1.0. Abstract

The completion of the editio princeps of the and fragments and manuscripts marks a watershed in the history of Qumran and Dead Sea Scrolls research. In addition to the DJD volumes, the recent update of the Leon Levy Digital Dead Sea Scrolls Library offers free access to its color images. These resources, among others, will continue to exist as crucial tools to research the scrolls. Nevertheless, recent developments in digital platforms offer a compelling medium to reconsider how ‘Digital Editions’ might serve future research needs, particularly in light of the fragmentary nature of the material remains. Electronic features make it possible to merge together image libraries, transcriptions, secondary resources, and extensive bibliographic material, as well as offer viable mechanisms for philological reconstructions. Such a malleable, hyperlinked database—built around high quality images themselves—would likewise mark another watershed in DSS and Qumran studies. As such, this paper explores in what manner the digital medium can build on the critical resources of previous scholarship, yet push scholarship forward by addressing methodological issues inherent in Lachmannian philology, and how artifactual and digital philology are apropos to a digital medium.

1.1. Introduction

The importance of the DJD editions is readily apparent: as an editio princeps, it provides the scholarly guild access to study the scrolls and fragments, effectively creating an opportunity to integrate what is learned into issues of the transmission theories of the Hebrew Bible, nature and practice of scribal cultures, legal issues and/or immanent traditions of Halakha, linguistic analysis of Hebrew and Aramaic language, as well as an assortment of other Second Temple sociological issues. The importance of having access to the data cannot be overstated, yet the importance of the data is made clear as our continued analysis and investigations surface important interpretive and methodological conclusions regarding history of ideas in the Second Temple era—which in turn has implications on the methods used to display data and even what data is important. That is to say, the manner we encounter the data in the static presentation of DJD presents a series of limitations.
and even hinderances to our ongoing investigations and study [comment: even to the point where some data has been overlooked or disregarded because of limited space; e.g. 4Q230/231 frgs. 1–12 or even the many DJD 7 frgs not incorporated into commerical software applications]. With an array of tools available in a digital format, it seems that it is time to consider what a digital edition might be and how it can be used in the contexts of research and teaching.

Today, I would like to focus on one question in particular as it relates to “digital edition,” which I do not see so much as a thing as much as a computational and algorithmically assisted philological research. The query can be formulated as such: What does it mean to maximize the scrolls and fragments of the Judaean Desert and broader refuge caves in a digital edition? Answering this question provides a gateway into addressing some of the benefits that artifactual and digital philology offers, which I will address below.

To pose the question in such a manner, furthermore, touches on two predominate issues on which I hope to provide some preliminary thoughts. The first issue relates to the operative methods—and by this I mean the methodology used in textual analysis—for studying the scrolls. For the present discussion, I will focus mainly on the Isaiah scrolls and fragments; however, what is discussed here is equally applicable to the so-called non-biblical and sectarian scrolls.

To my mind, the first issue requiring clarification is to learn what a digital edition may or may not be—especially as it pertains to how scholarly categories are predominant in print formats. Perhaps understanding what elements and features define a Digital Edition is found by looking at—odd is it may sound—the print editions of Discovery of the Judaean Desert (DJD) and the Israel Exploration Society (IES) volumes, particularly the methods used for presentation. Since the earliest editions of the scrolls, the plates and transcriptions were available to view side by side (e.g., DSSSMM I/II). The last of the DJD series, XXXII, likewise opted to print the plates on the adja-
cent page of the transcriptions, offering a productive means for both the specialist and non-specialist to encounter a quasi-diplomatic transcription accompanied by an image of the artifact—we would call this method a formal-diplomatic edition. The importance of this presentation is made evident by the historical linguist Olga Fischer, whom I now quote,

> Linguists interested in morphosyntactic change, usually employ edited texts, not manuscripts, but we have to be aware that the editors of these texts have made inferences about the script they edit; in other words, an edited text is always one step removed from the original.¹

In other words, Fischer’s distinction puts emphasis on the artifact itself. Granted, working with a digital image of a fragment is not the same as working with the fragment itself (and here we might recall Kutscher’s critique of Segal’s using printed editions and not manuscripts for his Mishnaic Hebrew Grammar]. The image is not the original, yet it brings us closer to the original more so than any edited edition. [Tease this out more in connection to Fischer; this also sets the stage for why material philology is a must in terms of the scrolls.]

