE BRICKS AND ADOBE

LEAST HARD

C. 30 B.C. ROMANS BEGIN ADDING VOLCANIC ASH TO LIME, SO THAT IT CAN HARDEN IN WET AREAS

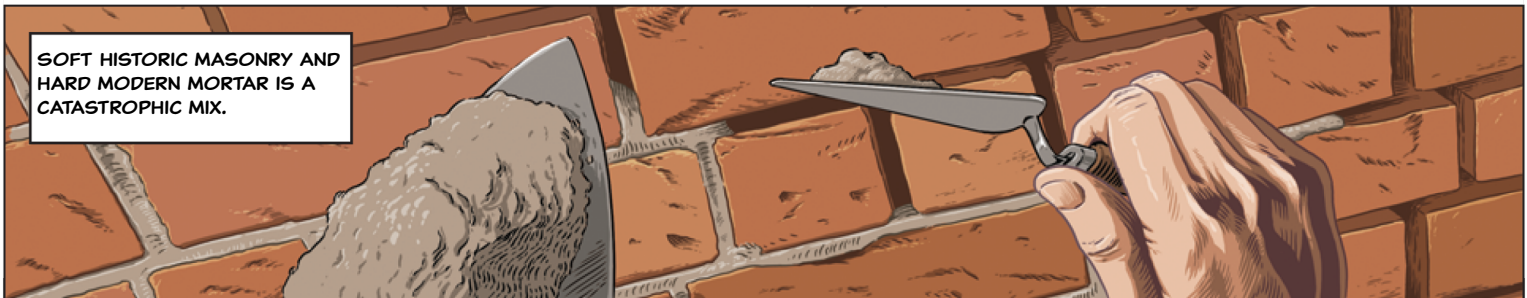
LATE 1800S BRICKS ARE MADE OF SPECIAL CLAYS AND FIRED IN FACTORY KILNS.

EARLY 1900S SOME PORTLAND CEMENT IS INTRODUCED INTO MORTAR MIXES TO HARDEN THEM

MID-1940S AFTER WWII, PORTLAND CEMENT ALL BUT REPLACES THE MUCH SOFTER LIME IN MORTAR.

MOST HARD

SOFT HISTORIC MASONRY AND HARD MODERN MORTAR IS A CATASTROPHIC MIX.



WHEN MORTAR NEEDS REPLACING CAREFUL CONSIDERATION OF MATERIALS IS REQUIRED IF WE WANT THESE AMERICAN ICONS TO LAST.

