

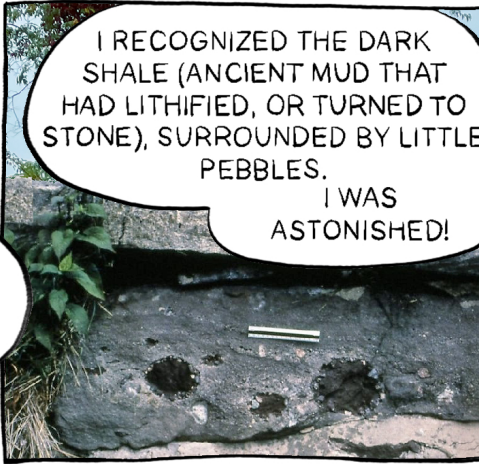
ARMORED MUD BALLS IN FRANKLIN COUNTY, MASSACHUSETTS

IN 1970, I DISCOVERED
LITHIFIED ARMORED MUD BALLS
IN THE QUARRIED STONE
SUPPORTS OF AN OLD BRIDGE
IN TURNER'S FALLS, MA.

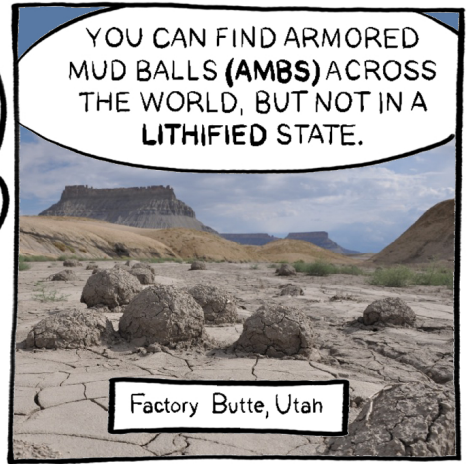


RICHARD LITTLE
Professor Emeritus,
Greenfield Community College

I RECOGNIZED THE DARK
SHALE (ANCIENT MUD THAT
HAD LITHIFIED, OR TURNED TO
STONE), SURROUNDED BY LITTLE
PEBBLES.
I WAS
ASTONISHED!

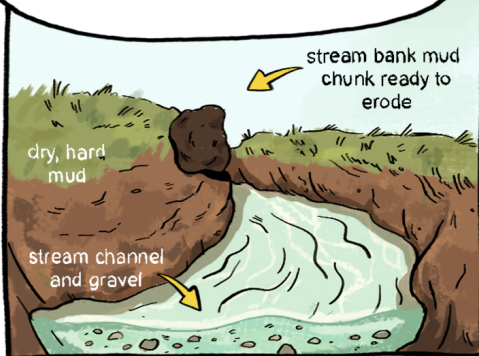


YOU CAN FIND ARMORED
MUD BALLS (**AMBS**) ACROSS
THE WORLD, BUT NOT IN A
LITHIFIED STATE.



Factory Butte, Utah

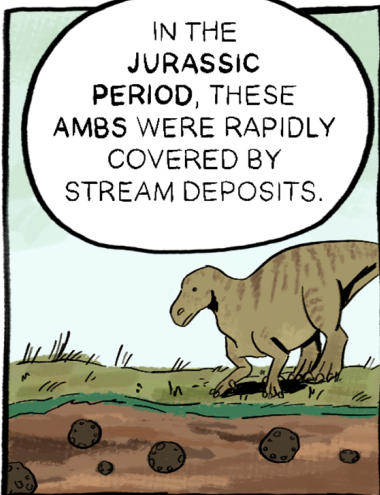
AMBS ARE FORMED
WHEN A CHUNK OF DRY MUD
ERODES ATOP A STREAMBED.



CHUNKS OF STICKY MUD
ROLL DOWNSTREAM AND
PICK UP A COATING OF
PEBBLES, CALLED "ARMOR"!



IN THE
JURASSIC PERIOD, THESE
AMBS WERE RAPIDLY
COVERED BY
STREAM DEPOSITS.



ANY
UNCOVERED
AMBS QUICKLY
FELL APART.



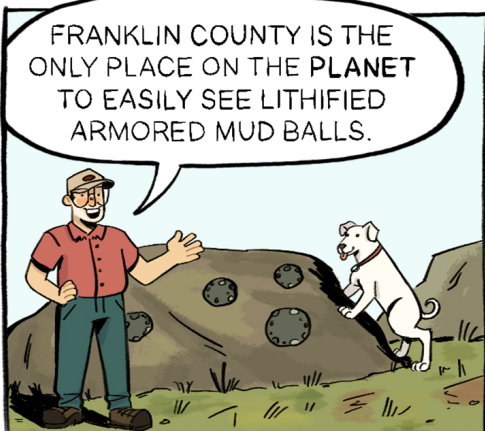
IT TOOK MILLIONS OF
YEARS FOR THE **AMBS**
TO LITHIFY AND THERE
MAY BE MANY HIDDEN
UNDERGROUND.



I FOUND THE **AMBS**
BECAUSE THEY HAD
BEEN QUARRIED FROM
A NEARBY HILL AND
USED TO BUILD THE
BRIDGE.



