

A Re-edition of "Cryptic A Rule of Congregation" (4Qpap cryptA Serekh Ha–Edah) from Qumran: Enhanced Algorithmic Methods to the Aid of Textual Studies

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1. The Cryptic Papyri from Qumran

The cryptic corpus from the caves of Qumran at the shore of the Dead Sea features some of the most difficult scrolls to handle, both due to the difficulty of the script and to the deterioration of the material. In the early 1990s, out of more than 200 fragments, Stephen Pfann identified 23 fragments to constitute a copy of the Rule of Congregation (Serekh Ha-Edah). The fragments are preserved in extremely bad condition; with scarcely one complete word in the entire Rule. They were published as nine different copies of the Rule (4Q249a-i).

2. The Current Project

The goal of the current study is to reexamine all 23 SE fragments, and to reassess Pfann's initial proposal of nine separate manuscripts. This is part of a reclassification and re-edition of all 400 cryptic fragments from Qumran. Our basic assumption is that unless proven otherwise, all fragments of Serekh ha-Edah (SE) belong to a single copy.

Reconstruction of the main copy was made possible based on the testimony of a key fragment (4Q249e i, Image 1), which preserves text from two consecutive columns. Calculating the number of characters per line and number of lines per column enabled us to restore the complete structure of the scroll.

