

Ancient Lives

A Zooniverse Project Blog

March 2, 2016

- **by Ancient Lives Team**
- **in News**
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Ancient Lives in the News

The Independent recently sat down with Dirk Obbink to talk about Ancient Lives, including the topic of identifications. Many papyrus fragments have indeed been identified through AL. More on that coming soon! Ancient Lives (<http://www.independent.co.uk/news/science/ancient-egypt-citizen-scientists-reveal-tales-of-tragedy-uneearthed-from-centuries-old-rubbish-dump-a6905541.html>)

May 11, 2015

- **by Ancient Lives Team**
- **in News**
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News from Ancient Lives

Dear Ancient Lives web users,

My name is Isabelle Marthot-Santaniello (imarthot) and I recently joined the Ancient Lives Project as Research Associate in Papyrology at the University of Minnesota.

With your help, hundreds of fragments from Ancient Literature and everyday documents have been identified.

We have been very busy lately working on a new interface for the website, more efficient and user-friendly, with up-to-date technology, which should be launched in a couple of months. That is the reason why the “Blog” has been quiet lately and why the academic team has not been very active in the “Talk” section, but you should now see more activity there.

For those who are just starting with Ancient Lives, here is an overview of the more important articles from the blog:

Presentation of the project:

“Welcome to Ancient Lives” (<http://blog.ancientlives.org/2011/07/26/welcome-to-ancient-lives/>) July 26, 2011

“Our team, our goals” (<http://blog.ancientlives.org/2011/10/01/31/>) Oct 1, 2011 (see last paragraph about the Oxyrhynchus collection)

Methodology of Ancient Lives:

“What do all those buttons mean?” (<http://blog.ancientlives.org/2012/10/09/what-do-all-those-buttons-mean/>) Oct 9, 2012

“How to identify a papyrus fragment” (<http://blog.ancientlives.org/2011/10/08/how-to-identify-a-papyrus-fragment/>) Oct 8, 2011 (the “Match” option is not available now, do not take the post from March 28, 2012 into account)

“Rulers and ‘not-papyri’” (<http://blog.ancientlives.org/2012/03/28/rulers-and-not-papyri/>), March 28, 2012

Basics:

“The Greek Alphabet” (<http://blog.ancientlives.org/2013/02/14/the-greek-alphabet/>), Feb 14, 2013 (see details on some letters in “More tips for Documentary Papyri”, Dec 1 2012)

“Greek letter combinations” (<http://blog.ancientlives.org/2012/07/22/greek-letter-combinations/>), July 22 2012

“Abbreviations and symbols” (<http://blog.ancientlives.org/2011/11/12/abbreviations-and-symbols/>), Nov 12, 2011 (see more examples of abbreviations in “Cursive Script” from May 29, 2012)

“Cursive Script” (<http://blog.ancientlives.org/2012/05/29/cursive-script-2/>), May 29, 2012: gives three lines with transcription and translation and then more detailed explanations of some abbreviations and ligatures

“More tips for Documentary Papyri” (<http://blog.ancientlives.org/2012/12/01/more-tips-for-documentary-papyri/>), Dec 1, 2012 (examples of epsilon, rho, upsilon, beta and ligatures)

“Symbols in Papyri” (<http://blog.ancientlives.org/2012/10/30/symbols-in-papyri/>), Oct 30, 2012

“Numbers in Greek Papyri” (<http://blog.ancientlives.org/2012/06/01/numbers-in-greek-papyri/>), June 1 2012

“Geographical, Personal and Month Names” (<http://blog.ancientlives.org/2012/07/15/geographical-personal-and-month-names/>), July 15, 2012 (common vocabulary in documentary papyri written in cursive script)

Introduction to Papyrology:

“Papyrology and Papyri” (<http://blog.ancientlives.org/2011/11/28/what-is-a-papyrus/>), Nov 28, 2011

“Literary VS Documentary Papyri” (<http://blog.ancientlives.org/2011/10/15/literary-vs-documentary-papyri/>), Oct 15, 2011

“Subliterary Papyri” (<http://blog.ancientlives.org/2011/11/09/subliterary-papyri/>), Nov 9, 2011

“An overview of Ancient Writing Surfaces” (<http://blog.ancientlives.org/2013/03/05/an-overview-of-ancient-writing-surfaces/>), March 5, 2013

To go further:

“At the Dawn of the Discipline” (<http://blog.ancientlives.org/2012/03/28/at-the-dawn-of-the-discipline/>), March 28, 2012 (a short History of Early Papyrology)

“Posidippus : the Milan Papyrus” (<http://blog.ancientlives.org/2013/01/31/posidippus-the-milan-papyrus/>), January 31, 2013

