Digital Textuality, Autopoietic Editing, and the Courten MS

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ABSTRACT

       Jerome McGann has explained the functioning of text by appealing to systems theory, explaining that reading is an autopoietic process that operates as a feedback loop co-dependent with the reader. He uses this idea as a starting point in a critique of hierarchical methods of digital markup, such as TEI. By forcing the structure of the text to conform to a formula of ordered content objects, the autopoietic functionality is lost and, since the text can no longer be said to operate in the same way, the reader's engagement is irreparably altered. In his essay "Marking Texts of Many Dimensions," McGann calls for the development of digital tools that would allow for markup that preserves the ambiguity of language and, therefore, the autopoietic nature of text. Though such tools do not yet exist, something of McGann's vision can be realized by modifying one's notion of the process of digitization. If the entire movement of text from printed object to on-screen rendering is understood as an autopoietic system, the engagement that McGann desires can still be achieved using the common and open tools available today. My work digitizing MS Sloane 3961, William Courten's seventeenth-century financial records, demonstrates this.

       The process I followed can be read as an autopoietic system, despite my use of TEI in the marking of the text. By conceiving of the system as the reader/editor's interaction with successive iterations of the text, rather than with textual elements and bibliographic cues, the reader/editor is made aware of the inherent ambiguities and is forced to actively read and engage the ambiguity in pursuit of a digital text. The autopoietic functionality is introduced in the iterative nature of the process, in that iterations of the text are read and understood in the light of previous and subsequent iterations of the text. The rendered text becomes the record of the decisions that led to that iteration and representative of the numerous iterations that preceded it and surround it. This is seen in the solutions developed to effectively digitize and represent Courten's cipher.

ACKNOWLEDGEMENTS

To the child about to be born,

who marks a new stage.

In numerous books and articles, Jerome McGann has explained the functioning of text by appealing to systems theory, explaining that reading is an autopoietic process that operates as a feedback loop co-dependent with the reader. A text, it follows, is an "autopoietic mechanism" (McGann 1991, 15) wherein the ambiguity of language is preserved and encoded into its constitutive elements. McGann uses this idea as a starting point in a critique of hierarchical methods of digital markup, such as TEI. By forcing the structure of the text to conform to a formula of ordered content objects, the autopoietic functionality is lost and, since the text can no longer be said to operate in the same way, the reader's engagement is irreparably altered. Thus the digital text's state as a representation of the printed text is open to question and critique. In his essay "Marking Texts of Many Dimensions," McGann calls for the development of digital tools that would allow for markup that preserves the ambiguity of language and, therefore, the autopoietic nature of text. Though such tools do not yet exist, something of McGann's vision can be realized by modifying one's notion of the process of digitization. If the entire movement of text from printed object to on-screen rendering is understood as an autopoietic system, the engagement that McGann desires can still be achieved using the common and open tools available today. My work digitizing MS Sloane 3961, William Courten's seventeenth-century financial records, demonstrates this.

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McGann's critique does not exist in isolation and other theories of digital textuality and method can be read in relation to it. These theories can be seen to be reaching toward the same abstract goal and, thus, can insightfully inform to my work on Courten. For example, Peter

Shillingsburg's script act theory provides a method for analyzing the functionality that McGann describes. The processes of digitization, markup, reading, and editing are helpfully complicated by the welter of voices, which further resist the reductive tendency that McGann critiques in structured markup.

Markup as Autopoiesis

      The processes at work in the act of digitization – the transmitting of textual content from the inscribed text-object to a digital medium – have engendered numerous debates about the nature of the work being performed upon 'the text' and the meaning of that work. Though such discussions deal with the subject in abstract terms, the practical realization of the resulting theories can, in the same abstract terms, greatly influence the constitution of the digital text. The manner in which one programs the text to render and function, then, betrays the theoretical assumptions under which one operates. This further defines and limits the manner in which the reader will interact with the resulting text. One frequently cited example of such a debate resulted from the argument that a digital text was an "ordered hierarchy of content objects" (OHCO).[1] This thesis proposes that a digital text consists of a hierarchy of textual objects, such as paragraphs, sentences, stanzas, etc. Marking-up such a text requires that the editor describe the hierarchy of objects using a system of markup that disambiguates the objects, delineating their boundaries from all others. Such a definition allows for certain interactions with a text, and dictates the manner in which a text is digitally prepared. As such, the OHCO definition is well suited to the TEI standard as a method of preparation. The debate surrounding the OHCO thesis and the TEI carries with it a history that is not the subject of this paper and, as such, I shall not pursue it here.[2] I will, however, deal with Jerome McGann's critique of the assumptions that underlie the OHCO thesis and TEI, and the textual assumptions that underlie his critique. These assumptions, relating to the processes that are performed in the act of reading and that resist the reducing of text to singular hierarchies of objects, will similarly define one's interactions with a text and the manner in which a digital text is prepared.

