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### Abstract

This article discusses digital “genetic” editing, that is the philological analysis (and presentation) of the processes behind the creation of literary texts; and it does so from out of the perspective of a user-reader. Research on such processes is mainly based on draft manuscripts or typescripts that authors have left behind intentionally or accidentally. Creative note-taking, revisions, proof-readings, cross-linking and additional material makes them a complex and interwoven set of data requiring specific analytic tools and reading and research environments for both general and specialist readers and users to understand them better. The article illustrates the idea of pre-electronic genetic editing and the significant changes it is undergoing in the digital era by comparing two editorial projects on renowned authors, one in print and one digital: the so-called “Frankfurt edition” of Friedrich Hölderlin, and the Samuel Beckett Digital Manuscript Project. The article discusses these in particular as “reading environments” (or user interfaces) designed for “critically experiencing” authorial writing processes in both the print and the digital medium, and proposes directions for future research in this area.

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### Keywords

Textual genetics; Digital manuscripts; Editorial scholarship; Digital Humanities;

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## Introduction

### TEXTUAL GENETICS

Main enterprises in Digital Humanities are directed towards digital research environments. Being designed as they are as containers for the stores of information and knowledge content available in cyberspace and tappable (as the case may be) through “cloud computing,” they tend, by and large, to be conceived of at the macro-level (as it might be called) of the interdisciplinary Digital Humanities endeavour. Yet at the same time, wherever a humanities discipline in itself is text-centred, the hub of any such research environment will be textual, and its reference basis therefore a text. This situates the Digital Humanities research environment in proximity to the scholarly edition of old, the critical presentation of a text, a group of texts, a (literary) work. Concomitantly, therefore, methodological developments in the field of editing are (not unsurprisingly) at the present time engaged upon modelling the scholarly edition itself as a research environment. This, comparatively speaking, is an endeavour on the “micro-level”: it explores and relationally networks the variability and self-reflexivity of works and texts in their given languages both in themselves and in their implications for meaning and significance. Deploying the digital medium puts the scholarly edition in a position to re-establish what historically has been its essential mediating function: namely, to aid a critical understanding in historical context of texts and works of the cultural transmission. Centrally, moreover, the medium furthers a re-conceptualizing of the notion of “text” itself.

Texts are from their outset rarely stable and unproblematic. Whatever their genre: literary or philosophical, or historical records, law texts, encyclopaedias or manuals, texts are always in their very substance variable. Typically, indeed, since texts always go genetically through processes of composition and revision, their variation is diachronic. Or, in other words: texts evolve over time, and while authors re-work their texts, the historical and social context might change as well. This genetic variation is already an incentive for the modern scholars to interpret the original source for its knowledge and understanding, which can then be further interpreted through subsequent editions made within the digital research environment. To the literary scholar and critic specifically, therefore, the scholarly edition as a digital research environment holds the power to correlate (again) effectively literary and textual criticism.<sup>1</sup>

The genetic dimension of texts has today become an established centre of interest and exploration in literary criticism and textual scholarship alike. But it is a challenging task too, as the non-linearity of the textual and other data in question and its temporal as well as interpretive dimension appears to be a non-trivial problem, calling for digital methods. This means, genetic editing is of comprehensive interdisciplinary concern for Digital Humanities. The need to respond to this concern has been recognized by the Text Encoding Initiative (TEI) consortium, curator of the widely used principal system for infra-structuring text data. At the core of this system, “Guidelines for Electronic Text Encoding and Interchange” have been proposed for more than 20 years. Since April 2012, TEI has incorporated the foundations for basic diachronic markup and hence allows encoding *works* (the term “text” would be too narrow in our case) with a genetic dimension in mind.<sup>2</sup>

While much effort has been spent on providing means for representing textual data and its genetic dimension in a digital format, less attention has been given as yet to processing this data and presenting it to the scholar in a reading environment.

### ELEMENTS OF THE *CRITIQUE GÉNÉTIQUE*

The genetic dimension of texts can be regarded from different perspectives depending on the underlying notion of the nature of “text” and the purpose of your research in the context of textual criticism. On the one hand, for traditional editing, this genetic dimension has been employed in order to eclectically constitute the “correct” edited text to be given in an edition of, say, a literary work. Hence, it can be seen as a supportive means towards an edition as a product of textual scholarship. The edition would then serve the purpose of providing a stable basis for further investigation, especially for hermeneutic, interpretative analyses.

In contrast to this, the French school of *critique génétique* emphasizes the critical analysis and interpretation of draft manuscripts.<sup>3</sup> It does not aim at the establishment of a stable text, but foregrounds the genetic dimension of texts itself as the basis for scholarship. Its aim is to disclose writing processes rather than to establish a textually stable end-product. This disclosure would allow the interpretation of writing processes, using manuscript material as a basis. It particularly supports the formulation and testing of hypotheses about the creation of a literary work within its historical and intellectual contexts.

*Critique génétique* then needs to consider all written material relevant for the creation of this particular work (the so-called *dossier génétique*) and to bring the various pieces into relation with each other. At the core of this approach, one would diligently and systematically document writing processes under both their textual and their inscriptional aspects: as basic operations on text (writing, deleting, adding, replacing, transposing, providing alternatives) and as topographic arrangement (*mise-en-page*) of text, textual fragments, and other elements on the manuscript.

### *Typical research questions*

Textual genetics allows research queries such as: “in Whitman’s revision of ‘Sleepers,’ list all changes that the word ‘Lucifer’ has undergone;”<sup>4</sup> “what changes did Joyce perform across the *Ulysses* text on a given date/within a defined time-span?;” “for Goethe’s composition of *Faust*, show a delimited stretch of text in a parallel display of successive versions;”<sup>5</sup> “display for comparison a transcription of the sequence of writing events versus a transcription of the text result of that writing.”<sup>6</sup> Thus, considered in more general terms, textual genetics formulate requirements of and for literary analysis and interpretation. Sample functions of a genetic edition in aid of critical pursuits may encompass:

- calling up document page images as the material foundations (virtualized) for exploring the writing, the text, and the editing;
- viewing the stratification of the genetic levels in images and transcriptions in their entirety;
- exploring (diachronically) the writing processes in drafts and draft sequences;

- exploring synchronic authorial performance (what happened at the same time across a *dossier*?);
- isolating a self-defined state of development of the text:
  - as level-only text (clear text),
  - as genesis or clear text up to given level,
  - as level only with its changes (overlay) towards the next level, (also with in-document sub-stratification, where applicable);
- registering and evaluating the editorial performance.<sup>7</sup>

#### TEXT-CENTRIC VS. DOCUMENT-CENTRIC

Genetic textual criticism in preparation for genetic editing teaches us to observe two general views on the material: a document-centric and a text-centric view. They are not, in principle, mutually exclusive. The document-centric view regards the document as a physical carrier from which, wherever it is itself a site of writing, the processes of that writing may be retraced by way of analysing its arrangement in the given document space and in terms of its diverse writing materials, as well as by making correlative sense of the text snippets, notes, markers, drawings and the like that the acts of writing have left on the document. The arrangement (*mise-en-page*) on such documents plays an important role (Gabler, 2007; Pierazzo, 2008), and all their traceable features could be characterized as a “protocol for making a text” (Ferrer, 1998). The text-centric view, by contrast, focuses on the text a document carries, be it a text as the result from the writing, reconstructed from the various stages or phases the texting went through on the document, or be it a straight (e.g., in a fair copy) or a “clean” reading text. Textual criticism for conventional scholarly editing in the book medium has been dominantly, if not exclusively, text-centric. This has remained true even where the discipline has focused on editing manuscripts (as has in particular the German mode of *Handschriftenedition*), but has at the same time had no alternative to the publishing of such editions in book form. Yet the alternative has arrived with the digital scholarly edition. Here, the document-centric and text-centric views may be brought together to re-enforce each other and thereby to support the editions’ users in understanding the dependencies between document and text. Consequently, scholarly editions in the digital medium should be constructed as research environments for the benefit of its user-reader so interfaced as to fulfil the traditional purposes, as well as to enrich the potential of editions as sites for reading, analysis, and study.

