

The Advantages in Using
Textural and Polarized
Lighting for
Imaging Fossils

by
Paul Mayer
The Field Museum

Macrofossil Photography Techniques Designed to Enhance Contrast and Emphasize Detail

Low-Angled (Textural) Lighting

Polarized Lighting

Ultraviolet Lighting

Color Filters

Immersion in Water (or Alcohol)

(Lund, 1980)

John Steinbeck Grapes
of Wrath
1939, Page 68











Light Box



Inside the Light Box



Light Box Image of Trilobite



PE 6110

***Calymene celebra* Raymond**

Wenlock, Silurian

Chicago, Illinois

High-Angle Lighting Setup



High-Angle Light



PE 6110
***Calymene celebra* Raymond**
Wenlock, Silurian
Chicago, Illinois



190 200 210 220 230 240 250 260 270 280 290 300 310 320

Low-Angle Lighting Setup



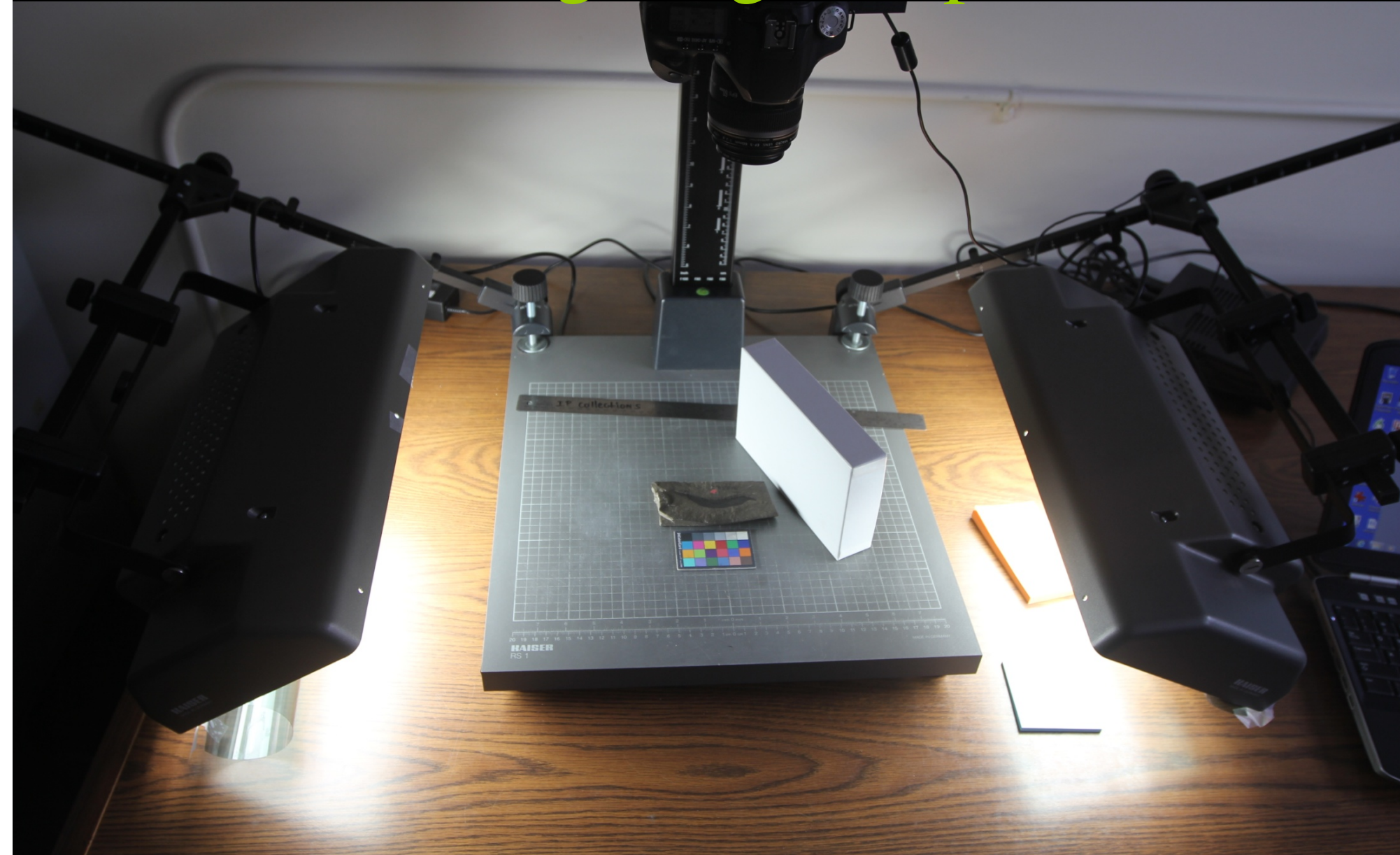
Low-Angle Lighting



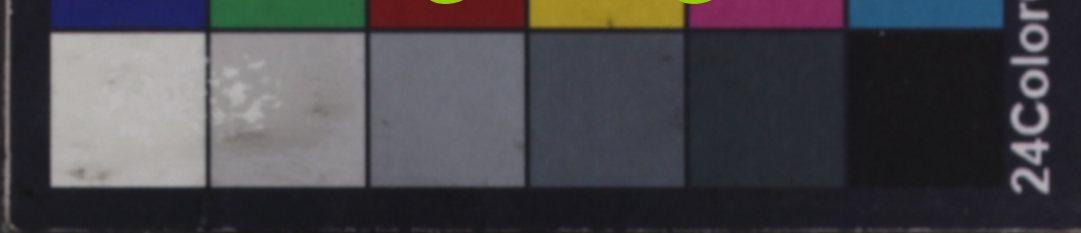
PE 6110
***Calymene celebra* Raymond**
Wenlock, Silurian
Chicago, Illinois

