1018-00-8 **Benoit B. Mandelbrot***, Yale University. *The nature of roughness in mathematics, science, and art.*

For Plato, Euclid, Newton, and Einstein, space was smooth. The kind of roughness that is obvious in everyday situations was dismissed as too complex for scientific study. It has now become accepted that much of the apparently shapeless roughness in the real world is in fact self-similar, that it can be handled with the help of fractal "pathologies", and also that fractals predate their use in mathematics. They have been a clear cut and remarkable feature in art since time immemorial. I will describe a grand Fractal Ring, which begins in art, progresses through pure mathematics and diverse sciences, and returns in the end to art. (Received May 13, 2005)