#### Reading environments

When it comes to a genetic view on literary or comparable works, the underlying data becomes complex and multi-dimensional. The data is multi-dimensional because sequentiality, or more generally time, plays an important role in writing processes and underlies other levels of data such as the spatial dimension of a manuscript page, the text itself as a sequence of characters, or private notes of the author to her- or himself on the page that accompany composition and revision. Reading and study environments need to take this into account.

In the following, we discuss two reading and study environments for genetic editions, one is print-based, the other digital. We highlight them in features in which they agree or differ, on grounds that such features are medium-independent, or else predicated by the respective medium as different. We make no attempt, however, at a systematic

survey of print-based versus digital genetic editions. The print-based example we focus is the “Frankfurter Ausgabe,” an edition of the works of Friedrich Hölderlin by Dietrich E. Sattler. As an example for the use of the digital medium and the internet for genetic editions, we have chosen the Samuel Beckett Digital Manuscript Project, directed by Dirk van Hulle and Mark Nixon and in particular the edition of *Stirrings Still*. We consider both editions as exemplary as well as highly influential (the Hölderlin, provenly, and the Beckett, yet potentially so) for the development of genetic editions in the respective media print<sup>8</sup> and Internet. These two editions are moreover in many ways comparable on a general level:

- They draw significantly on genetic criticism but see it not as the end of their endeavour. Instead, they deploy it in the service of textual criticism and consider textual genetics therefore as a significant foundation for constituting edited texts.
- Both follow the principle of distinguishing record and interpretation (“Befund und Deutung,” Zeller) and consequently differentiate clearly between document and text. (When it comes to markup however – i.e., the internal representation of data in the digital medium – it is true that the Beckett project claims to be text-centric only; this question is irrelevant for the print-based Hölderlin edition.)
- Both projects are comprehensive; each aims at editing the complete works of the author in question. While Sattler’s edition is finished (20 volumes produced between 1975 and 2008), the Beckett project is only at its beginning – the first “research module” (which we understand as the project’s digital equivalent to a print volume) was launched in June 2011, 25 more modules are to follow in the future.
- Both are editions of “canonical” authors: of Hölderlin as a major figure in German early nineteenth century Romanticism; and of Beckett, a twentieth century Irish Nobel prize laureate.

#### THE BOOK-BASED READING ENVIRONMENT

The example is taken from the “Frankfurter Ausgabe,” an edition of the complete works of Friedrich Hölderlin, edited by Dietrich E. Sattler in 20 volumes between 1975 and 2008 (it figures publicly still under the traditional label “historical-critical edition,” current in German scholarly editing). Johann Christian Friedrich Hölderlin (1770–1843) was an important German Romantic poet around the onset of the nineteenth century. Sattler not only considers early drafts of Hölderlin’s manuscripts towards establishing and constituting ultimate text; as the editor, he also presents Hölderlin’s writing processes to the modern reader. Sattler views the edition himself as a “chronologisch-integrale Edition” (chronological-integral) – a term admittedly though that is not found before Volume 20 of the series, which was published in 2008.<sup>9</sup>

One of Hölderlin’s early poems, *Adramelechs* (dating from 1785), illustrates how the edition functions as a reading environment for the modern scholar or lay reader. In Hölderlin’s final version (Sattler calls this version “IIB”), the poem reads:<sup>10</sup>

*Adramelechs Grim erwachte des Höllenbewohners:  
Hölle sinke tieffer hinab, Adramelech wütet  
Staune Satan du verzweifle König der Hölle,*

Nur Adramelech bleibt groß - entdeck ich die grossen Entwürfe  
Dann und meine Gedanken, die den Olympos beherrschen,  
Seinen Rath vereiteln, wie werden die schwächere gaffen,  
Satan wird vom Thron mit neidischem Stolze herabschaun,  
Du Jehova sollst bald in deinem richtenden Grimme -  
Dieses dein Israël soll dein Rachedonner zerschmettern,  
Oder Mein Geist ist hin - verlohren des mächtigsten Kräfte.  
So sprach er - und kehrte mit Wuth zur Hölle zurüke.  
Sein verschlagener Stolz versammelte alle Gestalten,  
Alle Schrecken des Tods um sich her, um seines Regenten  
Schreckenvolle Pracht an sich den Geistern zu zeigen.  
Und so fuhr er ein, die zitternde Geister der Pforte  
Öffneten ihre knarrende Thore weit auf, mit Erstaunen  
Sahn sie seine schreckbare Wuth, mit flammendem Zorne  
Wie nur selten Satan ergrimt, dekt' er die höllische Ränke.

One manuscript documentation (42/2,3) of this poem is extant. Figure 1 shows this manuscript as inscribed and revised by Hölderlin.<sup>11</sup> We can easily observe several layers of textual revision, out of which the philologist Sattler by thorough analysis privileges two, and constitutes out of them two versions, that, in his terminology, constitute two phases of the writing process: a first draft (I, beginning with the line *Jetzt erwachte der Grimm, der wütende Stolz Adramelechs* instead of *Adramelechs Grim erwachte des Höllenbewohners*;) and a second draft (IIA) with revisions (IIB).

