IMLS Silurian Reef Digitization Project

Imaging workflows, equipment configuration, and challenges for 3D objects in drawers and trays

By Paul Mayer

Interns:

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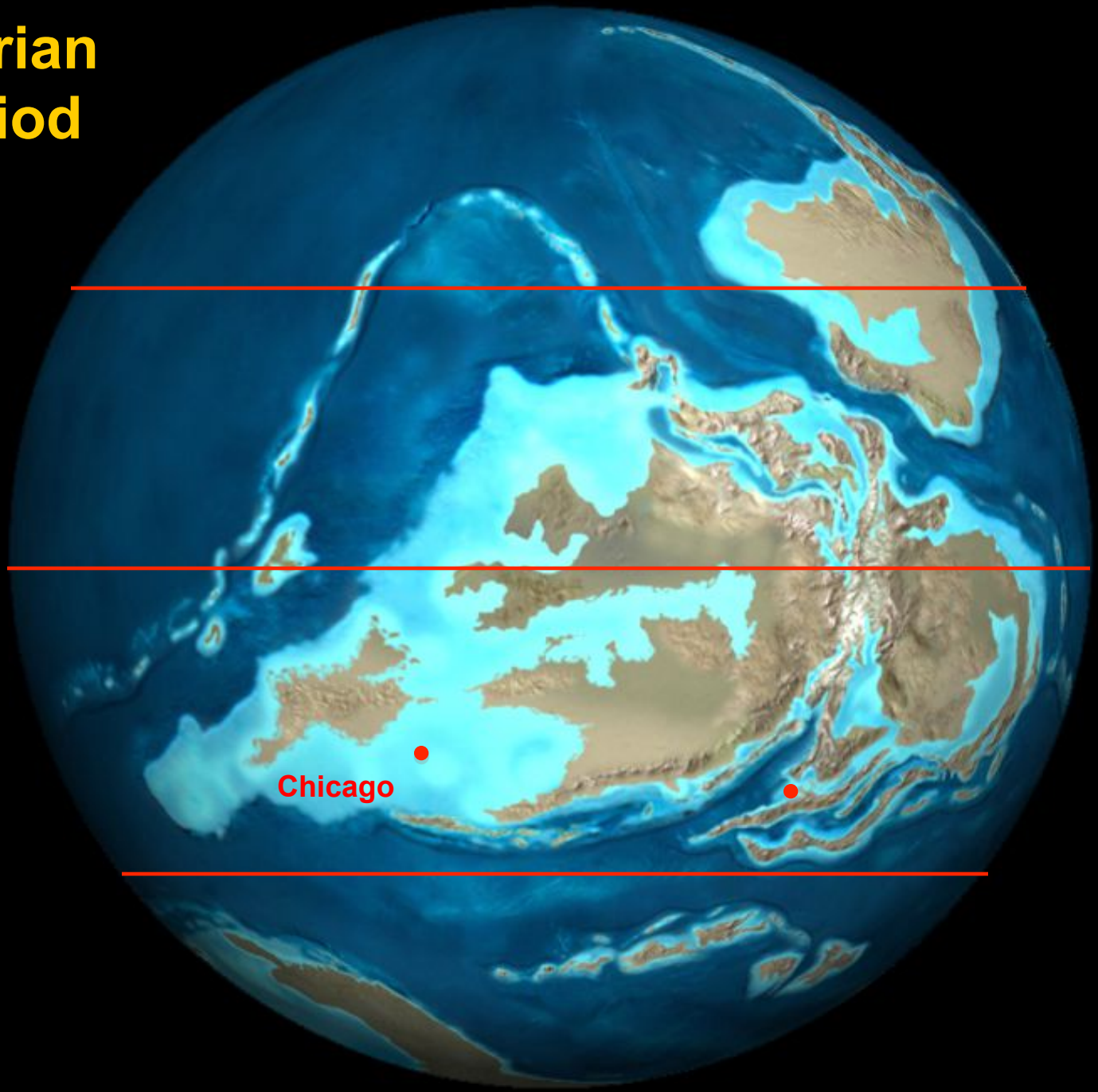
Alex Layng, Sam Albright

& Ryan Manzuk

The Field Museum

INSTITUTE of Museum and Library SERVICES

Silurian Period



Silurian Reefs

Flank beds dipping off of 100 meter tall Silurian reef core at Thornton Quarry, Illinois, USA


Silurian
Favositid Tabulate Coral
"Honeycomb Coral"
Chicago, Illinois

These collections represent a tremendous resource.

The question is how do we make better use of these remarkable, but often underused resources and preserve them for the future?

The Virtual Silurian Reef

INTRODUCTION

During the Silurian Period in earth history, 425 million years ago, when much of North America was covered by a shallow, tropical sea, reefs flourished in the area now occupied by Wisconsin and Illinois. This site uses these reefs as a vehicle for students to learn general principles, local details, and environmental significance of the study of the ancient past.

The Silurian reef diorama at the Milwaukee Public Museum, which serves as the focus for the pages that follow.

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Send comments to: reef@mpm.edu

Our answer is to:

1) Make information available through an online database for researchers

2) Tell their story through an educational outreach website aimed at middle school students and teachers.

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Workflow and Design

IMLS Silurian Reef Project

Goal to digitize 15,000 Silurian specimens in three summers, with three interns per summer and share data with MPM thru online database.

Intern Workflow

Interns select fossil group, pull 6 drawers from collection, photograph labels, enter label data in KE EMu catalog module, then photograph fossils. Interns record their times for each task

My Workflow

Edit images, batch upload images to KE EMu Multimedia module, then batch connect each Multimedia record to correct KE EMu catalog record.

Data Inspection & Error Detection

Connecting multimedia records to catalog records is perfect time to check for errors. EMu generates error report for unconnected records, and I visual inspect catalog records in a tabular format, and multimedia records one at a time

IMLS Silurian Reef Digitization Project

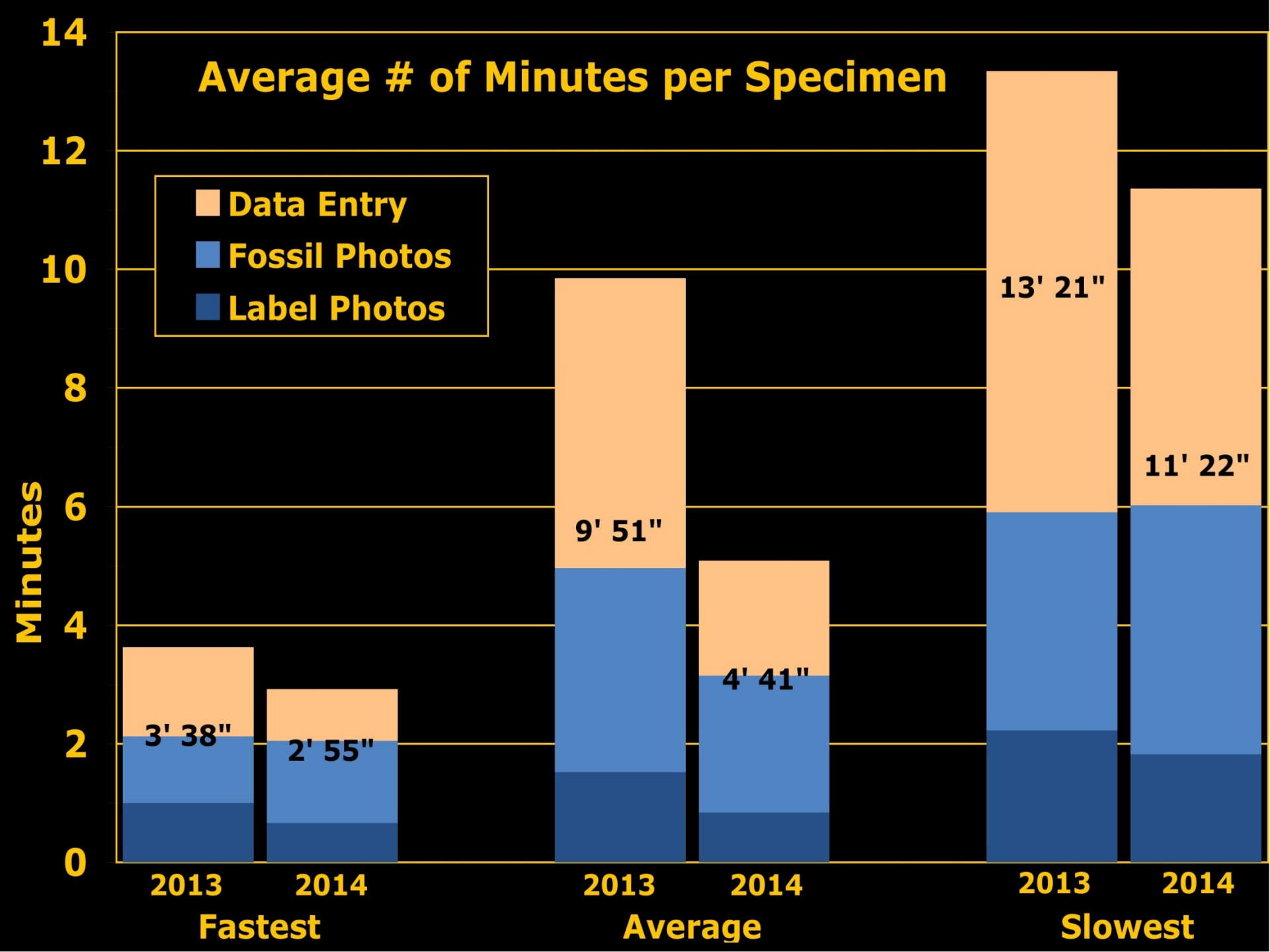
Goal: to digitize 31,000 Silurian reef fossil invertebrates from the FMNH and MPM collections.

