

6-7-2014

# Characterizing the Oldenburg ‘Butter Shale’ from the Upper Ordovician (Katian) Waynesville Formation along the Cincinnati Arch, USA

Christopher D. Aucoin  
*University of Cincinnati - Main Campus*

Carlton E. Brett  
*University of Cincinnati - Main Campus*

Benjamin F. Dattilo  
*Indiana University - Purdue University Fort Wayne, dattilob@ipfw.edu*

Dan Cooper  
*Trilobites of America, dancooper@cinci.rr.com*

Follow this and additional works at: [http://opus.ipfw.edu/geosci\\_facpres](http://opus.ipfw.edu/geosci_facpres)

 Part of the [Paleontology Commons](#), [Sedimentology Commons](#), and the [Stratigraphy Commons](#)

---

## Opus Citation

Christopher D. Aucoin, Carlton E. Brett, Benjamin F. Dattilo, and Dan Cooper (2014). *Characterizing the Oldenburg ‘Butter Shale’ from the Upper Ordovician (Katian) Waynesville Formation along the Cincinnati Arch, USA*. 4th Annual Meeting of IGCP 591, Estonia, 10 - 19 June 2014. *Abstracts and Field Guide*. 12. 4th Annual Meeting of IGCP 591, Estonia, 10 - 19 June 2014. Abstracts and Field Guide: University of Tartu. Presented at 4th Annual Meeting of IGCP 591, Estonia, 2014, Tartu, Estonia.  
[http://opus.ipfw.edu/geosci\\_facpres/147](http://opus.ipfw.edu/geosci_facpres/147)

This Poster Session is brought to you for free and open access by the Department of Geosciences at Opus: Research & Creativity at IPFW. It has been accepted for inclusion in Geosciences Faculty Presentations by an authorized administrator of Opus: Research & Creativity at IPFW. For more information, please contact [admin@lib.ipfw.edu](mailto:admin@lib.ipfw.edu).

## Characterizing the Oldenburg 'Butter Shale' from the Upper Ordovician (Katian) Waynesville Formation along the Cincinnati Arch, USA

*Christopher D. Aucoin<sup>1</sup>, Carlton E. Brett<sup>1</sup>, Benjamin Dattilo<sup>2</sup> and Dan Cooper<sup>3</sup>*

<sup>1</sup> University of Cincinnati, Department of Geology, USA.; [aucoincd@mail.uc.edu](mailto:aucoincd@mail.uc.edu), [brettce@ucmail.uc.edu](mailto:brettce@ucmail.uc.edu)

<sup>2</sup> Geoscience Department, Indiana University Purdue University Fort Wayne, USA; [dattilob@ipfw.edu](mailto:dattilob@ipfw.edu)

<sup>3</sup> Trilobites of America; [dancooper@cinci.rr.com](mailto:dancooper@cinci.rr.com)

The Upper Ordovician (Katian) strata of the Cincinnati Arch contain numerous mudstone units known locally as 'butter shales' or 'trilobite shales'. Most of these deposits are heavily collected for their excellently-preserved trilobites. The Oldenburg Butter Shale, however, is a previously-undescribed mudstone package from the Waynesville Formation, known only from limited exposure near Oldenburg, Indiana.

The Oldenburg Shale is a 2 m-thick mudstone package with minor beds of shelly packstones, and calcisiltite-filled gutter casts. It contains abundant articulated trilobites. The mudstone portion contains illite, chlorite, quartz, calcite and traces of dolomite and pyrite. In outcrop, the shale exhibits no obvious bedding and breaks conchoidally. When cut and polished, the mudstone shows a mottled fabric, containing *Lingulichnus* and *Chondrites* trace fossils. The shelly units contain brachiopods, gastropods, and bryozoans. The gutter casts are 20–30 cm wide, display hummocky stratification, and contain *Lingulichnus*.

Faunally, the Oldenburg is very unlike surrounding Waynesville strata. Instead of being dominated by brachiopods as is typical, the Oldenburg fauna consists of abundant bivalves (*Modiolopsis*, *Ambonychia*, and *Caritodens*), lingulid brachiopods, and the trilobites (*Isotelus*, and *Flexicalymene*, and rare *Amphilichas* in the upper 30 cm). Articulate brachiopods are represented in the shale to a limited extent by the genera *Zygospira* and *Platystrophia*. The shale also contains bryozoans, orthoconic cephalopods, rare crinoids and conulariids. Conodonts and scolecodonts are a major component of the microfauna.

Taphonomy of the fossils, together with sedimentological features, indicates that this butter shale accumulated rapidly as a series of episodes of distal storm-generated mud and silt flows.

Towards the top of the mudstone is a horizon of small concretions, about 7 cm wide. Overlying the butter shale is the pyrite crusted surface of the Mid-Richmondian Unconformity which removes the Oldenburg shale in most other locations. The concretions present at the top of the shale are the likely product of the prolonged sediment starvation accompanying this unconformity.