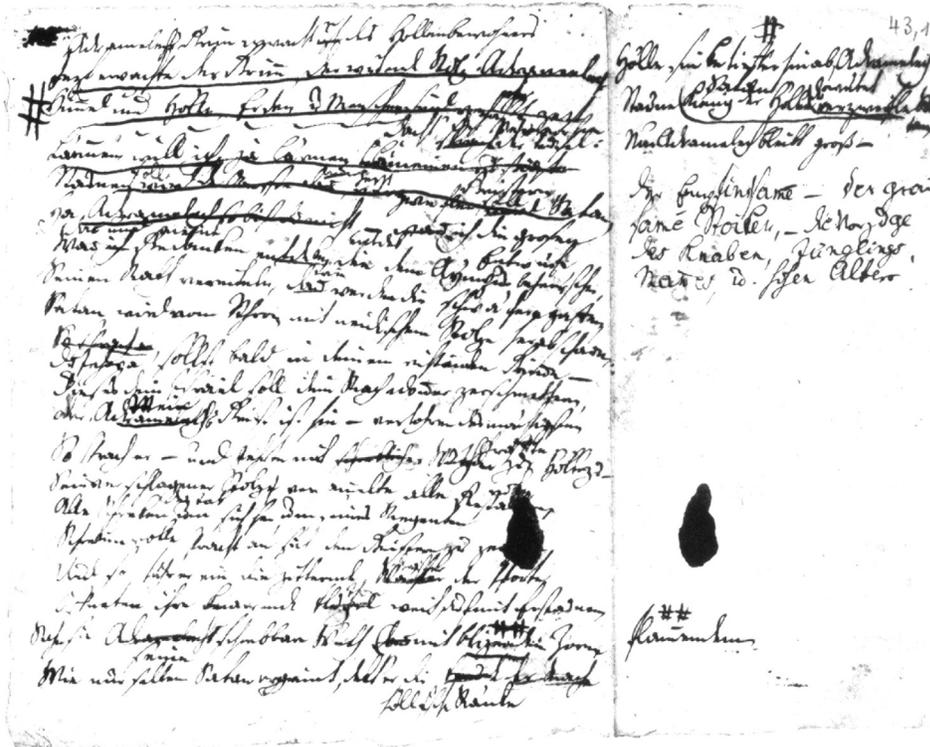
The edition grants its readers access to the material on four different levels: first, the manuscript image as seen, second a “differentiated transcript” (*differenzierte Umschrift*), third a “linear presentation of the text” (*lineare Textdarstellung*), and fourth the edited text (*Textkonstitution*). The presentation of the material follows a set of editorial principles, differentiated by levels as follows.

**Manuscript image:** Presenting the manuscript image as facsimile in this example is straightforward. There is apparently only one manuscript that documents Hölderlin’s writing of this poem. Generally speaking, however, many and far more complex examples exist, comprising several manuscripts that document successively revised inscriptions of the same work or passages from it, and sometimes extending as well to additional material that played a role in the author’s writing process (the sum of such material called a *dossier génétique* by Grésillon).

**Differentiated transcript:** The differentiated transcript is a spatial representation of the writing as found on the manuscript (Sattler sees that writing already as “text” and terms the transcription *räumlich abgebildeter Textbefund*).<sup>12</sup> Sattler considers this transcript as the basis for the editorial text constitution. The transcript represents two results of his philological studies on the manuscript: first, the writing as such and its spatial arrangement on the page (*mise-en-page*) and second, the chronological layers of textual production. Sattler combines these two dimensions of space and time in one view, but differentiates between them by using different types and font sizes. To represent the spatial component of the manuscript, he uses a columnar representation of the progression, line-by-line, of the text inscription, alongside which he approximates the

location of pieces of extra-columnar writing on the given page. Compare, for instance, on the manuscript image (Figure 1) where the word “flammenden” was written by Hölderlin in the bottom right corner of the document, and how it has been typeset in bold in the differentiated transcript by Sattler (Figure 2). To indicate the chronology of

Figure 1: Hölderlin manuscript (Adramelechs)



Source: Hölderlin, Sämtliche Werke, Vol. I, 73

Figure 2: Adramelechs, differentiated transcript

[42/2] Adramelechs Grim erwacht<sup>1</sup> (ist) des Hellenbewohners  
 (Liest erwachte der Grim, der wütende Stolz [Adramelechs])  
 5 # (Himmel und Hölle, Erden u.) Menschen sind verhasst (zeit)  
 euchs  
 „dacht“ der Ver[ ]worfne.  
 (Lärmen[ ] will ich, ja lärmern (beil[ ]menen) rüßigen)  
 soll (sprach[ ] der Teufel.  
 10 (Stauen wird der Oberste (dan), verzweifeln (wird) Satan.)  
 (Höl[ ] Adramelech so bist du nicht...) (wan) ich die großen  
 Daß und meine entdek<sup>2</sup> Entwürfe,  
 (Wan ich) Gedanken (entdecke), diele deim[ ] Olympus beherrschen,  
 15 Seinen Rath vereiteln, (dar) werden die schwächere gaffen,  
 Satan wird vom (St)Thron[ ] mit neidlichem Stolz herabschaun,  
 (So sprach er.)  
 Du Jehova sollst bald in deinem richt[ ]enden Grimme –  
 20 Dieses dein Israhel soll dein Rachedofler zerschmettern,  
 (m)Mein  
 (o)Oder [ ] (Adramelechs) Geist ist hin – verlohren des mächtig[ ]ernisten  
 Kräfte[ ]e.  
 So sprach er – und kehrte m[ ]it (schrecklicher) Wunderth zur Hölle[ ]e zu-  
 25 rükel[ ]e.  
 Sein verschlagener Stolz[ ]e versaffelte alle Gestalten,  
 des Tods  
 Alle Schreken um sich her, um seines Regenten  
 Schreckenvolle Pracht an sich den Geistern zu zeig[ ]en.  
 30 Und so fuhr er ein, die zitternde (Wächter) der Pforte  
 Geister  
 Thore  
 Öffneten ihre (w)knarrende (Flügel) weit[ ] (Lauf mit (o)Erstaunen[ ]  
 35 Sahn sie (Adramelechs) schreckbare Wuth, ((daß) mit blizendem Zorne  
 seine (m)R[ ]  
 Wie nur selten Satan ertzigrimt, dekt<sup>3</sup> er die (Freude) (der Rache)  
 höllische Ränke

Hölle sinke tiefer hinab, Adramelech  
 42/3] wütet  
 du  
 Staune (König der Hölle) verzweifelle (Sa-  
 5 (tan).  
 Nur Adramelech bleibt groß –  
 Der Empfinsame – der grau  
 [ ]  
 same Stoiker, – die Vorzüge  
 des Knaben, Jünglings,  
 10 Maltes, u. hohen Alters.

Adramelechs Grim... ITHAB Der Empfinsame...  
 ## flammendem[ ]

42/2:1.2 erwacht[ ]e: SA erwacht[ ]e  
 2 Hellenbewohners: SA Hellenbewohners  
 4 euchs: SA [ ]e  
 5 Unterstreichung: SA Gedankenstriche  
 6 Ver[ ]worfne: SA Verworfen  
 7 Teufel: SA Teufel:  
 12 Höl[ ]e: SA Höl  
 13 entdek<sup>2</sup>: SA entdek  
 17 (St)Thron[ ]: SA (St)Thron  
 22 (o)Oder: SA Oder  
 mächtig[ ]ernisten: SA mächtigsten  
 23 Kräfte[ ]e: SA Kräfte:  
 24 m[ ]it: SA mit  
 33 (e)Erstaunen[ ]: SA Erstaunen  
 34 Wuth, (dann): SA Wuth (dann)  
 35 (m)R[ ]: SA R[ ]e  
 36 ertzigrimt, SA ertzimt.