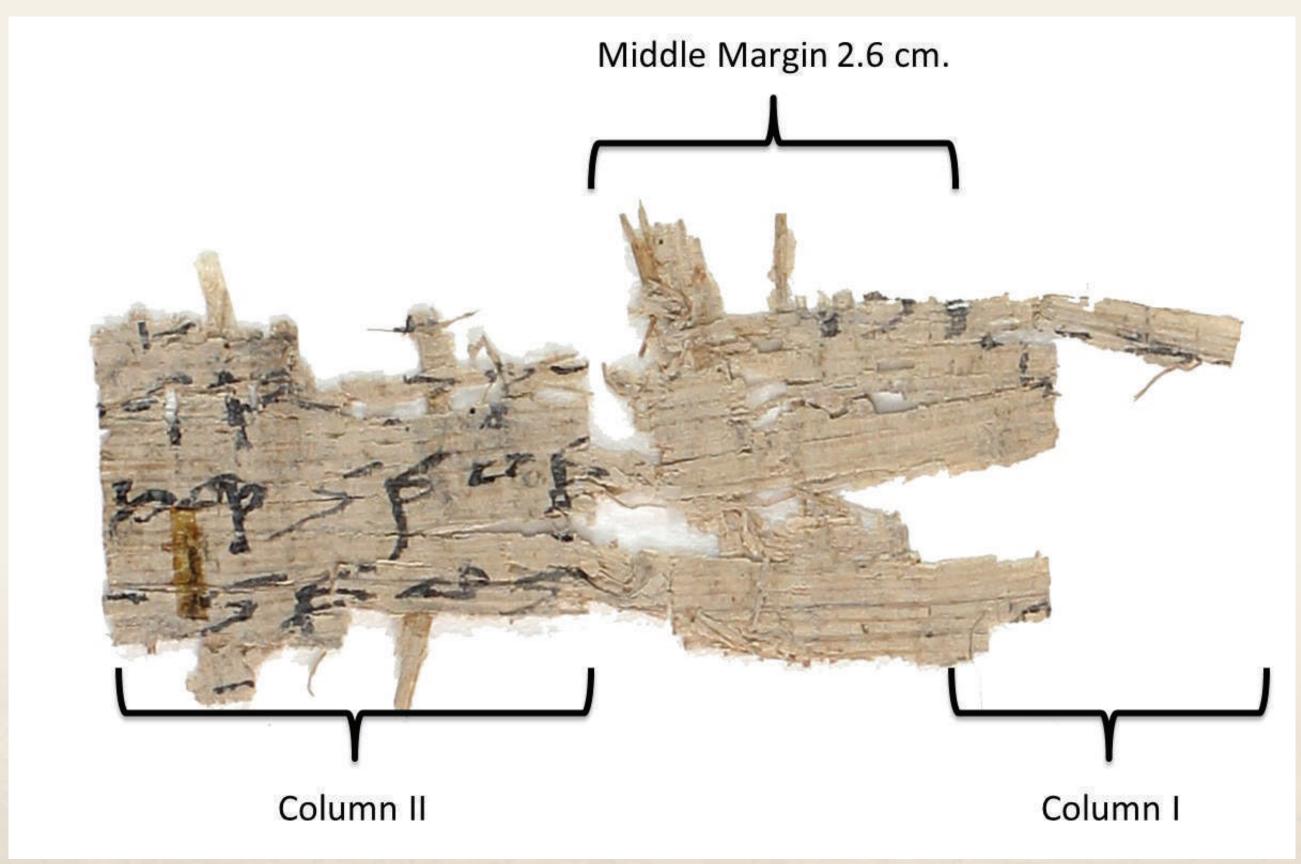


Image 1 - Fragment 4Q249 e1.

3. Initial Results

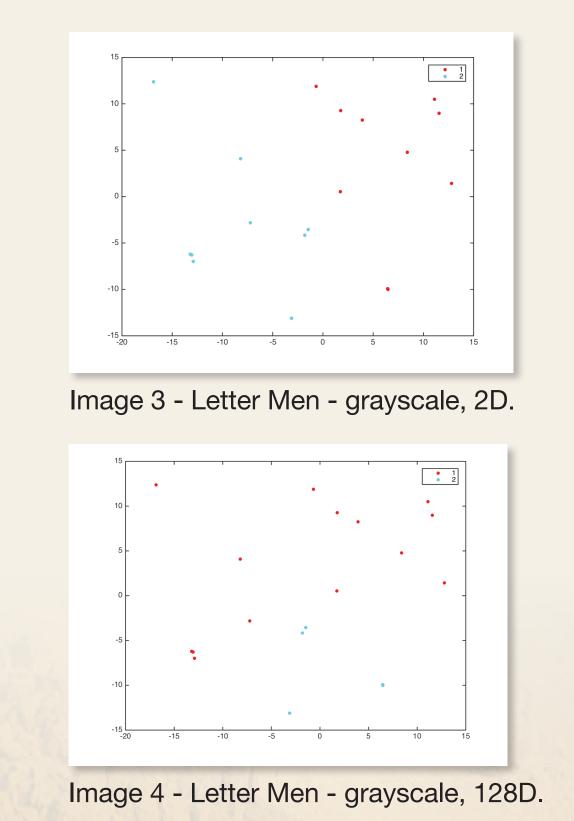
If our reconstruction is correct, under the terms of 15 lines per column and ca. 35 characters per line, the fragment is located in columns III and IV of the scroll 4QcryptSerekh HaEdah^a (new suggested name).

We suggest a reconstruction of the whole Serekh according to the same guidelines, resulting in a 5 column scroll, each column holds between 15-16 lines. We were able to place 11 fragments out of the 23 in our copy (see below).

4. Primary Letter Clustering

We make extensive use of the new images made available by the Leon Levy Library of the Dead Sea Scrolls, www.deadseascrolls.org, and of the new multispectral imaging technology employed in that project. The quality of the new photographs enable the unprecedented ability to apply state-of-the-art algorithmic methods: to map material features of fragments, to record features in easily accessible databases, and to perform computer analyses of the collected data. The present poster focuses on ascertaining fragment assignment into discrete scrolls and their placement in the manuscript by means of letter clustering. A battery of letter clustering vectors was carried out. Each letter was resized to a fixed size of 80x80 pixels and was described by the SIFT descriptor resulting a vector of size 128 (Image 2). Then t-SNE algorithm was applied for 2D dimensionality reduction and visualization. Initial results indicate that the grayscale 2D vector was the most efficient, and was able to recognize 2 groups of fragments with 42% accuracy (Image 3). All of our SE fragments were clustered by the algorithm into group 1, which approves our initial intuition. Six other miscellanies fragments were grouped in that group too, which produces a further assignment for us to check with possible new findings. Future clustering would consider material features of a known group of fragments (50% of fragments in group 2) and should results in higher accuracy and clearer division.





5. Future Aspects

Further material traits of the fragments will be traced as numerical data and analyzed to support text-related questions. We plan to widen the clustering process to the entire cryptic papyri corpus (over 200 fragments) and group the fragments to separate manuscripts; map the fiber pattern of each fragment and search for similar patterns in adjoining fragments. This is unprecedented in scrolls research. Finally, we hope to make this project a pioneer of digital editions of the DSS, since as per today all transcriptions of the scrolls are protected under copyright, a status we deem unproductive for future research.