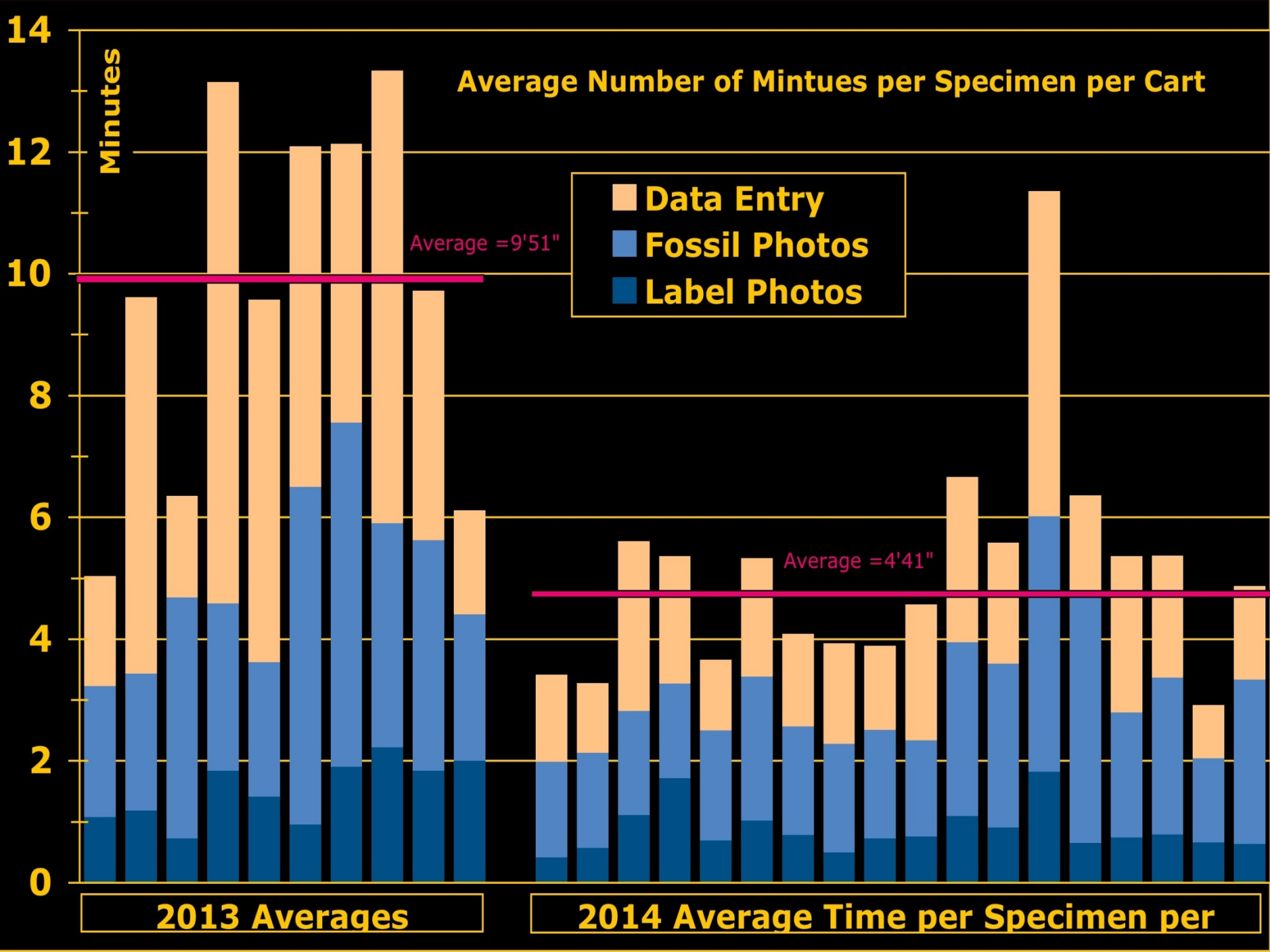
Each intern has a set of fossils that they cycle through the three work stations.

2. Fossil Photography Station

3. KE EMu Data Entry Station

1. Label Photography Station


Average # of Minutes per Specimen
Data Entry
Fossil Photos
Label Photos
Minutes
14
12
10
8
6
4
2
0
3' 38"
2' 55"
9' 51"
4' 41"
13' 21"
11' 22"
2013
2014
2013
2014
2013
2014
Fastest
Average
Slowest


Average Number of Mintues per Specimen per Cart
Minutes
14
12
10
8
6
4
2
0
Data Entry
Fossil Photos
Label Photos
Average =9'51"
Average =4'41"
2013 Averages
2014 Average Time per Specimen per


206
My Work Flow:
Inserting images into the database

Edit images then batch upload images using .csv file with lots of data.

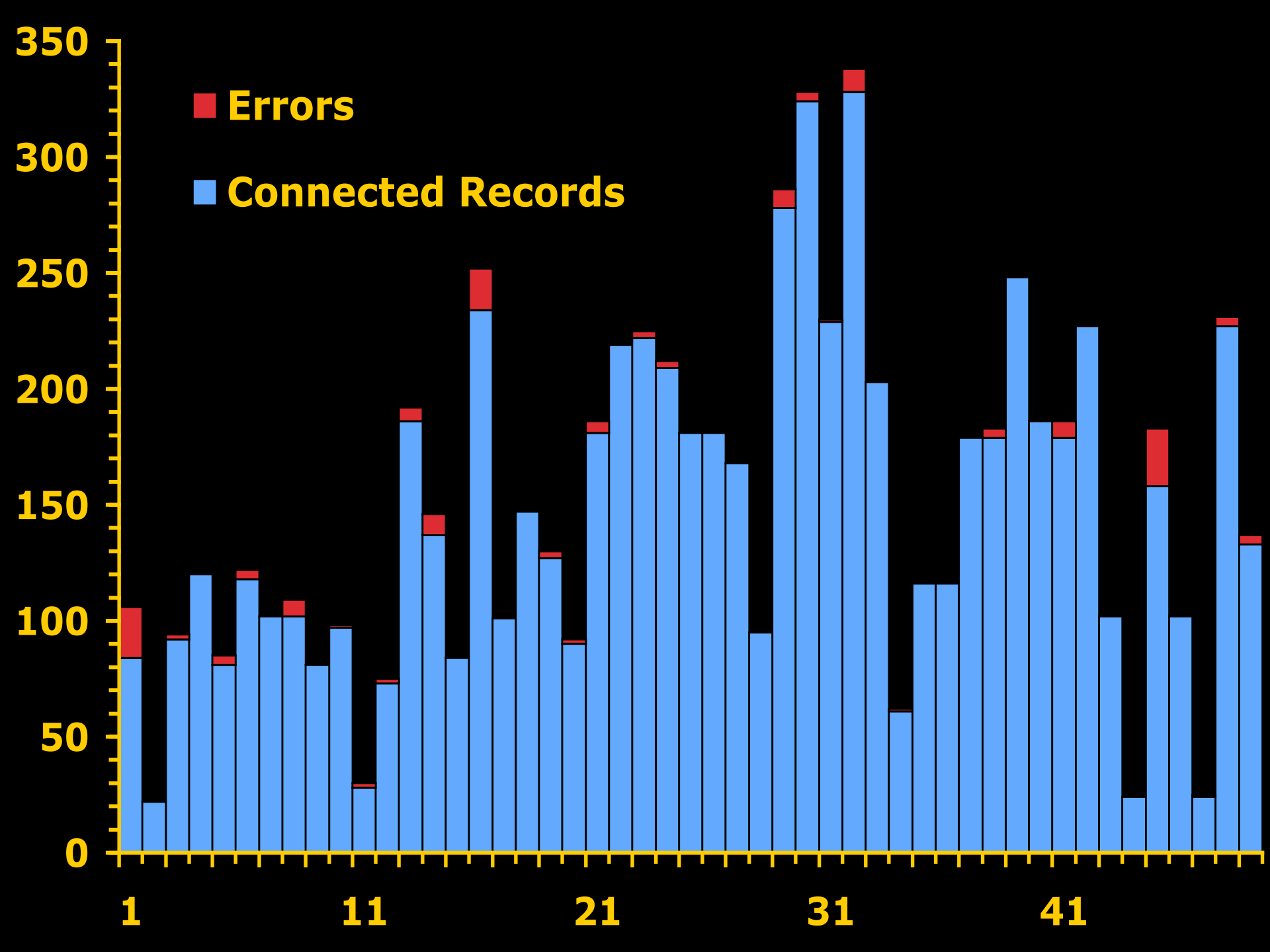
MM title comes from image name = specimen number

