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**External Morphology of Circumocular Structure on a Cambrian Trilobite Fossil with SEM Energy Dispersive Spectroscopy Compared to Proetidia Members** KRISTOPHER ANDREW, KEITH ANDREW, KARLA ANDREW, EDWARD KINTZEL, Western Kentucky University — The identification and characterization of certain fossils is considerably enhanced by using both optical microscopy and scanning electron microscopy coupled with electron backscatter techniques. Using the Large Chamber Scanning Electron Microscope (LC-SEM) at Western Kentucky University's Nondestructive Analysis (NOVA) Center we are performing a detailed surface morphology and elemental abundance study of the circumocular region resolving the holochroal region along with a simultaneous optical study. Backscatter electron imaging is used to obtain high resolution compositional maps of the samples allowing for a method that distinguishes between different material phases. We find using multiple methods allows us to better characterize the specimens, in particular we find that a Cambrian arthropod Trilobite is rendered with BSE details from the cephalon, thorax, pygidium and left pleural lobe regions allowing for improved placement in the Order Proetida and an analysis of the circumocular region allows for modeling the primitive structure.

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