Purpose: To determine if there exists a heretofore unknown cue to scale, and therefore depth, hidden in the patterns of natural materials. **Background:** Conventional wisdom holds that materials such as clouds, rock, and water are fractal and scaling-symmetric: they look the same no matter how far you zoom in. But it is also clear that physical forces place different constraints at different scales. Elephant-sized ants collapse; surface tension can only create small water droplets. **Hypothesis:** The structural legacy of these different constraints should be evident in the visual patterns of the materials - likely both reflectance and relief - and a resourceful visual system would exploit this cue. **Method:** Observers viewed images (rock formations in Utah) that lacked any known depth cues. Images were carefully vetted, filled the picture frame, and had no obvious relationship between spatial frequency power spectra and distance. These test images appeared on the left side of the monitor, while a measurement image of a woman appeared on the right. Observers zoomed in or out on the measurement image until it matched the distance of the test. **Results:** Ten naive observers were able to make distance judgments that were correlated with actual distances. Performance was only slightly degraded in conditions with inverted or grayscale test images. **Conclusion:** We take these results as an existence proof for an absolute cue to scale and depth in the visual structure of, at least, one natural material: rock. Our current work seeks to further isolate and formalize this cue.