LC_IMLS_Aug26_trilobite2.csv

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	MulTitle	Multimedia	MulDescription	AdmPublishW	AdmPublishW	DetRights	DetDate0	DetSubject_t	DetSubject_t	DetSubject_t	DetSubject_t	DetContribut	DetContributor_tab(2)
2	P 596	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P596_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 596	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
3	P 596	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P596_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 596	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
4	P 1458	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P1458_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 1458	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
5	P 6358	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P6358_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 6358	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
6	P 6358	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P6358_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 6358	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
7	P 6881	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P6881_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 6881	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
8	P 6881	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P6881_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 6881	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
9	P 7546	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P7546_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 7546	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
10	P 7546	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P7546_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 7546	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
11	P 8172	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P8172_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 8172	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
12	P 8172	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P8172_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 8172	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
13	P 8173	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P8173_fossil_2.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 8173	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
14	P 8173	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P8173_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 8173	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
15	P 8173	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P8173_label_2.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 8173	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
16	P 8173	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P8173_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 8173	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
17	P 8174	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P8174_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 8174	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
18	P 8174	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P8174_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 8174	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
19	P 8175	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P8175_fossil_2.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 8175	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
20	P 8175	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P8175_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 8175	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
21	P 8175	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P8175_label_2.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 8175	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
22	P 8175	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P8175_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 8175	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
23	P 8200	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P8200_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 8200	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
24	P 8200	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P8200_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 8200	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
25	P 8631	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P8631_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 8631	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
26	P 8631	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P8631_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 8631	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
27	P 8917	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P8917_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 8917	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
28	P 8917	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P8917_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 8917	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
29	P 9191	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P9191_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 9191	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
30	P 9191	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P9191_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 9191	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
31	P 11520	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P11520_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 11520	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
32	P 11520	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P11520_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 11520	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
33	P 11526	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P11526_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 11526	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
34	P 11526	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P11526_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 11526	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
35	P 11573	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P11573_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 11573	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
36	P 11573	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P11573_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 11573	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
37	P 11574	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P11574_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 11574	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
38	P 11574	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P11574_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 11574	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
39	P 11872	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P11872_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 11872	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
40	P 11872	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P11872_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 11872	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
41	P 11915	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P11915_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 11915	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
42	P 11960	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P11960_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 11960	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
43	P 11960	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P11960_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 11960	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
44	P 16766	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P16766_fossil_2.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 16766	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
45	P 16766	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P16766_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 16766	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
46	P 16766	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P16766_label_2.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 16766	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
47	P 16766	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P16766_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 16766	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
48	P 17594	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P17594_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 17594	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
49	P 17594	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P17594_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 17594	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
50	P 19915	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P19915_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 19915	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
51	P 20658	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P20658_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 20658	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
52	P 20658	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P20658_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 20658	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
53	P 20863	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P20863_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 20863	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
54	P 20863	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P20863_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 20863	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
55	P 20864	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P20864_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 20864	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
56	P 20864	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P20864_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 20864	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
57	P 20865	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P20865_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 20865	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
58	P 20865	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P20865_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 20865	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
59	P 20866	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P20866_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 20866	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
60	P 20866	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P20866_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 20866	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
61	P 20867	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P20867_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 20867	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
62	P 20867	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P20867_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 20867	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
63	P 20869	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P20869_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 20869	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
64	P 20869	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P20869_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 20869	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
65	P 20872	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P20872_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 20872	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
66	P 20872	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P20872_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 20872	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
67	P 20886	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P20886_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 20886	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
68	P 20886	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P20886_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 20886	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
69	P 21208	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P21208_fossil_2.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 21208	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
70	P 21208	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P21208_fossil_3.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 21208	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
71	P 21208	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P21208_fossil_4.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 21208	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
72	P 21208	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P21208_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 21208	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
73	P 21208	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P21208_label_2.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 21208	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
74	P 21208	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P21208_label_3.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 21208	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
75	P 21208	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P21208_label_4.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 21208	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
76	P 21208	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P21208_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 21208	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
77	P 21586	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P21586_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 21586	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
78	P 21586	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P21586_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 21586	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
79	P 22556	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P22556_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 22556	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
80	P 22556	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P22556_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 22556	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
81	P 22733	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P22733_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 22733	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
82	P 22733	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P22733_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 22733	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
83	P 30882	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P30882_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 30882	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
84	P 30882	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\P30882_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen P 30882	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
85	PE 495	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\PE495_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen PE 495	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
86	PE 962	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\PE962_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen PE 962	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
87	PE 962	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\PE962_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen PE 962	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
88	PE 1458	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\PE1458_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen PE 1458	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
89	PE 3004	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\PE3004_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen PE 3004	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
90	PE 3004	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\PE3004_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen PE 3004	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
91	PE 5312	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\PE5312_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen PE 5312	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
92	PE 5312	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\PE5312_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen PE 5312	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
93	PE 6335	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\PE6335_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen PE 6335	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
94	PE 6335	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\PE6335_label_2.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen PE 6335	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
95	PE 6335	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\PE6335_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen PE 6335	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
96	PE 17223	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\PE17223_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen PE 17223	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
97	PE 17223	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\PE17223_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen PE 17223	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
98	PE 24340	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\PE24340_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen PE 24340	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
99	PE 24340	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\PE24340_label.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen PE 24340	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
100	PE 24928	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\PE24928_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen PE 24928	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer
101	PE 28645	\\davinci\Geology\mayer\IMLS_LC\LC_IMLS_Aug26_trilobite-small\PE28645_fossil.JPG	IMLS Silurian Reef Digitization Project, Image of Silurian trilobite, specimen PE 28645	Yes	Yes	© Field Muse	26-Aug-13	Silurian	IMLS	Arthropod	Trilobite	Liza Connolly	P. S. Mayer

LC_IMLS_Aug26_trilobite2.csv

Ready


350
300
250
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Errors
Connected Records
1
11
21
31
41

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)

