

Photographing Fossils

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Outline

- End purpose (Web page, publication, ...)
- Cameras & Macro lenses
- Mounting camera, specimens
- Lighting
- Coating/whitening
- Using a scanner to image fossils
- Photomicroscopy
- Digital photo processing

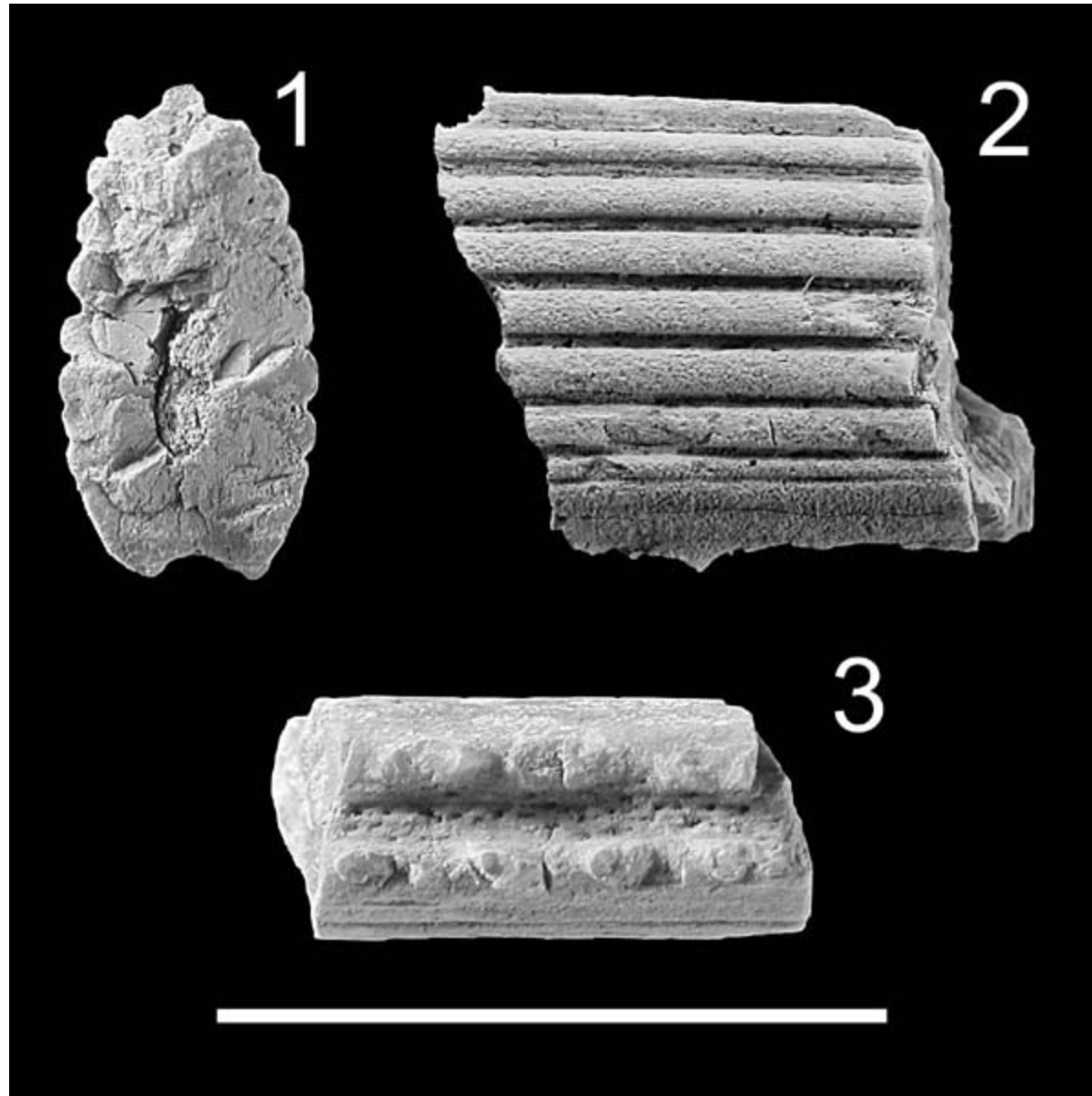
What is the End Purpose?

- Formal publication
- Website
- Documentation / study
- Display / decoration

Purpose: Publication

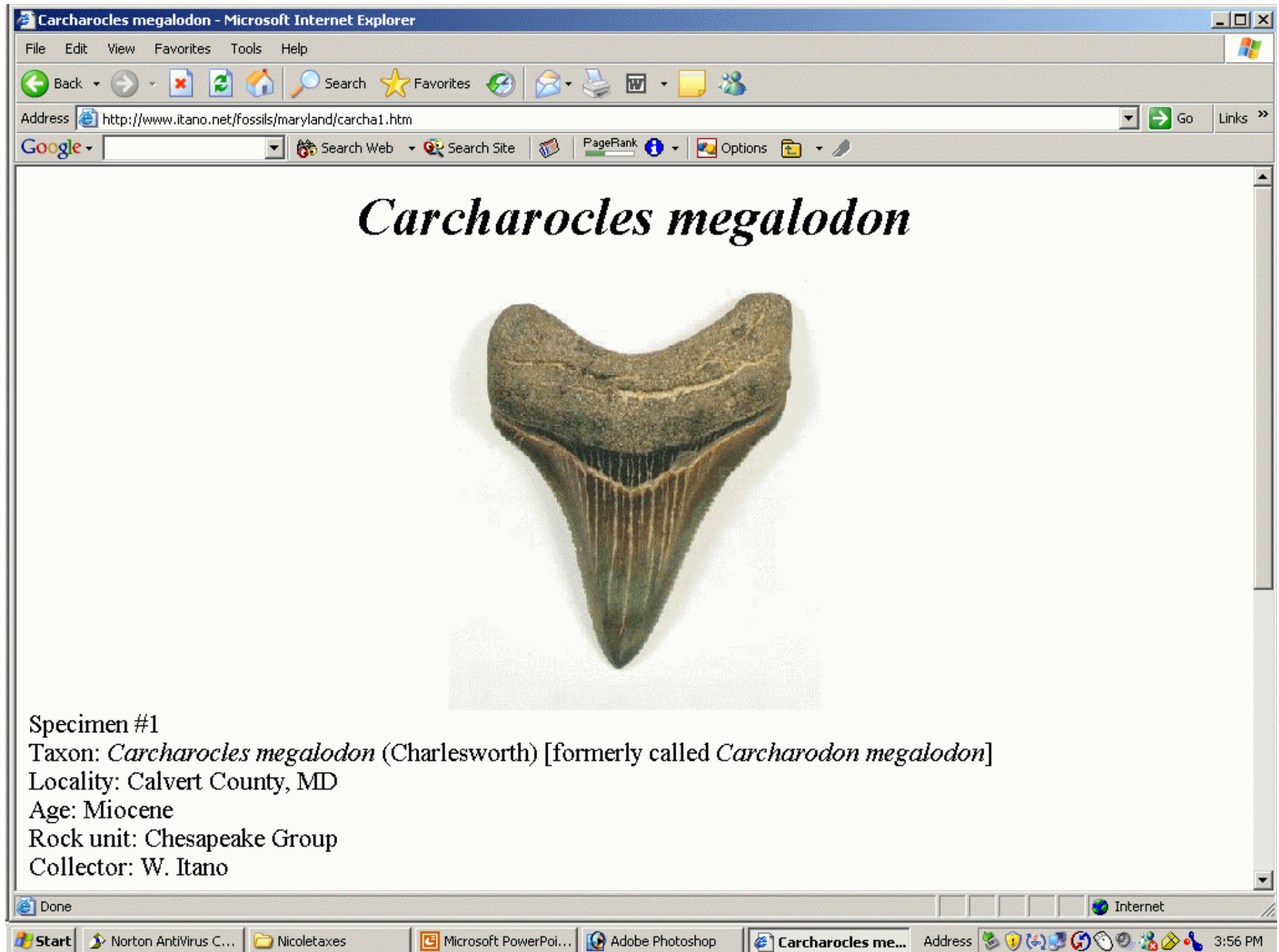
- High-resolution, usually grayscale
- Specimens may need to be coated to give uniform white surface
- Check publisher guidelines, e. g. Journal of Paleontology:
 - Digital photos at 450 dpi (dots per inch)
 - EPS or TIFF format preferred

