Your Old Testament before the mid-20th Century Discoveries

- our oldest Hebrew manuscripts were medieval (Greek translations were 500 years older)
- we had only two
- the books they transcribed were written 1000-1700 years earlier

What We Discovered 70 Years Ago

- Hebrew versions of all of the Old Testament books (except Esther) that were 1,000 years older
- a wealth of other books giving us an unparalleled window into Second Temple Judaism
  - targums (Aramaic translations of the Hebrew Bible used in synagogues)
  - apocryphal and pseudepigraphic works
  - legal texts and community rules
  - eschatological works
  - wisdom literature
  - copper scroll (a list of treasures, scrolls and their locations inscribed on copper)
  - teffilin and mezuzot (parts of Exodus and Deuteronomy attached at the wrist/head/doorpost)
  - commentaries on biblical books
  - paraphrases of biblical books
  - liturgical or worship texts
  - documentary texts (contracts, deeds of sale)
  - calendars

- an archaeological site with features that paralleled the religious emphases in these texts
  - location in wilderness, in midst of 11 caves with scrolls (Isaiah 40:3)
  - ritual baths (mikva’ot; Leviticus 15:11-14)
  - large, communal facilities (dining, storage, industrial installations; Exodus 16; Isaiah 25:6)
  - graveyard with 1200 simple graves and evidence of secondary burial (Isaiah 14:13; Daniel 12:2-3)

Problems Deciphering the Evidence

- war, ongoing Israel-Palestine tensions
- most of the “scrolls” were very fragmentary and damaged
  - sorting, cataloguing, grouping, identifying and translating the tens of thousands of fragments would take decades
  - poor state of fragments
  - initial technologies used: cellophane tape, glass plates, exceptional memory!, hand-compiled concordance, infrared film, radiocarbon dating
Imaging Technologies

- **Infrared Photographs**
  - **Process:** Infrared film can reveal contrasts between the iron- or soot-based inks and darkened skin or papyrus backgrounds.
  - **Application:** Originally applied by photographer Najib Albina to the Dead Sea Scrolls discovered and purchased by the international team at the Rockefeller Museum 1948–1955.

- **High-resolution Digital Photography**
  - **Process:** Satellite imaging technologies used at the Jet Propulsion Laboratory in Pasadena were adapted by B. and K. Zuckermann to re-image Dead Sea Scroll fragments. Adjustments across the light spectrum allow the image to reveal more ink than traditional infrared.
  - **Application:** The Israel Antiquities Authority has now applied this technology to all of the fragments in its possession (see the Leon Levy Dead Sea Scrolls Digital Library link below).

- **X-ray Flourescence Imaging**
  - **Process:** A more basic application of the x-ray image-contrast technique that can be used when a single surface is covered with a subsequent painted image, text (as in a palimpsest), or even mold. The x-ray absorption patterns differ depending on the material, so the obscured lower image can be seen.
  - **Application:** Can be applied to archaeological and paleontological finds, but can’t help with rolled materials, where layers of the original writing surface obscure other layers.

- **Phase-Contrast Tomography**
  - **Process:** (1) The object is scanned using a synchrotron to generate the most intense possible x-ray beam; (2) small continuous portions of the same surface are identified manually; (3) the results have to be interpreted, as the interwoven geometry of the imperfectly folded scroll results in variations in letter forms, sizes and shapes; (4) x; (5) x. Does not have an accompanying computational framework, so there is no way to independently verify the relative locations of rendered fragments (that is, to prove what the researcher claims).
  - **Application:** The Herculaneum scrolls were originally part of the villa library of Julius Caesar’s father-in-law, Calpurnius Piso Caesoninus. They were carbonized by 320°C/662°F gas from the 79 CE eruption of Mt. Vesuvius and first unearthed in 1752, Mocella’s application of the technique to select scrolls has succeeded in revealing contrast at the ink boundaries, equivalent to Seales’ pipeline (1). Only solitary words and phrases have been revealed, rather than consecutive text,

- **Microcomputed Tomography (a “micro” version of a CT scan)**
  - **Pipeline:** (1) scan; (2) apply segmentation algorithm to map layers; (3) apply x-rays to define textures—denser ink appears brighter than the background skin; (4) apply flattening algorithm to render the 3-D image in successive mesh sections; (5) merging these sections into a single whole. Computational frameworks can be independently verified.
  - **Application:** W. Brent Seales and University of Kentucky team worked with the Israel Antiquities Authority to “virtually unwrap” a charred scroll found in 1970 in a synagogue ark at Ein Gedi, on the Dead Sea coast; it turned out to be a 3rd–4th century CE scroll of Leviticus 1:1–2:11, younger than the Dead Sea Scrolls but the oldest Torah scroll found in a synagogue ark.
Bibliography


Stories and Videos about the Herculaneum and Ein Gedi Leviticus Scrolls


Web Sites

Oldest Medieval Manuscripts of the Hebrew Bible before the Dead Sea Scrolls were found

- Aleppo Codex, (930 CE) – www.aleppocodex.org
- Leningrad Codex (1010 CE) – wsrp.usc.edu/educational_site/biblical_manuscripts/LeningradCodex.shtml

The Dead Sea Scrolls Online

- The Leon Levy Dead Sea Scrolls Digital Library – The bulk of the fragmentary manuscripts, originally housed at the Rockefeller Museum in East Jerusalem, are now under the curation of the Israel Antiquities Authority, and they have made high-resolution, digital images of all of the fragments available to the public. https://www.deadseascrolls.org.il/
- The Digital Dead Sea Scrolls – A collaboration between Google Israel and Israel’s Shrine of the Book, which houses several of the largest and best preserved Dead Sea Scrolls, offers scrollable, online versions of these manuscripts with full-over English translations. http://dss.collections.imj.org.il/
- The Orion Virtual Qumran Tour – Hosted at the Orion Institute for the Study of the Dead Sea Scrolls and Related Literature, at Hebrew University, Jerusalem. http://virtualqumran.huji.ac.il/

The ’Ein Gedi Leviticus Scroll

- University of Kentucky College of Engineering Digital Restoration Initiative – W. Brent Seales and his team host a site explaining their virtual unwrapping process, with special attention to their work on the ’Ein Gedi Leviticus Scroll. http://vis.uky.edu/digital-restoration/home/ (for the virtual unwrapping video, click About > Video)

The Herculaneum Scrolls

- PHerc – Papyrologist Graziano Ranocchia’s page detailing results of a grant he received to study the carbonized philosophical texts discovered at Herculaneum. http://www.pherc.eu/index.html

Books by Catherine Murphy