“The Herculaneum Papyri” part I (<http://blog.ancientlives.org/2013/04/04/the-herculaneum-papyri-part-i/>)(April 4, 2013) and Part II (<http://blog.ancientlives.org/2013/04/18/the-herculaneum-papyri-part-ii/>)(April 18, 2013)

“Greek Literary Bookhands” (<http://blog.ancientlives.org/2011/11/01/greek-literary-bookhands/>), Nov 1, 2011

“Papyrus as Evidence of Linguistic Change” (<http://blog.ancientlives.org/2013/03/16/papyrus-as-evidence-of-linguistic-change/>), March 16, 2013

“Scribal Error in Biblical Manuscripts” (<http://blog.ancientlives.org/2013/05/06/scribal-error-in-biblical-manuscripts/>) May 6, 2013

“Papyrus and Education in Antiquity” (<http://blog.ancientlives.org/2013/06/23/papyrus-and-education-in-antiquity-i/>)part I, June 23, 2013

“Coptic Language and Literature” (<http://blog.ancientlives.org/2014/03/05/coptic-language-and-literature/>), March 5, 2014

“Multispectral Imaging” (<http://blog.ancientlives.org/2014/06/11/multispectral-imaging/>), June 11, 2014

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June 11, 2014

- **by Ancient Lives Team**
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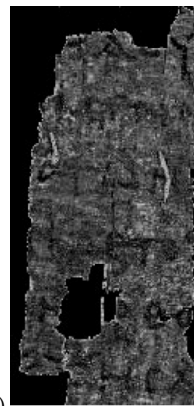
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([https://tracklw.com/view/DVnuxoWz1uXvsULpQCetTUyE4zAmjzGWDaFle31vIouA?c=41229&pid=4443&tid=\\$ob_click_id\\$&ob_marketer=MKA_Wap6&ob_publisher_id=\\$publisher_id\\$&ob_](https://tracklw.com/view/DVnuxoWz1uXvsULpQCetTUyE4zAmjzGWDaFle31vIouA?c=41229&pid=4443&tid=ob_click_id&ob_marketer=MKA_Wap6&ob_publisher_id=$publisher_id$&ob_))

Multispectral Imaging

By Jared Matzke

If you're here, you probably already know: reading papyri is hard. Indeed, sometimes the letters are so faded and the fragment so pitted and creased that it's not just hard, it's impossible. How cruel, to recover a bookroll that survived the heat and flames of a volcanic eruption, centuries of underground entombment, followed by the callous handling of traders and treasure hunters, only to see it remain unread, resting silently in a museum. Such is the fate of many of the Herculaneum papyri, and similar fates have befallen scores of others, miraculously saved from time's destruction, yet unreadable and tantalizing. We must accept that there is only so much our eyes can glean from a text charred black by flames or rubbed clean by an indifferent scribe. Lately though, papyrologists have been using more than just their eyes to read these texts.

Most of us are well aware that there is light beyond the ordinary visible range. There is the UV light that will give you a sunburn, the gamma rays that might give you cancer, the infrared light that lets police see through walls with thermal cameras. Indeed, there is a continuous spectrum of light, only a sliver of which is visible to us. It is another familiar notion that some substances absorb light while others allow it to pass through. But a perhaps not as familiar observation—yet very well understood—is that each material has a unique interaction with light, and it absorbs only some portions of the spectrum and transmits others. Glass, though transparent to visible light, is opaque to infrared, so that a person standing behind an ordinary window pane would be invisible to a thermal camera, although obviously visible to the ordinary human eye. Because every type of molecule has a unique absorption spectrum (like a fingerprint), materials can be identified on the basis of what sorts of light they absorb or transmit. Ink and papyrus, for instance, have different characteristic absorption spectra. Good spatial resolution can be achieved as well, such that letters can be clearly distinguished from the surrounding papyri when a fragment is imaged using a broad spectrum of light. This technique is known to papyrologists as *multispectral imaging*, and is now used extensively in papyrological research. See the additional clarity brought to this muddled papyrus by multispectral imaging techniques.