Example Journal Figure



Purpose: Webpage

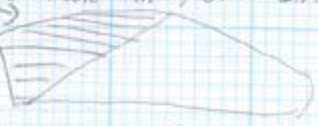
- Usually in color
- Final figure should not have more pixels than necessary for display on 800 X 600 monitor
- Use image compression (usually JPEG) to reduce file size



Documentation/Study

4844 *Ctenacanthus lucasi* Eastman, holotype
Marshall County, Iowa, Quarry at Le Grande,
Miss., Kinderhook Fm., coll: L.A. Cox. 127 mm long

Costae run into
anterior margin
Does not appear
to be due to severe wear of ant. edge.



distal
end
view



**Pictures taken in
Smithsonian collections
along with my notes
and sketches**

Other Uses for Fossil Photos



Cameras & Macro Lenses - 1

- 35 mm SLR camera with interchangeable lenses
 - Manual control of aperture & exposure time
 - Use aperture priority – high f-stop (f/11 or higher) for better depth of focus
 - Manual focus
 - Macro lens – 55 mm focal length is good
 - Advantages/disadvantages: film has high resolution but have to wait for developing

Example 35 mm SLR Camera



- Nikon N6006 camera with Nikon 60 mm macro lens

Cameras & Macro Lenses - 2

- Digital camera with built-in macro lens
 - Some Nikon Coolpix models
 - Swivel body types: 950, 990, 995
 - Non-swivel body: 5000
 - Others by Canon, etc.
 - Generally not as good resolution as film, but more convenient

Example Digital Camera with Macro Mode



- Nikon Coolpix 990 (No longer made)

Cameras & Macro Lenses - 3

- Digital camera with interchangeable lenses
 - Example: Nikon D70 + Nikon macro lens
 - At 6 megapixels, starting to compete with film



Bellows Extension Unit



- Allows high magnification

Mounting the Camera



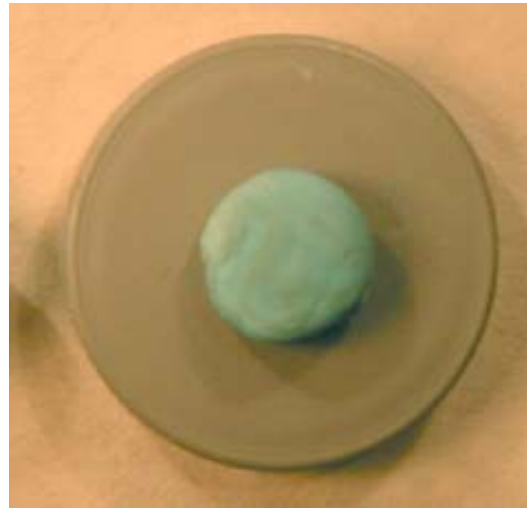
- Copy stand with lamps

Portable Setup



- 35 mm SLR camera with macro lens, built-in flash, and mini-tripod in use at the Smithsonian

Mounting the Specimen



- Blue tack on film cap for small fossils

Lighting

- Ordinary lamps (can get hot)
- Flash attachments
- Ring lights
- Halogen light sources with light pipes

Ring Flash



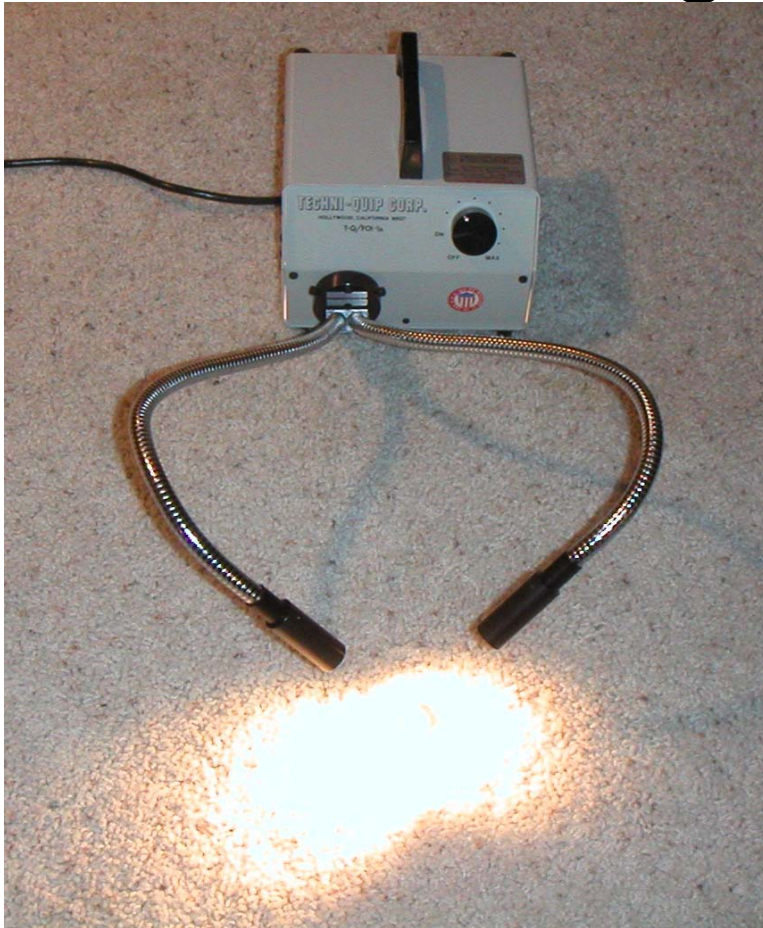
- Useful when specimen very close to lens
- Fits around camera lens