> the limitations of the static page are perspicuous when one begins to conceive of the data as unbounded by margins. While the previous DJD and IES volumes are informative, they are not necessarily determinative—and various options are possible for configuring the data apart from the static medium of print. Learning of the potential options and features available in a digital medium can shape and define what is meant by digital edition.

The second issue of concern is to articulate and to provide a clear definition for what is meant by “maximizing.” Maximizing, as formulated in the above question, is syntagmatically related to the prepositional phrase “in a Digital Edition.” To my mind, a digital edition—not limited to the margins of a page—should facilitate research on the primary data. When attempting to pin

¹ Fischer, 2007: 43.
down the various denotations and connotations of what “maximizing” might mean, I hope to keep the conversation moored to the importance of the data—with precedence on an image of the artifact, yet also accommodate secondary and tertiary resources.

With these two issues in mind—learning about digital edition and what might maximizing the data might mean—let us now address each in a dialectic manner. To do so, I find it helpful to illustrate the questions above with concrete examples. Moreover, concrete examples can provide opportunity to clarify and perhaps move towards an understanding of what is meant by digital edition and maximizing.²

2.0. What is a Digital Edition?

In DJD XXXIX, Emanuel Tov wrote,

The general philosophy behind the DJD editions is to provide the scholarly public with a workable edition of the text, which, while presenting the best possible edition according to its editor, may be improved upon by subsequent generations of scholars.³

We stand in a fortunate position since the first and second generation of scrolls scholars have completed their crucial task of publishing the editio princeps. In addition, the Israel Antiquities Authority (IAA), with the aid of Google, has published and since updated the Leon Levy Dead Sea Scrolls Digital Library (LLDSSDL) to provide color images of the scrolls and fragments. As a result, the third generation of scrolls scholars live in a privileged era with the data of the scrolls readily available and with capable tools at our hand for researching the scrolls. One might wonder

² I would like to express my thanks to Dr. Martin Abegg Jr. for asking me to give thought to what form a digital edition of DJD might look like, and how digital editions might aid in our analysis of the text. When I was first asked to consider digital editions, I was unaware of how influential such a process would become in my study of the Isaiah Scrolls for my thesis at Trinity Western University.

whether it is beneficial to even talk of digital editions and rather just talk about new editions. Nevertheless, there does seem to be room for improvement. However, such improvements should not make a clandestine departure from the history of scholarship which produced the DJD volumes. To my mind, whatever a digital edition of the scrolls might be, it stands to reason that the DJD and IES volumes are worthy of emulation, albeit in a different way. As such, it seems a caveat can be made in terms of what is meant by Tov’s expressed recognition of improvements. Can a digital edition of the previous DJD and IES volumes benefit current research—merely by just being in a digital format? Also, how does the digital medium, when interrelated with the methodological framework of future projects (or current projects such as Bruce Zuckerman’s reconstructions [see Tov’s Amos Fragment article DSD, 2014]), provide improvements. In other words, would creating a digitized version of the DJD and IES volumes, which replicate the format of the print, improve the data by merely being a digital version? Or, could the digital medium offer such opportunities for improvement whereby future projects are developed in light of the advantages of computer-assisted research. On the one hand, it is important to keep our critical investigations linked to the previous generations of scrolls scholarship; on the other hand, whatever a digital edition might be, it is certainly not a digitized version of print edition. Given the important history (viz., the interpretative clues of material reconstruction) of the PAM images, there are some merits to considering structure of the print editions of DJD.

It is important that a digital edition preserves the earliest research on the fragments, in part because the archaeological data offers interpretive clues for the fragmentary nature of the

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4 In other words, digital editions and print editions are not binaries.