42/3:4 verzweifelle: SA verzweifelle

Source: Hölderlin, Sämtliche Werke, Vol. I, 72

the writing inferable from the traces it has left on the manuscript and so to represent editorially, from genetically oriented analysis, the sequence of writing and revisions (which parts were early, which were added later, etc.), Sattler employs typography. He operates with different fonts and font weights as well as with diacritical signs to indicate layers of writing (*Schichten*) and operations on text (deletions, additions, overwritings, underlining, etc.). For example, Hölderlin's hand is generally represented in a grotesque font. The font weight then indicates the textual layer: light grotesque means an earlier text layer (*frühere Schicht*), medium grotesque an "intermediate" text layer (*mittlere Schicht*), heavy grotesque a later, more recent layer (*spätere Schicht*). In addition, a condensed font width indicates words that do not belong to the text in question (as seen in the first three lines, which belong to a different speech), and roman font is employed for hand other than Hölderlin. Operations on text are represented by diacritical signs such as (...) for deleted text or | for inserted text. It is the editor's interpretation, though, that assesses operations; they are not simply recorded. In Sattler's edition, all deletions, for example, are represented in the same typographic way regardless of how Hölderlin actually put the deletion in practice.

**Linear presentation of the text:** While the transcript is "document-centric," (i.e., focuses on the physical layout on the manuscript page), the linear presentation does not reproduce this layout. It is text-centric.<sup>13</sup> The linear presentation (as well as the edited text) is presented to the reader in a different section of the printed edition. These two sections are clearly distinguished: the first section labelled *Handschriften* (manuscripts), pp. 59-238, the second section labelled *Textedition* (text edition), pp. 240-521.<sup>14</sup> Sattler explains the linear presentation of text as a development from the spatial arrangement of textual layers towards a chronological succession of "phases" (*Phasen*) of textual production (*Textentstehung*). Such phases might be distinguishable as conceptual work, draft, fair copy, and revision (*Konzept, Entwurf, Reinschrift, Überarbeitung*) or simply a chronological succession such as first draft, second draft etc. For each phase Sattler constitutes a text which he considers being the "valid text" within this phase (*innerhalb einer Phase gültiger Text*). Again, Sattler operates with different fonts and font weights to indicate textual variation within the phase in question and in comparison with adjacent phases. Light grotesque, for instance, indicates text abandoned by the author (*aufgegebener Text*) and bold grotesque marks the "valid" text for the given phase. Text phases are numbered in Roman numbers, other textual variations in Arabic numbers, and stages of variation are indicated by depths of indentation. To indicate variation further, a system of diacritical signs is additionally used. Sattler also introduces a reference system for structuring the given work and counting acts, scenes, and verse lines. Though it must be mentioned here that these numbers do not constitute a comprehensive reference grid, but shift in their arrangement and application across the different stages of textual production (Figure 3).

**Edited Text:** The edited text<sup>15</sup> follows the traditional approach of providing a stable textual basis for further reference, reading, and study. If required, the edited text is accompanied by an apparatus (which is not relevant in our example).<sup>16</sup>

The whole set of fonts, font characteristics, and signs that are used in the edition for all levels (differentiated transcript, linear presentation and edited text) are listed and explained in their respective reference functions in the introduction to the

### Figure 3: Adramelechs, text constitution

Lineare Textdarstellung / Konstituierter Text

	I		
	Entwurf.		42/2 → 73
	<sup>1</sup> Jezt erwachte der Grimm, der wütende Stolz Adramelechs		3
1		<sup>2</sup> echs	4
	<sup>1</sup> Himmel und Hölle, Erden u. Menschen sind verhaßt jezt sprach der Teufel.		5,7
2		[nd] <sup>2</sup> dacht' der Verworfenne.	6
	<sup>1</sup> Lärmen will ich, ja lärmern beim		8
3		<sup>2</sup> bei einen rußigten Geistern,	8,9
	<sup>1</sup> Staunen wird der Oberste dann, verzweifeln wird Satan,		11
	<sup>2</sup> soll <sup>3</sup> nun <sup>4</sup> soll		9,10
4		<sup>5</sup> jezt	10
5	Ha, Adramelech so bist du nicht, – wann ich die grosen Entwürfe,		12,13
	<sup>1</sup> Wann ich Gedanken entdeke, de		14
		<sup>2</sup> ie dem	14
6		<sup>3</sup> n Olympus beherrschen,	14
7	Seinen Rath vereiteln, dann werden die schwächere gaffen,		16
	<sup>1</sup> Satan wird vom St		17
8		<sup>2</sup> Thron mit neidischem Stolze herabschaun,	17
9	So sprach er,		18
	v.3 Lärmen, v.8 Thron enden mit Abstrich, vmtl. keine Kommata.		

#### Konstituierter Text I

Jezt erwachte der Grimm, der wütende Stolz Adramelechs  
Himmel und Hölle, Erden und Menschen sind verhaßt jezt dacht' der Verworfenne.  
Lärmen will ich, ja lärmern bei meinen rußigten Geistern,  
Staunen soll der Oberste jezt, verzweifeln soll Satan,  
5 Ha, Adramelech so bist du nicht, – wann ich die grosen Entwürfe,  
Wann ich Gedanken entdeke, die den Olympus beherrschen,  
Seinen Rath vereiteln, dann werden die schwächere gaffen,  
Satan wird vom Thron mit neidischem Stolze herabschaun,  
So sprach er,

#### IIA/B

A Neuentwurf v. 1-4, Überarbeitung von I v. 5-9 und Fortsetzung; B Überarbeitung (vmtl. v. 1<sub>2</sub>, 3<sub>4</sub>, 5, 10<sub>4</sub>, 5, 15<sub>2</sub>, 16<sub>4</sub>, 17<sub>2</sub>, 4, 18<sub>3</sub>, 6).

Nach Unterstrichelung von v. 2 bis Menschen Streichung bis v. 5 nicht, Neuentwurf am oberen Seitenrand und, mit Einweisungszeichen, recto:

	<sup>1</sup> Adramelechs Grim erwacht' izt des H <sup>o</sup> llenbewohners		42/2 → 73
		<sup>2</sup> e [ö]	2
1			1
2	Hölle sinke tieffer hinab, Adramelech wütet		42/3: 1, 2
	<sup>1</sup> Staune König der Höle		4
		<sup>2</sup> le verzwei le	4
		<sup>3</sup> f Satan ,	4, 5
3	<sup>4</sup> Satan du <sup>5</sup> verzweifle König der Höle		2-5
	v.3 <sub>5</sub> : Inversion durch Umstellungslinien.		

edition (p. 8ff.). These listings can also be understood as a manual for using the edition. Sattler's system of qualifying different features of the textual production is sophisticated, yet not self-explanatory. For a reader, and in terms of the notion of a reading environment, the ease of access to the several levels varies. For example, in the differentiated transcript, the representation of the spatial dimension of the handwriting in print is intuitive and self-explanatory, the representation of the chronological dimension (layers) is not.

Considering the print-based edition as a "reading environment," it has three general parts: a para-text containing introduction and table of contents, and two major content parts: *Handschriften* with manuscript facsimiles and "differentiated transcripts," and *Textedition* with "linear presentation" and constituted texts. Reader navigation differs for each of the two major parts. The part *Handschriften* follows is the physical order of the manuscript material (in general: page by page) while *Textedition* arranges the poem as a unit. In the document-centric part *Handschriften*, the arrangement of the information is usually synoptic displaying the facsimile on one side of the book (either recto or verso) and the (differentiated) transcript on the opposite, allowing the reader to look at both simultaneously. The arrangement of the information in the text-centric part *Textedition* with the linear presentation of text is, as the name suggests, linear. As a reader, you have to read from the top to the bottom (usually over several pages), to follow the different writing phases in chronological order. "User interaction" in this edition basically means turning pages, using the table of contents and the introduction.