      McGann invokes the language of systems theory to explain the functioning of the text in

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[1] This was first proposed in Coombs et. al. (1987), though an abundance of scholarship debating the notion has followed.

[2] See Robinson 2009 and Hayles 2003 for discussion of the key ideas in the debates and their implications.

the act of reading. Text operates as a poietic system that is, with the interaction of the reader, in the process of producing some *thing*, though the nature of this product depends on the constitution of the textual system and the input the reader brings to the whole. A system that functions by producing itself, whether a derivative iteration or a functional duplicate, is called autopoietic. By contrast, an allopoietic system is one that functions to produce something other than itself. This metaphor is one that McGann invokes in numerous books and essays. For example, in *The Textual Condition*, "books" are described as "autopoietic mechanisms operating as self-generating feedback systems that cannot be separated from those who manipulate and use them" (15). Thus the reader's interaction with the book produces an output that, to McGann's thinking, is a realization of the book as a system. The reader is essential to the operation of the system, such that the text, as a system, includes the interactions of the reader as a functioning component.

McGann emphasizes the importance of text-as-system in his discussions about markup and digital textual ontology. Textual models such as OHCO are inadequate, he argues, because "traditional texts are riven with overlapping and recursive structures of various kinds, just as they always engage, simultaneously, hierarchical and nonhierarchical formations" (2006, 62). These overlapping structures are excised in models such as OHCO. To do so is to limit the ability of the text to function as a printed text would. McGann does not suggest that the OHCO thesis is in itself incorrect, but adequate only for some purposes: "Hierarchical ordering is simply one type of formal arrangement that a text may be asked to operate with, and often it is not by any means the chief formal operative. Poetical texts in particular regularly deploy various complex kinds of nonlinear and recursive formalities." OHCO is, ultimately, too limiting a system because the reader's interaction with a printed text is not only with a hierarchical arrangement of content objects. This being so, the intentional marking-up of a digital text – the defining of its constitution – should reflect better the natural interaction that one has when reading a printed text. This interaction is, according to McGann's essay "Marking Texts of Many Dimensions," non-hierarchial, non-linear, and marked throughout with the preservation of ambiguities inherent in the use of langauge.

In "Marking Texts," McGann attempts to theorize an ergodic method of digital textual markup that more closely emulates the process of reading. Such a process, he says, "must be

social, historical, and dialectical" (199). So-called 'traditional' texts, those that are printed or otherwise inscribed upon a physical substrate, intrinsically demonstrate such a markup, which, McGann suggests, practitioners of the digital humanities must seek to emulate. The difficulty of such an endeavour arises because 'traditional' textual markup operates by marking "natural language so that it can be preserved and transmitted" (200). Structured digital markup functions by isolating and identifying textual fields and objects, arranging them in hierarchical relationships that serve to "expel" all ambiguity from the makeup of the text. According to McGann, the inherent ambiguity and redundancy of natural language is precisely what is preserved in 'traditional' markup: "This capacity [to generate equivalent redundancies and ambiguities] is what makes manuscript and print encoding systems so much more resourceful than any electronic encoding systems currently in use." As such, digital markup must be revisited and rethought. The issue is based in McGann's notion of texts operating as autopoietic systems. Such a system can accommodate the web of co-dependent relationships coded into the text and performed in its reading. The relationship, for example, of the lexical content of the text to the typeface in which it is printed and its location on the page represents such an irreducible network of co-dependencies. Further, the reader represents a further node in the relational web, a vital component in the system that allows the whole to function.

