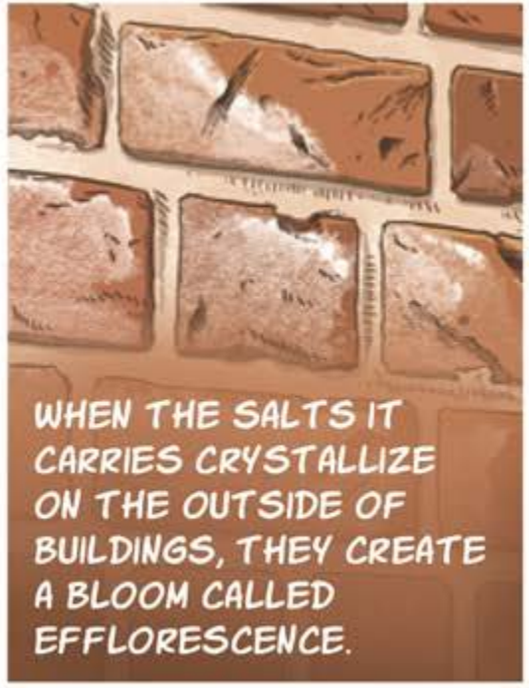
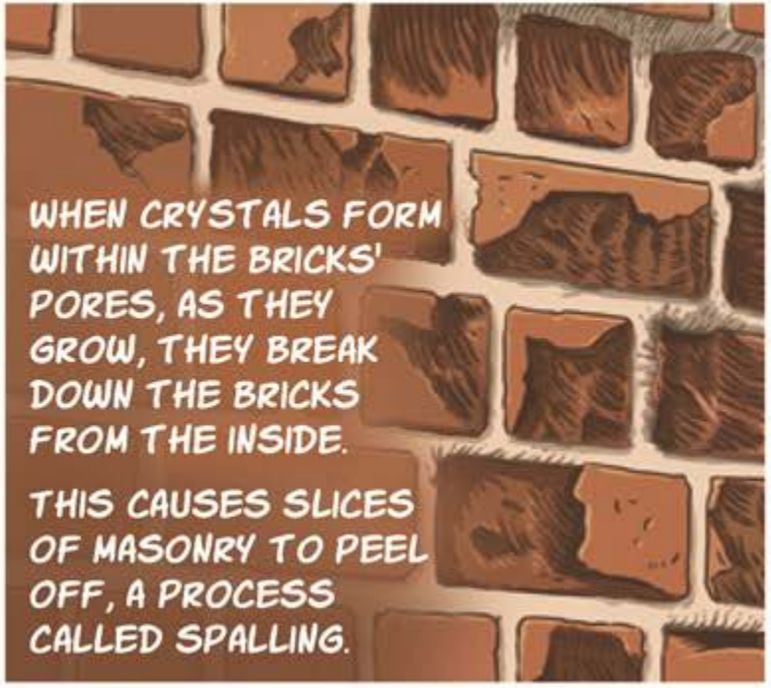
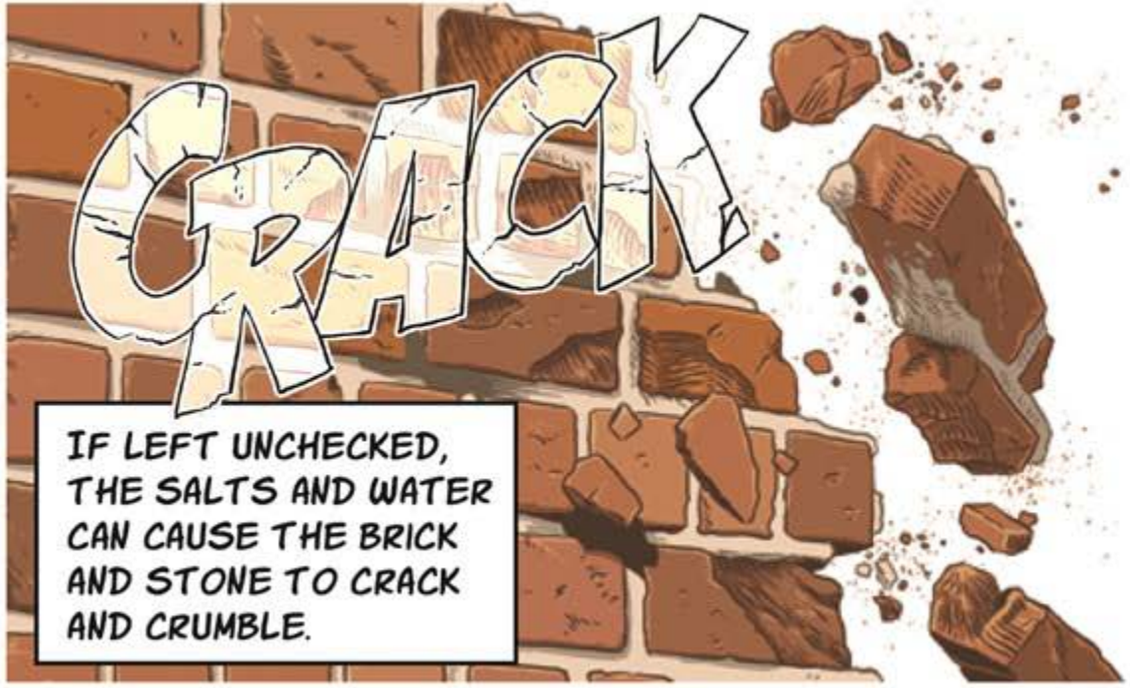

FORT SUMTER SURVIVED THE OPENING SALVOS OF THE CIVIL WAR IN 1861.