5 For my thinking on the presentation of the data in DJD and IES volumes, I am indebted to Prof. George Brooke's insights regarding the principles of the editio princeps. George Brooke, “The Principles of Principal Editions of the Dead Sea Scrolls,” (Material Philology and Dead Sea Scrolls Symposium; Copenhagen, April 5, 2014).
corpus—more on this in a moment. Yet, the presentation of the data must be artifact concentric. That is, a digital edition should be primarily about the artifacts—the scrolls, fragments, and peripheral related discoveries of Judaea and Jordon, that is, not limited to manuscripts, but certainly including them. As a supplemental tool to a print counterpart, the digital edition could both include the previous research in the DJD editions, and make various enhancements. Hence, a digital edition is not to replace a print edition, but it stands to reason the mere duplication of the print into a digital medium overlooks the various features and tools available for rigorous analysis of the scrolls and fragments [Comment: Bruce’s comments about the need for scholars to work on the data is well received and is necessary; someone not trained in the field lacks the intuition required for high grade research quality resources]. Perhaps some examples will sufficiently illustrate the discussion.

The following examples are predominately from the Isaiah scrolls and fragments, since that has been what I have been working with the most in my thesis. For the first example, I will use Frag. 1 of 1Q8 (the Smaller Isaiah Scroll).

In a digital format, the first information accessible would be a hyperlink to the discussions on the material finds, an indexed entry of all images. Beneath the the introduction hyperlink would be the imaging history of the fragment. Both the previous discussions on the material aspects of the scrolls and the images are the central component of a digital edition—e.g., DJD and IES. As most are here are likely aware, the imaging history often illustrates early attempts of understanding how the fragments related to one another—an hence is an important interpretive factor in material reconstruction. Thus far, we could have something like this for 1Q8 frag. 1:
Should you click on one of the introduction hyperlinks, an additional window would appear containing the preliminary conversation of the fragments. In addition, the PAM numbers are likewise hyperlinked for easy access to the the images—making it easy to call up these images for analysis. A hyperlink could also be added for the *LLDSSDL* image online there, and thus a comparison of the early images can be easily made.

To these images, the DJD and, in the case of the Isaiah scrolls, DSSHU plates could likewise be included for analysis. Thus,
The presentation of the images, however, could undergo a significant enhancement—the presentation here, mind you, surfaces the inherent limitations of the paginal margins. Since the edges of the margin are non-existent in a digital medium, several important features could be included to accompany the images. Traditionally, as we are all aware, DJD provided an Aramaic square script transcription of the fragment, prior to the Plates. As the methodology of presentation of DJD developed, volumes such as DJD XXXII provide the transcription on the mirroring page. In a digital medium, the static page does not limit what is possible insofar as how transcriptions are concerned.

For example, the traditional method could accompany the image, on the click of a button. However, traditional Aramaic square script could be replaced for a Hasmonaean or Herodian script, also done with a click of the mouse.

For transcriptions, the primary advantage of toggling between the scripts would also prove a pedagogical value insofar students can learn the ancient scripts—and eventually transition to reading the artifact itself. Such a point might seem trivial, but extended exposure proves invaluable for
building intuitions and scholarly aptitude, particularly for adjudicating between proposed variants in scholarly literature and parallel editions—which raises an important additional feature relating to transcriptions.

Provided in a digital edition is a list of competing transcriptional proposals, and a high resolution image serves as a means to adjudicate between the validity of the transcriptions. Thus, the transcription alternatives could be presented in numerous ways, but to demonstrate the point, a simple columnized format is sufficient:

<table>
<thead>
<tr>
<th>Transcriptional Variants of 1QIsa* Pl I 1</th>
<th>Flint-Ulrich</th>
<th>Qimron-Perry</th>
<th>Burrows</th>
<th>Pfann</th>
<th>Abegg</th>
</tr>
</thead>
<tbody>
<tr>
<td>ישנא נשיא בֵּי עֹזִיָּהוּ אשֶׁר מַעַּרְשָׁה עֹזִיָּהוּ והיוּשֶׁךְ בֵּי עֹזִיָּהוּ</td>
<td>ישנא נשיא בֵּי עֹזִיָּהוּ אשֶׁר מַעַּרְשָׁה עֹזִיָּהוּ והיוּשֶׁךְ בֵּי עֹזִיָּהוּ</td>
<td>ישנא נשיא בֵּי עֹזִיָּהוּ אשֶׁר מַעַּרְשָׁה עֹזִיָּהוּ והיוּשֶׁךְ בֵּי עֹזִיָּהוּ</td>
<td>ישנא נשיא בֵּי עֹזִיָּהוּ אשֶׁר מַעַּרְשָׁה עֹזִיָּהוּ והיוּשֶׁךְ בֵּי עֹזִיָּהוּ</td>
<td>ישנא נשיא בֵּי עֹזִיָּהוּ אשֶׁר מַעַּרְשָׁה עֹזִיָּהוּ והיוּשֶׁךְ בֵּי עֹזִיָּהוּ</td>
<td>ישנא נשיא בֵּי עֹזִיָּהוּ אשֶׁר מַעַּרְשָׁה עֹזִיָּהוּ והיוּשֶׁךְ בֵּי עֹזִיָּהוּ</td>
</tr>
</tbody>
</table>