190 200 210 220 230 240 250 260 270 280 290 300 310 320

One-Directional, Low-Angle Lighting Setup



Low-Angle, One-Directional Lighting

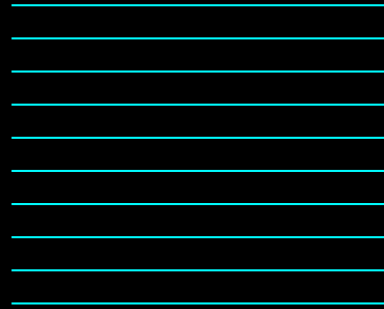


PE 6110
Calymene celebra Raymond
Wenlock, Silurian
Chicago, Illinois

**Normal
Light**

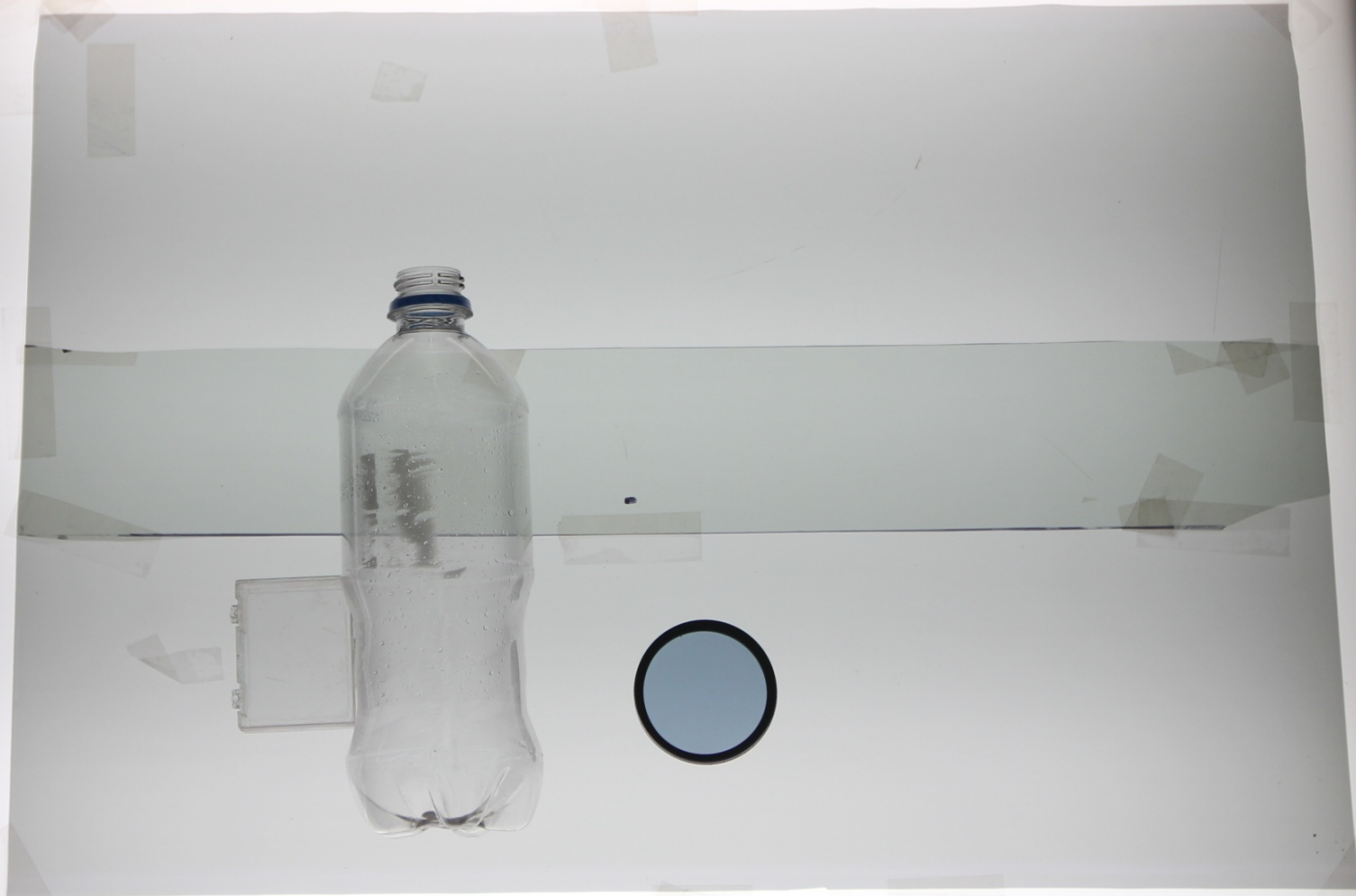
**Polarizing
Filter**

**Polarized
Light**

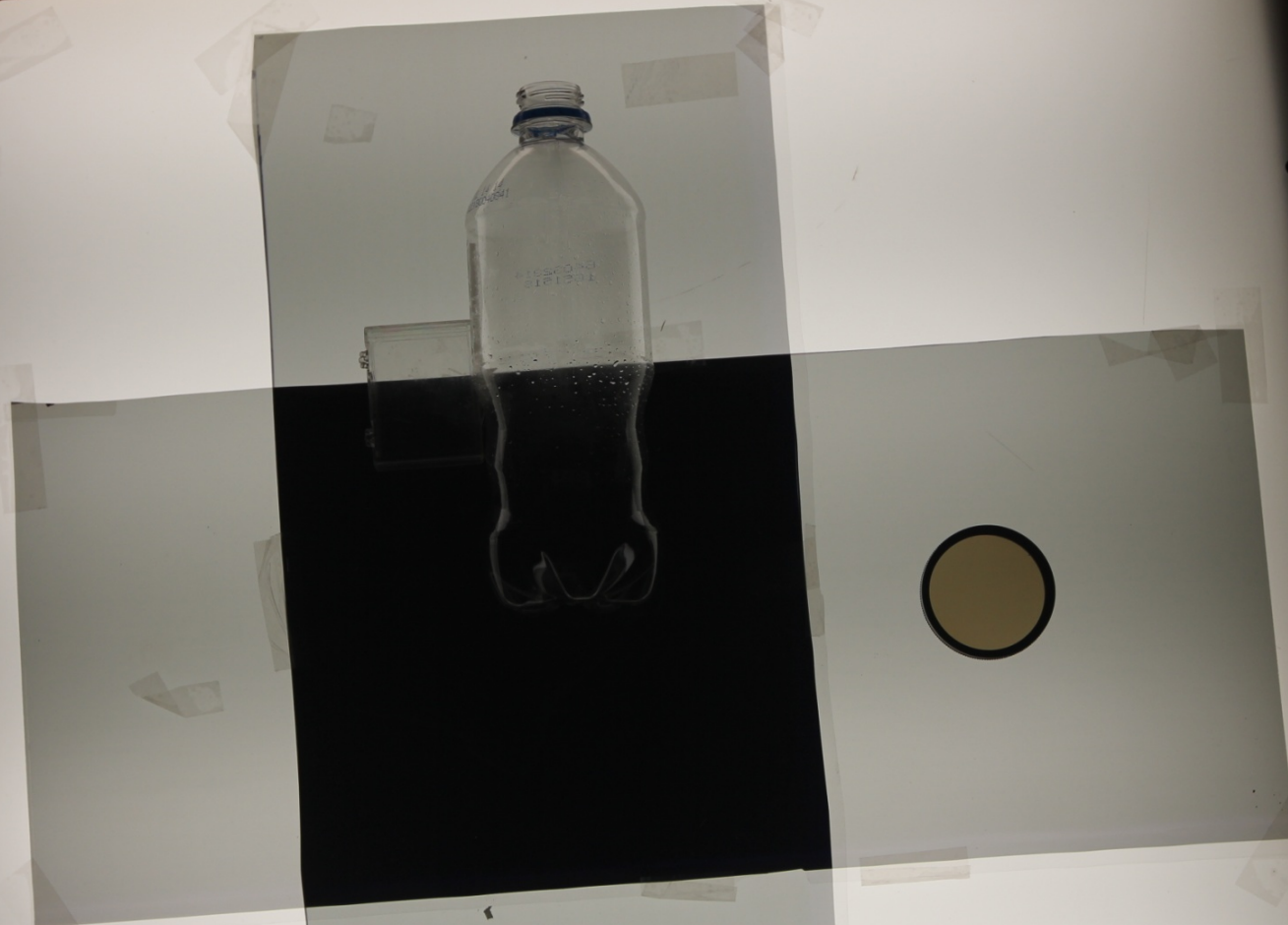


Light from the sun or a light bulb is unpolarized. This means that the waves