Volumegraphica

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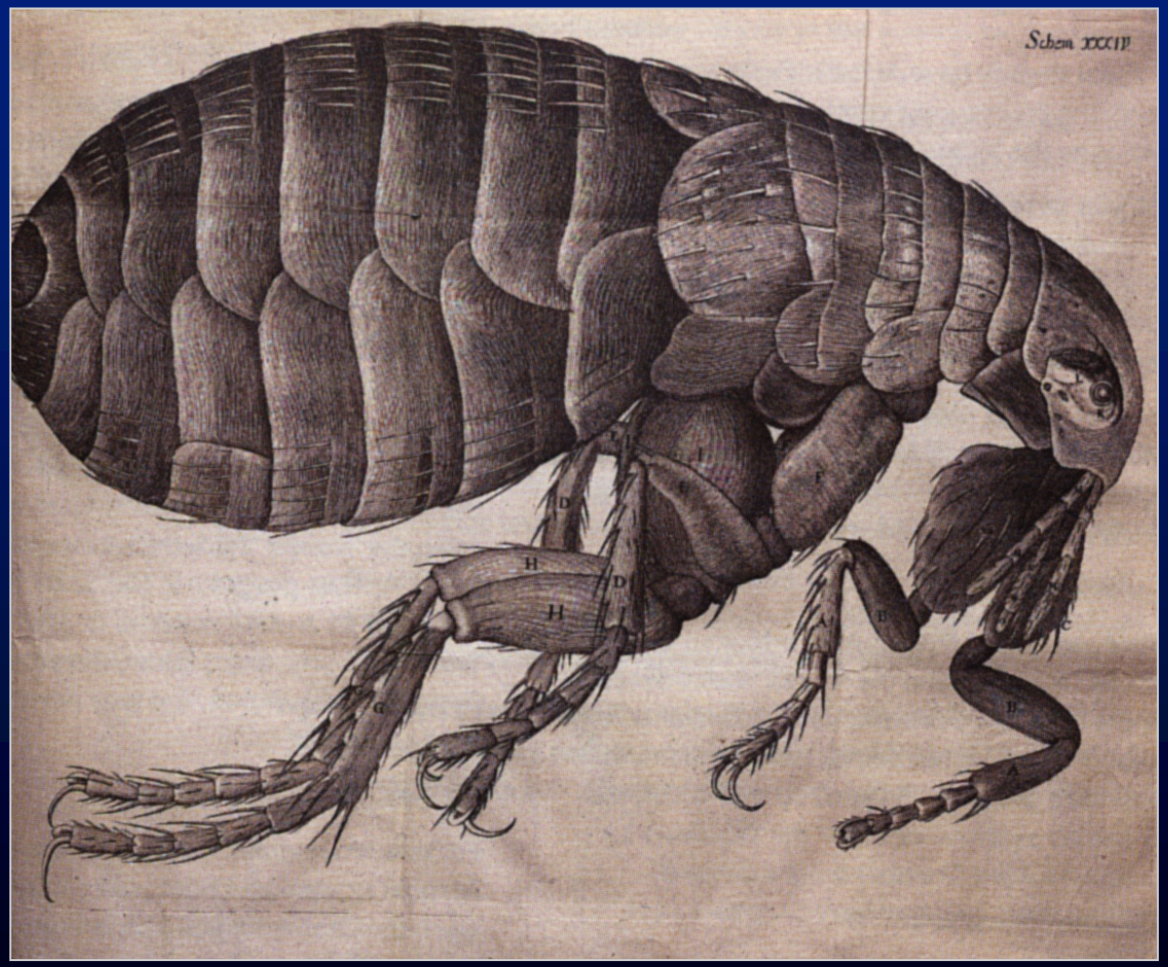