McGann's essay is an envisioning of a new system of digital markup and a call for such a system to be developed. Though no such system (as yet) exists, I propose that the multi-dimensionality that he desires can be intimated through other means. By conceiving of the entire process of digitization – the movement from manuscript to on-screen rendering of code – as an autopoietic system, the reductive tendencies of current digital markup systems are mitigated, destabilizing the hierarchical rigidity. The topological perspective that McGann desires can thus be realized as a process in time rather than just space. As such, the marking of the digital text, which McGann suggests is the encoding of a particular theory of that text, becomes but one potential outcome of the process of digitization. The rigid structure imposed *a priori* on the text by the likes of the TEI is thus placed in the context of the workflow and decisions that prompted its use. With such a view, editing becomes an heuristic and nonlinear task, wherein one's work is actively informed by one's work.

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Theorizing Process as Poiesis

  McGann cites the definition of autopoietic systems given by the originators of the theory, which is re-quoted here:

> If one says that there is a machine M in which there is a feedback loop through the environment so that the effects of its output affect its input, one is in fact talking about a larger machine M^1 which includes the environment and the feedback loop in its defining organization. (Maturana and Varela, quoted in McGann, 200)

While McGann's definition of textual autopoiesis focuses upon the output of the system that occurs in the act of reading and the relation of the output to the system itself, the Maturana and Varela's definition suggests that the nature of the system is defined by its input and the relation of input to output. The autopoietic output is fed back into the system as input, making the system cyclical. Its organization is closed and it, as a system, is stable in its operation. The allopoietic system, in contrast, is one in which the input does not consist of the previous output fed back into the system. The process is non-cyclical and potentially unstable. In McGann's textual nomenclature, the reductive effect of an *a priori* system such as TEI functions allopoietically. Without any allowance for unpremeditated encounter with the text, poiesis must depend upon the system from without. An autopoietic encounter, rather, is one in which the reader does not presume the structure of the text prior to the act of reading. The textual condition is thus allowed to function.

  Using this vocabulary, I propose that the process of digitization can be understood as an iterative system of textual production wherein each iteration of the text functions by producing a subsequent iteration, forming a new component in the ongoing cycling of the system. The system thus creates itself as it functions and thus meets McGann's description of an autopoietic system, one that performs "self-maintenance through self-transformation" (202). A web of co-dependencies is established between the various iterations and the editor, who is also incorporated into the system. I envision the process like this. The editor has manuscript a, which is electronically transcribed (or OCR'd) into b. The content of b is encoded in XML, creating document c, which, when rendered according to the accompanying CSS/XSLT document, generates and outputs on-screen text d. The entire process is a system that inputs a and produces d, with the editor's engagement with each iteration. The autopoietic nature of the

whole is suggested by the heuristic and cyclical nature of the process. For example, I am reading *d* and notice an error that necessitates a correction in the code of *c*. I return to both transcription *b*, to see if the error was occurred in the encoding, and to *a*, to see if the error was in my original reading and transcription, and corrections can be made with reference to these iterations. It may be that the error was in the original transcription, but the author's inscription on *a* is ambiguous and read with difficulty. The correct reading can perhaps be discerned with reference to *b*, *c*, and *d* as examples of what the reading *is not*. Should a correct reading remain elusive, it can be appropriately marked and returned to later. But, supposing that one identifies an error and corrects it, that correction, which was made with reference to other iterations of the text, may suggest a pattern of error throughout the transcription and its derivatives, suggesting a consistent error in reading. With this realization, further corrections can be made and one's ability to read the MS improves. In this way, editing teaches one to read.

This process can be compared to the autopoietic system in both the cyclical manner by which it operates and for the web of co-dependent relations that develops between iterations. Since each iteration becomes a new component of the system that informs subsequent iterations while re-interpreting prior ones, one can say that the process is creating itself through its operation, performing the aforementioned "self-maintenance through self-transformation." Such an editing process is non-linear and proceeds by identifying and utilizing the web of marked relations between iterations in the text. Being non-linear, the process is also one without a fixed point of termination. Each new reader/editor can, identifying an error in the process or new relation between iterations, modify the transcription or code, reorienting the web of relationships and potentially revealing new patterns of meaning that are read in the context of the entire process. While the editor may, until tools such as those that McGann calls for are developed, have to resort to the structured hierarchical markup such as TEI for the practical marking up of the text, to conceive of the entire process as I've outlined here allows for an engaged and informed reading prior to and following the marking up. The act of inputting the XML code to markup the text becomes but one stage of the process, one that is ever questioned and modified by every other.