(<https://zooniverseancientlives.files.wordpress.com/2014/06/msi2.png>)

(<https://zooniverseancientlives.files.wordpress.com/2014/06/msi1.png>)

(MSI images are courtesy of the Imaging Papyri Project, University of Oxford)

But perhaps the nice improvement in contrast seen here doesn't quite strike you as an earth shattering triumph of modern science. Fortunately, multispectral analysis can do much more. A number of important texts have come down to us as palimpsests; that is, manuscripts on which the original writing has been thoroughly erased in order that the material be repurposed for another text. In the visible portion of the spectrum, the original text is completely gone. In the infrared and ultraviolet however, traces remain. What's more, because the original and subsequent texts are in different inks, the different layers of text can be distinguished based on the differences in their absorption spectra. Perhaps the best example of this application of multispectral techniques is the Archimedes Palimpsest



(<https://zooniverseancientlives.files.wordpress.com/2014/06/apalimpsest.jpeg>)

(Copyright: the Owner of the Archimedes Palimpsest. Licensed for use under Creative Commons Attribution 3.0 Unported Access Rights)

Impressive, but what about those unopened bookrolls? What are we to do when our treasured fragments of ancient lives haven't been delivered to us in crisp, flattened pages, or folded neatly in codices? Lately techniques are being advanced that utilize x-rays to obtain not just a two-dimensional map of, say, a sheet of papyrus, but a three-dimensional, textured surface of complicated objects like bookrolls. Ink, with its dense conglomeration of organic molecules, has a different susceptibility to x-ray radiation than papyrus, which is much less dense and mostly comprised of air. This difference allows for image contrast. More interestingly though, the use of computed tomography—which utilizes a composition of many x-ray images to form a succession of two-dimensional slices along a third axis, and is familiar to many of us as the medical CT scan—allows any particular pixel to be associated with a point in three-dimensional space. The entire volume can then be segmented layer by layer, ultimately resulting in a reconstruction of the text's contents in a readable, planar format.



(https://zooniverseancientlives.files.wordpress.com/2014/06/scroll_scaled.jpg)

(Photo: Steve Bailey for the EDUCU project. Brent Seales, a University of Kentucky computer science professor, and his research team attempting to read carbonized bookrolls using an X-ray CT scan.)

The techniques presented above are only a selection of those available to papyrologists, and the development of novel methods for imaging papyri is an active area of research. The emerging techniques range from the exotic world of particle physics to the simple principles of optics. As these scientific techniques become increasingly accessible, papyrologists are beginning to read opaque texts without ever opening a bookroll.

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March 5, 2014

- by Ancient Lives Team
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Coptic Language and Literature

Coptic is the latest form of the Egyptian language. It emerged in the first and second centuries CE, when people began to transliterate the language of Egypt into Greek characters along with a few other letterforms derived from demotic. Scholars classify these early texts as “Old Coptic,” but it is perhaps better to think of them as “New Coptic,” since the authors responsible for these early texts were experimenting with creative new ways of writing the Egyptian language. As a transliteration of Egyptian largely into Greek characters, Coptic may have helped bridge the linguistic gap between Greeks and native Egyptians who lived together in Egypt at the time.

The language flourished among Egyptian Christians from the fourth through the seventh centuries. Many read the bible in Coptic translation, and composed literature, magical texts, and private letters in the language. Coptic was even used occasionally as the language of bureaucracy. While Coptic is no longer spoken today, it lives on as one of the liturgical languages of the Coptic Orthodox Church.

The Greek New Testament has been translated into countless languages over the past two millennia, but the Coptic version is one of the earliest and most important. Sometime around the third century CE, Christians who wanted to make their scriptures more accessible to Egyptian speakers produced Coptic translations of the Gospels, the letters of Paul, and the rest of the New Testament writings. On account of its early date, the Coptic version is especially important for scholars who seek to recover the earliest attainable text of the New Testament. When early Greek manuscripts preserve two or more conflicting variants of the same biblical verse, scholars often appeal to the reading preserved in the Coptic manuscript tradition to help settle the dispute. Thus the Coptic translation of the New Testament plays an important role in helping scholars establish the earliest Greek text of the New Testament.

One of the most important Coptic manuscript discoveries occurred in the upper-Egyptian town of Nag Hammadi, where in 1945 local farmers unearthed twelve complete ancient books containing numerous Coptic texts. Thanks to this chance discovery, we now have dozens of previously unknown early Christian texts, many of which represent unusual forms of Christianity that did not survive long after ecclesiastical leaders deemed them heretical. Perhaps the best-known text from this manuscript hoard is the assemblage of sayings attributed to Jesus known as the *Gospel of Thomas*. Along with several other texts from the Nag Hammadi Library, the *Gospel of Thomas* has led scholars to rethink many traditional assumptions about early Christianity.

Most prolific and skilled among ancient Coptic writers was Saint Shenoute the Archimandrite. Shenoute was a monastic leader active during the fourth and fifth centuries CE, who oversaw a federation of male and female monastic communities. The value of Shenoute’s numerous sermons lies not only in what they reveal about early Christian monasticism, but in what they can teach us about the Coptic language. Shenoute’s Coptic is studied by philologists today and serves as the basis for many Coptic grammars.