LED Ring Light



- Continuous light
- No heat
- Specially made for Nikon 950/990/995 series

Halogen Light Source

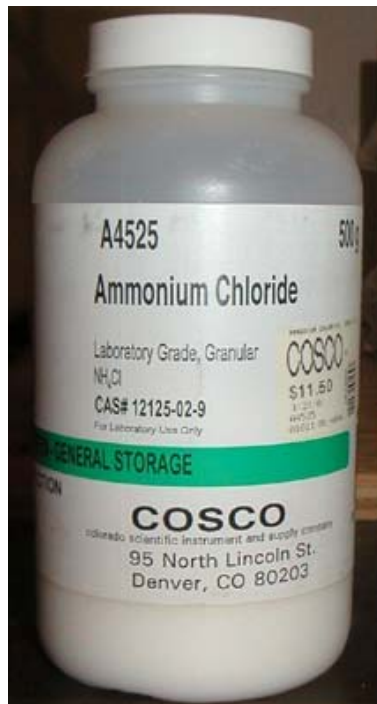


- Flexible light pipes
- Intensity adjustable
- Cool (Heat stays in lamp box)

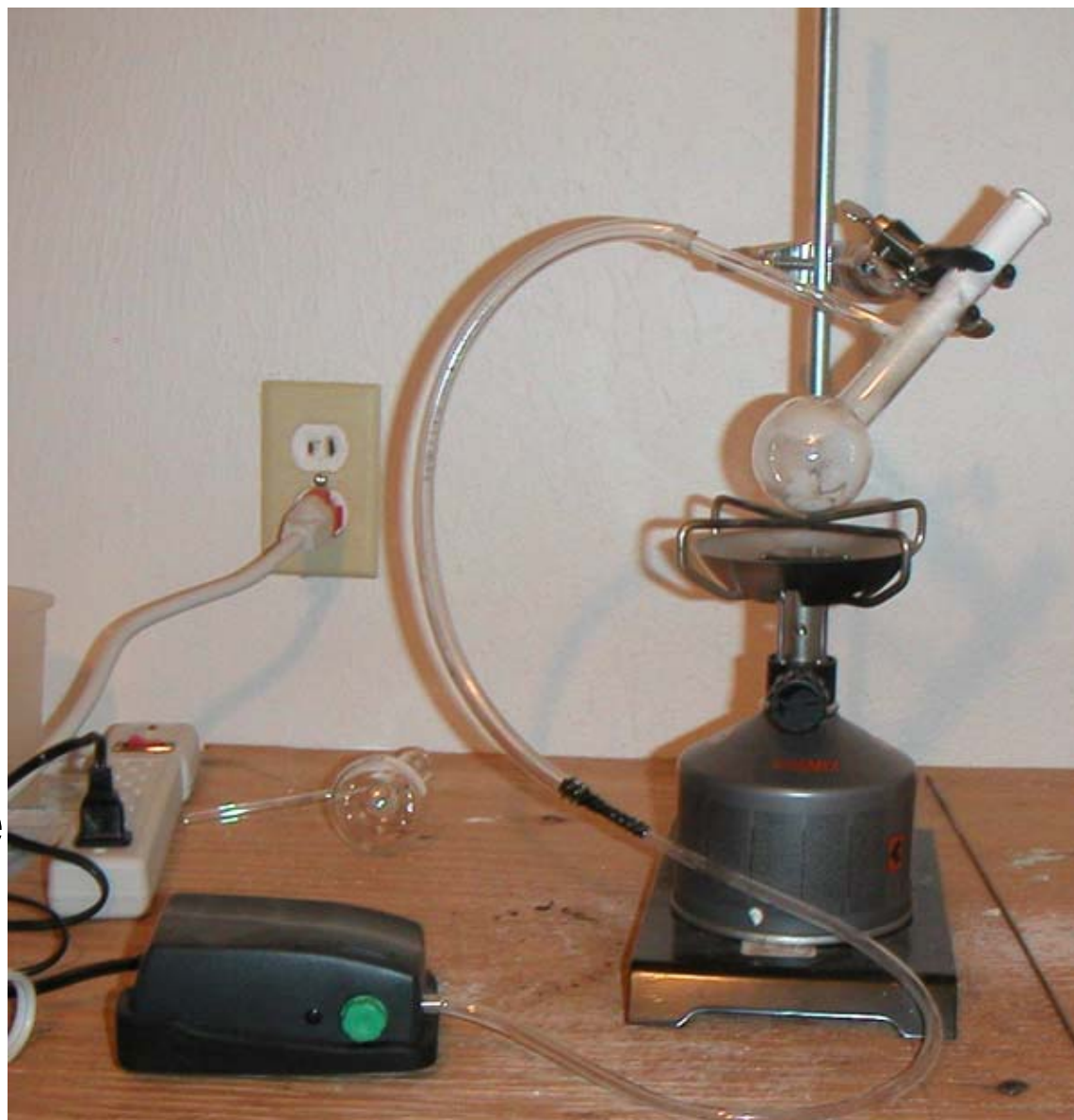
Whitening Fossils

- Usually, fossil coloration is unimportant
- Important features photograph better if the specimen is given a light-colored coating
- Ammonium chloride smoke is suitable
- Can easily be brushed off
- Must be heated to the sublimation temperature
- Avoid breathing the smoke

Ammonium Chloride Setup



- Ammonium chloride
- Propane camp stove
- Distilling flask
- Aquarium air pump



Ammonium Chloride Setup in Operation

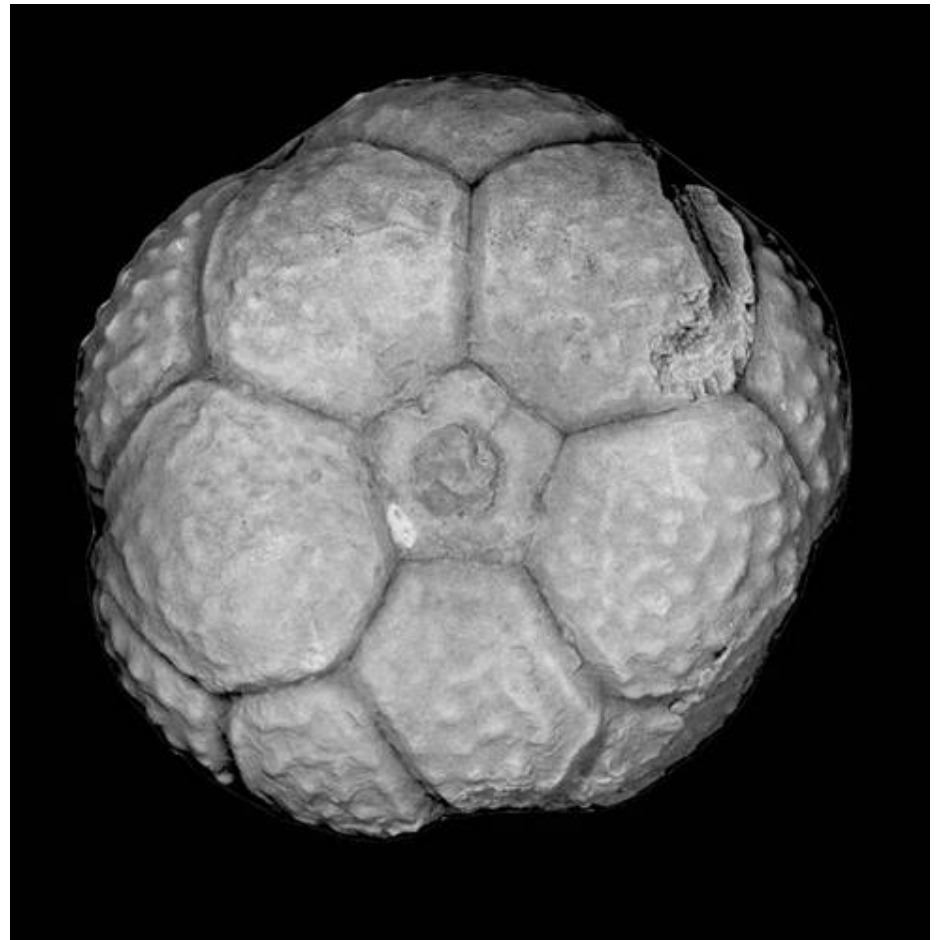


Avoid Breathing the Smoke



- Best done under a fume hood
- At least where a mask

Example of Natural Color vs Whitened Fossil



Holotype of *Synarmocrinus cobbani* (crinoid)

