Back-Reflection Energy-Dispersive X-ray Diffraction to Assess the Origin of the "MacGregor Man"

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Purportedly originating from the late Predynastic–Early Dynastic period of ancient Egyptian civilisation (about 3100 BC), the statuette known as "MacGregor Man" was acquired near the site of Naqada in southern Egypt by the Reverend William MacGregor at the end of the 19th century. The Ashmolean Museum (University of Oxford) subsequently purchased the statuette at the sale of MacGregor's collection in 1922, and it remains one of the most important items in the museum's Egyptology collection. However, the authenticity of the statuette has been the focus of fierce scholarly debate since it first came to light.[1] At that time there was little with which the object could be compared and a forger would have little source material to copy: some of its features are consistent with securely provenanced statuettes and figurines that were discovered some time after the appearance of MacGregor Man.[2] Several other aspects have caused others to question whether MacGregor Man is genuine. It is carved from what is widely believed to be a basaltic rock; rare in ancient Egypt and its hardness would have made sculpting such a detailed statue exceedingly difficult with the tools available to ancient stonemasons. Also, there are strong indications that MacGregor Man may have been deliberately damaged, possibly in an effort to artificially "antiquate" the statuette (though other explanations are feasible).

Despite the sustained interest in MacGregor Man, no mineralogical analysis of the stone it is sculpted from has been carried out to date. Though it has been visually identified as being most likely a basalt, it has so far been impossible to ascertain even this basic information without removing a sample from and thus damaging the statue. Even a basic understanding of the mineralogy of the sample could prove informative since basaltic composition can be diagnostic for determining the region of its origin.[3]

Using energy-dispersive X-ray diffraction (EDXRD) in a back-reflection geometry,[4] a non-destructive technique, high-resolution powder diffraction data from several regions were collected at Diamond Light Source (Didcot, Oxfordshire, U.K.) in February 2019. From these data, despite poor powder averaging (resulting from the large crystallite size), we plan to extract crystallographic information such as the minerals present and unit cell dimensions. This will be compared to published data from known Egyptian basalt samples in an attempt to ascertain whether it is Egyptian in origin. The results of this crystallographic analysis will be presented.

References

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