of light vibrate in all directions perpendicular to the axis of its path. Light is partly polarized when reflected off objects. Light can be completely polarized when it passes through an optical filter, The polarizing filter only allows light waves vibrating in one plane to pass through it.

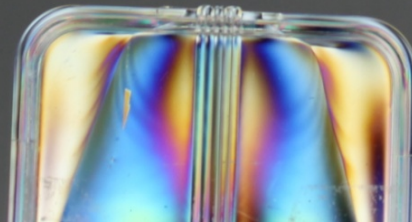
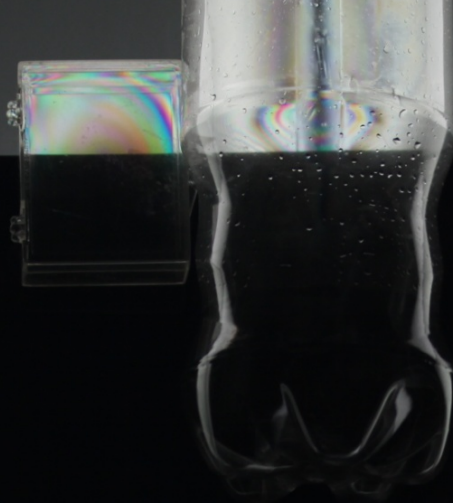
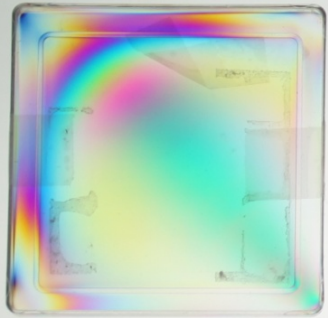
Overlapping Polarizing Film Camera with no Filter