If you’d like to learn more about Coptic language and literature, see the brief bibliography below. For those interested in learning the language, I’d recommend Bentley Layton’s *Coptic in 20 Lessons: Introduction to Sahidic Coptic with Exercises and Vocabularies* (Peeters Publishers, 2007).

Select Bibliography

Coptic Encyclopedia, 8 vols. Available online (<http://ccdlib.libraries.claremont.edu/cdm/search/collection/cce/searchterm/coptic%20encyclopedia/>)

Rebecca Krawiec, *Shenoute and the Women of the White Monastery* (Oxford University Press, 2001)

Marvin Meyer and James Robinson, *The Nag Hammadi Scriptures* (HarperOne, 2009)

Marvin Meyer and Richard Smith, *Ancient Christian Magic: Coptic Texts of Ritual Power* (Princeton University Press, 1999)

June 23, 2013

- by Ancient Lives Team
- in News
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Papyrus and Education in Antiquity I

Dear Ancient Lives Users,

First off, apologies for the lateness of this post. It’s been a tough month as we’ve all transitioned from the business of finishing up the spring semester to the business of starting up our various summer projects. (Most excitingly, for one of us this transition involved heading off to Greece to spend the summer on an archaeological dig.)

—

The existence of the papyri that we have and love presupposes an obvious fact: that people knew how to write. This is an easy fact to take for granted when many of us live in countries where education is compulsory and literacy rates are high. But taking this fact for granted precludes some interesting questions about the world in which the papyri were written: for example, how and when did people learn to write?

Ancient literary sources do tell us a fair amount about the nature of ancient education. For example, Dionysius of Halicarnassus, a first-century BCE Greek historian and rhetorician tells in his *On the Composition of Words* how students were first taught the shape, sound, and name of the letters of the alphabet, then how to put those letters together into syllables, syllables into words, words into sentences, sentences into connected passages, and so on till they were accomplished readers. And once they were comfortable reading syllables at least, students began to learn to write via a similar curriculum.

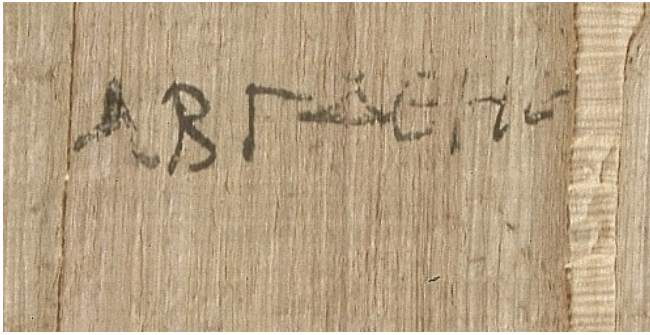
Other Greek and Roman authors such as Plato and Quintilian, a first-century AD Roman rhetorician known principally from his *Institutes of Oratory*, which discusses extensively the theory and practice of oratory as well as the education of the orator, largely corroborate the shape of the ancient curriculum. And Plutarch advises us in his *On the Training of Children*, when our children first reach a certain young age, to avoid *pedagogues* (primary teachers) who are cheats and drunkards. Plutarch's focus in this essay is on the moral education of children, so he has nothing much to say about the practice of learning to write, but we do get from him the idea that in some circles at least one's education began early as a child. Altogether then the literary sources gave us a picture of a certain progressive curriculum begun, at least in some circles, at an early age. But before the discovery of all the papyri we mostly (we do have some ostraka, pot sherds or bits of limestone with writing on them, and writing tablets preserved) lacked direct evidence of the mundane, day-to-day details of this preliminary education.

Thanks in large part to papyrological evidence we know that, because first and foremost students needed to know how to write, that this is evidently what they learned in the first of the three stages of a complete education; the second and third involved advanced study of poetry and prose. The first exercises that students undertook were writing individual letters of the alphabet in no particular order and then writing letters in order. Eventually students went on to practice writing syllables, lists of words, sentences, short passages, and finally longer passages.

Students had, then as now, poor handwriting when they began their studies, but after much practice were able to write more neatly. We know from the distribution of hands in our surviving examples that some of these activities were done only by beginning or intermediate students, others only by advanced students. For example, we only find examples of practice with individual letters in the beginners' handwriting, while no examples of long passages are written in a beginner's handwriting for obvious reasons. Other exercises, such as writing lists of words and short maxims, were done by all students, but mostly by intermediate ones: beginners lack the skill to do this much and advanced students would only need to do so occasionally to hone further their handwriting skills. (You can imagine that you might observe a similar distribution if you gathered together all the examples of student writing from a contemporary primary school.)