Scanning Fossils

- Small fossils can be imaged with a flatbed scanner
- Depth of focus surprisingly good
- Be careful not to scratch the scanner surface (Use plastic sheet to protect surface)
- Use highest resolution

Flatbed Scanner



Scanning Fossils - 1



- Lay the fossil directly on the scanner
- (Or over a plastic sheet to protect the surface)

Scanning Fossils - 2



- Drape a cloth over the scanner for a background
- Start the scanner software

Results



Entire scan



Cropped

Scanning Small Fossils



Microscope slide of conodonts (less than 1 mm)

Close-up Scan of Conodonts



Photomicroscopy



Stereo zoom microscope with camera port

Photomicroscopy with Handheld Digital Camera

- Digital cameras with small lenses can take photos directly through eyepieces



Example Photo Taken Through Eyepiece

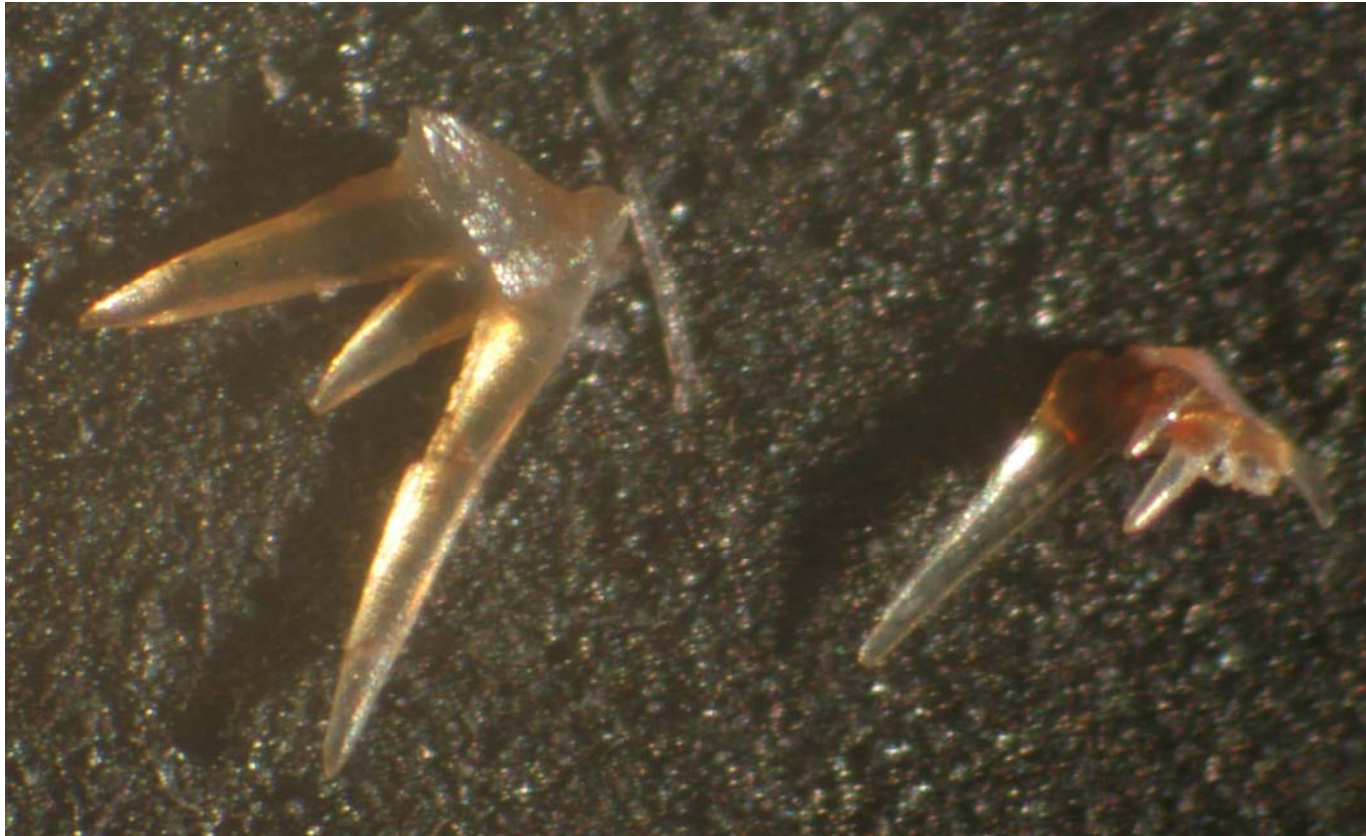


Best is Trinocular Microscope



Can use almost any SLR camera. Purchase the proper adapter.