Collecting Courten

The application of these ideas will be better understood with a concrete example. My work upon British Library MS Sloane 3961 is one aspect of Brent Nelson's larger project researching the Culture of Curiosity in the 16th- and 17th-centuries in England and Scotland. One of this project's goals has been the creation of a virtual curiosity cabinet, called "The Digital Ark," its purpose being to gather information from surviving records and provide a medium for analysis. My role within the project has been transcribing texts, editing and encoding these documents, tagging the contents appropriately and helping to populate a database of names, places, documents and other relevant information. The MS is one catalogue included in the project, a record made by William Courten (1642-1702) of acquisitions he made to his substantial collection of exotic artefacts, natural curiosities, numismatic fascinations, and art objects.[3] Courten was a naturalist and collector, associated with other notable collectors of his day, including the John Tradescants (Senior and Junior), Sir Hans Sloane, Elias Ashmole, etc. He was the grandson of the merchant Sir William Courten, who funded the colonizing of Barbados, even holding the deed to the island for a time. The basis of the grandson's collection was the items inherited from his father and grandfather, though he did increase its size significantly through his own travels and acquisitions made from other merchants, travellers, and collectors. Upon his death, Courten bequeathed his collection to Sloane who, combining Courten's with his own collection (which was already vast), bequeathed it all to the English nation, forming the foundation of the British Museum.

The MS is a codex of 186 folio leaves containing ledgers, lists, letters, and personal memoranda, most of it related to the collection. Since the purpose of the text was, presumably, personal record-keeping, little consideration was given to orderly use of space, consistency of abbreviation or the ability of others to read the text. Thus, within the tabular form of the ledger, records will curve above or below the line; braces will loosely join records; some characters are ambiguously inscribed and easily mistaken for others; cancellations are messily marked and insertions made in too-little space. Further to this is Courten's frequent (and inconsistent) use of an idiosyncratic cipher, for which a key remains. The text also bears witness to social nature of

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[3] See Gibson-Wood 1997 and Griffiths 1996 for discussions about Courten, his collection, and the place that this MS has within his extant writings.

collecting and the web of relationships of which Courten was a part. Names punctuate the entries, recording a social collection as much as a natural or antiquarian one.

The process of digitization began with a rich-text transcription of the MS from microfilm. I sought to reproduce the appearance of the inscription on the MS, though my understanding of the task grew as the work progressed. My initial difficulties in reading the Courten's handwriting, compounded by his use of cipher, are evident in the original transcriptions. Without a sound or standard method for the process, my transcription appears, in retrospect, haphazard and impressionistic. At times I denoted cipher within brackets, at other times I inserted "[Cipher:]" into the transcription to mark its use. I erratically expanded abbreviations. Additions and cancellations were inconsistently recorded. The list continues. Though the quality of the work improved as my understanding of the document and its place within the project increased, the earlier transcriptions record the errors and misunderstandings under which I operated. It retains an archaeological value, allowing one to conceive of the entire process of digitizing and preparing the MS.

The next part of the process was encoding the document in XML. At this stage in the work upon the MS, the concern was not to maintain and mark the tabular structure of the ledgers, but rather to tag relevant content for reference to the project database. As such, I tagged all references to the names of people (<name type="person">), locations (<name type="place">, and print sources (<bibl>). I differentiated header content from ledger content and marked monetary values and page tallies as separate <seg> entities. Courten's cipher characters were matched with similar Unicode characters and each occurrence of the characters in the MS was tagged with <g> nested within <seg type="cipher">. Each character is declared in the header of the XML document and content for each provided in the accompanying CSS document. Defining the content of the cipher in the separate document allowed for content transformations, so the editor could display either the representative characters (the cipher) or their Latin equivalents, or both. Since Courten's enciphered words are English words, the transformation allows for effective proofreading of the encoded document.