All that being said, here are some examples of such exercises:

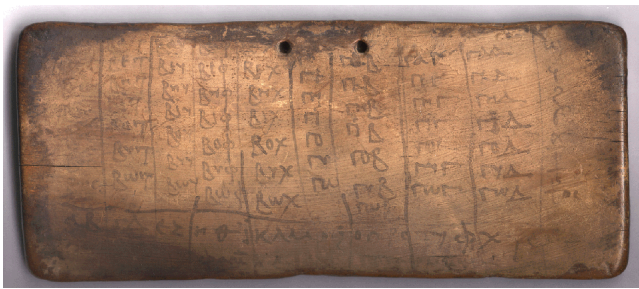
Here is a 2nd-century BC (?) example where someone has attempted to write the letters of the alphabet in order (P.Mich.inv.3197):



(<https://zooniverseancientlives.files.wordpress.com/2013/06/alphabet.jpg>)

If you're familiar with the Greek alphabet, you'll notice that the writer here has missed the letter Z between E and H. In addition to this mistake, the letters are sloppy, irregularly sized, and not in line. And notice how the writing goes against the grain of the papyrus: beginning students often had to make do with the backs of used documents or little scraps, since good, unused papyrus was wasted on them.

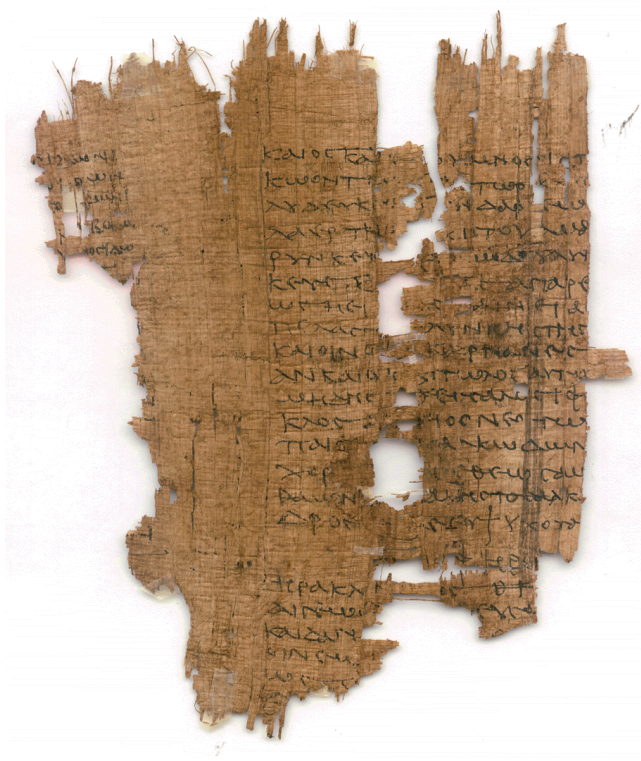
Here is a 6th-century wooden tablet on which someone has practiced writing syllables (P.Duk.inv. 232):



(<https://zooniverseancientlives.files.wordpress.com/2013/06/tabletsyllabary.gif>)

Notice the relatively nice but still not expert handwriting. It is one of the anomalies of surviving school exercises that practice with syllables, while it seems it would be beginner's work, is only done evidently by more advanced students.

And here we have a 3rd-century list of the participants of the Caldonian Boar Hunt (P.Duk.inv. 752):



(<https://zooniverseancientlives.files.wordpress.com/2013/06/list.gif>)

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May 6, 2013

- **by Ancient Lives Team**
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Scribal Error in Biblical Manuscripts

Since the reproduction of manuscripts in the ancient world required individual hand copying by scribes, the transmission of texts was often liable to corruption. By examining the different manuscripts of a particular passage, textual critics are able to discern the common errors. Since extant manuscripts of biblical texts, specifically the New Testament, exist in such a great number, they are a good place to look for scribal errors. The following is a list of common types of scribal errors one may encounter in these manuscripts:

Unintentional Errors

1. Confusing similarly shaped letters: Some letters in the Greek alphabet were easy to confuse when handwritten. For example, the round letters epsilon (ε), theta (Θ), omicron (Ο), and sigma (Σ) all have similar shapes.

Alpha (Α), delta (Δ), and lambda (Λ) all have triangular shapes and were sometimes confused.

Sometimes two letters written closely together were mistaken for one letter. For instance, a tau followed by an iota (ΤΙ) could end up looking like a pi (Π); a lambda followed by an iota (ΛΙ) could look like a nu (Ν).