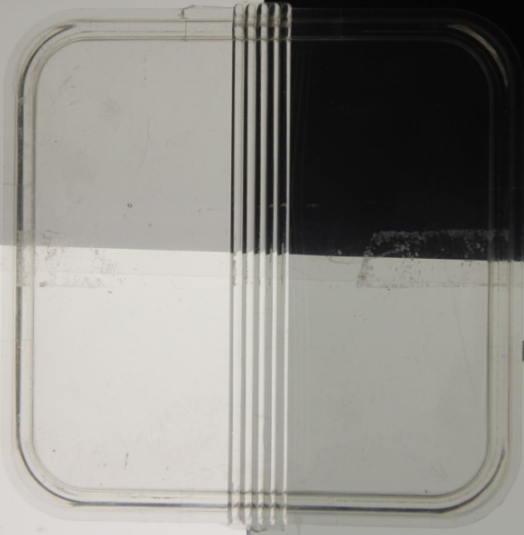
Crossed Polarizing Film Camera with no Filter



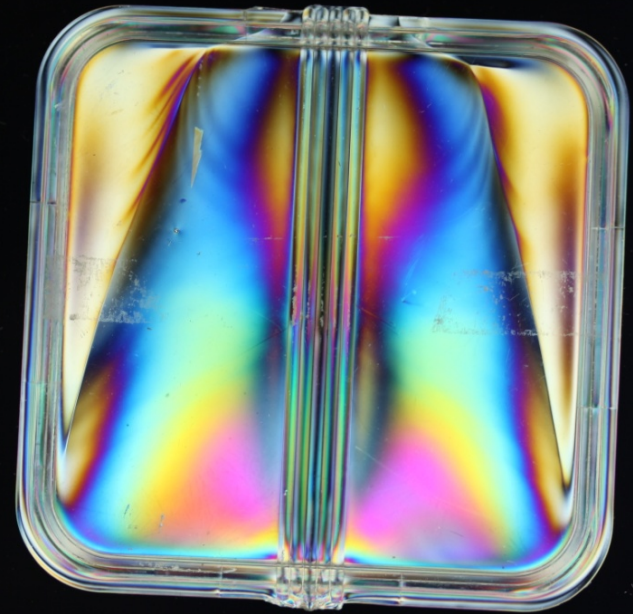
Crossed Polarizing Film Camera with Polarizer Filter



