Thera Frescoes

Benedict J. Brown

Princeton University
Geography

Thera is a Greek island. The modern name is Santorini.

http://www.boutrostours.com/images/map-greece.gif
Aegean civilization: before “ancient Greece”

Minoan age: c. 2000 BC – c. 1400 BC
- Named for King Minos of Crete
- Centered on Crete
- Bronze-age civilization
- Overseas trade with Cyprus, Egypt, Aegean Islands
- Pre-Indo-European: not Greek, alphabet undeciphered
- Cycladic islands had distinct culture, influenced by Crete and Eastern civilizations
- Eventually conquered by Mycenaean

Sources:
- *Encyclopedia Britannica*: “Aegean Civilizations”
- http://www.ancientgreece.com/history/history.htm
Eruption

Thera exploded about 1650 B.C.

http://www.mmtaylor.net/Holiday2000/Legends/Atlantis.html
Eruption

Most of island and civilization destroyed

http://www.mmtaylor.net/Holiday2000/Legends/Atlantis.html
Eruption

Explosion was bigger than Mt. St. Helens or Krakatoa

http://www.mmtaylor.net/Holiday2000/Legends/Atlantis.html
Eruption

Source of Atlantis legend?

http://www.mmtaylor.net/Holiday2000/Legends/Atlantis.html
Akrotiri

- Major excavation at Akrotiri
- Well preserved by ash, like Pompeii
- No bodies $\implies$ time to evacuate island
Wall Paintings

- The most important finds are wall paintings

Saffron Gatherers - Thera Foundation
The most important finds are wall paintings

Spirals - David Dobkin
Wall Paintings

► The most important finds are wall paintings
Wall Paintings

- Shattered by eruption and earthquakes

Spirals - David Dobkin
Fresco

Painting on plaster:

- Basically invented by Minoans, used by Romans, rediscovered during Italian Renaissance (http://en.wikipedia.org/wiki/Fresco)

- **Buon fresco**
  - Pigment is applied to wet plaster
  - Highly durable
  - Pigment must be applied very quickly

- **A secco**
  - Paint (pigment with binder) is applied to dry plaster
  - Much less durable
  - Useful for touching up after plaster has dried

- Thera wall paintings are mostly *buon fresco*, with some *a secco* elements
Fragment Matching

- Archaeologists match based on edge fits (3-D)
  - Painstaking
  - Requires lots of handling of pieces
  - What about erosion?
- Many things we could match
  - 2-D and 3-D edge profile
  - thickness
  - painting
  - plaster color/discholoration
  - proximity of finds
  - user annotations
  - some of these have been explored some
Painting Techniques

- Curves painted using stencils to allow fast painting on wet plaster
- Use curve fitting to identify stencils (Papaodysseus et al.)
- Stencils are Ellipses, hyperbolae and linear spirals

Papaodysseus et al.
Existing Matching Work

- 2-D Edge profile
- Line widths
- Curve extension

Papaodysseus et al.
Existing Matching Work

- 2-D Edge profile
- Line widths
- Curve extension

Fragoulis et al.
Existing Matching Work

- 2-D Edge profile
- Line widths
- Curve extension

Papaodysseus et al.
Other Tasks for Computer

- Archiving (annotated database)
- Technical analysis (e.g. curve fitting)
- Color restoration
- Inpainting missing areas
- Efficient distribution of work

David Dobkin
Assume frescoed face is flat, scan with flatbed scanner
Scan back with 3-D scanner for thickness and registration
Scan sides with 3-D scanner for matching
3-D Scanner

- Off-the-shelf, NextEngine scanner
3-D Scanner

- Off-the-shelf, NextEngine scanner
User Experience

- Archaeologist scans piece, and simultaneously enters information into db
- Virtual worktable for matching pieces
- Ability to annotate pieces graphically
- Distributed, multi-user, matching environment