To allow for a greater understanding of the challenges of this document and the process of re-reading and correction that the autopoietic system allowed, one should examine a representative sample of the text. This is 32^r:

Things Bought in February march
8 April 1689

‖ ll s d

Qty	Description		ll	s	d
1	Doubls of ye Lrss oyster ~	‖	008	19	01
1	Singly Lrss oyster white 6	‖	—	02	06
1	Worms shell 6	‖	—	00	02
1	Bottls with a fish in in of ye Thames N. K.	‖	—	00	01
1	Brass meddall of Faustina Jun.r R Junonis Regina ~	ll	—	01	—
1	Comon nutmeg with its mare 6	ll	—	00	03
2	Coronation meddalls of K. Wm & Q. mary R re totus		—	14	—
	absumatur 575 ps				
1	Birth ps of K. charles ye 2d R. Hackenius Anglo ll	ll	—	02	06
	rem nulli				
1	Lacertus volans ex Java	ll	—	2	03	—
	of mr. Sherwood —				
1	Echinomelicactis Species	ll	—	10	—
1	Melocactus	ll	—	1	01	—6
	of mr. Wyat				
5	Large mochos &. 3a 5850. C 585 ps	ll	—	2	—	—
	of mr. Sherwood				
	Plants				
100	100 different seeds from ye Indies	ll	—	3	18	—
1	A box of moxa with ye Candles	ll	—	02	—
1	Land newt in a bottle	ll	—	01	—
1	A pescenius Niger in a Sardonix	ll	—	04	10
1	mocho werry white with black spotts	ll	—	10	—
1	Small mocho with a Landskip	ll	—	01	—
1	Emerald in its bedd 55	ll	—	2	03	—
2	small insects F	ll	—	00	02
1	Snaile shell found in ye midle of a ps of Lignum vitæ	ll	—	01	—
1	meddall brasse Innocentius IX. R Recti corde LI	ll	—	05	—
1	Gregonius XIII. br. D R Hugonotorum Strages	ll	—	05	—
		ll	23	6	— 1

Structurally, the page begins with a header providing a date and context for the data that follows. The page number at the top right was presumably added later, when the pages were collected and bound. Just below the page number are the column headings for value: "ll," "s," and "d." The body of the page is separated into three sections, the leftmost column being quantity, the central field being the description of the artifact purchased, and the rightmost columns being the amount paid for each artifact. The first value entry is the carryover from the previous page, and the final is the new total, which will be carried over to the next page. The structure of the page suggests the desire to retain order in his dealings, though the importance of the structure is secondary to

the content; the naming of the object can and will spread across multiple lines, these lines being joined at the right edge with a bracket.

The order in which the entries are listed is both chronological and social: the name of the merchant/traveller from whom Courten purchased is written in the middle of the central field. In this case, the heading "of M^r: Sherwood" is followed by "of M^r: Wyatt" and then again by "of M^r: Sherwood." This suggests that, within the window of "February March & April 1689," Mr. Sherwood sold to Courten at least twice, though Mr. Wyatt also sold to Courten between the Sherwood purchases. The diversity of Courten's interests is also displayed here. The natural objects (shells, seeds, preserved creatures, minerals) are mixed with human-made artefacts (medals, coins, bottles). Further, Courten's sense of financial economy is demonstrated. The entry "5 large mochos" cost £2, with a note ("c s8s ps") that each cost 8s, though the note ("3a s8s6ɔ") suggests that Courten valued the shells at 8s 6d each. It is worth noting that Griffith's reading of this format for recording value is the opposite of mine. He notes that Courten "had a price code, which I cannot understand; since he gives valuations not in code in the right column, I can only imagine that this code refers to the price that he paid" (269). My understanding is that the encoded value ("s8s" or "ɔ6ɔ" for 8 shillings or 6 pence) is the valuation, since the tally at the bottom of each ledger records the sum of the values in the right column, I thought this could only be a record of money paid out. The example of 29^r, which will be discussed later, further bears this out. Regardless, a difference in reading allows for an enriched engagement with the possibilities of markup and the subsequent iterations of the text.

Returning to 32^r, the autopoietic functioning of markup may unfold like this. The rendered text contains some content that does not seem to make sense. The first three lines have been rendered each with a 'G' that, when compared to the rest of the transcription, seems to actually be a malformed 'σ'. Returning to the MS, it appears that the Greek character is correct, though the inscription is ambiguous . Prior to my correction, however, the rendered text was read with the 'G', which suggests Courten's frequent abbreviation signified with a lower-case 'g'. The lower-case 'g' is used to associate a single object with the person by whom it was given. I thus return to my transcription and rendered text to look for other instances of the discrete 'G'; a misreading potentially begets a pattern of error, and insight can still be gleaned from the pattern. The names of the dealers with whom Courten dealt are also noted with interest. The "Mr

Sherwood" mentioned twice on this page is quite likely the same "–p shopLvvɔ" mentioned elsewhere. One questions why his name is enciphered in some places but not in others, but can confidently tag both names to the same entry in the database. I further note that the page is, overall, legible enough to provide a proof-text against errors on other pages.