While the above transcriptional variants do not present a great deal of difference, a digital edition can effectively contain such information when requested by the user. A comprehensive database of catalogued transcriptional variants (which is supposedly completed in Göttingen), including the biblical, non-biblical, and sectarian scrolls, adds another layer of potential secondary data to a digital edition. Thus, the digital edition clearly arranges its data around the primary evidence of the fragment, as depicted in a high resolution image.

Consequently, it seems to me that a particular advantage inherent in the digital medium is the privileging of the artifact for consistent analysis, in all of the various forms of its imaging—infrared, black and white, and color. In addition, privileging the artifact is also observable insofar as transcriptions are concerned, for a digital medium provides ample opportunity to anchor and link various data to create an efficient tool for scholarly study.

On the ability to anchor and interlink data, three more transcription features merit a brief
note and example. The first feature is the ability to compare interrelated and overlapping manuscripts. The example of 1QIsa² Pl I 1 is illustrative to the point of discussion. When extant overlapping material is available, a hyper-linkable icon, when clicked, would call up related scrolls and fragments. In the case of 1QIsa² Pl I 1, it would thus be possible to call up 4Q55, 4Q56, 4Q63, as well as the pesharim scroll 3Q4. The display of each fragment could be further manipulated in one grouped window or individual windows for each scroll or fragment, with its own chart of the history of the images, as discussed above.

A high resolution image could be the default for displaying the related manuscripts, yet other options are also possible. For example, with the sophistication of software applications like Adobe Photoshop™, reconstructions can overlay the image for altered representation of the fragment.

As can be observed, the digital presentation is apropos for active manipulation, as the medium is not a static page. The transcription overlay could be toggled on or off, as personal preference and...
research interests demand (or even reconstruction methodologies could be displayed for analysis [Bruce's example of the TS reconstruction]). Additional settings to adjust the hue, brightness/contrast, and exposure of the image would offer additional means to manipulate the image for research purposes. However, we have to admit this is a rather unsophisticated manner to handled the data given the inherent potential of digital medium.

Those works with multiple related scrolls (e.g., the S texts), an icon would be visible to create various charts for comparative analyses. For example, a columnized format is easily created with the click of a button. Such a table comparison is possible in regards to how the data is marked with meta-tags, including but not limited to, verse, word address in verse, orthography, morphology, syntax, and scribal hands.

<table>
<thead>
<tr>
<th>Isaiah 1:1</th>
<th>1Qlsa*</th>
<th>4Q55</th>
<th>4Q56</th>
<th>4Q63</th>
</tr>
</thead>
<tbody>
<tr>
<td>הָוַי</td>
<td>נֵ֙וה</td>
<td>וּבָשָ֣ר</td>
<td>קָטַ֔נ</td>
<td>קָטַ֔נ</td>
</tr>
<tr>
<td>יִשָּׁרְוֹ</td>
<td>יִשָּׁרְוֹ</td>
<td>יִשָּׁרְוֹ</td>
<td>יִשָּׁרְוֹ</td>
<td>יִשָּׁרְוֹ</td>
</tr>
<tr>
<td>וּלְעָלָ֖ה</td>
<td>וּלְעָלָ֖ה</td>
<td>וּלְעָלָ֖ה</td>
<td>וּלְעָלָ֖ה</td>
<td>וּלְעָלָ֖ה</td>
</tr>
<tr>
<td>רִמְלָ֑ד</td>
<td>רִמְלָ֑ד</td>
<td>רִמְלָ֑ד</td>
<td>רִמְלָ֑ד</td>
<td>רִמְלָ֑ד</td>
</tr>
<tr>
<td>יִרְשָׁלִּם</td>
<td>יִרְשָׁלִּם</td>
<td>יִרְשָׁלִּם</td>
<td>יִרְשָׁלִּם</td>
<td>יִרְשָׁלִּם</td>
</tr>
</tbody>
</table>