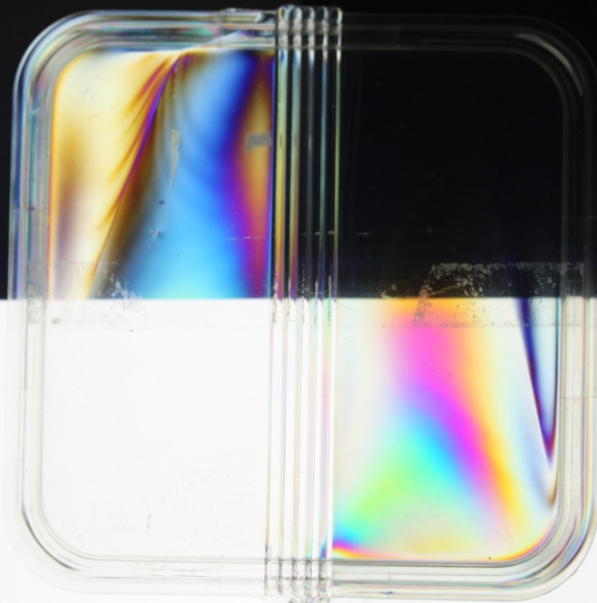
No Polarizing Filter



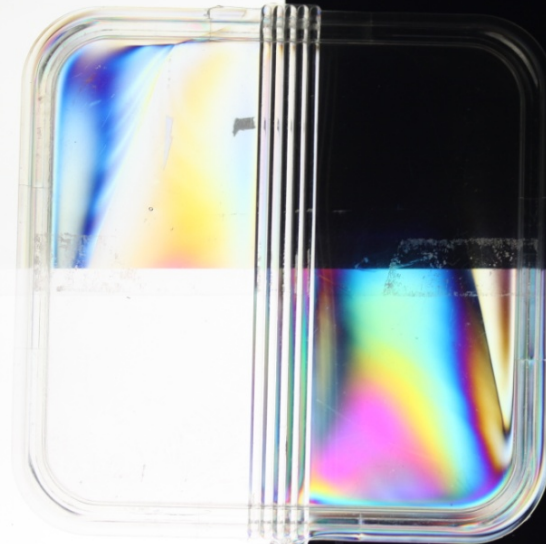
Polarizing Filter Crossed



Polarizing Filter Turned 0°



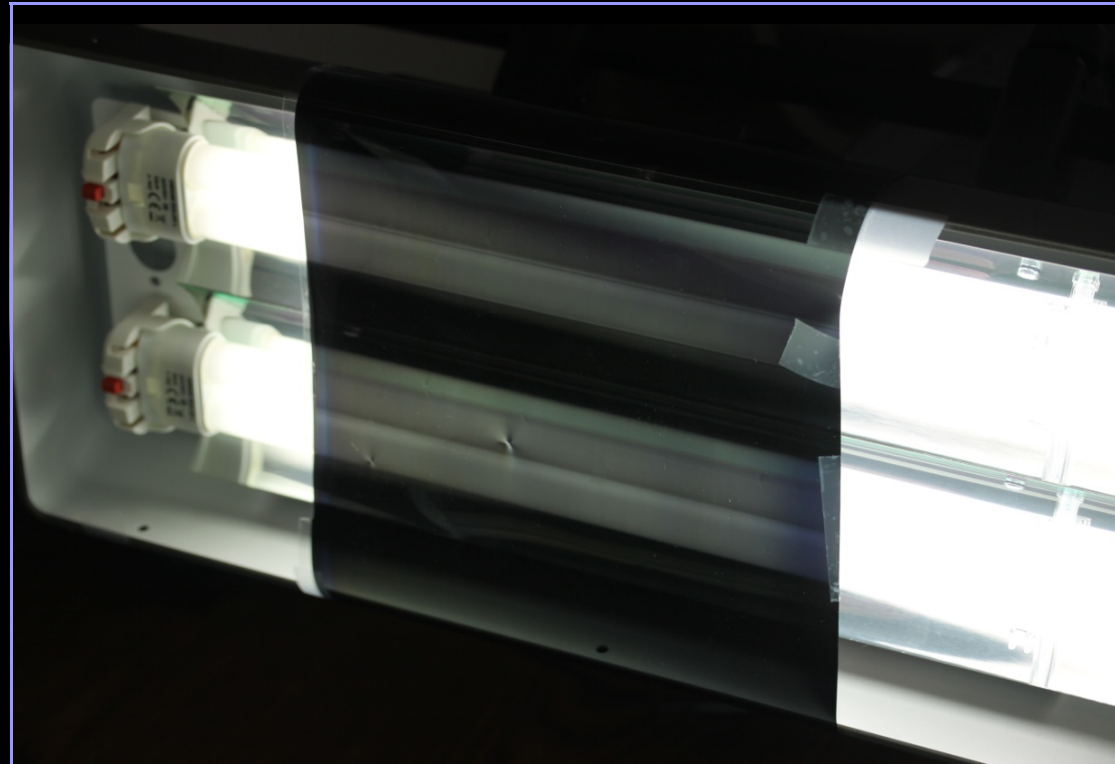
Polarizing Filter turned 90°





Close up of lights with
uncrossed polarizer filter

Close up of lights with
crossed polarizer filter



Articles on Polarized Light and Fossil Photography

Rayner, R.J. 1992. A method of improving contrast in illustrations of coalified fossils. *Palaeontologia Africana*,49.

Boyle B. 1992. Fossil detail leaps with double polarization. *Professional Photographers of Canada*, 22: 10-12.

Bengtson S. 2000. Teasing Fossils out of shale with Cameras and Computers, *Palaeontologia Electronica*, 3(1):14pp.

http://palaeo-electronica.org/2000_1/fossils/issue1_00.htm

Jean-Bernard Caron, Curator of
Invertebrate Palaeontology at the
Royal Ontario Museum,

Video on polarizing light photography
and submerged Burgess Shale fossils in
water.

<http://burgess-shale.rom.on.ca/en/science/fieldwork-collections/labwork-collections/02-photographing-fossils.php>

Low-Angle Lighting

Brings out relief
or topography
(texture)

Creates shadows

Might
emphasize rock
matrix more
than fossil.

PE 22816
Polychaete worm
Rhaphidiophorus
hystrix

Pennsylvanian
Mazon Creek

Carbondale Formation
Francis Creek Shale



Polarized Lighting

High Contrast

Increase saturation

Reduces reflection

Flat light

PE 22816

Polychaete worm
Rhaphidiophorus
hystrix

Pennsylvanian
Mazon Creek

Carbondale Formation
Francis Creek Shale





PE 10504
Tullimonstrum gregarium
Mazon Creek, Pennsylvanian
Carbondale Formation, Francis Creek Shale





PE 57188

Eubleptus maculosus
Mazon Creek, Pennsylvanian

Carbondale Formation, Francis Creek
Shale



How/Why Does Polarized Lighting Work?

“Polarized light is reflected back directly by the fossil material while the matrix reflects a more chaotic form of light, enabling the second polarizing filter to increase the contrast between the fossil and the matrix.”