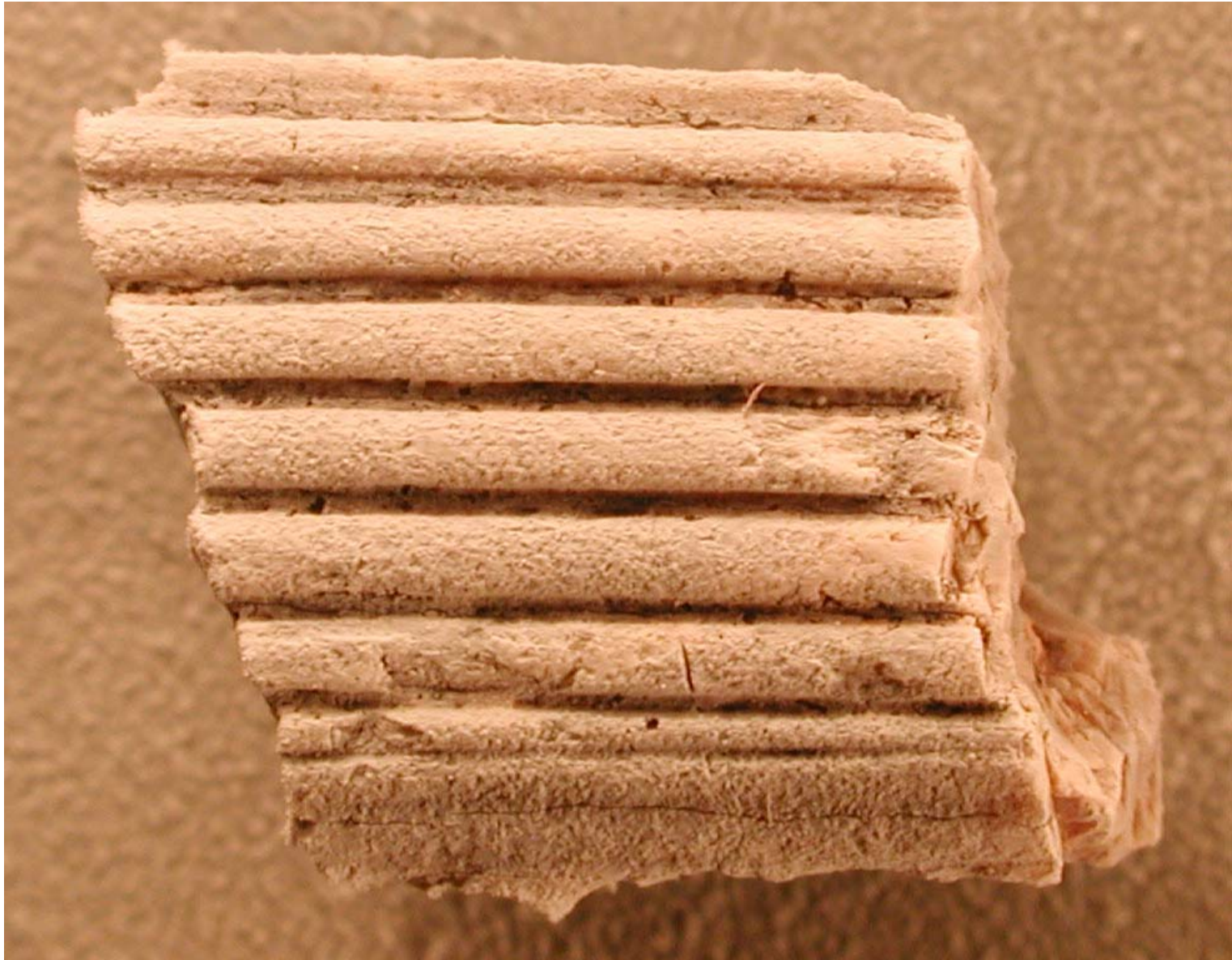
Photo Taken Through Camera Port



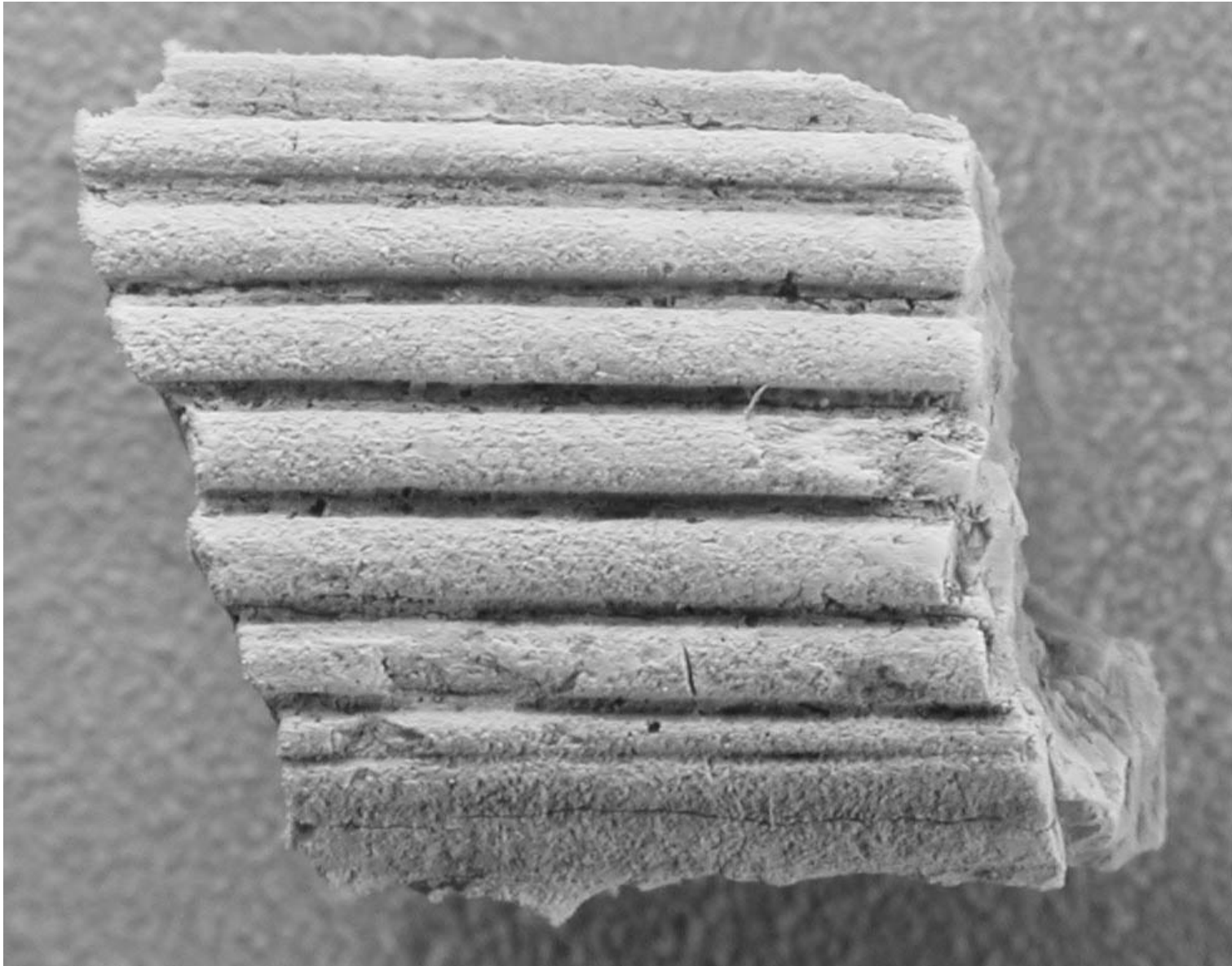
Digital Photo Processing

- If using film, need scanner to convert photo to digital
- Almost any software can be used for:
 - Cropping
 - Adjusting contrast, brightness
 - Converting color to B/W
- Adobe Photoshop is good but expensive (\$650):
 - Advanced cropping features (“Magnetic lasso”)
 - Multiple layers for making composite plates with labels, scale bars
 - Sharpening filters