Light Box

Inside the Light Box

Light Box Image of Trilobite

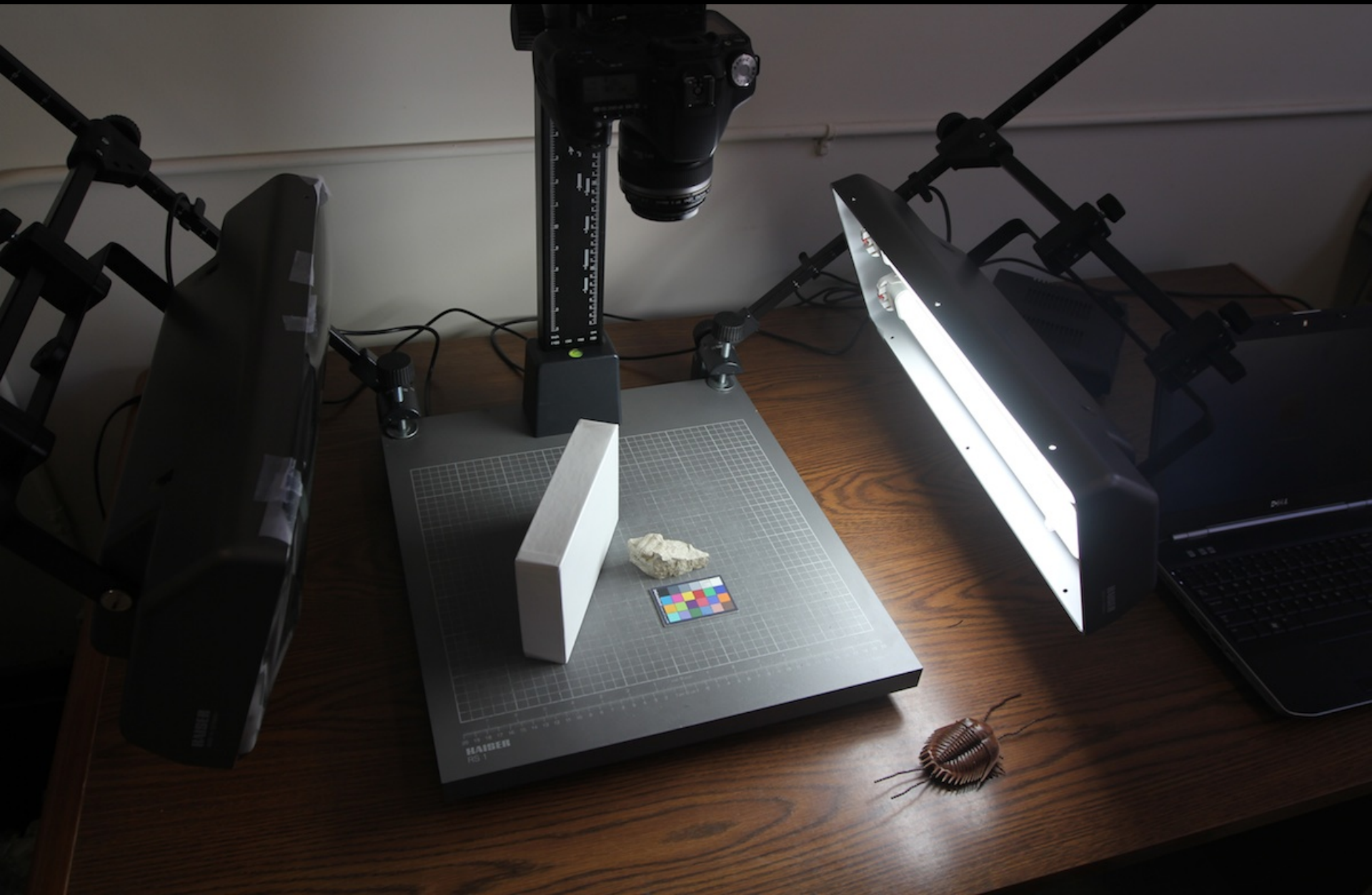
PE 6110
***Calymene celebra* Raymond**
Wenlock, Silurian
Chicago, Illinois

Low-Angle Lighting Setup

Low-Angle Lighting

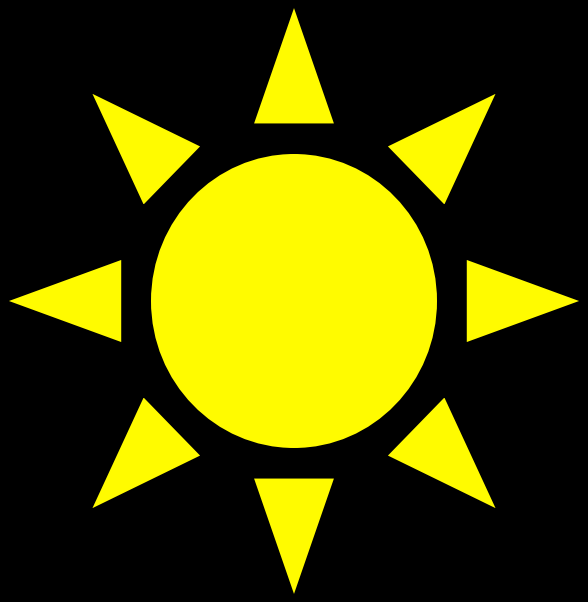
PE 6110
***Calymene celebra* Raymond**
Wenlock, Silurian
Chicago, Illinois