2. Dittography and haplography: These terms describe errors that result in repeating text or omitting text. They frequently occur when a word, phrase, or line begins with a similar string of letters (homoeoarcton) or ends with a similar string of letters (homoeoteleuton), causing the eyes to skip forward or backward. One example of haplography resulting from homoeoteleuton can be found in Matt. 5:19-20 of the Codex Sinaiticus.* The first sentence of verse 19 ends with ἐν τῇ βασιλείᾳ τῶν οὐρανῶν and the end of the verse also ends with ἐν τῇ βασιλείᾳ τῶν οὐρανῶν. Thus, the scribe of the Codex Sinaiticus has accidentally omitted everything from the first occurrence to the end of the verse. The scribe of the Codex Bezae has gone even further by skipping from the end of the first sentence of verse 19 to the end of verse 20 which also ends with ἐν τῇ βασιλείᾳ τῶν οὐρανῶν.

3. Confusing similar sounding letters: Sometimes scribes would write from dictation or would read the words aloud to themselves while copying. The blog post “Papyrus as Evidence of Linguistic Change,” has already presented some of the changes in pronunciation that occurred in the Greek language over time which often resulted in spelling variations. This is evident in many biblical papyri as scribes who relied on hearing often mixed up similar sounding diphthongs and

vowels of that period. One excellent example of this confusion can be found in Rom. 5:1 where the manuscript evidence is quite equally divided between ἔχομεν and ἔχωμεν.

4. Word substitutions: Errors could also occur when scribes trying to retain a line in their memory accidentally replaced some words with close synonyms. Prepositions like ἐκ and ἀπό, or conjunctions like ὅτι and διότι are some examples of synonyms which mistakenly get replaced.

5. Transposition of words: Sometimes scribes would unintentionally reorder a string of words, especially if the sense of the phrase remained virtually the same. This is another type of error related to faulty memory.

6. Assimilation of marginalia: Some manuscripts contained notes or glosses in the margins from earlier scribes. These notes sometimes found their way into the actual text of the manuscript.

Intentional Changes

1. Harmonization: The wording of a particular phrase or sentence was sometimes altered to reflect the wording of another similar but more familiar one. This was especially common with quotations that had a longer form in a different book or quotations from the Septuagint that did not conform to the exact wording of the Septuagint.

2. Conflation of readings: Conflation tended to happen more often in biblical manuscripts than elsewhere. A scribe would sometimes make his copy using more than one manuscript. Where the wording of the exemplars differed from each other, a scribe would sometimes conflate both readings into one.

3. Grammatical adjustments: Although the New Testament was written in Koine Greek, the rise of Atticism in the 2nd century AD led scribes to try to improve the style of a text. Other times, they would tend to make slight adjustments to improve clunky grammar. A good illustration of the tendency to correct can be found in Mark 1:37 which reads, “καὶ εὗρον αὐτὸν καὶ λέγουσιν.” One variant occurring in a majority of manuscripts attempts to improve the grammar with the following: “καὶ εὗροντες αὐτὸν λέγουσιν.”

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*For more information about the codices Sinaiticus and Bezae, see

<http://codexsinaiticus.org/en/codex/> (<http://codexsinaiticus.org/en/codex/>) and

http://legacy.earlham.edu/~seidti/iam/tc_codexb.html (http://legacy.earlham.edu/~seidti/iam/tc_codexb.html)

April 18, 2013

- by **Ancient Lives Team**
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The Herculaneum Papyri (Part II)

Piaggio constructed a machine to unroll the papyri. He stuck thin animal membranes to the back of each piece (first he tried onion membranes) and attached strings to these, wound around a bar, from which the roll would hang. Its weight helped to pull it down. He carefully cut off pieces as they were unrolled and began transcribing them. Although effective, this was an extremely time-consuming process. According to one source, (see *OHP*, 308) a year's work would only complete about half a roll.

The process of reading the papyri has become much easier in the last couple of decades with the advent of imaging technology. Multispectral imaging in particular has facilitated incredible advances in reading the charred texts by its ability to distinguish between the black letters and the black background surface. Pieces of the same roll that were once separated are being joined back together.

Possible developments for the future include using tomography, imaging by sections, (used, for example, to see inside a human body) in virtually unrolling the texts.

Work also continues on the publication of the various texts from the Herculaneum papyri. The director of this work is Marcello Gigante, whose journal *Cronache Ercolanesi* records their progress.