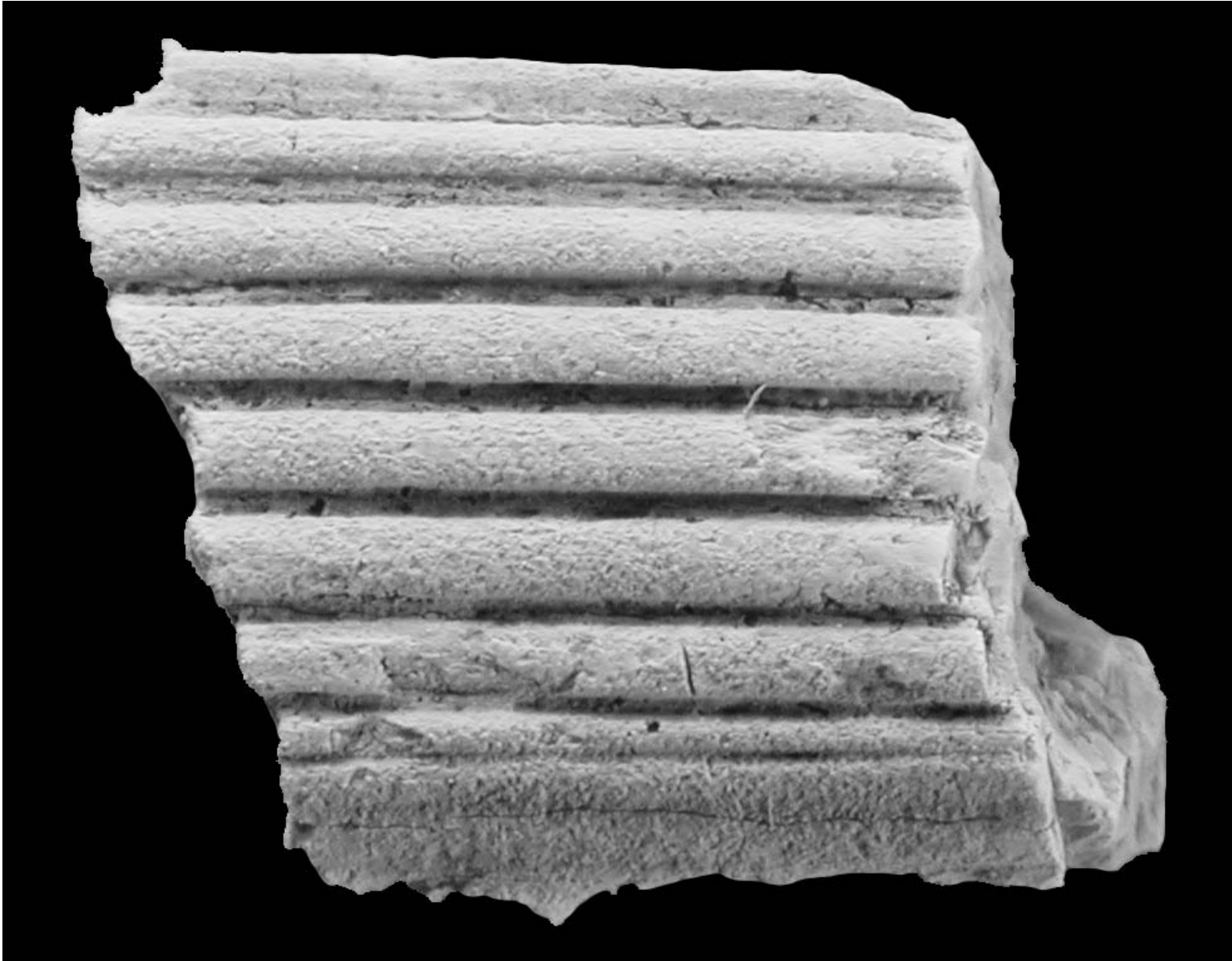
Digital Photoprocessing Example



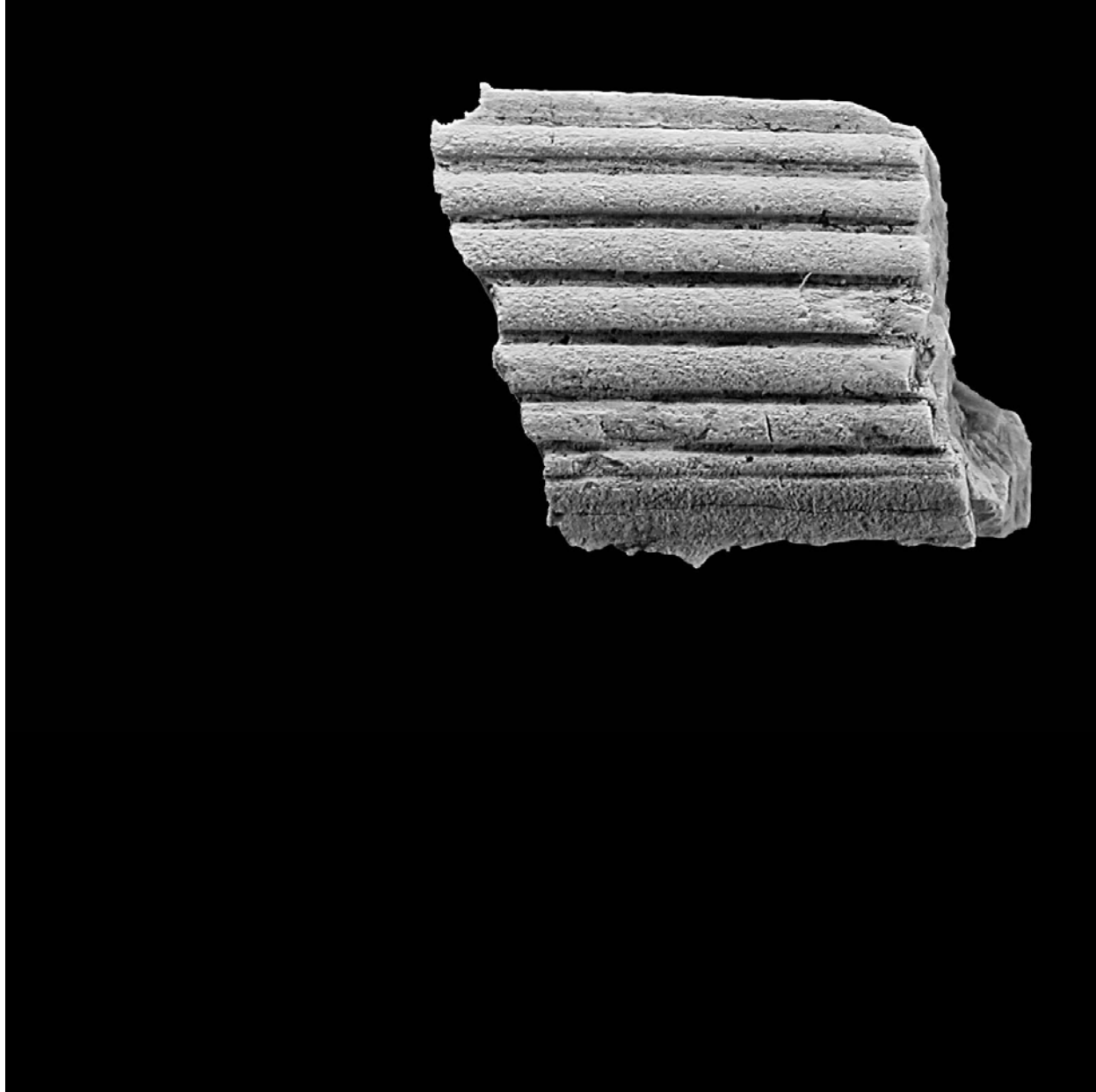
Digital Photoprocessing Example



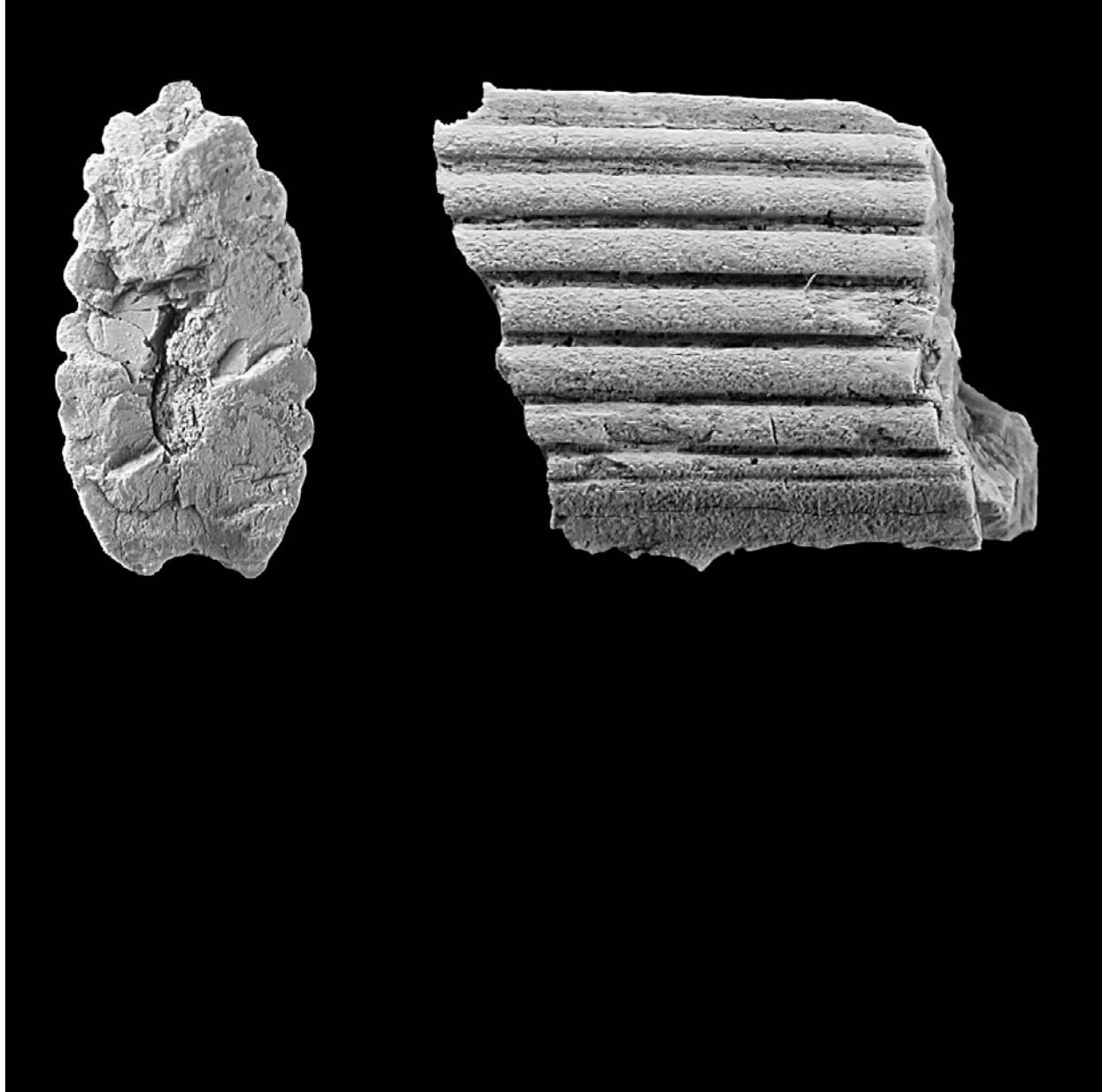
Digital Photoprocessing Example



Digital Photoprocessing Example



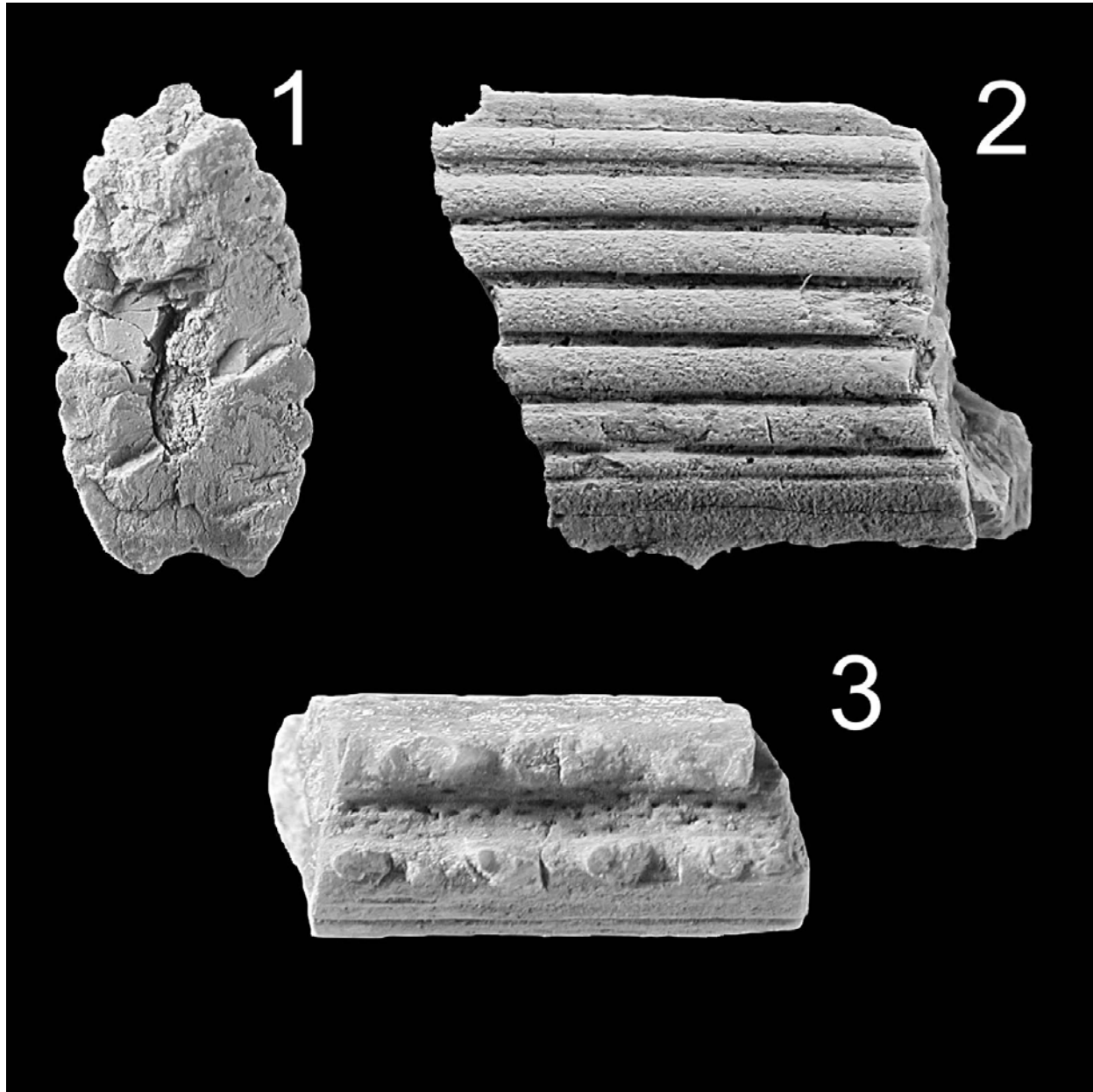
Digital Photoprocessing Example



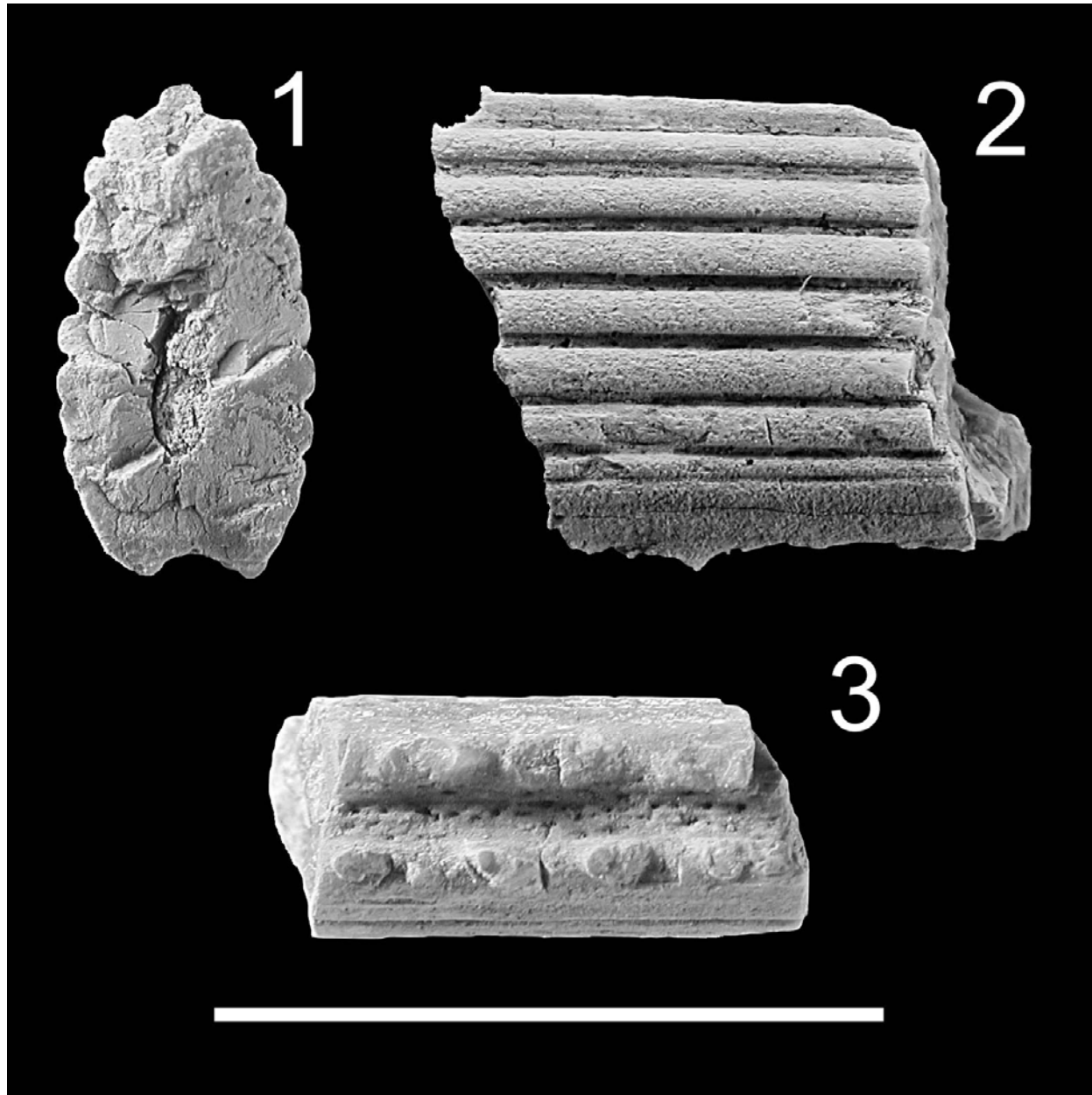
Digital Photoprocessing Example