THE USE OF POLARISED LIGHT IN
PHOTOGRAPHY OF
MACROFOSSILS

by PHILIP CRABB, 2001

Palaeontology Volume 44 issue 4

Low-Angle, Non-Polarized Light

UC 23586

Dictyonema flabelliporme

Lower Ordovician, Matane Shale

Matane, Quebec

Dictyonema
shale
Matane
23586

190 200 210 220 230 240 250 260 270 280 290 300 310 320

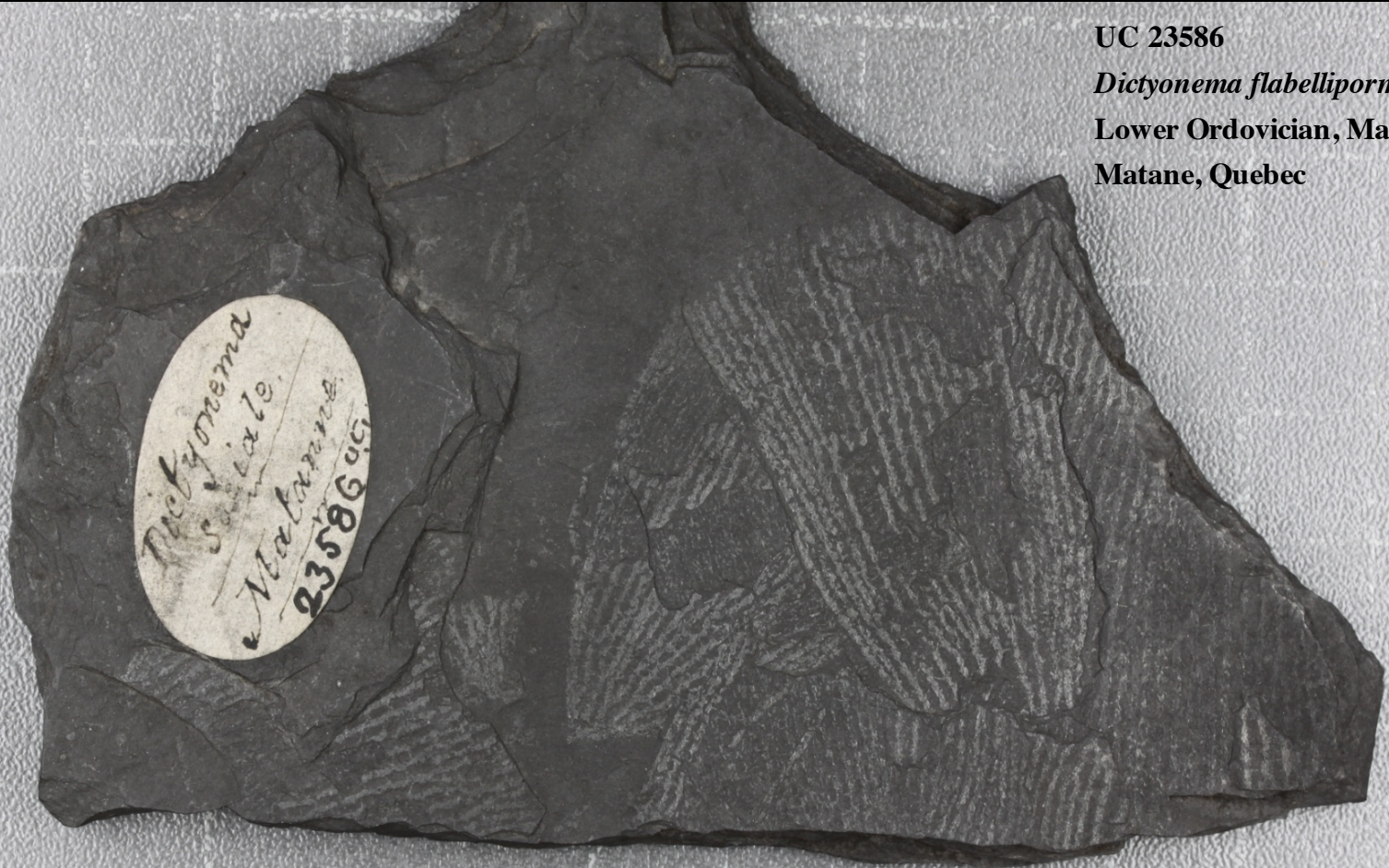
High Angle, Polarized Light

UC 23586

Dictyonema flabelliporme

Lower Ordovician, Matane Shale

Matane, Quebec



190 200 210 220 230 240 250 260 270 280 290 300 310 320

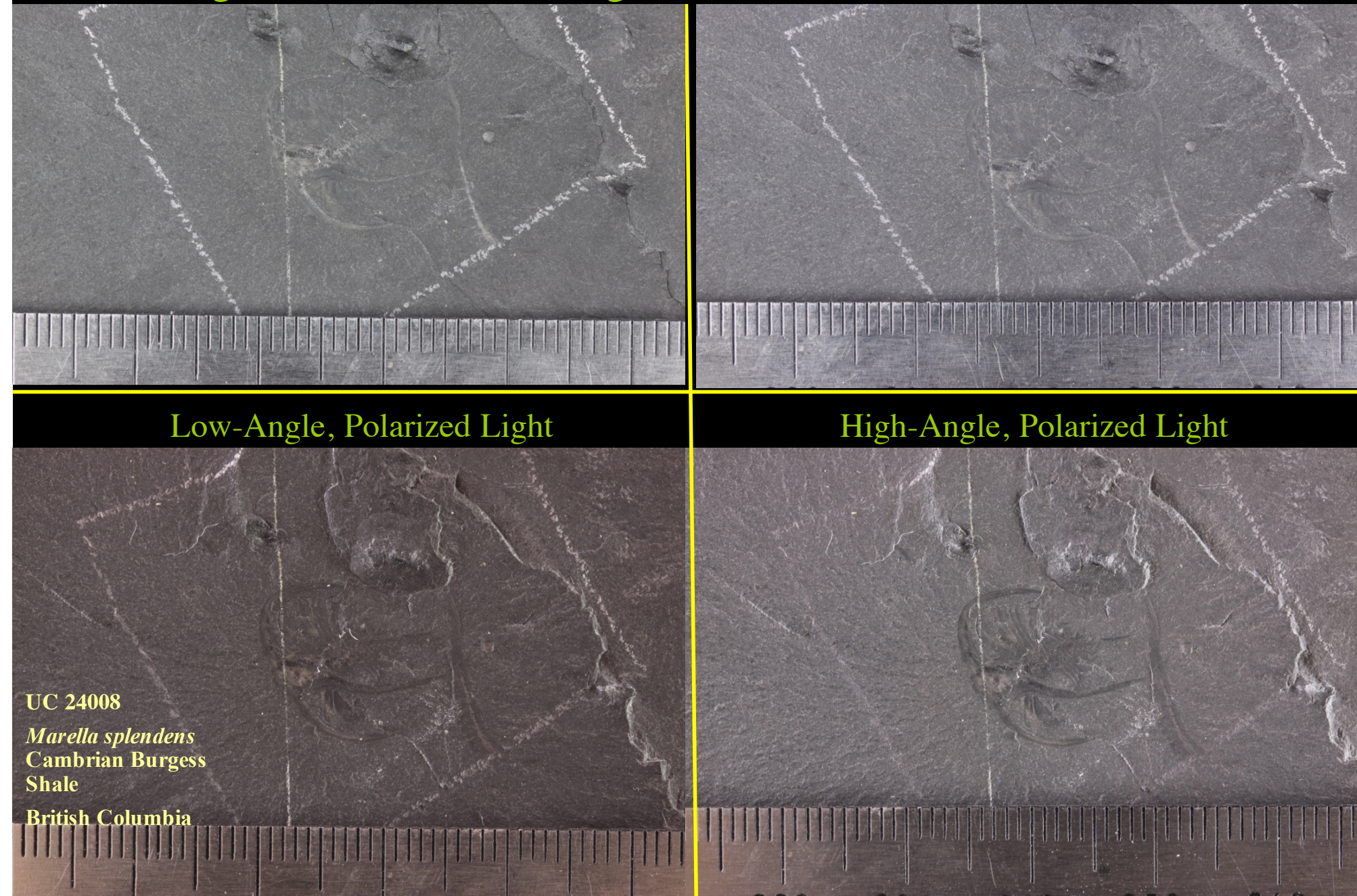
Low-Angle, Non-Polarized Light

High-Angle, Non-Polarized Light

Low-Angle, Polarized Light