FRANKLIN COUNTY IS THE
ONLY PLACE ON THE **PLANET**
TO EASILY SEE LITHIFIED
ARMORED MUD BALLS.



art by LILY DANDROW
ldandrowart.com



IN 2023, A BILL WILL BE PRESENTED
IN THE STATE LEGISLATURE TO START
THE PROCESS OF **AMBS** BECOMING
AN OFFICIAL STATE "SEDIMENTARY
STRUCTURE".

YOU CAN
HELP SPREAD
THE WORD BY
CONTACTING YOUR
STATE SENATOR
AND STATE REP.

edited by
NICK BERTOZZI
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THANK YOU
FOR YOUR
HELP!

Frequently Asked Questions..... ARE THESE THE ONLY LITHIFIED ARMORED MUD BALLS IN THE WORLD? Maybe. These are *definitely* the only “easily seen” lithified armored mud balls in the world. There are about 10 other locations where lithified armored mud balls have been noted in the geological literature. They are all in locations that are remote, hard to find, and probably not seen today due to erosion, soil cover, etc. Those other locations from Greenland to Trinidad, are listed and described on the ArmoredMudBalls.rocks web site. *Photo to right: Turners Falls AMB with dime for scale (GCC Geology Path)*



WHY ARE THE FRANKLIN COUNTY AMBs THE BEST IN THE WORLD? + **Best Armor, Color, & Sizes:** The dark mudrock of the ball contrasts with the “puddingstone” conglomerate of the old stream deposited sand and pebbles. The balls are very easy to see. Also, these AMBs’ armor have a diverse mix of colorful streambed pebbles eroded from nearby Jurassic mountains. Some other lithified AMBs from ocean environments are just sand-coated and the color of the ball matches the surrounding rock, making them hard to see. The great size range of the Franklin County examples, from basketball to golf balls, is unlike any other geological location. + **Geological “stratigraphy”:** The Franklin County AMBs are found sedimentary strata of *two different geological time periods from two different quarries and rock outcrops* -- Jurassic (Turners Falls Sandstone*, where most of the AMBs are from) and also about 500,000 years earlier, Triassic Period (Sugarloaf Arkose*). It is extremely rare to have AMBs formed and preserved. It is exceedingly rare to have AMBs formed over such a large time period in the same spot on earth. And, even more amazing: *after* the formation of the Triassic Sugarloaf Arkose AMBs (found in Greenfield and Deerfield) a 200’ thick lava flow (Deerfield Basalt) covered the region, followed by a Jurassic lake. Then, in the Jurassic Turners Falls Sandstone, AMBs rolled into the old Connecticut Valley once again. And, of course, in both cases, in different towns and geologic ages, these rare forms had to be exposed and discovered!

WHY ARE LITHIFIED ARMORED MUD BALLS SO RARE? There are 7 essential events that must happen.

1. Lake beds are needed to deposit mud**. This usually is related to wetter climate conditions.
2. Dry climate conditions*** and / or land uplift are needed for the mud layer(s) to become dry and hard. Then stream erosion, typically due to flash floods common in dry climates. The hard mud chunks fall into the stream. They get round, sticky, and roll along picking up pebbles from the stream bed. That is the armor.
3. Quick burial as the flood subsides, and with geological time, lithification -- turning to stone.

4. Uplift and erosion to expose the rock with AMBs
5. A quarry is needed to remove those specific sedimentary layers with the AMBs.
6. Those quarried blocks have to be placed so that someone can see the round balls.
7. Now, someone has to discover, identify, publicize, and save the rare AMBs.

You can also help! Contact your State Legislators. Sign the petition on the ArmoredMudBalls.rocks web site.

*Turners Falls Sandstone and Sugarloaf Arkose are official geology-mapped names of the rock formations. A “formation” is a geological term (noun) for a mapped rock unit. “Arkose” is a type of sandstone that was deposited close to mountain source areas and so is mostly composed of weaker minerals, like feldspar. ** Some AMBs form from ocean and coastal mud deposits, but not in the Jurassic Connecticut Valley.

*** Dry climates are needed because wetter climates have longer continuous stream transport that destroys AMBs. Dry climates and flash floods make quick burial of AMBs a possibility. Mud balls do not survive very long during stream transport.

*Please note: **unlithified, “recent” armored mud balls** are occasionally found in a number of places. They are very rare, but being so unusual and interesting, there are many photos online. The Factory Butte, UT examples as seen in the cartoon were discovered by noted artist Will Sillin in 2015. A revisit several years later revealed none had survived.*

MORE INFORMATION:

www.ArmoredMudBalls.rocks

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Many thanks to the creativity and talents of graphic artists: Nick Bertozzi (nickbertozzi.com) and Lily Dandrow (ldandrowart.com).

Utah photo thanks to Will Sillin (willsillin.com).

THE BEST PLACE IN THE WORLD

TO SEE THE LITHIFIED AMBs IS

GREENFIELD COMMUNITY COLLEGE’S GEOLOGY PATH
(front of Main Bldg).

For other nearby locations, see the AMBs website.