If you find this research interesting, check out the website for the archeological sites in the bay of Naples,

<http://bloggingpompeii.blogspot.com/2012/01/cronache-ercolanesi-412011.html> (<http://bloggingpompeii.blogspot.com/2012/01/cronache-ercolanesi-412011.html>)

See Carol C. Mattusch's bibliography for Herculaneum, <http://www.oxfordbibliographies.com/view/document/obo-9780195389661/obo-9780195389661-0076.xml?rskey=3kdqVZ&result=21&q=> (<http://www.oxfordbibliographies.com/view/document/obo-9780195389661/obo-9780195389661-0076.xml?rskey=3kdqVZ&result=21&q=>)

Also see David Sider, "The Special Case of Herculaneum," in Roger S. Bagnall, ed. *Oxford Handbook of Papyrology*, pp. 303-319

And Sider, *The Library of the Villa dei Papiri at Herculaneum*, 2005

On the technology side, check out this article about multispectral scanning at Oxford: <http://www.economist.com/blogs/babbage/2011/09/document-analysis> (<http://www.economist.com/blogs/babbage/2011/09/document-analysis>)

OHP = *Oxford Handbook of Papyrology*

April 4, 2013

- **by Ancient Lives Team**
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The Herculaneum Papyri (Part I)

You might have heard about the new exhibit that opened last week at the British Museum: Life and Death in Pompeii and Herculaneum. While the city of Pompeii occupies perhaps a more prominent place in the public eye, it is the nearby town of Herculaneum that has been particularly interesting to papyrologists.

A prosperous seaside town on the bay of Naples (modern Ercolano), Herculaneum was buried, like Pompeii, during the eruption of Mt. Vesuvius in 79 CE. Of the parts of the town that were eventually unearthed, one villa was especially significant. The elegant style and culture of its inhabitants was evident in their library, where the discovery of papyrus scrolls led to the designation Villa dei Papiri, or ‘house of the papyri.’ The papyri were found in the library and in the hallways nearby, suggesting the inhabitants may have tried to gather some as they escaped the volcanic eruption.

Close to 1100 papyrus rolls were found in this villa in the 1750’s. Some were eventually identified as works by the philosopher Epicurus (c. 341-270 BCE) along with Stoic texts and a few “scraps” of Latin poetry. Most turned out to be philosophical treatises by the 1st c. BCE poet Philodemus who wrote in Greek and was a follower of Epicurus. It has been suggested that this may have been Philodemus’ library, or it may have belonged to his friend L. Calpurnius Piso Caesoninus who was consul of Rome in 58 BCE (and father-in-law of Julius Caesar).

The papyri are not only significant for their content, but for the centuries of trial and error it has taken to perfect a process for unrolling these charred book rolls. Early attempts included slicing them open (which caused loss of the letters along the cut and the possibility that the text, now in two pieces, would be separated) and peeling the sheets apart (equally damaging). Next, the experimenters tried mercury (thinking that it would force the layers to separate), and rosewater. Neither worked, but instead destroyed the papyri. Then, they tried gas, but the smell was horrible and the results disappointing. One experimenter even tried putting a roll in a bell jar and waiting for the sun to steam apart the layers. This failed in that the steam caused the letters to run and gave the false impression that they were written in Oscan, not Greek.

Not until Antonio Piaggio, a specialist from the Vatican, took over in 1793, would any real progress be made.

(to be continued...)

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Papyrus as Evidence of Linguistic Change

All languages undergo changes in pronunciation over time, and Greek has not been exceptional in this regard. Most notable among the changes in the pronunciation of Greek over the last 2500 years is one called “iotacism”, a change whereby the vowels ι, η, υ, ει, οι, ηι, υι all came to be pronounced as ι (ee). Another is the change of β, δ, γ, φ, θ, χ from “stops” (sounds approximating English’s *b, d, g, p, t*, and *k*) to “fricatives” (sounds akin to English’s *v, th*, and *f*, for example.) Thus Greek ἐχει ‘s/he has’, pronounced in antiquity approximately as “ekay”, is now pronounced approximately as “ehee”, although the spelling has not changed.

The conservatism of standard spelling, to which most educated writers aspire, often masks actual pronunciation and can obscure the fact of change. (Think, for example, of the disparity in English now between the spelling and pronunciation of *-ough* in words such as *enough* and *bough*, which though they once rhymed have been pronounced as “inuɪ” and “baw” for centuries.) For this reason it can be next to impossible to figure out precisely when and how changes in pronunciation happened, unless documents written by people educated enough to write but not enough to write without occasional spelling errors survive from a range of time.

But thanks to the abundant survival of just such documents for Greek written on papyrus, modern scholars have been able to answer these questions, which had been lingering since the Renaissance. Not long after Greek was “rediscovered” in Western Europe during the Renaissance, scholars had worked out which changes in pronunciation Greek had undergone since antiquity and established the 5th-century BC as their *terminus a quo*, but they were unable to figure out more precisely when and how these changes had happened, because they lacked sufficient documentary evidence from the intervening 2000 years.