Encoding to Decipher

Courten's cipher gives this document a distinctive character, distinguishing it from the other catalogues being included in the *Culture of Curiosity* project. It presents several challenges to the editor seeking to digitize it effectively. How can one best represent the enciphered data, and how will the enciphered text be distinguished from other use of the same characters? How can the purpose of the cipher be deduced? What is the nature of the system and how will understanding this affect the encoding and markup? It appears that the cipher is idiosyncratic and is employed somewhat erratically, for it cannot, as it is used, serve the purposes of either security or what could be called 'universality.' It functions as a substitution system, wherein most letters are replaced by a symbol that consistently signifies that letter. Courten wrote English words and simply replaced the letters with his private symbols, but not consistently; words are enciphered in some places and not in others, and single words are written in a mix of Latin letters and cipher characters. This alone seriously compromises any cryptographic potential suggested by the presence of the cipher. Further, had Courten consistently enciphered certain names, locations, or mention of activities, the simplicity of the system would have undermined the desire to obscure meaning.

Simplicity and inconsistency also rule out the possibility of the cipher's 'universality,' an idea comparable to the Royal Society's projected philosophical language. A glance at the examples in John Wilkins' *Essay Toward a Real Character and a Philosophical Language* show a marked difference in the nature of the system. Further, though the universal language was to enable communication without ambiguity or metaphor (a notion reminiscent of McGann's critique of TEI), Courten's cipher remains in places ambiguous, particularly when the cipher characters can be read as Latin letters. An example of this is in the header of 29[r]:
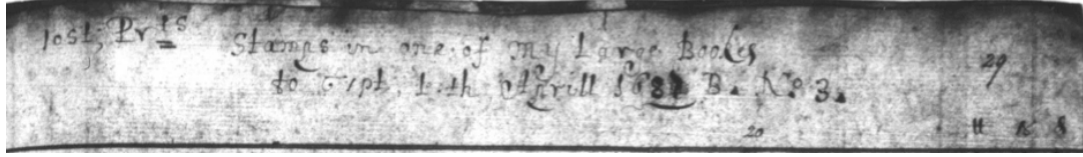
The header indicates that this page records "Stamps in one of my large Bookes to *part, with* Aprill 1689." (italics denote transliteration). In the upper-left of the page is an additional note: "lost Pr[ts]". This may suggest that the prints were lost or, if this is an ambiguous instance of cipher use, it would indicate that the items listed on the page, or the page itself, are the "best" prints. Lacking further data to support either reading, the decision remains the editor's. Such ambiguity, however, is counter to the intent of the universal philosophical language. I will note here that both Griffiths and Gibson-Wood gloss this instance as "best prints" with no mention of the enciphered original or the abbreviation. I agree that in this case the intended meaning is mostly clear, though to record the deciphering without mention of the original is counter to the autopoietic potential of the bibliographical condition of this text. It serves the purposes of their essays to "silently transliterate" the cipher (Griffiths 269), though a proper digitization of the text should strive to preserve the presence and appearance of the cipher.

Based on Courten's use of the cipher in a number of cases, though he was not consistent in his use of it, I suggest that the cipher is used to provide a secondary voice on the ledger sheet – it provides the potential for difference in time, identity, or intent. It can distinguish personal memoranda from business transactions, mark entries made at different dates, or, as mentioned above, differentiate an amount paid from a valuation. For example, 56[r] contains this entry immediately prior to the final tally:
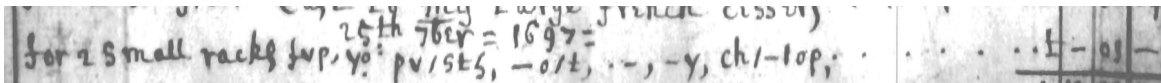
Deciphered, it reads: "for 2 small racks *for, y[e]. roasts, meat, in, my, chamber,*". In this example, Courten's use of the cipher is consistent, in that he does not mix cipher and Latin characters together. But this string does not appear to contain sensitive information that would require obscuration or encryption. In this case, the racks are meant for use in Courten's chamber and, as such, may represent a private purchase or purchase made for personal purposes recorded in the midst of the other transactions. The presence of the cipher, then, becomes a signal to himself of the different character of this particular transaction.