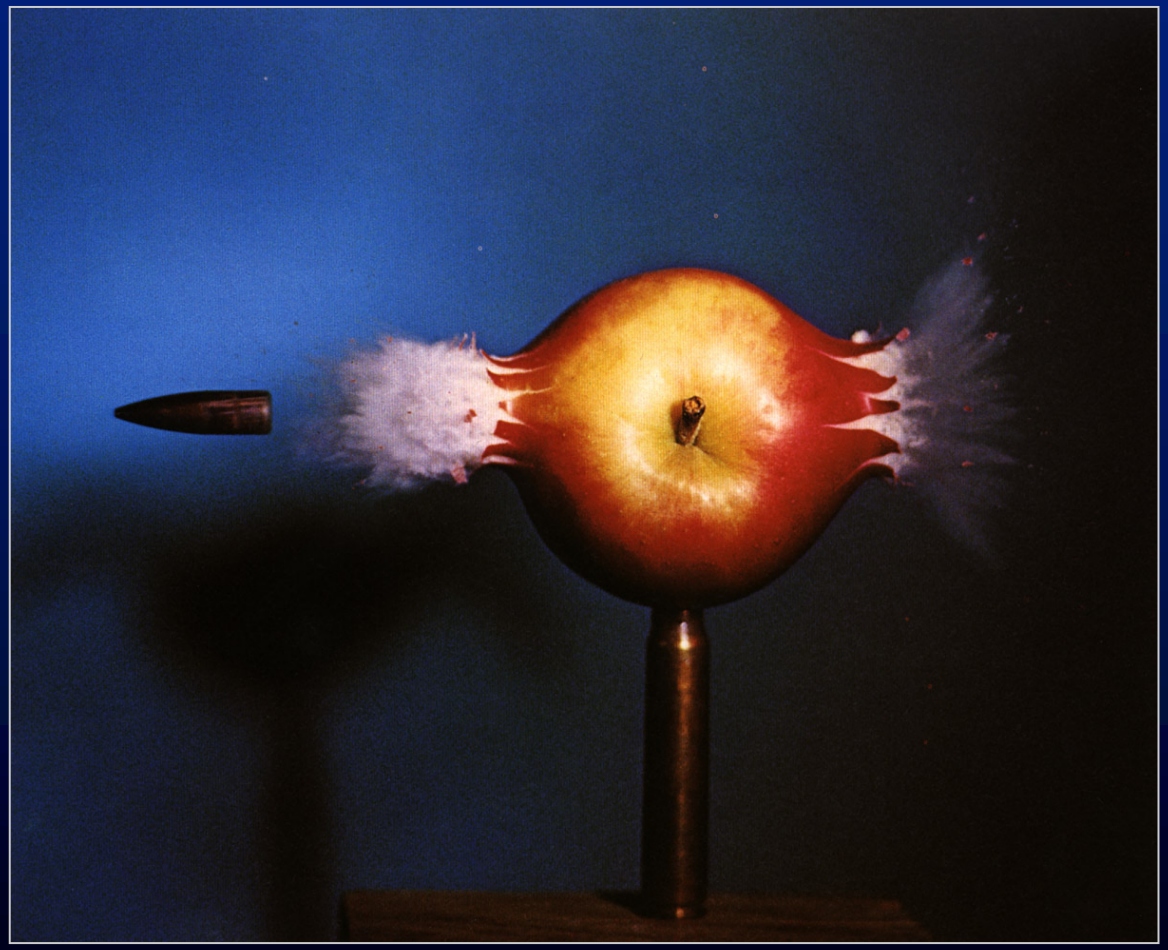
Visualizations from data