High-Angle, Polarized Light

UC 24008
Marella splendens
Cambrian Burgess
Shale
British Columbia

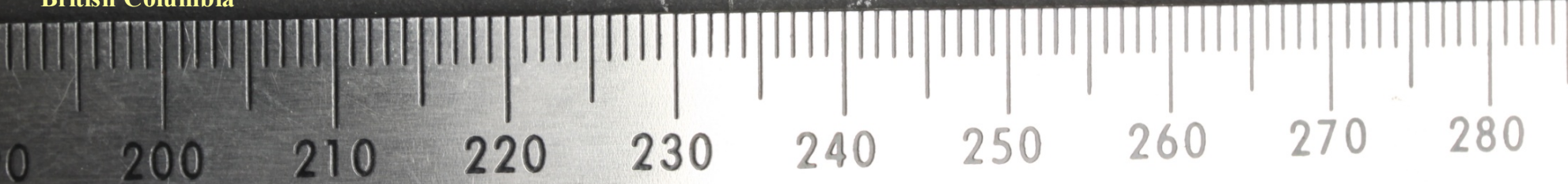


90°, Non-Polarized Light

UC 24008

Marella splendens
Cambrian Burgess
Shale

British Columbia

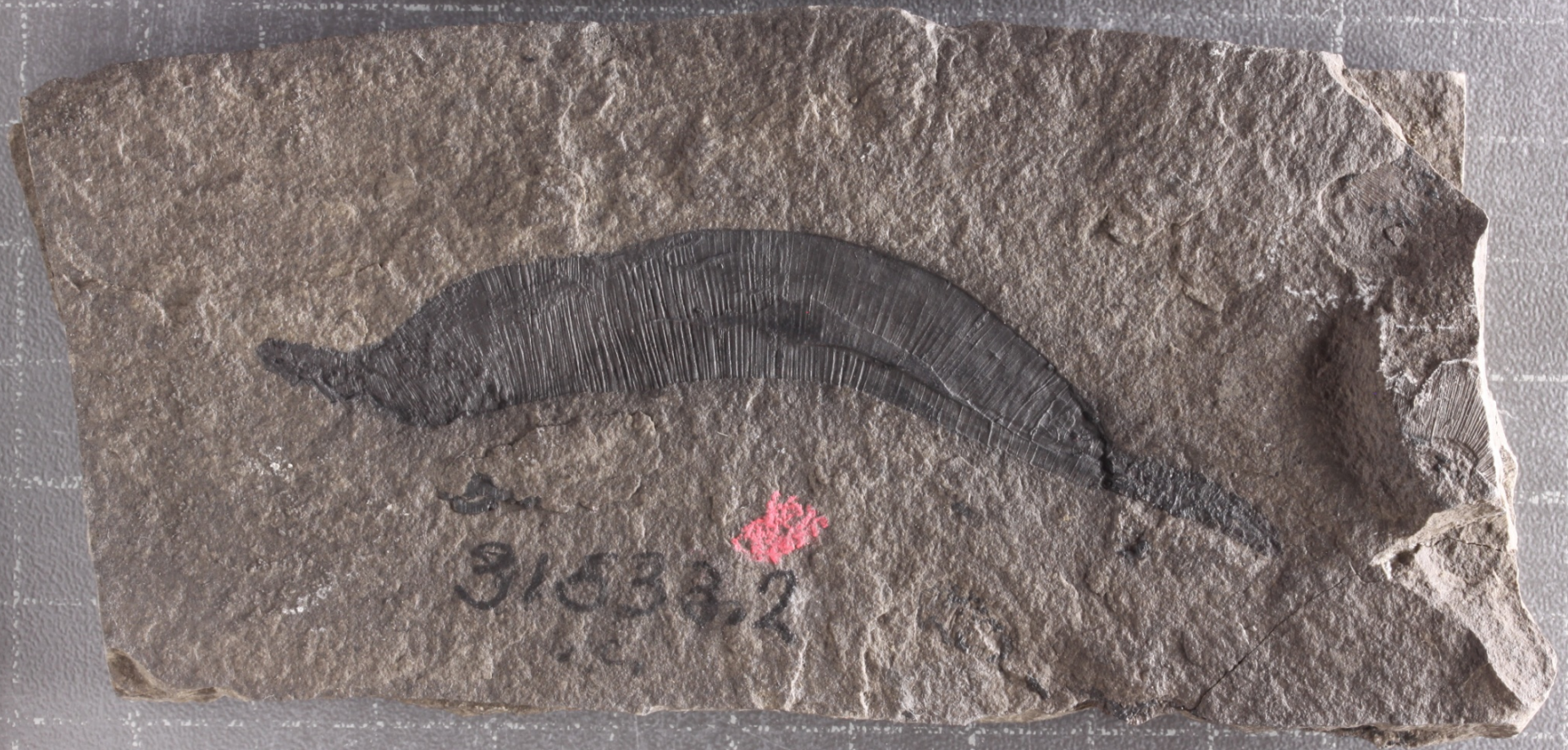


90°, Polarized Light

UC 24008
Marella splendens
Cambrian Burgess
Shale
British Columbia



One Directional, Low Angle, Non-Polarized Light

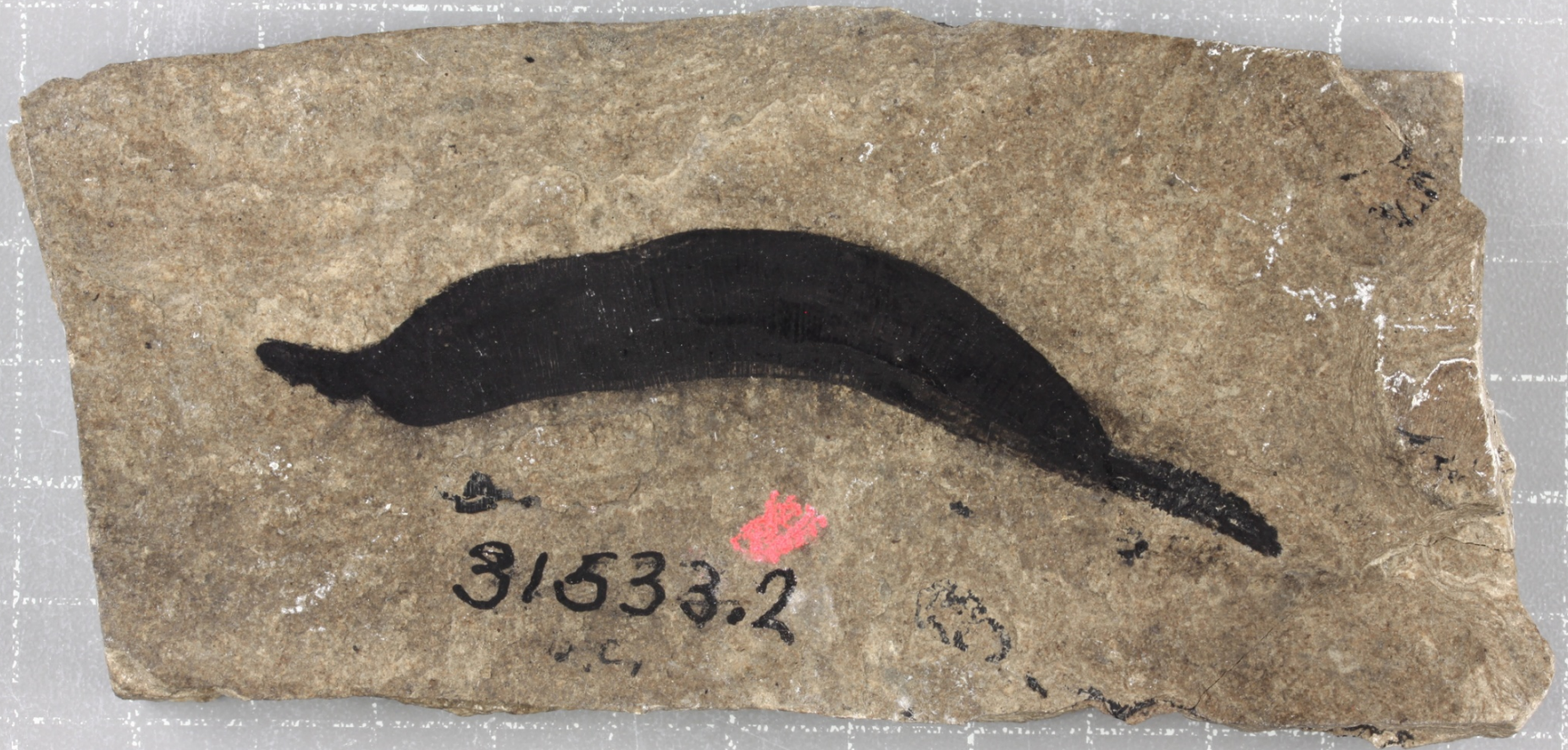


UC 31533-2

Lecthaylus gregarius Weller
Racine Dolomite, Silurian

Blue Island, Illinois

High-Angle, Polarized Light



UC 31533-2

Lecthaylus gregarius Weller
Racine Dolomite, Silurian

Blue Island, Illinois

Low-Angle, Non-Polarized Light



PE 40223

Eubleptus danielsi

Mazon Creek, Pennsylvanian

Carbondale Formation, Francis Creek Shale

High-Angle, Polarized Light



PE 40223

Eubleptus danielsi

Mazon Creek, Pennsylvanian

Carbondale Formation, Francis Creek Shale

Low-Angle, Non-Polarized Light

UC 12900

Carcinosoma newlini

Kokomo, Indiana

Kokomo Limestone, Late Silurian



High-Angle, Polarized Light



UC 12900

Carcinosoma newlini

Kokomo, Indiana

Kokomo Limestone, Late Silurian

My set up:

- Kaiser RS1 Camera Stand
- Kaiser RB 5004 High Frequency Daylight Light Set
- Canon EOS 60D + lenses
- CameraTrax 24 ColorCard 2" x 3"