43^r contains an example of differences of time being marked. In the page header the following is written:

Shells bought of M^r: Jackson
    April y^e. 15th: 1691 nvt cat/ᴜvg\oɔ
    Catalogued 7ber y^e: 12th:

Deciphered, the second line reads: "April y^e: 15th: 1691 *not catalogued*". This example marks two different actions occurring at different times. The shells listed on this page were purchased of one Mr. Jackson and, presumably, not properly catalogued or entered into the collection. Knowing that the cataloguing would have to be done at some point, Courten marked this in cipher with the date. The presence of the cipher, then, serves to signify the incompletion of the act while it anticipates the future completion. Accordingly, the third line indicates that the shells had been catalogued on September 12th of that year.[4]

The cipher characters were also used frequently to indicate differences in value for any given artefact. This example from 9^r ("Sold out of y^e. Painters statuarys, grauers, &c.") demonstrates the interplay of difference that the cipher characters can signify, even when they are not used to encipher words:

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[4] Courten abbreviated September, October, November, and December according to their respective Latin prefixes: 7ber, 8ber, 9ber, Xber.

1 Titian by Aug. Caraccio		⊙vssos 1s	£ --- 05 --
1 Stefano de la Belle Hollar fecit s10s			
1 Raphael Urbin Pontius fecit s6s			
1 Cheualier Bernjnj Eq. oct Leon fec. s5s			
1 Raphael Urbin by Hollar	1sE	σ ɔ2ɔ	£ --- 03 --
1 Inigo Jones Uilla Mena f	3ᵈ.		

The first entry "Titian by Aug. Caraccio" was apparently sold for 5 shillings, but is marked with the enciphered note "*losses* 1s". Each of the subsequent artefacts is marked with a value in shillings or pence, indicated with 's' and 'ɔ' (being the cipher equivalent for 'd'). These entries are bracketed together and were collectively sold for 3 shillings. This collective entry is also marked with "σ ɔ2ɔ". I read this as follows: "ɔ2ɔ" indicates 2 pence, a formula that can be seen in the list of artefacts, where "s#s" indicates a value in shillings. 'σ' is the cipher equivalent of 'p'. In the context of the 'losses' noted above, I would suggest that 'σ' is an abbreviation for 'paid'. So if the "Titian" painting was sold at a loss for 5s, the other 5 artefacts, which, it seems, were purchased for a mere 2d, were sold for 3s. The presence of the cipher characters, used to encipher and to abbreviate, can thus suggest the dynamics of economy and fluctuating value. By preserving the presence of the cipher and providing the ability to decipher the text, this edition thus restores the autopoietic nature of the text; it restores the traces of interaction between creator and text, the reader and text. It acknowledges that meaning-making in the text is dependent on an understanding of the system that feeds into it.

 If, as I have proposed, Courten used the cipher to indicate difference upon the page, a question remains: how can this best be digitized and represented? Our solution was to mark the presence of cipher with <seg type="cipher"> and, nested within the <seg> tags is a <g> entity for each character. The <g> tags refer to characters defined in the header of the document, the rendered content of each being provided in the CSS document. Thus, for the lost/best example from 29ʳ, the code would be as follows:

```
<seg type="cipher"><g ref="#cpipe"/><g ref="#co"/><g ref="#cs"/>
<g ref="#ct"/></seg> Pr<hi rend="sup">ts</hi>
```

By nesting the enciphered characters within <seg> tags, we can differentiate them from the rest of the text – in code or rendered – and highlight their presence through the use of text colour. So doing, the reader of the generated text can gain a sense of the original textual condition through the preservation of the cipher, though the deciphered meanings are also renderable.

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The work of properly deciphering and encoding the cipher was enabled by an autopoietic process such as I have outlined above. My understanding of the cipher was improved by the ability to dynamically transform the represented text. Having transformed the cipher characters to Latin characters I could read the words I had encoded into the text and correct as needed, with reference to the rich-text transcription and the MS. Having made discrete corrections in this manner, my ability to read the MS increased as the accuracy of the digital text improved. In some cases, the discrete correction suggested a pattern or error, suggesting a consistent misunderstanding of the text. There is an interesting play of editing here, in that the author enciphered his words, encoding them, potentially, to hinder others from reading them, and now code is used to decipher them and read them. The text that we end up with is abstracted, then, by several degrees from that which Courten wrote, but it is through the abstraction that we are made able to read it, to discern the meaning in the different voices, rather than just the presence of the voices.

