Not the Great Pyramid of Cheops in miniature, but a view of the building stones of Scotland from a different perspective.

The front cover displays a scanning electron microscope (SEM) image of a di-trigonal pyramidal diagenetic quartz overgrowth on a sand grain, with associated kaolinite platelets. Individually, the small platelets adhering to the quartz crystal are less than ten μm in size, the dimension of the entire image covering an area of approximately 140 by 100 μm. The image was obtained from a sandstone block used to form one of the small statues on the Jenner’s Department Store Building, Princes Street, Edinburgh, which was designed by W. Hamilton Beattie (1893–95), and described in Buildings of Scotland: Edinburgh as ‘a wondrous Renaissance compilation’.

The study of the statuary was designed to characterize the primary grain constituents of the sandstone (believed to be from Cragg Quarry in Northumberland) and the secondary or diagenetic minerals – the quartz overgrowths and kaolinite shown here – which have helped cement the grains together and give the stone coherence. Experiments then demonstrated that silicone consolidants inhibit both the uptake of rainwater and its evaporation, but do not render the stone impermeable. The stone thus sees less water in a wetting and drying cycle but still ‘breathes’ and so is potentially less prone to self-destruct through the expansion and contraction of diagenetic smectite clay minerals.

The SEM image was obtained by Dr John Dixon of the Department of Geology and Geophysics, University of Edinburgh as part of a collaborative study with sculpture conservators Graciela Ainsworth and Jonathan Kemp into the use of consolidants to preserve the ornate carved work on this building.