Here are a few examples of spelling errors as a result of iotacism from P66, a 2nd century AD papyrus containing nearly the entire Gospel of John:

Image

(<https://zooniverseancientlives.files.wordpress.com/2013/03/picture-21.png>)

ἐγίγεται instead of ἐγείρεται (he/she is awakened or raised)



(<https://zooniverseancientlives.files.wordpress.com/2013/03/picture-51.png>) ὑμῖς instead of ὑμεῖς (you (pl.))

But a couple lines later, the scribe has spelled it right:



(<https://zooniverseancientlives.files.wordpress.com/2013/03/picture-6.png>)

This raises the possibility that the scribe merely made a few “typos,” but in P46, another 2nd century papyrus containing fragments of the New Testament, we see an instance of “reverse iotacism,” where a scribe has written ὑμεῖν instead of ὑμῖν (to you (pl.)):



(<https://zooniverseancientlives.files.wordpress.com/2013/03/untitled.png>)

If scribes are using “ei” and “i” interchangeably at a certain point in time, then we can be fairly confident that those vowels were no longer distinctly pronounced and that the iotacisms of P66 were not merely typos.

Another change in the pronunciation of Greek vowels that appears in P66 is the merger of αἰ and ε, which resulted in the occasional confusion of these two in writing. Thus we see in P66:



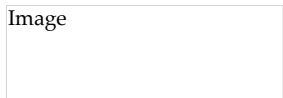
(<https://zooniverseancientlives.files.wordpress.com/2013/03/f.png>) οἶδαται instead of οἶδατε (you (pl.) know)

And we see the reverse in P.Oxy. 2783 from the early 3rd century AD (which is to say not much later than when P66 was written):



(<https://zooniverseancientlives.files.wordpress.com/2013/03/hsjf.png>) εὐχομε instead of εὐχομαι (I pray)

Although the consonants of Greek changed their pronunciation as well, they nonetheless remained distinct enough that they were not mixed up in spelling. However, the use of different consonants to transliterate foreign words over time yields evidence of changing pronunciations. For example, Latin words beginning with *v* were spelled in Greek with *ov*, as in this example from P.Oxy 3758 from the 4th century AD:



(<https://zooniverseancientlives.files.wordpress.com/2013/03/g.png>) οὐεδακιος for Latin *veredarius* ‘courier’. But by the 7th or 8th

century AD this was spelled βερεδακιος, since β had started to sound rather like Latin *v*. For example:



(<https://zooniverseancientlives.files.wordpress.com/2013/03/hei.png>) βερε(ε)δακιου (P.Ross.Georg. 4 2)

References:

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An Overview of Ancient Writing Surfaces

Papyrus

Papyrus was the most common writing material of the ancient world. The stalk of the papyrus plant was cut into thin strips, which were laid in two perpendicular sheets: one with the plant’s fibers running horizontally (generally the front side, or recto) and the other with the fibers running vertically (the back, or verso). The sheets were stuck together by the natural juices of the plant. Sheets could be joined to form rolls or stacked to form codices. (The codex, a “proto-form” of the book, started rising in popularity in the second century and eventually came to replace the roll.) Ink was made of soot and gum arabic in water. A reed pen was used for Greek and Latin, a brush for Egyptian.

Parchment

To make parchment, the skins of animals (mainly calves, sheep, and goats) were cleaned and the hair was scraped off; they were then stretched out to dry, and treated with chalk and alum.

Wax Tablets

Wax tablets were pieces of wood hollowed out and filled with beeswax. They were written on with a stylus made of wood, bone, or bronze. One end of it was pointed, the other flat for smoothing out mistakes. Tablets could also be strung together to form codices. They were generally used for everyday activities like bookkeeping.

Wooden Boards

Wooden boards, sometimes covered with white paint, were used for various purposes in different places. In Athens, they were used to publish official texts. In Egypt, they were used as labels for packages and mummies.

Ostraca

An ostrakon is a piece of stone or pottery. Here are several types:

-Athenian black glaze, written on by scratching through the glaze

-Egyptian flat limestone, written on with ink

-potsherds written on with pen/brush and ink

Ostraca were less appealing than papyrus because they were heavy, couldn't be bound together or easily archived, and contained only short texts. They were, however, free. In Athens, ostraca were used as ballots; Many in Greek and demotic are tax receipts. They are most important for Coptic texts: most of those that survive are letters.

For more information, see chapter entitled "Writing Materials in the Ancient World" by Adam Bülow-Jacobsen in *The Oxford Handbook of Papyrology*

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