Poiesis and Script Acts

McGann's critique of structured markup does not exist in isolation. It, as a response to the questions and debates surrounding digital textual ontology, represents a trend of theory in the digital humanities seeking to dismantle reductive textual hierarchies. One such theory that operates tangentially to McGann's can provide insight into the notion of process as autopoiesis and the work upon the Courten MS. Peter Shillingsburg's script act theory allows one to focus on the nature of the agency being enacted upon a text in each of its iterative appearances. Shillingsburg develops a method and language for isolating and analyzing 'script acts,' these being "every sort of act conducted in relation to written and printed texts, including every act of reproduction and every act of reading" (40). The author performs a script act in the inscribing of a text, as does everyone involved in the preparation and printing of the text. The reader then performs a further script act in the reading of the text and reacting to it. The purpose of such a theory is to provide a means of questioning "how constructions of texts and constructions of understandings from texts in individual acts of writing and reading 'happen' (or don't)" (41). The resulting analysis is not necessarily concerned with the content of the understanding constructed in the act, and it further emphasizes the particularity of that understanding and its relationship to the particular copy of the text upon which the script act is performed. Script act

theory also emphasizes the ongoing construction of understanding in the process of writing and reading texts. Thus no script act is an island, but occurs as a product of the preceding script acts and also suggests the field of possible acts that could be performed in the ongoing process of writing/reading.

Shillingsburg's concern with the manner in which meaning is (or is not) constructed in the isolated script act operates congruently with McGann's interest in the poietic event. Just as the functioning of autopoiesis in the act of reading occurs in the context of textual condition, the reader's own actions and thoughts, and the lexical content of the text, so too does script act theory strive to account for the web of potential meanings and correspondences that are created in the act of reading. Script act theory can provide a useful vocabulary for work done on the Courten MS through its focus upon the act performed upon the text and its emphasis of the process in which texts are written/read. Further, it attempts to trace the manner in which one act leads to another, and the relationships that result between versions of texts, each version becoming both "spur and spoor" to further acts (50). Thus Courten's act upon the text affects my reading and the resulting transcription, which thus affects the encoding of the text in XML and so forth. Further, the process inherently has no terminal point. As such, editing a digital representation of the MS continues to reach back temporally to Courten's act of writing as it projects forward new resulting script acts. However, Shillingsburg's emphasis on the particularity of the copy of the work, being discrete from all others, does not necessarily account for the non-linear influence that one iteration of the Courten text has upon the others. While it is true that "no single copy represents a work in the same way that any other copy represents it" (40-41), the web of relations between texts – the irresolvable and non-linear fashion in which one iteration will influence and inform previous and subsequent iterations – is not explicitly represented by script act theory, which proposes a line of influence forward and back. Further, Shillingsburg flirts with a problematically platonic notion of the text – the 'work' that is reflected in each copy – and suggests that the 'work' is the sum of the particular witnesses and variations (76). The nature of the Courten MS, being an inventory of objects and artefacts, some of which are extant and bear witness to Courten's inscription, lead me to question this ontological premise. How shall the limits of the Courten MS, as a 'text' be defined when, for example, the artefact listed on 52^r, ("1 goose *Roman, god, found*, at Pauls", cipher denoted by italics), remains in the

British Museum? Can the artefact be somehow considered an aspect of the 'text'? To my mind, the limits are not easily defined or limited to merely the inscribed contents of the page. Incidentally, the "Digital Ark" addresses these connections by trying to encompass as much of this relational web of texts and things as can be collected. The distinction between 'text' and 'not-text' is blurred in the light of the interconnectedness of the entire project.

This theory, which operates in parallel with McGann's own theorizing of autopoietic textual functioning and markup, can inform the work done upon the Courten MS and the larger *Culture of Curiosity* project. They share certain ontological assumptions, though the practical application of each theory differs from the other. They can be read in concert as a complicating of methodology, one that is pragmatically helpful in that it confuses the practical steps pursued to achieve a practical end. By actively bringing numerous theoretical approaches to bear upon textual work and digitization, and by reading the theories in concord, the entire process of digitization, markup, reading, and editing is helpfully confused and resists the reductive tendencies that McGann critiques in hierarchical systems of markup.

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