One-Directional, Low-Angle Lighting Setup

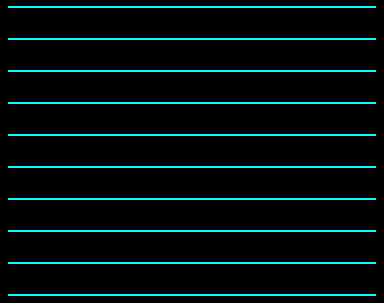


Low-Angle, One-Directional Lighting

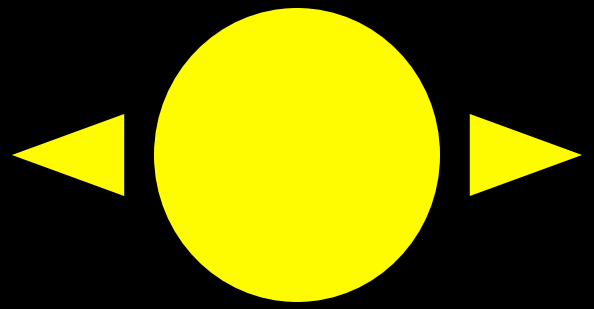
Normal Light



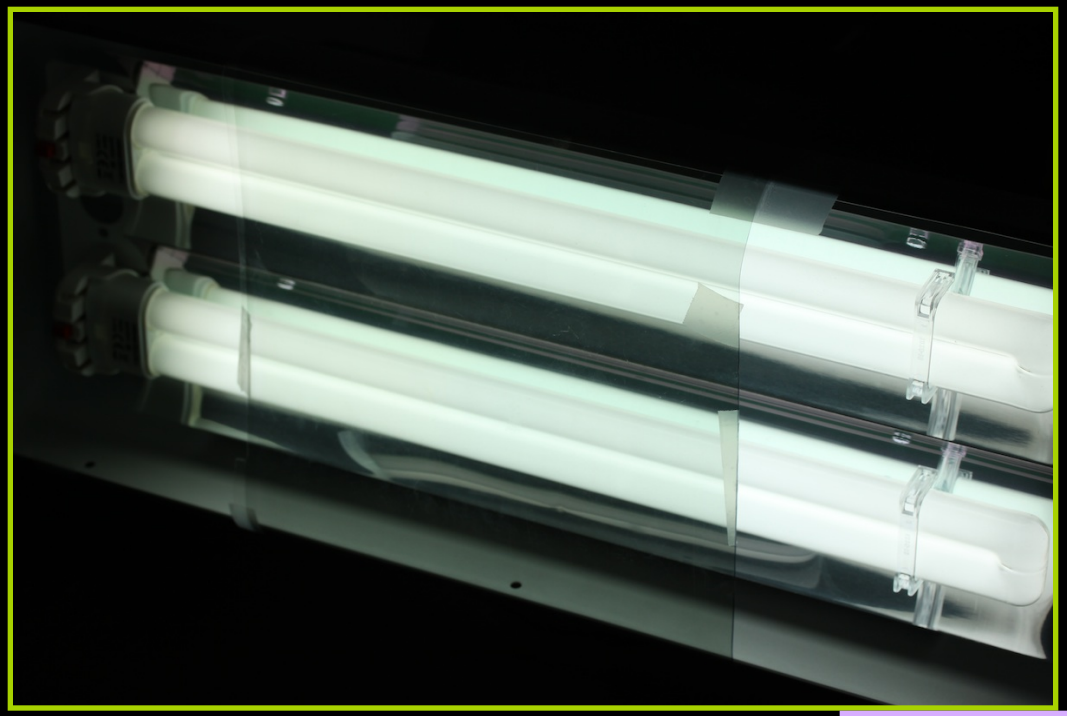
Polarizing Filter



Polarized Light

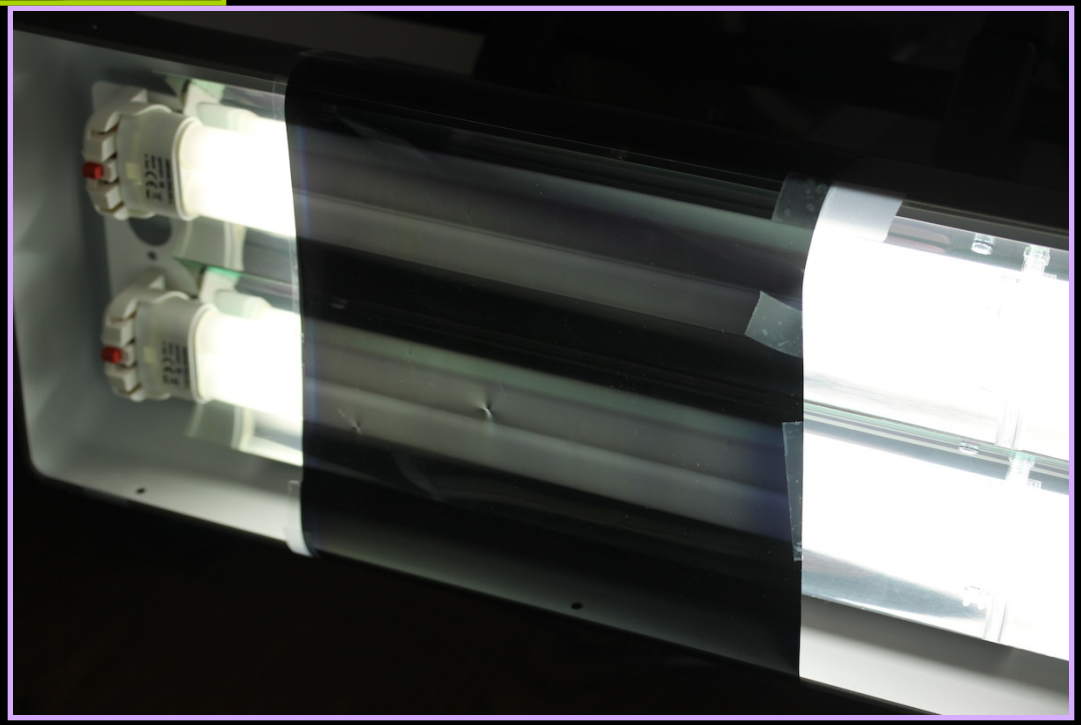


Light from the sun or a light bulb is unpolarized. This means that the waves of light vibrate in all directions perpendicular to the axis of its path. Light is partly polarized when reflected off objects. Light can be completely polarized when it passes through an optical filter, The polarizing filter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



Close up of lights with uncrossed polarizer filter

Close up of lights with crossed polarizer filter



Low-Angle Lighting

PE 22816
Polychaete worm
Rhaphidiophorus hystrix

Pennsylvanian
Mazon Creek

Carbondale Formation
Francis Creek Shale

Polarized Lighting

- High Contrast
- Increase saturation
- Reduced reflection
- Flat light

PE 22816
Polychaete worm
Rhaphidiophorus hystrix
Pennsylvanian
Mazon Creek
Carbondale Formation
Francis Creek Shale

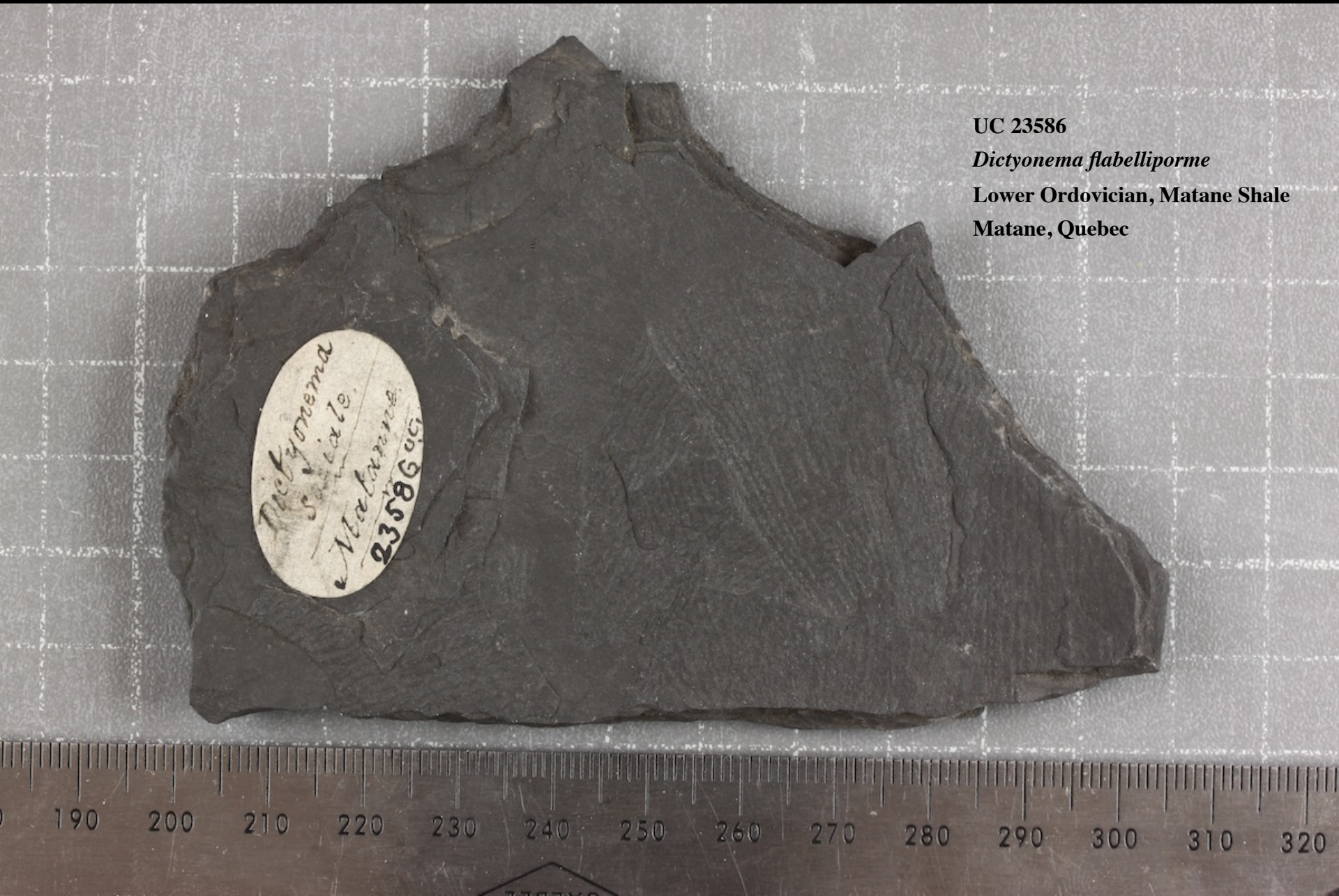
PE 57188
Eubleptus maculosus
Mazon Creek, Pennsylvanian
Carbondale Formation, Francis Creek Shale