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.

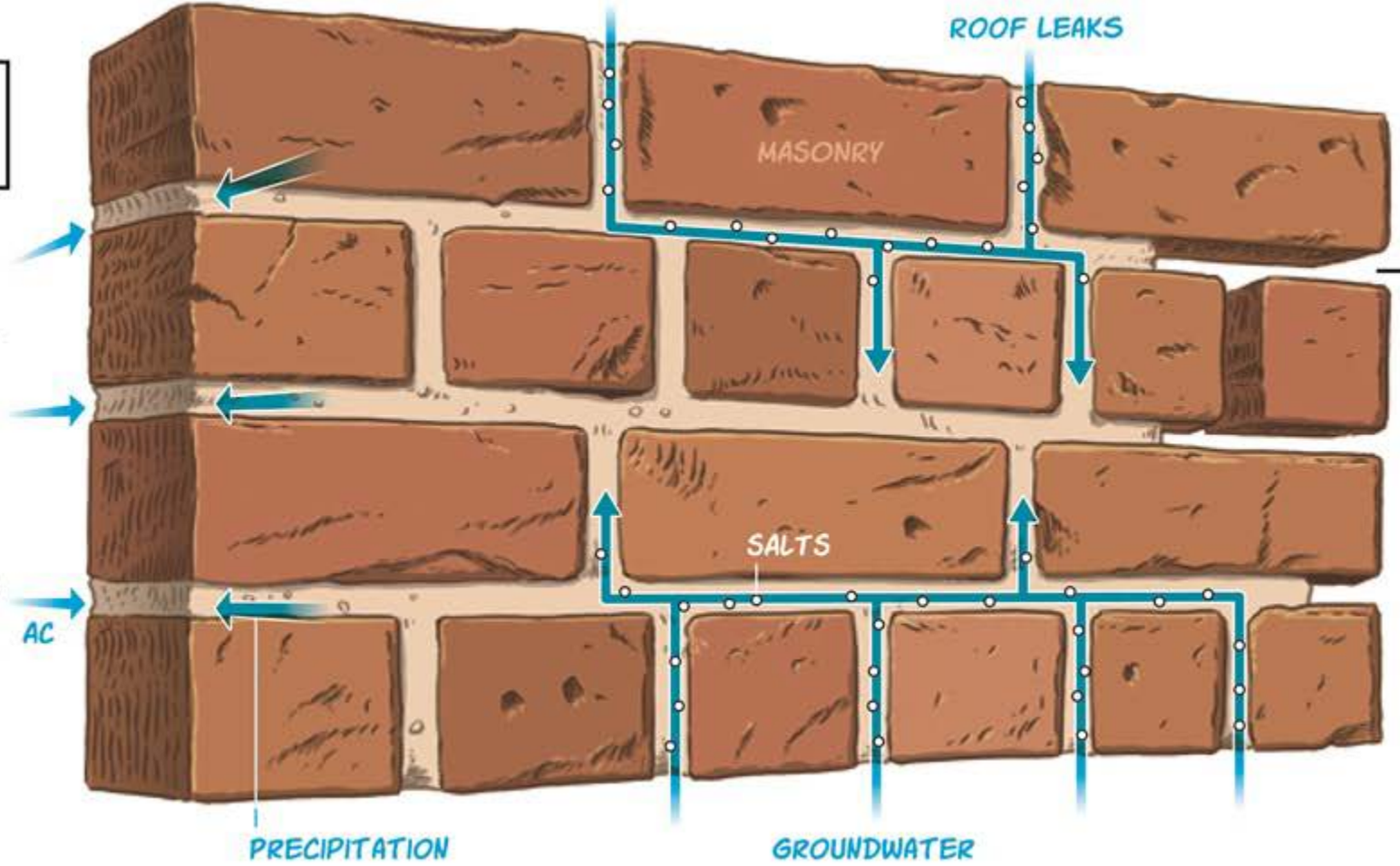

WHEN CRYSTALS FORM WITHIN THE BRICKS' PORES, AS THEY GROW, THEY BREAK DOWN THE BRICKS FROM THE INSIDE.
THIS CAUSES SLICES OF MASONRY TO PEEL OFF, A PROCESS CALLED SPALLING.


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

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.

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 HAND-MOLDED AND SUN-DRIED TO MAKE BRICKS AND ADOBE.

c. 30 BC
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 MORTARS.

LEAST HARD — 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.
NATIONAL PARK SERVICE
NCPTT