

Fossil Preparation by Marc Behrendt

You have been collecting really great fossils all day, you get home, set the box on a chair and spread your treasure onto the kitchen table to look at it closer. It's pretty neat stuff, but wouldn't it look better if all that mud and rock still stuck to it were gone?

Fossil preparation or cleaning can be done in the home or in a fancy lab. Sometimes all it takes is a toothbrush and water. If the fossil is sturdy, like coral and many brachiopods, this method will remove all the mud and loose matrix. However, if your fossil has any cracks in it, if it is fragile, or if it sits on soft shale, do not try to brush it off with water. Fossils like trilobites, bones and fragile brachiopods will dissolve or fragment and leave you with an empty rock and memories. To make something fragile look better, you need a different method to clean your specimen.

If you have access to the right equipment, you are in good shape. Or you could send your specimen to a fossil preparation lab. Let's assume you have a complete trilobite and would like it cleaned. Part of it is buried in the rock and part is exposed but covered with a thin layer of shale.

The first step is to stabilize the specimen. When the rock dried after it was dug up, all the water evaporated, leaving countless microscopic cracks both in the rock and in the fossil. Apply super-thin super glue under a microscope by dipping the tip of a pin into a drop, then touch the pinpoint to a crack, which sucks up the glue instantly. The glue hardens, filling in the crack and holding everything together. If too much glue is used, such as with a single regular drop, then the glue will have to be cleaned away before the matrix can be cleaned from the trilobite.

Now the fun begins! To expose the buried portion of the trilobite, pneumatic hammers will be used. These are just like the loud jackhammers road workers use to dig holes through the roads, except fossil preparing hammers are so small they must be used under a microscope. Ever so carefully the hammer's pounding chips away tiny fragments of the matrix hiding the trilobite. Usually the matrix touching the trilobite shell pops right off after most of the upper matrix is removed. Great care is taken not to touch the trilobite with the hammer, because a hole in the fossil is not pretty.

Before micro-air hammers were used, fossils were exposed using small steel picks like dentists use (this process is still used in many labs today). The method works very well, as you can see in any older museum collection, but it takes a long, long time to accomplish what an air hammer can do in a short time!

OK, the trilobite has been totally exposed, but is still covered by a thin layer of shale. It is time to pull out the micro-sandblaster. Also known as air abrasive machines, these instruments, using high air pressure, shoot a tiny regulated amount of powder through a hose and nozzle onto the fossil, eroding the soft rock away while leaving the harder trilobite's shell intact.

Depending on the type of rock and the hardness of the fossil, the air pressure, the amount and type of powder, and the size of the nozzle can be changed to meet the situation. Imagine this -- you have a big rock and you want to break it in half. You first choose your hammer. Will it be small and delicate or big and heavy? Should it be made of rubber or metal? Then, do you swing it really hard, or gently tap the rock? Too much hammer or too much swing and your rock is dust. Too little hammer or tiny taps may crack the rock in a day or two. The right hammer with the right swing will cause the right impact to break the rock in a controlled manner in a short time.

The same concept is used with the air abrasive machine. With experience or careful experimentation, the air pressure and powder flow are adjusted to remove the matrix from the fossil without "burning" the trilobite's shell away with the rock. All the work is done under a

microscope under the watchful eye of the preparator, who is alert for new or previously unnoticed cracks in the shell that will need to be stabilized.

Although it is important to clean the entire trilobite carefully, the eyes need special attention. Many kinds of trilobites have the lenses still in the eyes, and these are very fragile. With delicate and precise micro-sandblasting, the entire eye is cleaned so each lens is perfectly exposed without being damaged!

Finally, the rock itself is spruced up. All the chisel marks from the hammers are ground away using either a combination of air hammer and air abrasive, or with a grinder like a Dremel tool. The matrix is shaped into the way it best displays the trilobite. Occasionally, new fossils are discovered under the matrix during this step. These are cleaned up and make nice surprise additions for the piece. When it's all done, sit back and admire your trilobite. It's no longer grey and covered with rock -- it is a beautiful black or brown color, looking like it will crawl off the rock any moment.

There are many other techniques available for preparing fossils. Several books are available which describe these different methods. Three of the many are:

Paleotechniques edited by Rodney M. Feldmann, Ralph E. Chapman, and Joseph Hannibal. Published by the Paleontological Society at the Department of Geological Sciences, The University of Tennessee, Knoxville, TN 37996.

Handbook of Paleo-preparation Techniques by Howard H. Converse Jr. Published by Florida Museum of Natural History, University of Florida, Gainesville, FL 32611

Fossil Preparation Manual by Tom Whiteley and Gerry Kloc. Published by the authors, 1995.

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