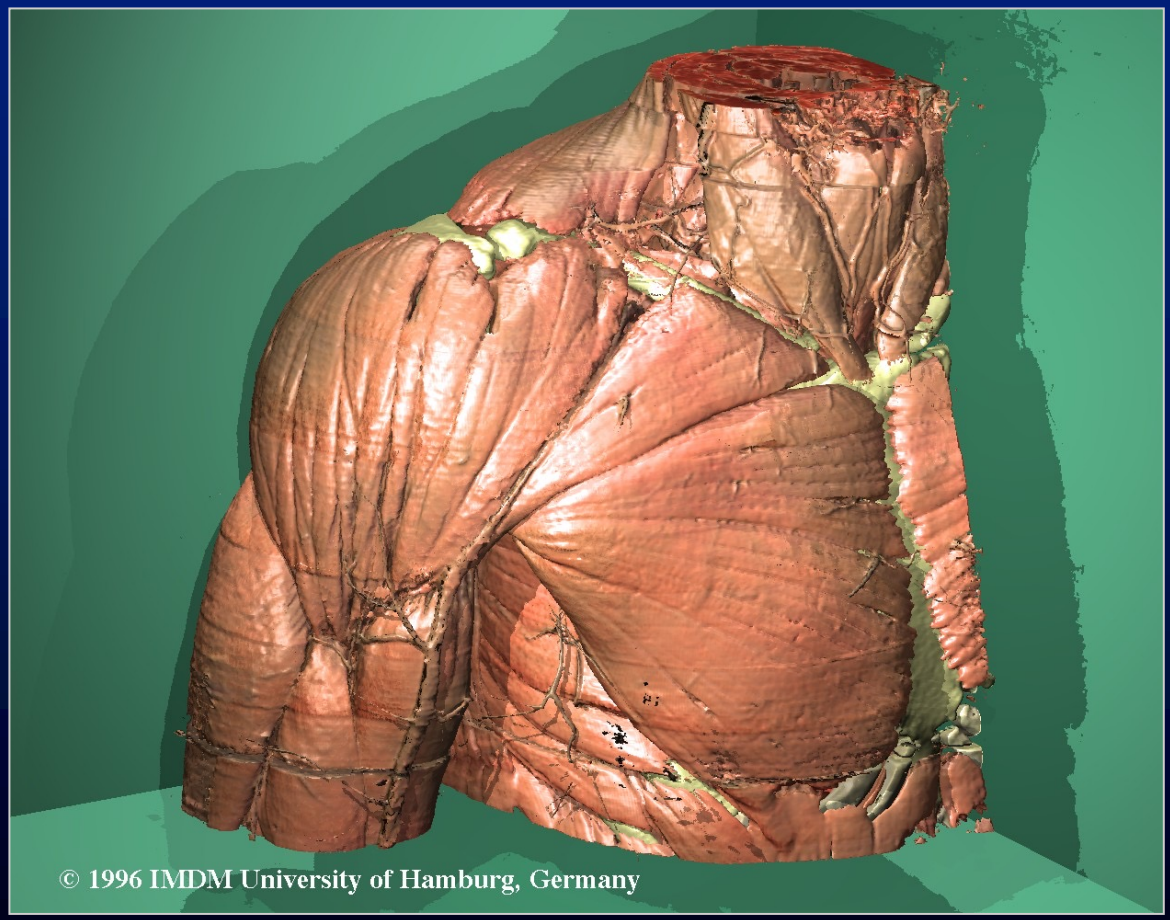
Robert Hooke, Micrographia, 1665

Visualizations from data



Harold Edgerton, Stopping Time, 1964

Volume rendering

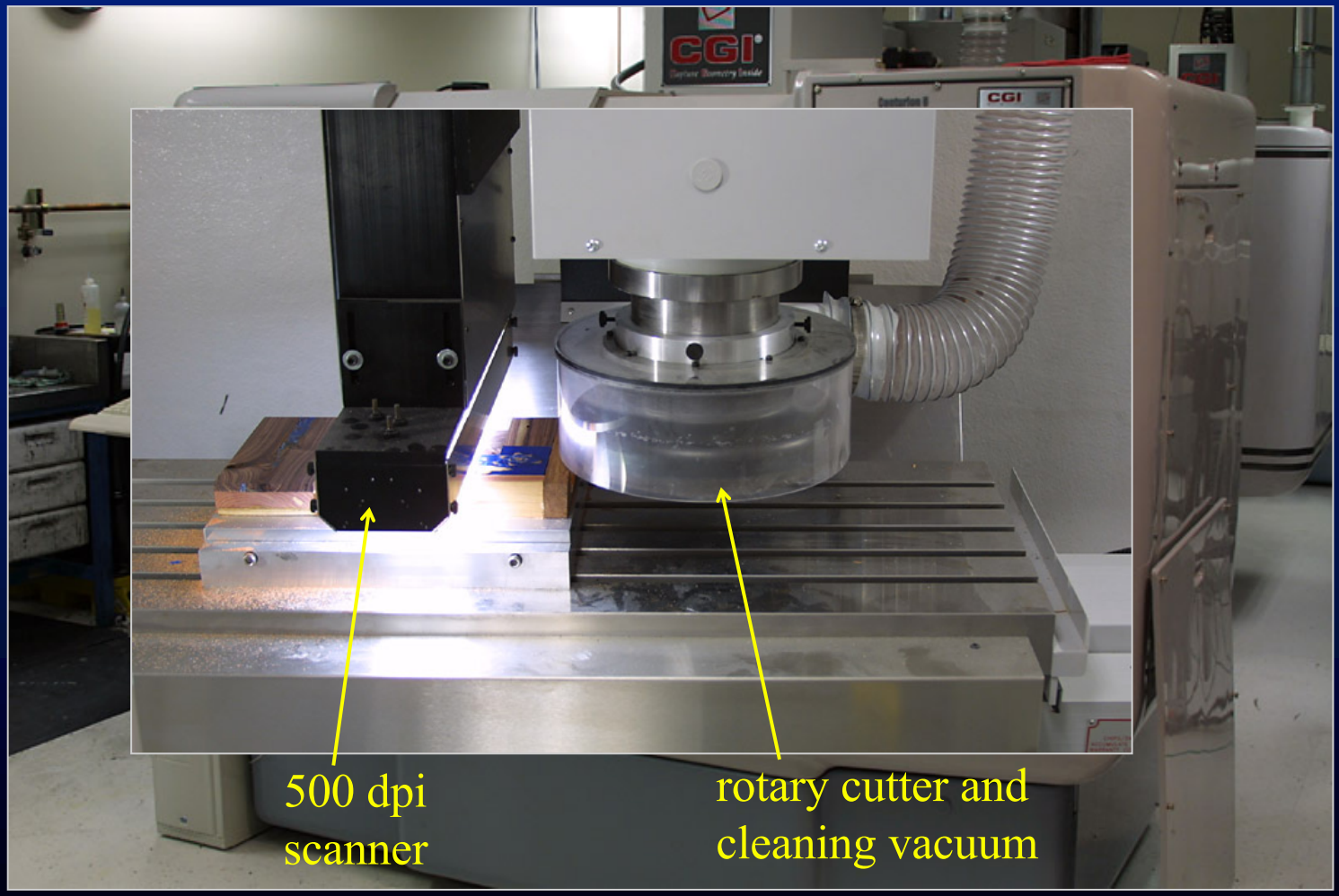


Karl-Heinz Höhne, Visible Human data, 1996

Volumegraphica

- objects to look at
  - wood grain
  - marble veining
  - pine cones
  - conch shells
  - lots more!
- procedure
  - slice objects thinly
  - photograph open face
  - volume render
  - will need clever visual metaphors