Digital Photoprocessing Example



Digital Photoprocessing Example

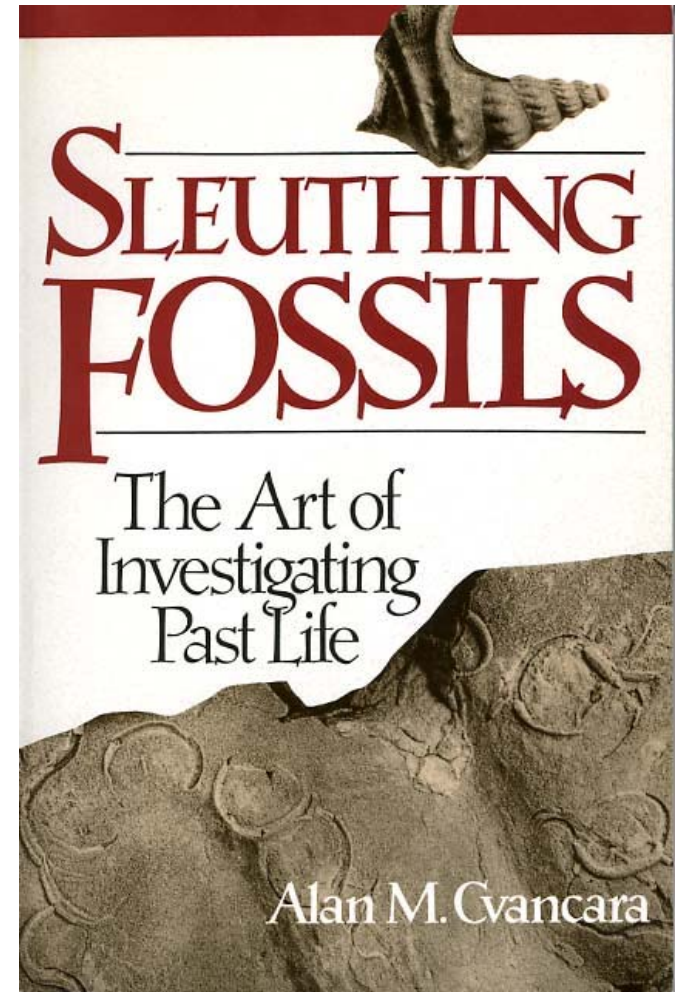


Fossil “Repair”



References - 1

- A. M. Cavanaugh, *Sleuthing Fossils*, Chapter 8, 1990
 - Good advice on getting your study into print
 - Out of print, but available used (from \$0.85 as of 3/5/05 on amazon.com)



References - 2

- B. Kummel & D. Raup, *Handbook of Paleontological Techniques*, 1965
 - Out of print
 - Expensive on the used-book market (\$400)
 - CU Geology Library has it

References - 3

- R. M. Feldmann, R. E. Chapman, & J. T. Hannibal, *Paleotechniques*, Paleontological Society Special Publication No. 4, 1989
 - Available for \$20 from Paleontological Society website: www.paleosoc.org

Note: All of these references are too old to include digital photography

