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Pyritized tube-feet in a protasterid ophiuroid from the Upper Ordovician of Kentucky, U.S.A.

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A single specimen of the protasterid ophiuroid *Protasterina flexuosa* from the Kope Formation (Cincinnatian, Upper Ordovician) of Kentucky exhibits three-dimensionally pyritized tube feet. This represents the first report of soft-tissue preservation in an echinoderm from the type-Cincinnatian series. The tube feet are solid and lack all internal structure. They consist of aggregated masses of small euhedral to subhedral pyrite crystals suggesting that pyritization, although decay-induced and mediated, did not necessarily replicate soft-tissues but might instead have formed inside the void-spaces left behind during the decay process. The discovery of pyritized soft-tissue as delicate as ophiuroid tube feet suggests that similar forms of soft-tissue preservation might be found in other taxa in the Kope Formation. Perhaps much more importantly, this unexpected occurrence demonstrates the incompleteness of our knowledge of permissible conditions for the preservation of soft-tissues and it thereby indicates promise for discovery of other such occurrences in diverse organisms in unexpected settings. Systematics of Paleozoic ophiuroids remains problematic in spite of many years of study by capable paleontologists. The incomplete but well-preserved specimens treated here include the types of *Protasterina flexuosa* and *Protasterina fimbriata* as well as previously undescribed specimens. Together they permit a revised diagnosis and detailed description of the genus *Protasterina*. *Protasterina fimbriata* is the type species of the genus but is a subjective junior synonym of *Protaster flexuosus* (= *Protasterina flexuosa*). The genus is clearly differentiated from the only other known protasterid ophiuroid from the Cincinnatian series, Taeniaster spinosus, and from all other protasterid genera.

Key words: Ophiuroidea, Protasteridae, soft-tissue preservation, pyritization, Cincinnatian, Edenian, Ordovician, Kentucky.

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