Slicing and scanning



CGI (Capture Geometry Inside) model CSS-1000

A selection of hardwoods

Volumegraphica

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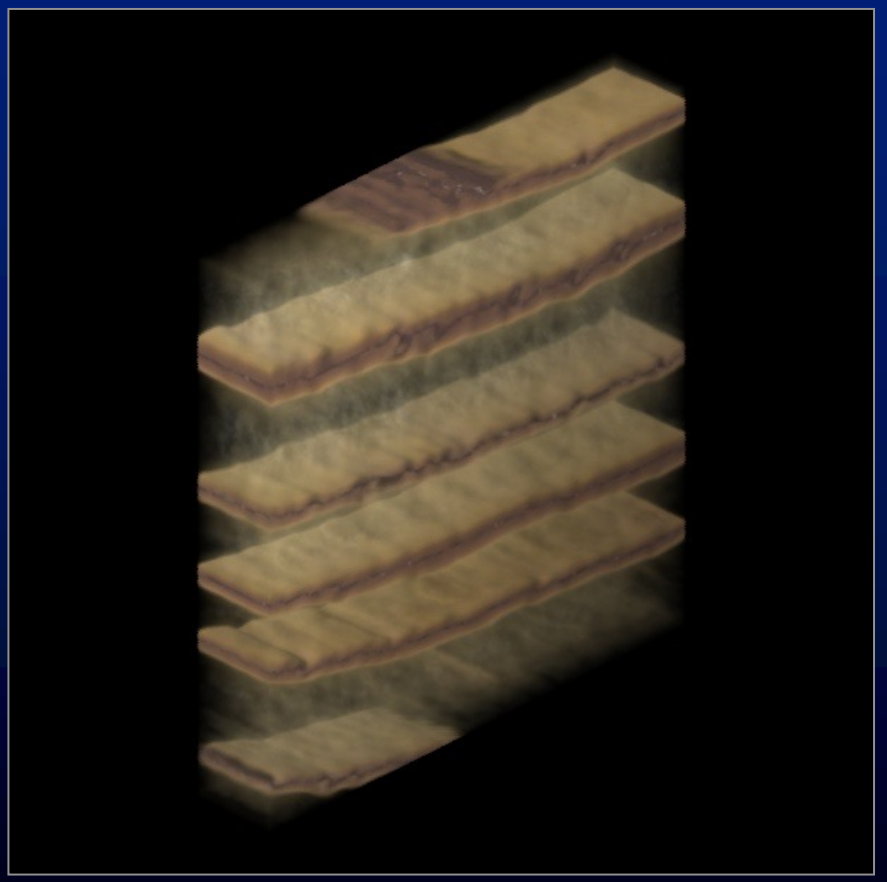
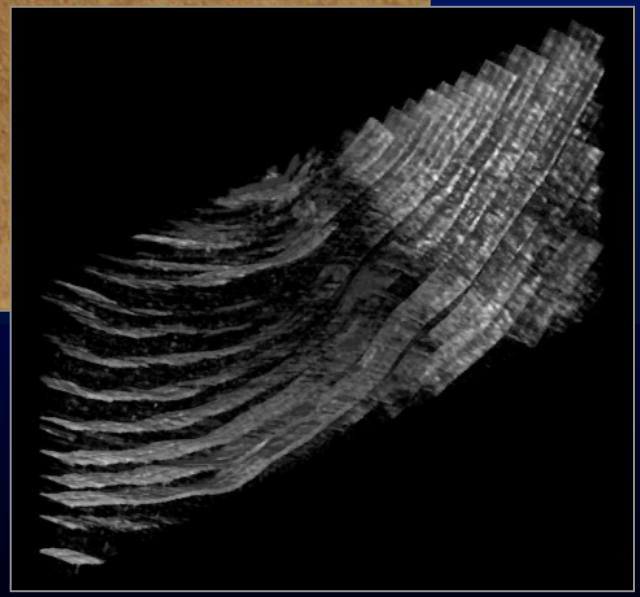
Volume rendering of wood grain - pine