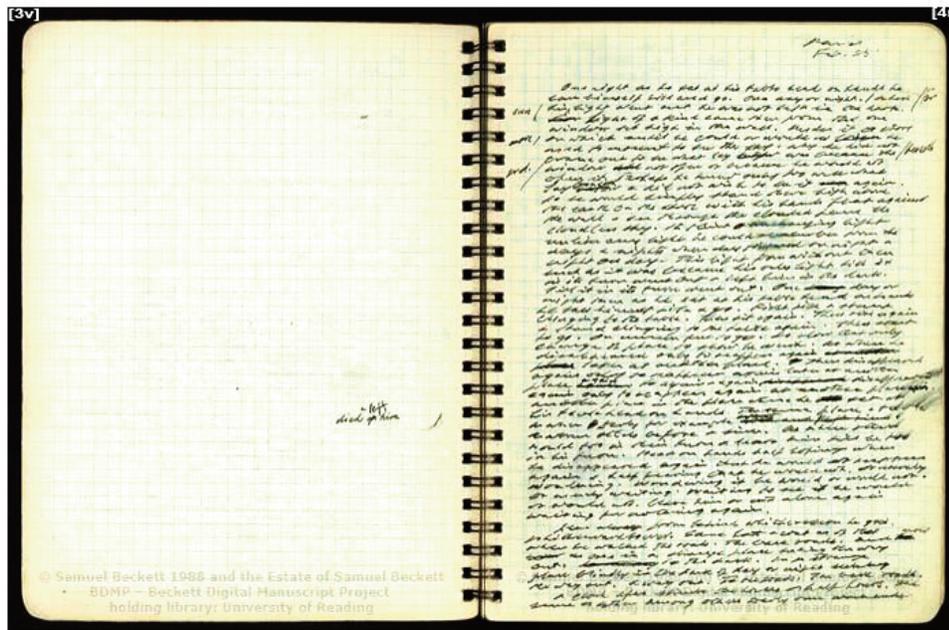
#### THE DIGITAL READING ENVIRONMENT

As an example for a digital reading environment for genetic editions, we discuss the following Samuel Beckett Digital Manuscript Project, a project directed by Dirk van Hulle from the Antwerp Centre for Manuscript Genetics and Mark Nixon of the University of Reading, and their partners.<sup>17</sup> According to its editorial principles, the Beckett Digital Manuscript Project (BDMP) "functions both as a digital archive and as a genetic edition" that "digitally reunites the manuscripts of Samuel Beckett's works and facilitates the exploration and examination of the genetic dossier from diverse perspectives."<sup>18</sup> Similar to Sattler's Frankfurt edition of Hölderlin, BDMP positions itself in between the two approaches of critical editing and *critique génétique*: "in critical editing, the critical aspect is notably presented in the form of an edited text; in genetic criticism, the critical aspect is present in the reconstruction of the dynamics of the composition process."<sup>19</sup> The BDMP tries to "accomplish genetic criticism's double task by (1) making Samuel Beckett's manuscripts accessible and (2) analysing the composition process in order to open the manuscripts' hermeneutic potential."<sup>20</sup> The editors have so far provided, as "research modules" within the BDMP two of Beckett's works, the story *Stirrings Still / Soubresauts* and the poetry collection *Comment dire / what is the word*. The edition<sup>21</sup> grants its readers access to the material on two general levels, "documents" and "chronology," and it offers additional functionality such as full-text search and various display options. We shall here focus, however, on two major areas – *documents* (with its three constitutive elements manuscript images, typographic transcriptions, and linear transcriptions) and *chronology*.

**Manuscript image:** the edition offers a "pageflip reconstruction" of Beckett's notebooks allowing the reader to browse through a digital reproduction of the notebook. This

feature mimics the “real” book and hence provides a pre-digital reading environment within the digital environment. However, it mainly presents manuscript images as facsimiles with a digital magnifying glass as a reading aid. As a “stand-alone” feature, the manuscript images and notebook emulations work as an archive in digital form (Figure 4), but they develop their potential only in combination with the textual features.

Figure 4: Notebook emulation (BDMP)

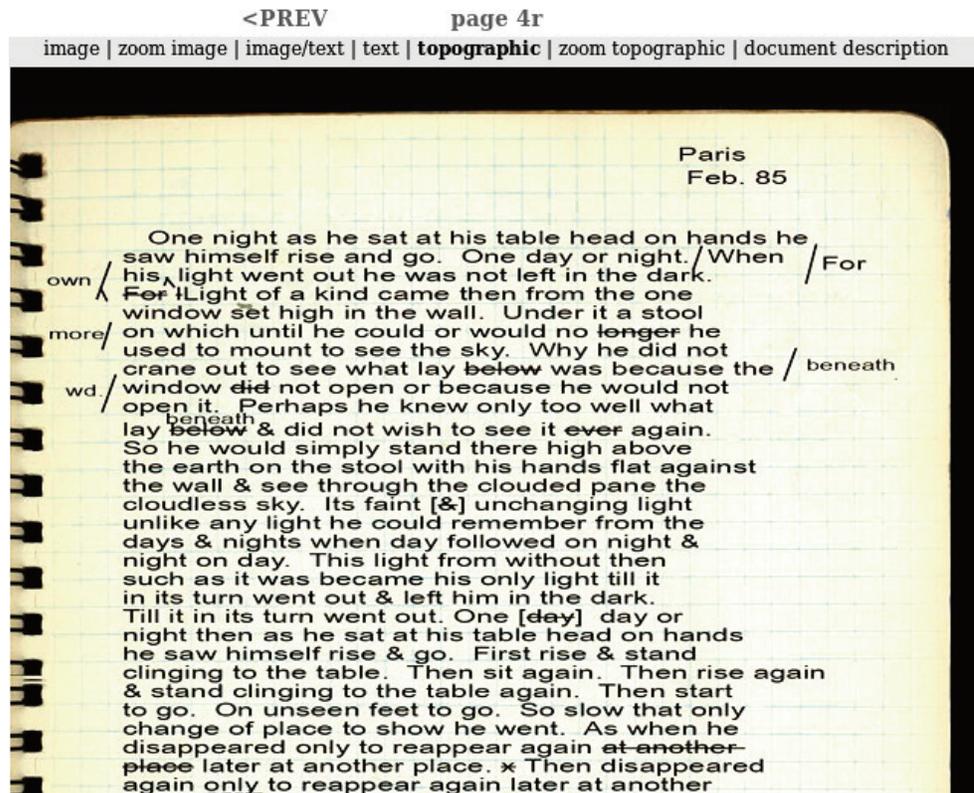


Source: beckettarchive.org

**Topographic transcriptions:** The topographic transcriptions (Figure 5) work pretty much like the manuscript images save that the displayed text is not in Beckett’s handwriting but in a digital font. It is a “graphic representation of the documents (respecting the layout of the pages).” This representation mimics how Beckett worked on the manuscript: if he struck through a portion of text with a line at a particular angle, the topographic transcription will display an approximation of this line at this same particular angle. If Beckett changed the colour of his pen or pencil, the topographic transcription will represent these colours as closely as possible, and so on. These are well considered features. They take into account Zeller’s distinction of *befund* (here: the line on paper at the same spatial position of a text) and *deutung* (here: the deletion of that text). The topographic transcription records portions of text that have been struck through precisely as portions of text struck through. They do not interpret them as deletions. In other words: the topographic transcriptions are not formalized or standardized; they are not representations of writing acts abstracted at higher levels of interpretation, but they are records of evidence observed without interpretation: “merely an attempt to recreate the impression of the original document (e.g., by reconstructing the topography, the font, and the type of paper).”<sup>22</sup>