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

Non-Polarized Light



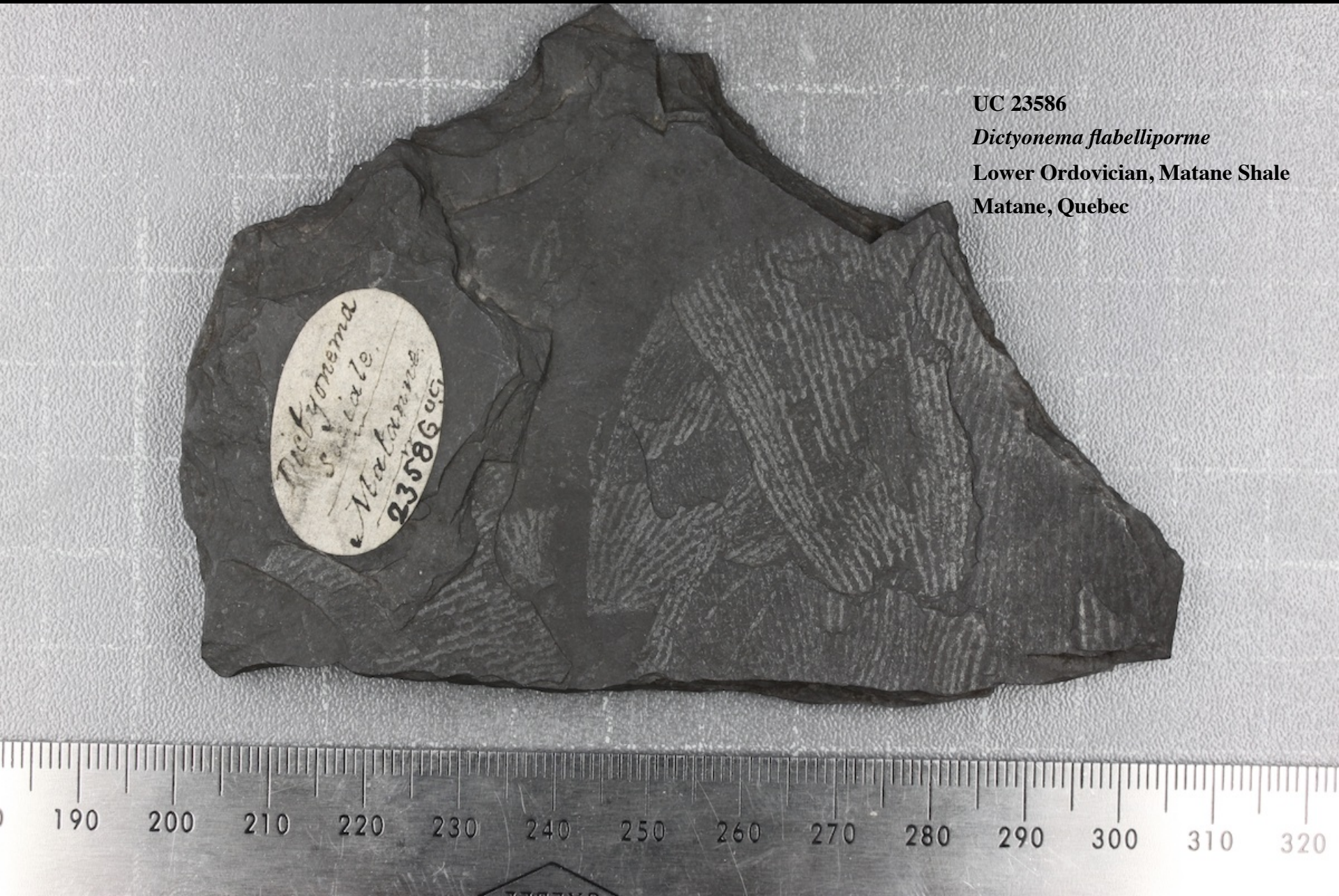
UC 23586

Dictyonema flabelliporme

Lower Ordovician, Matane Shale

Matane, Quebec

Polarized Light



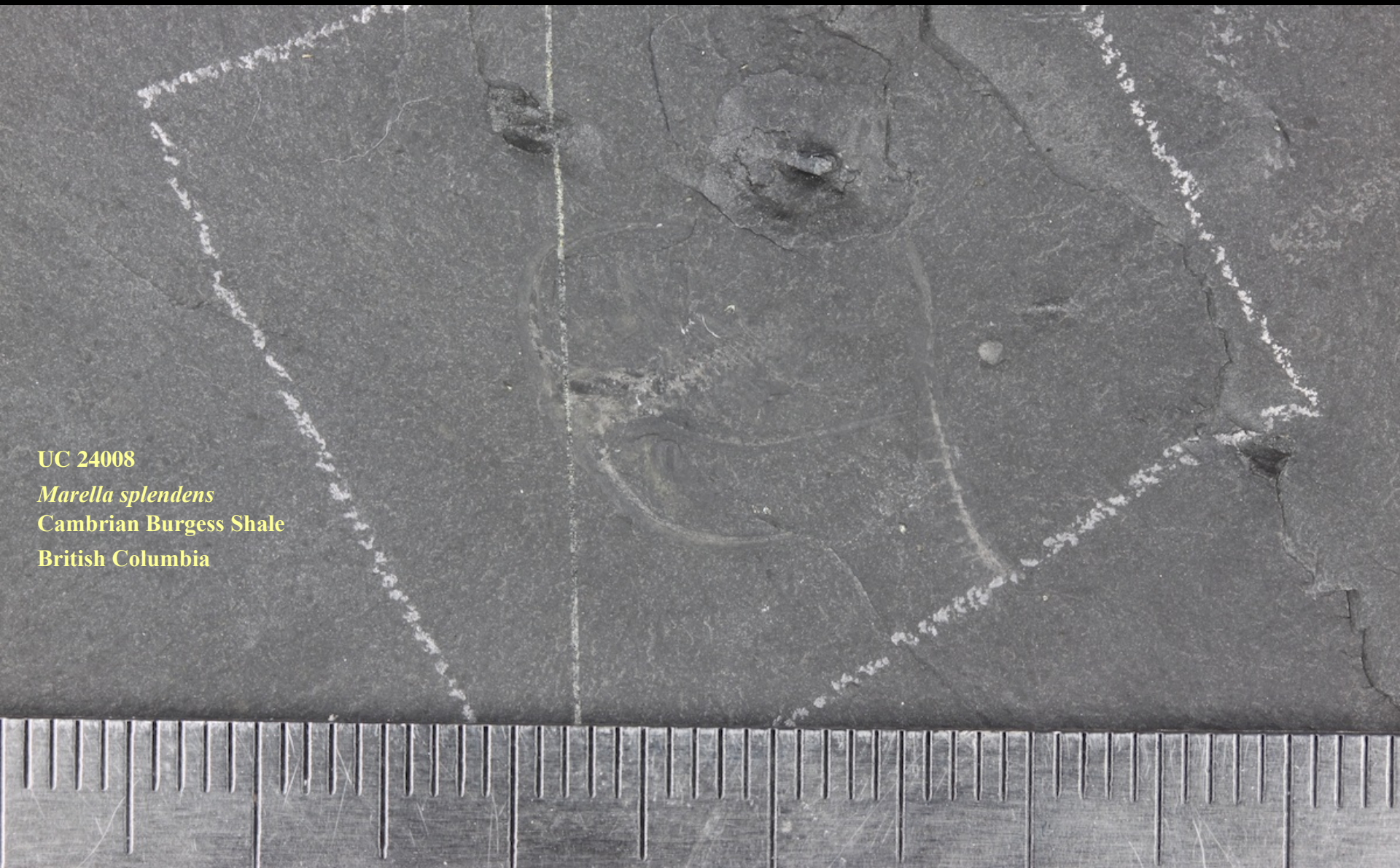
UC 23586

Dictyonema flabelliporme

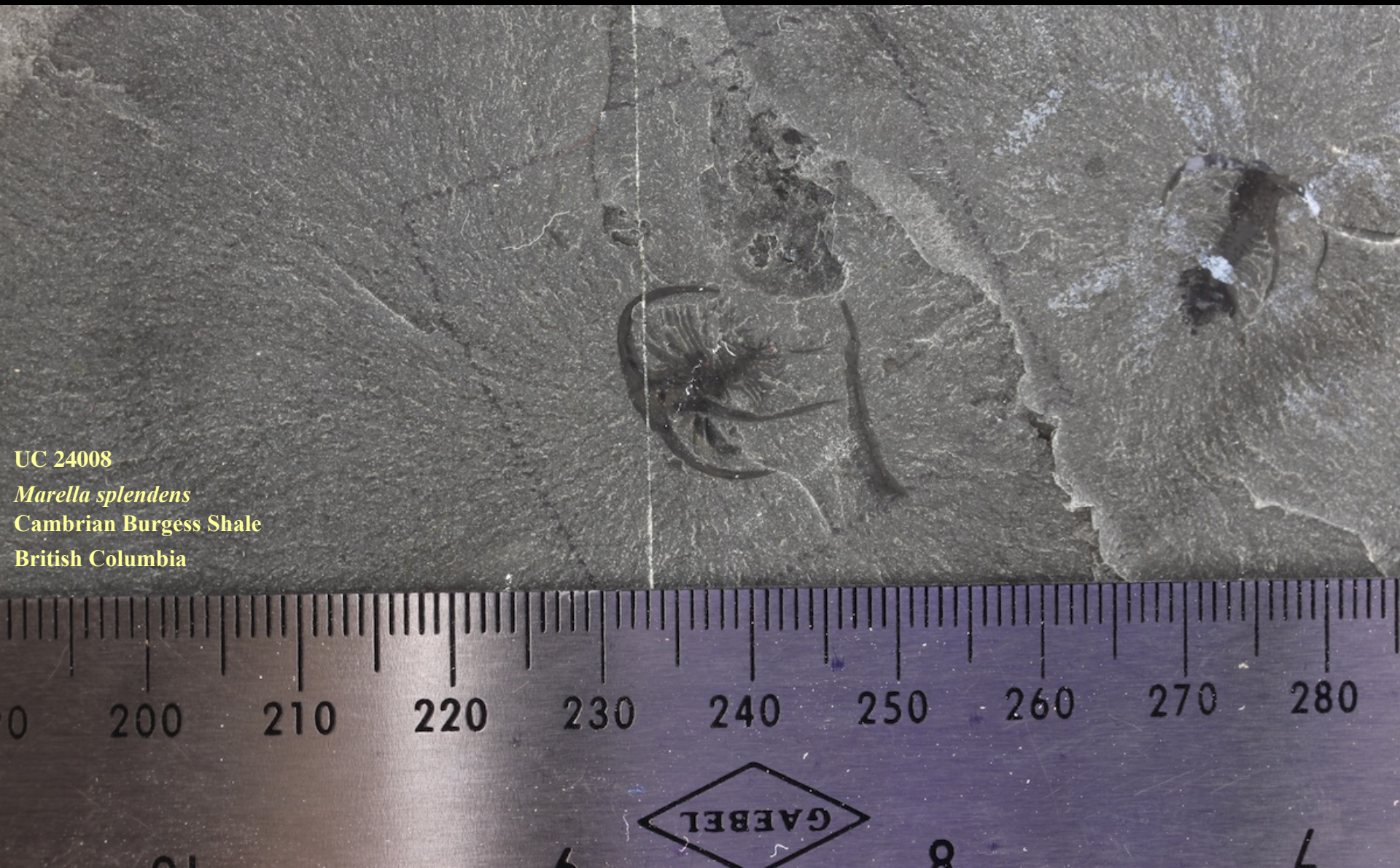
Lower Ordovician, Matane Shale

Matane, Quebec

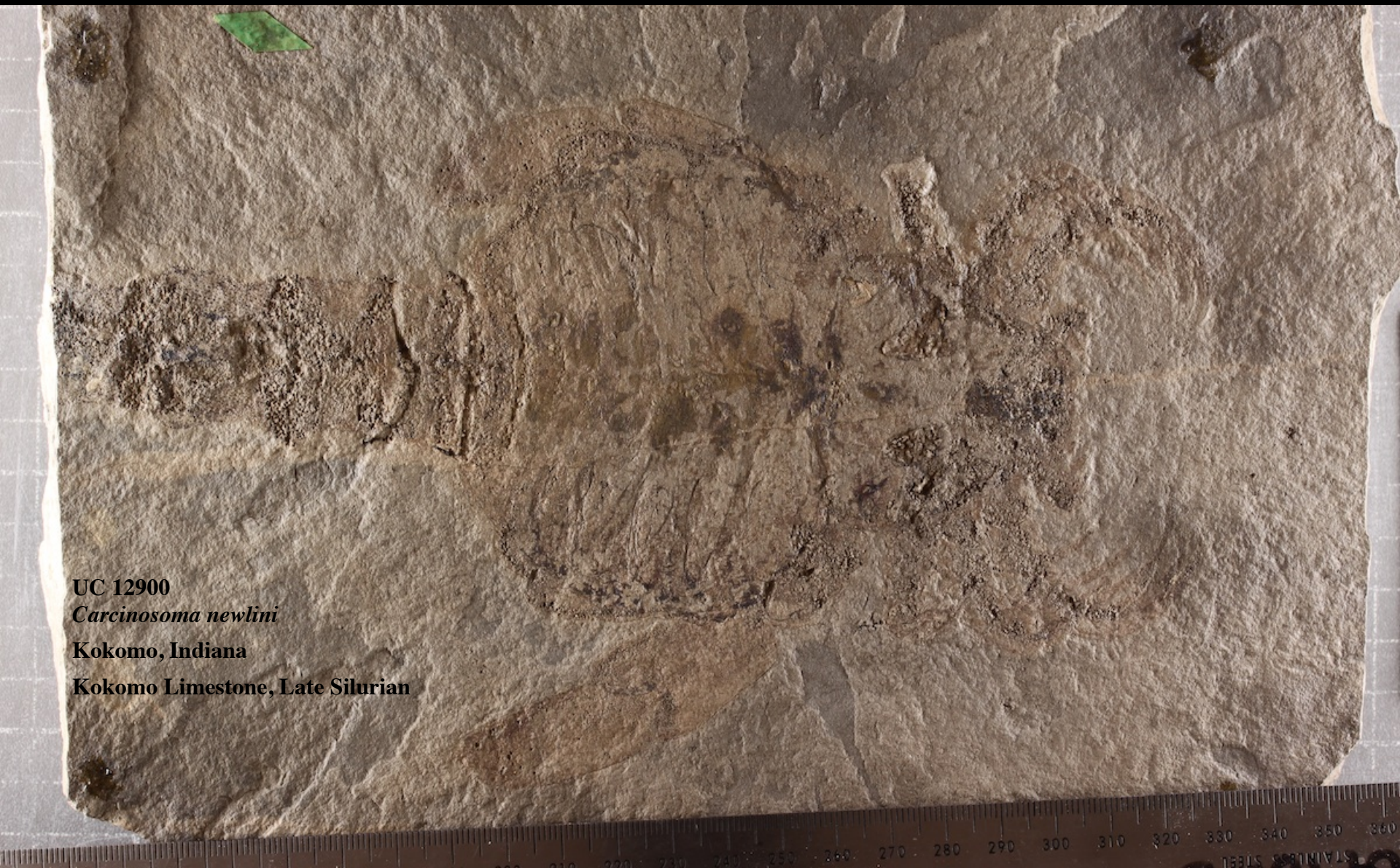
Non-Polarized Light



Polarized Light



Low-Angle, Non-Polarized Light



High-Angle, Polarized Light