→

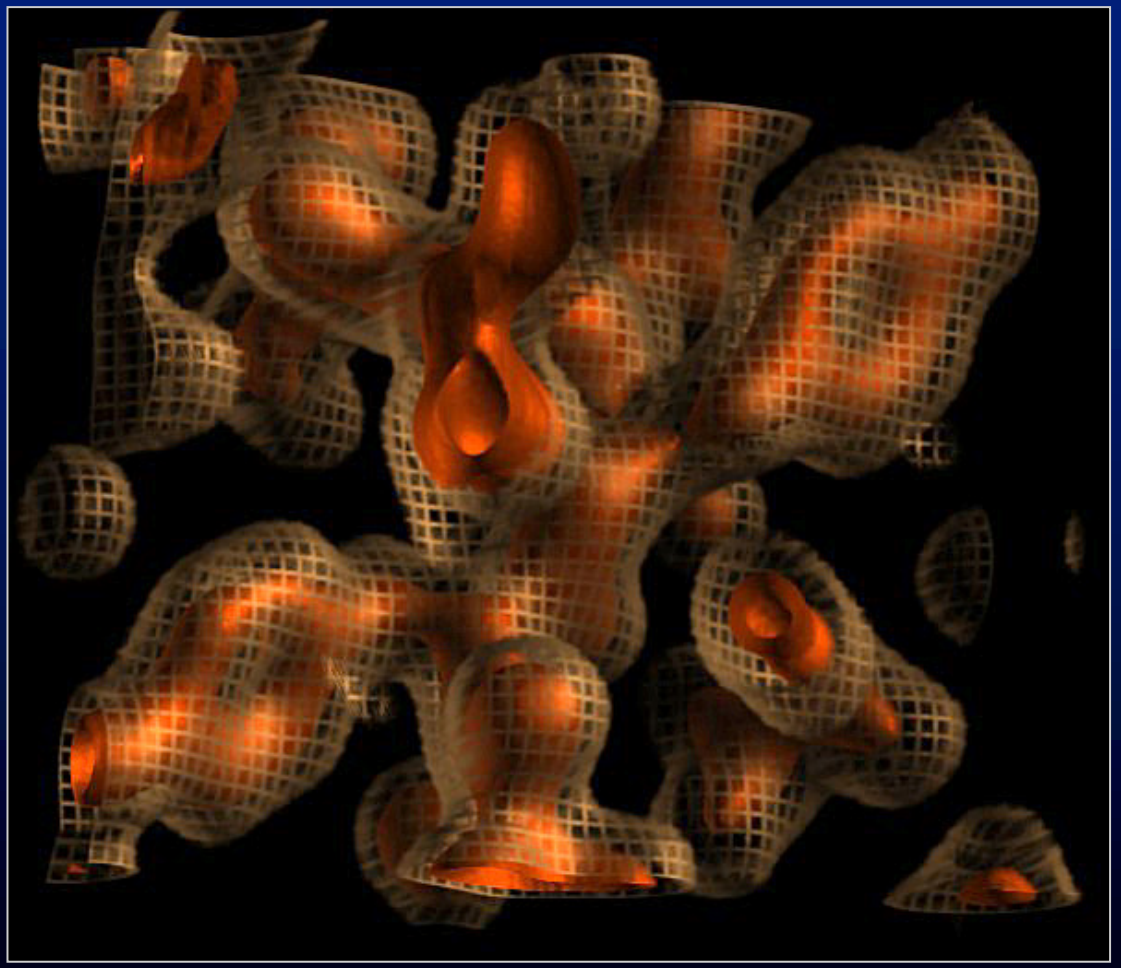


Volume rendering of wood grain - maple



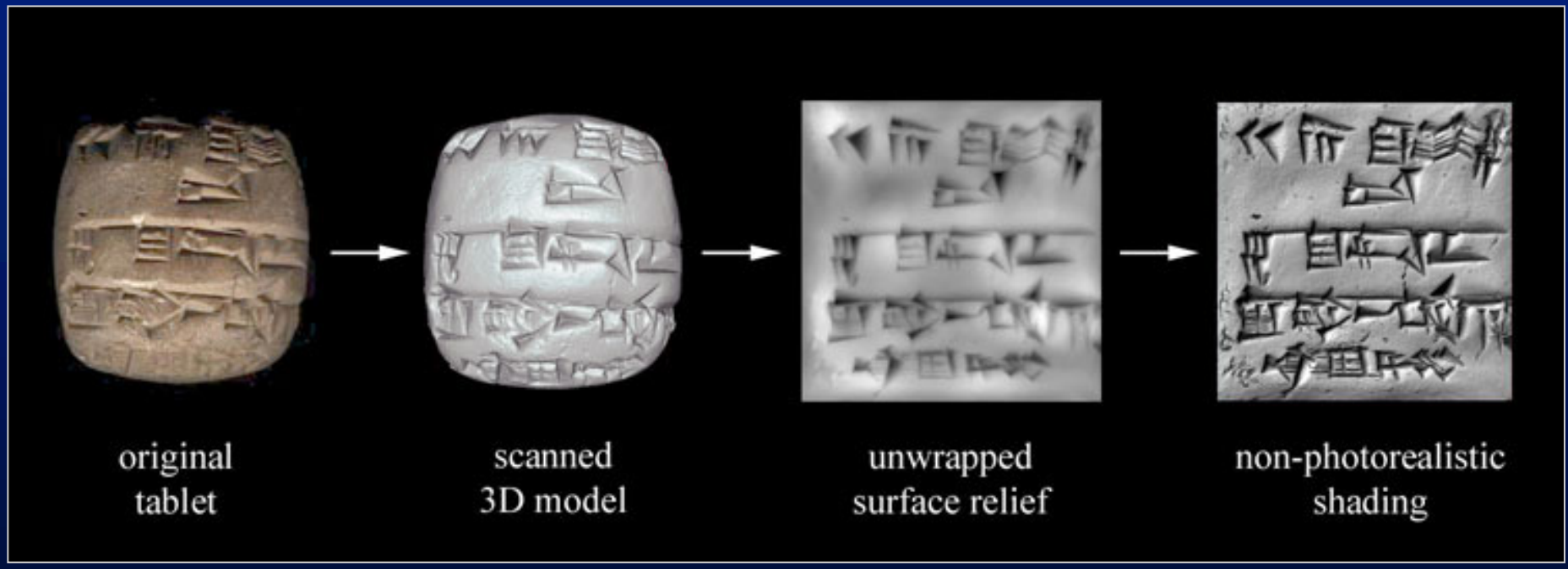
Visual metaphors for volume data

→



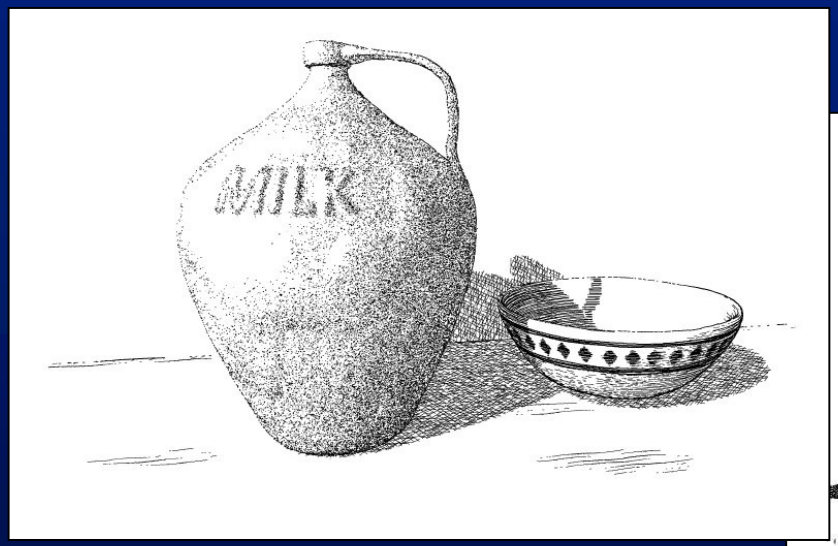
Two isoelectron density surfaces of ribonuclease

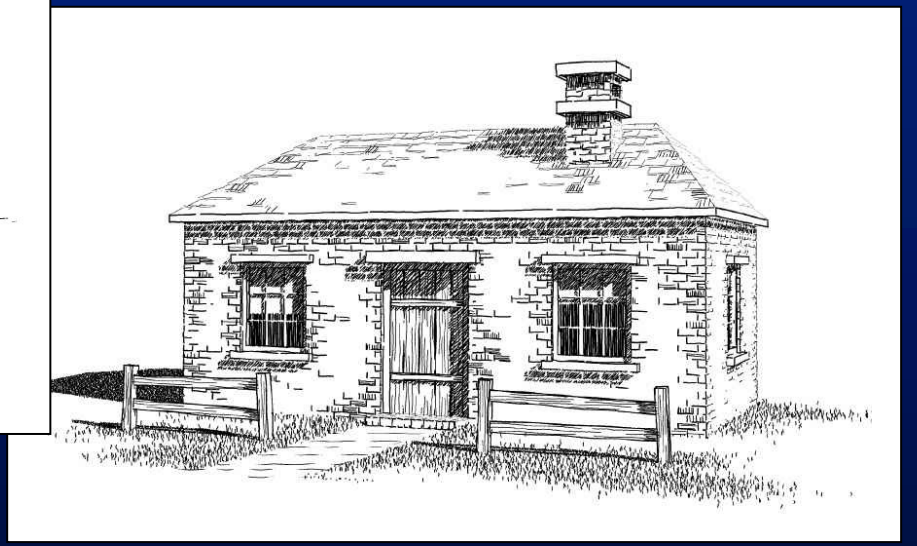
Non-photorealistic rendering (NPR)



- 50-micron laser scan + alignment + merging
- directional shading + accessibility shading

Automatic pen-and-ink rendering





- Georges Winkenbach (1994)
- 3D model → shading → stroke density → image
- simulation of random stroke variations, indication, etc.
- so far used only for artistic rendering, not scientific

Computer-assisted scientific visualization

- automatic shading, but manual control over
  - abstraction
  - simplification
  - emphasis
- combination of rendering techniques
  - surface and volume rendering
  - realistic and non-photorealistic rendering
  - cross-sections
  - expoded views
  - etc.