The second feature, while not explicitly relating to the transcriptions of the scrolls, corre-
lates more with nexus between digital presentation of transcriptions and tertiary resources. With the data, both images and transcriptions, in a digital medium, it is possible to hyperlink the data with available Hebrew manuscript apparatuses, such as BHS (for pedagogical reasons), BHQ, HBCE, and HUBP (and I would also add PDF/JPEG Facsimile editions of B19A, other Firkovitch Ms(s), Aleppo, and even the apparatuses of Kennicott and de Rossi). Likewise, a link to the ancient versions, such as the Göttingen LXX, Targumim, or Peshitta, could facilitate a host of research questions—in a variety of sophisticated ways. To my mind, this is perhaps key to understanding what “maximizing” might mean, insofar as a digital medium can sustain the imagination of the research queries with powerful and efficient ways to answer the riddles driving our research.

The third, and perhaps the most exciting, relates to a new method of transcription available in a digital medium. The image of the fragment can be tagged with Regions of Interest (ROI) and be associated with an array of meta-data. Interoperability is possible vis-à-vis XML/TEI or JSON encoding standards; hence, it would be possible to associate the position of the word with the additional meta-data and interpretative decisions. To use the example of 1QIsa* Pl I 1 again,  

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6 The XML examples here are meant only to exemplify the point under discussion.
A Simple Example of eXtensive Markup Language (XML)

<line num="1">
  <word loc="1.1">חזון</word>
  <word loc="1.2">ישעיהו</word>
  <word loc="1.3">בן</word>
  <word loc="1.4">אמוץ</word>
  <word loc="1.5">אשר</word>
  <word loc="1.6">חזה</word>
  <word loc="1.7">על</word>
  <word loc="1.8">יהודה</word>
  <word loc="1.9">ו</word>
  <word loc="1.10">ירושלם</word>
  <word loc="1.11">ב</word>
  <word loc="1.12">יומי</word>
  <word loc="1.13">עזיה</word>
</line>

A (More) Complex Example of XML
The above example could be expanded to include many levels of data (and account for different types of data), such as the transcription variants above, syntactical tagging, and scribal hand, or different morphology based on variant readings, only to name a few—all stored within a relation database management system (RDBMS). In addition, perhaps the most intriguing aspect is that the sophisticated linguistic analysis we have come to expect in our use of computer assisted research is linked to the primary data of the images. Thus, if we ran a search for any particle (PRT), the visual results would be inherent in the image. Indeed, morphological decisions will stand on the validity of transcriptions—yet morphological options can be included on the difference of proposed transcriptions [See Pfann’s transcription above ובימי]. One could essentially navigate through the search results, while maintaining visual contact with the artifact. In addition, an available concordance could be easily accessible, which it too could account for and display transcrip-
From some of the above examples, it stands to reason that a digital edition is firstly an edition in a digital medium. The digital medium is limitless in the various ways data can be populated and manipulated. Because we stand on the last sixty plus years of scholarship, it is possible to make the images of the scrolls the primary feature of the digital edition. Not only would the previous scholarship invested in DJD make its mark in a digital edition, but it could also become part of the digital edition. Improvements can be made simply on the basis of the layouts and arrangement of the data, but improvements are likewise applicable to how editions are conceived. Merely duplicating DJD in a print edition would have the value of accessibility, but the wealth that the data holds for the third generation of scholars is arguably more valuable if these volumes were “enhanced” so to say by the digital medium under the supervision of scrolls specialists.

Thus, we might say that maximizing the scrolls in a digital edition is a means to accompany and foster the imagination of the researcher. Images are constantly in view, but these images stand on a host of interrelated and interlinked data, including means to perform powerful linguistic searches. Moreover, the nexus between philology and historical linguistics is consistently in dialogue with one another—because the data is raw, meaning, we constantly are reminded that our
data is fragmentary—limitations will always exist. Nevertheless, it seems that digital editions can erase some limitations imposed on us in print editions, and open up new vistas in our analysis of the scrolls.