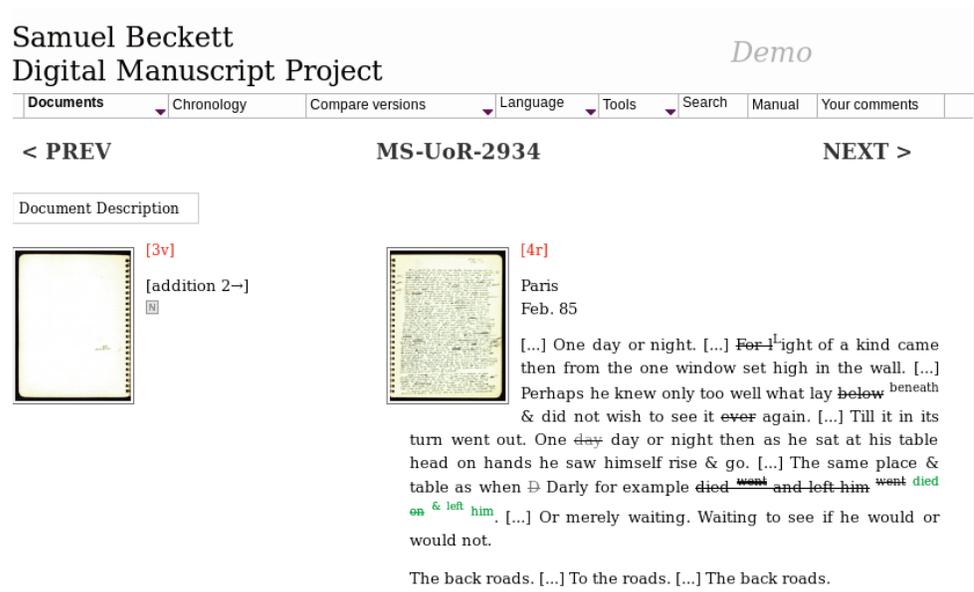
**Linear transcriptions:** The linear transcriptions (Figure 6) transform the topographic transcriptions to the level of interpretation. They build “a textual representation of the document” in a formalized way. The editorial principle behind this is to “translate the

Figure 5: Topographic transcription within BDMP



Source: beckettarchive.org

Figure 6: Linear transcription within BDMP



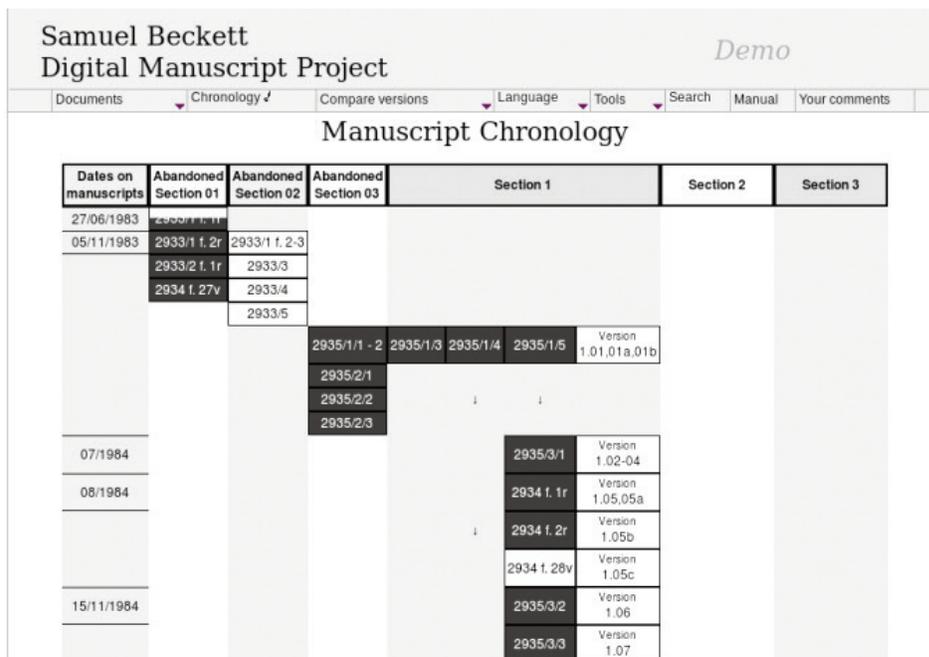
Source: beckettarchive.org

signs on the manuscript into a textual format, with as little diacritical signs as possible.”<sup>23</sup> Instead of diacritical signs, the edition uses typographical features such as strike-through for deletions, superscript for additions, grey colour for unclear reading, and bold font for metamarks. The linear transcription relinquishes the mimicking of

spatial arrangements on the page (*mise-en-page*) and hence proceeds from a document-centric to a text-centric view. It does not, however, suggest layers or phases of writing and hence does not take into account the chronological dimension of Beckett's writing production. It is a representation of text and operations on text.

**Chronology:** The genetic or chronological aspect of Beckett's writing performance is made accessible through two different user interfaces: a "genetic map" providing a general overview as well as access to the material on a document level<sup>24</sup> and a synoptic comparison of textual versions of the "same" part of the work.<sup>25</sup> The genetic map charts the "intricate composition process"<sup>26</sup> of Beckett's writing. The map has two dimensions: a time-line on the vertical axis and the general succession of the literary work (in this case sections of *Stirrings Still*) on the horizontal axis (Figure 7). The map visualizes the development of the work and shows when which parts of *Stirrings Still* were revised by Beckett, and on which documents. The map is relatively coarse, though, as the level of granularity is the "section" of which *Stirrings Still* has only three. On a level of increased

Figure 7: Genetic Map of *Stirrings Still* (extract)



Source: beckettarchive.org

detail, the environment allows its user to compare "versions" of the text based on either sentences, paragraphs or whole sections. The result is presented in a vertical juxtaposition of all versions (Figure 8) or in horizontal juxtaposition of two versions, randomly chosen by the user (Figure 9). This also provides an (experimental) direct link to a CollateX-based collation<sup>27</sup> of the "top layers" of all English versions on a sentence-level (Figure 10).

Considering BDMP as a reading environment, it has a clear structure through which the user is guided by drop-down-menus, but it does not suggest a linear reading or usage. BDMP provides two distinct views, the manuscript view (documents) and the text view (chronology). The manuscript view allows browsing through the manuscripts



independently, but follows the physical order of the manuscript material (page by page). It offers different displays of the material that can be used distinctly (i.e., you browse either only through the images or only through the text), or they can be used in various combinations. The general unit of navigation in the text view is two-fold: it can be a “revision campaign” (accessible through the genetic map), or a segment of the work on either sentence, paragraph, or section level. The genetic map especially allows the user a non-linear reading. “User interaction” in BDMP means browsing through the material in various ways, by searching, randomly accessing specific data, or manipulating several display options. BDMP also comes with para-texts providing introductions to the edition (editorial principles, a manual, and a technical description).