One Directional, Low Angle, Non-Polarized Light

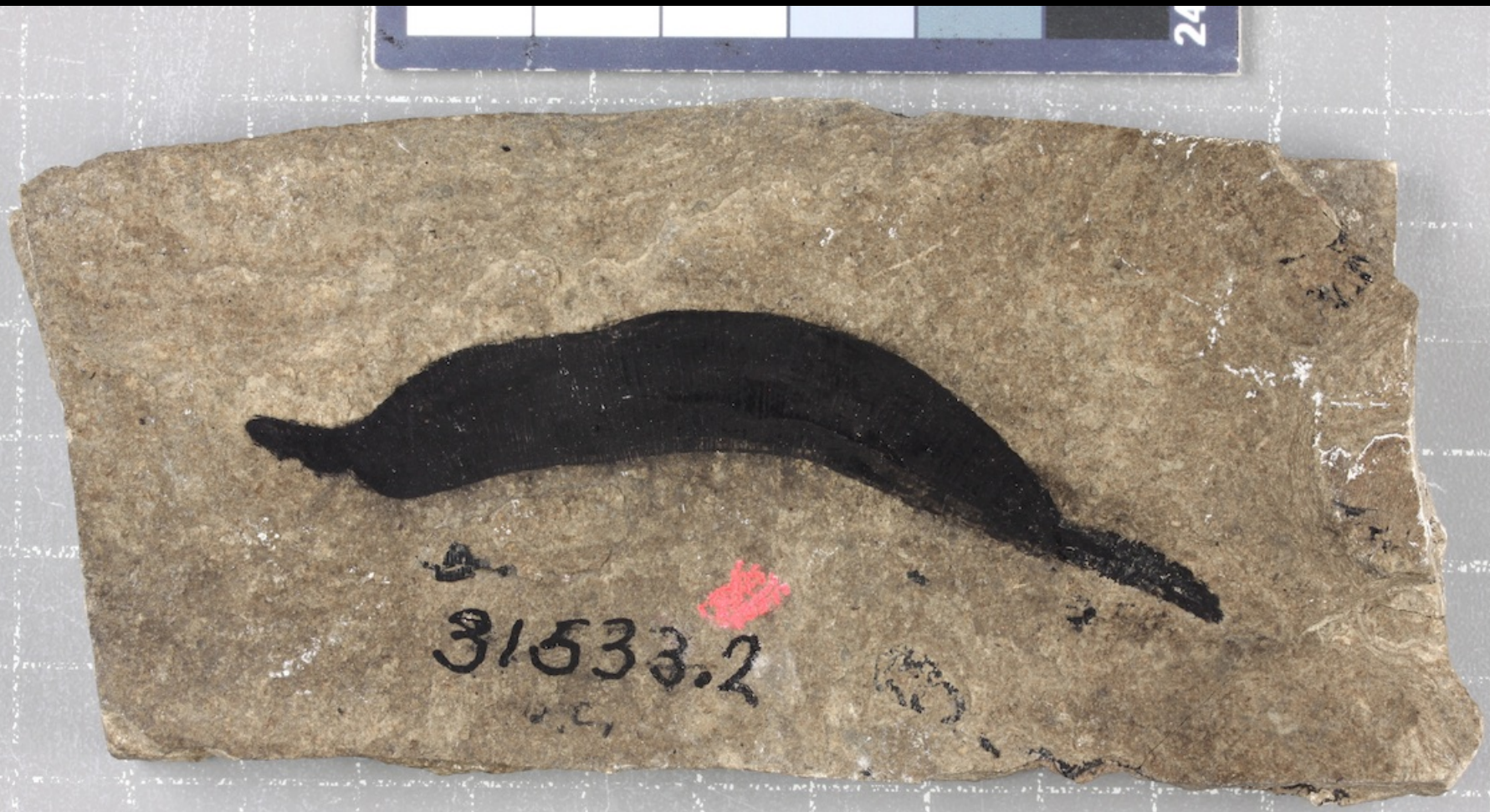
UC 31533-2

***Lecthaylus gregarius* Weller**

Racine Dolomite, Silurian

Blue Island, Illinois

High-Angle, Polarized Light



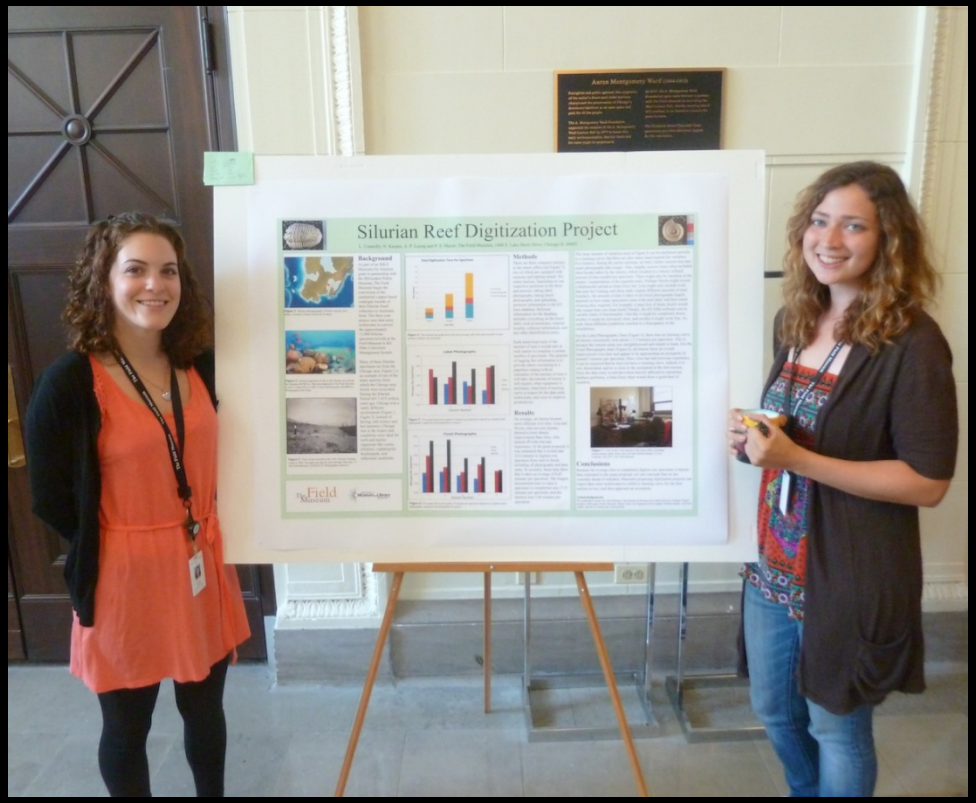
UC 31533-2

***Lecthaylus gregarius* Weller**

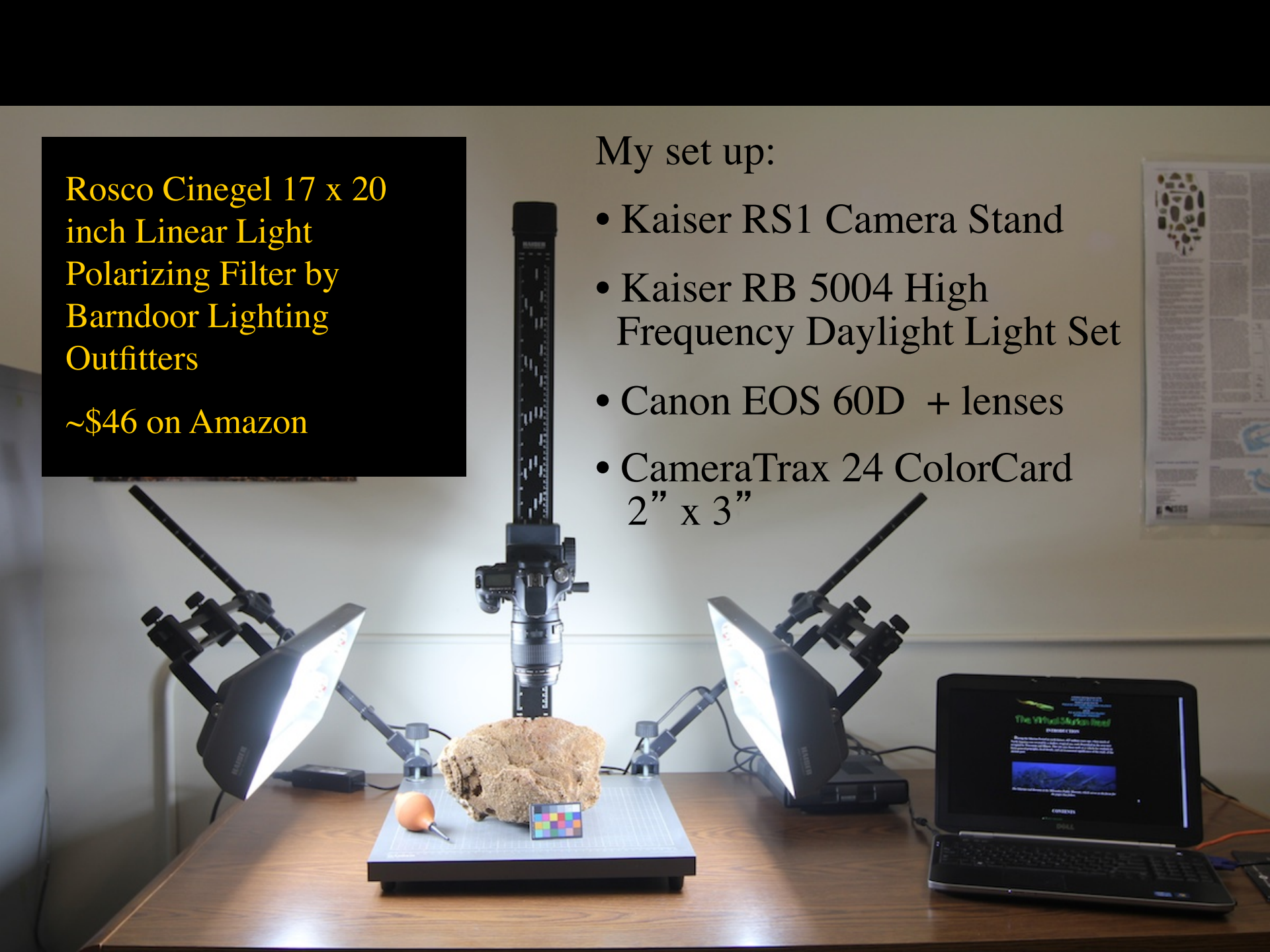
Racine Dolomite, Silurian

Blue Island, Illinois

Summary



- 15,000 Silurian specimen to be digitized in 3 summers.
- Workflow and error detection designed around collection organization.
- Digitization rates now averaging ~5 minutes per specimen
- Error rates less than 2%
- Low angle and polarized light to enhance fossil images


Rosco Cinegel 17 x 20 inch Linear Light Polarizing Filter by Barndoor Lighting Outfitters
~$46 on Amazon
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”

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

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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

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