## COMPARISONS

The two editions highlighted here are comparably patterned. The BDMP documents view corresponds approximately to Sattler’s *Handschriften*, Sattler’s *Textedition* to BDMP’s chronology. The distinction between a document-centric and a text-centric view and the deployment of both perspectives link the editorial principles of these two editions. Despite the fact that they are based on different media for their reading environments, the two editions thus have much in common. This allows us now to compare their “performance”, that is the effectiveness and efficiency of their reading environments. Guided by the typical functions of genetic editions from a researcher’s point of view as previously outlined, we simply describe here how the user-reader needs to “operate” in, or interact with, the respective reading environment in order to achieve the given (selected) task.

When it comes to “viewing the stratification of the genetic levels entire,” we observe major differences between the two approaches/media: the Hölderlin editions provides an overview of the entire stratification through its narrative while BDMP provides a visual, graphical overview through a genetic map that is additionally, as mentioned above, interactive (i.e., it directly links to the textual layers in question). In the Hölderlin edition, access to any stratum (layer) the reader is interested in is granted by a linear presentation of the material that requires the user to understand and interpret typographic markup and diacritics employed by the editors and explained in the edition’s introduction. In other words: the users have to reconstruct the layers themselves. In BDMP, on the other hand, access to the stratum in question is given by automatic reconstruction and presentation without need for further intervention.

From the observation of these general differences in the underlying design principles, we may conclude that the two types of editions are – from the users’ point of view – equal in their effectiveness (i.e., the research task in question can be accomplished in both cases and should achieve the same results), but a major gain in efficiency through the digital medium is apparent (i.e., the same result can be achieved with significantly less effort in BDMP). This is most evident with regard to “isolating a self-defined state of development of the text.” In BDMP, this task can be tackled automatically with no more effort than a mouse-click. However, the user must accept the definition of “states” prescribed by the editor. If not, the isolation of the *self*-defined state needs to be done intellectually and requires the user’s manual excerpting, just as with the Hölderlin edition. BDMP does provide means for user-interaction, but it does not allow feeding

back user pre-settings. While the presentation of data is dynamic in a way that the user may influence it, the underlying data is not.

As already mentioned, we differentiated aspects of investigating the “development of the text”: as level-only text (clear text), as genesis or clear text up to a given level, and as level only with its changes (overlay) toward the next level (also with in-document sub-stratification, where applicable). It is, as already said, left up to the user to isolate intellectually and by manual excerpting self-defined states of development of the text in respect of any of these sub-tasks. BDMP, by offering appropriate display options, provides automatic means for this only for the first (level-only text; clear text). When it comes to the other sub-tasks, the BDMP’s user interface does not provide any means of support and leaves it again to the user to work them out manually. This is, however, not a limitation of the medium or the digital edition as such. It is only that the makers of BDMP have not (yet?) implemented these features. But which features (derived from which research tasks) need to be implemented in digital research environments? Unfortunately, there is not yet a common understanding of what a user interface for a digital edition, in general, and digital genetic edition in particular should provide (in terms of features or functions), let alone what it should look like and how it should interact with its user.<sup>28</sup> The list of “typical research questions” or research tasks as suggested might be a starting point for such a discussion.

The final item in this list refers to manuscripts as the material basis of those textual layers and their underlying textual operations that we have just discussed. We defined the research task in question as “to call up document page images as the material foundations (virtualized) of given textual (authorial or editorial) operations.” Here, if the printed edition is capable of providing high quality reproductions of these manuscript pages, a difference in efficiency of accessing these images is hardly recognizable. One flips through pages in the book, or navigates by mouse-click through the digital edition. The digital edition does have certain advantages in effectiveness, however, as it allows for zooming, panning, and other image manipulation operations.

The provision of such material foundations (manuscript images) is crucial for any genetic study. Transcriptions alone are important as they render text. But, since by the very act of transcribing they lift text off the manuscript materiality and accordingly reduce and curtail the given manuscript’s multi-faceted specificity, they do not render manuscripts in their immediacy. In the process of transcription, a transcriber is faced with a range of choices to be made judiciously:

- whether or not to observe the line-fall in the manuscript;
- whether to indicate shifts in inks and hands;
- how to render strike-throughs;
- how to indicate correlations, if any, between strike-throughs and additions;
- for text written in addition to text previously present, how to make known (if at all) that, say, the pencil line by which the addition was entered runs above the ink that was there before, as well as whether or not to record that additions were inscribed between lines, in the margin, at the top or the bottom of the page, or at whatever oblique angle elsewhere; and, furthermore,

- whether the manuscript's over-all appearance gives indication of more than one writing campaign over time, and under that aspect also how changes to be observed at a physical remove from each other (on the same page or perhaps many pages apart) might be interdependent and correlated.

Transcription under such a compass of considerations brings to the fore that its ultimate function could be to provide a four-dimensional extrapolation of the three-dimensional space of the original manuscript surface (the fourth dimension made explicit by interpreting the writing traces in terms of time: what came before, what after – relatively, or even absolutely – and when), and so to aid in translating a display of writing events into text in progression. It is clear that transcription in such challenging complexity is ultimately imaginable only in subservience to a representation of manuscripts, if not as originals, then as digital images in a digital edition.

Subservience is understood here as not menial; it is thoroughly functional. It is consequently a *desideratum* of high priority in the further development of digital editions to fully understand transcriptional mark-up functionally (not just formally), so as to map the functions and devise interface functionalities comprehensively answerable to them in all the analytical dimensions of the mark-up.

Taking all considerations into account, it appears obvious that the digital edition provides much simpler and more efficient access to the material and answers to research questions, and also shows that reading environments in the print domain have several drawbacks when it comes to complexity and multi-dimensionality of data. It also appears obvious that the digital medium allows functions that are not possible in print. The BDMP has clearly left behind the metaphor of the book, it does not mimic the print-based edition as so many other digital editions still do. But we believe that the potential of the computer and the computer screen as a medium for textual genetics is still far from being fully exploited. For instance, the digital edition of the letters of Vincent van Gogh (<http://www.vangoghletters.org>) provides a user-interface in which users can rearrange windows (for instance a text window and a facsimile window) according to their needs. The layout of the BDMP edition, by contrast, is rather static and cannot be modified/rearranged. One of the advantages of the book as a reading environment is that several books or other printed materials can be arranged around it on your desk. In the digital medium, such an arrangement can so far only be emulated by multiple (or by really large) screens; however, digital editions are currently designed and thus optimized for the standard computer screen and are consequently difficult either to “down-size” (to portable devices such as tablets) or to “up-size” (to multiple screens).

The two separate resources, digital and print, substitute for the time being for what should ideally be one integrated digital resource. This pinpoints, too, today's challenge to libraries. It lies in providing their holdings to users not only as “raw” materials (practically speaking: making their documents available, “just as they are,” in web-hosted digital reproductions), but beyond that to embed them in digital environments as aids to usage – whether on their own institutional strength, or in project consortia with scholars from outside. With manuscripts nowadays, archives and libraries commonly take the first step of digital imaging on their own initiative. From the point

of view of library users, however, this is merely a half-way measure. The researcher as library user (on-site or online) is commonly in dire need of digital reproductions accompanied with transcriptions as deciphering and reading aids. Not least of all, this is due to the fact that digital reproductions are just digital reproductions and not, materially, the original source documents themselves. The conjunction of originals/reproductions with reading and study aids would traditionally be seen as the normal product of scholarship, in other words, not a primary responsibility of a library. The present understanding emerging between libraries and scholars is that mutually reliant cooperation should be developed in the overlapping field of their respective expertise and interests. Consequently, reading environments for genetic editions call for joint library-and-scholarship enterprises: an innovative field much desired from both sides.<sup>29</sup>

### Notes

1. Although the questions discussed in this article are applicable to other genres (as, for instance, Rehbein, 2009, has shown for medieval city ordinances), we have chosen our examples from literary works and solely discuss them from the viewpoint of the literary critic.
2. The initial white paper (<http://www.tei-c.org/Activities/Council/Working/tcw19.html>) was co-authored by Lou Burnard, Fotis Jannidis, Gregor Middell, Elena Pierazzo, and Malte Rehbein. It has most recently discussed by Gerrit Brüning, Katrin Henzel, and Dietmar Pravida (2013).
3. Grésillon, 1994.
4. Cf. 'The Changing Shape of "The Sleepers," with special attention to the "Lucifer" passage' by Brett Barney, Ed Folsom, and Kenneth M. Price: <http://www.whitmanarchive.org/resources/sleepers/sleepers.html>.
5. Cf. Bohnenkamp et al, 2011.
6. Of course our sampling of research queries concerning a Walt Whitman poem, James Joyce's *Ulysses*, or Johann Wolfgang von Goethe's *Faust* is wholly arbitrary. It simply reflects a networking in which we happen to be engaged. Elsewhere, Malte Rehbein has discussed typical research questions that an historian might have been analyzing legal records of the past (Rehbein, 2011).
7. This list represents a sampling of functions envisaged for a prospective digital research environment for James Joyce's *Ulysses*, to be based on the critical and synoptic edition of 1984 as its reference grid. (James Joyce, *Ulysses. A Critical and Synoptic Edition*. Prepared by Hans Walter Gabler with Wolfhard Steppe and Claus Melchior. 3 vols. New York: Garland Publishing Inc., 1984, <sup>2</sup>1986.) This edition was originally published in three volumes in book form and was created comprehensively with computer aid, from first transcriptions and through all stages of the editing to its ultimate electronic typesetting. Its digital record, dominantly text-genetic in orientation, and thus distinctly text-centered, already encodes to that extent already all information required to implement digitally most of the functions

listed here. Nonetheless, as an historical instance of genetic or genetically oriented scholarly editing, the *Ulysses* edition precedes by a generation the examples discussed in the present essay and is therefore not anatomized along with them.

8. Other editions adopted “the editorial principles pioneered by Sattler” (van Hulle 2004, p.18).
9. The poem *Adramelechs* that we discuss in the following is put there in a chronology of all of Hölderlin’s work and revisions (p.18 for the year 1785):
10. Thanks to Harald Beck (Augsburg), we give a reading aid in English:  
Adramelech’s, hell’s denizen’s wrath awakened:  
Plunge deeper o hell, Adramelech rages  
Be thou astonished Satan, despair thou king of hell,  
Only Adramelech’s greatness remains – when I divulge the great designs  
Then and my thoughts that rule Olympus,  
Thwarting his counsel, how will the weaklings gape,  
Satan from his throne will look down with envious pride,  
Thou o Jehova shalt soon in the wrath of thy judgement -  
This thy Israel the thunder of thy revenge shall shatter,  
Or my spirit is lost – bereft of its mightiest forces.  
Thus spake he – and in fury to hell back returned.  
His perfidious pride assembled all shapes,  
All terrors of death around him, to show to the spirits  
In himself his ruler’s terrifying splendour.  
And thus he entered, the portal’s trembling spirits  
Wide opened their creaking gates, with awe  
They beheld his dreadful rage, ablaze with a fury  
Such as rarely Satan incenses, to veil the hellish plot.
11. Example taken from: Friedrich Hölderlin, *Sämtliche Werke*. Frankfurter Ausgabe. Hg. D.E. Sattler, Vol. I, (c) 1995, Stroemfeld Verlag, Frankfurt am Main und Basel. Reproduced with kind permission, <http://www.stroemfeld.com>.
12. Cf. Zeller’s distinction between *Befund* (record) and *Deutung* (interpretation).
13. Cf. the differentiation between document-centric and text-centric in markup proposed by an international group to the Text Encoding Initiative: <http://www.tei-c.org/Activities/Council/Working/tcw19.html>.
14. Page numbers refer to Vol. I only.
15. Other editions of Hölderlin’s works that do not pay attention to the genesis of the texts, provide only edited texts, usually with modern spelling, such as by Jochen Schmidt (1992).
16. As an example, see *Alexanders Rede an seine Soldaten, bei Issus* (manuscript: p. 67sq., text p. 281sqq.).

17. <http://www.beckettarchive.org>
18. <http://www.beckettarchive.org/editorial.jsp>
19. <http://www.beckettarchive.org/editorial.jsp>
20. <http://www.beckettarchive.org/editorial.jsp>
21. Available online at <http://www.beckettarchive.org>, but only on a subscription basis. The edition is accompanied by a series of books, published by University Press Antwerp (van Hulle, 2011). See also van Hulle (2009).
22. <http://www.beckettarchive.org/editorial.jsp>
23. <http://www.beckettarchive.org/editorial.jsp>
24. Sattler occasionally employs a similar, yet much more simplified, idea of a “map” that illustrates the succession of text stages (*Textstufen*). The poem *Einst und Jetzt* (p. 505) provides an example. One of the major differences, however, is that the “map” in the print-based edition is of course illustrative only and not interactive as in the digital edition where the user can click on elements of the map and be immediately redirected to the text stage in question.
25. A similar approach has been undertaken by Malte Rehbein in his digital edition of town ordinances of late medieval Göttingen. Similar to the BDMP’s genetic map, a two-dimensional matrix has here been implemented in which the y-axis represents the various topics covered by the ordinances (comparable to the sections of *Stirrings Still* on the east-west axis of BDMP’s map), while the x-axis represents a time-line (this is on the north-south-axis in the BDMP map). The text view of the *kundige bok-edition* provides either a single version of the text or two versions, randomly chosen by the reader in horizontal juxtaposition. Cf. <http://kundigebok.stadtarchiv.goettingen.de/>. For the encoding model employed here, see Rehbein 2009.
26. <http://www.beckettarchive.org/manual.jsp>.
27. <http://collatex.sourceforge.net/>
28. Rosselli del Turco (2011) discusses some of it.
29. Recently discussed in Mittler/Rehbein (2011), Dahlström (2011), and Stäcker (2011).

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