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References

Biggs, M, & Huitfeldt, C 1997, 'Philosophy and electronic publishing. The theory and metatheory in the development of text encoding', *Monist*, 80, 3, p. 348, Humanities International Complete, EBSCO*host*, viewed 15 February 2013.

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PHILOSOPHY AND ELECTRONIC PUBLISHING. THEORY AND METATHEORY IN THE DEVELOPMENT OF TEXT ENCODING

This article is an account of an electronic discussion which took place between November 1995 and June 1996. A number of specialists in relevant research areas had been invited to take part in the discussion from the very beginning, and some were added later. Altogether 30 individuals subscribed to the list. The "target paper," written by Allen Renear, was sent to the list on November 27, 1995. The target paper alone comprised 8,500 words. The ensuing discussion, to which 9 of the members on the list made one or more individual contributions, comprises 30 entries of altogether 37,000 words. It is the function of this printed article to provide a brief summary and a key to the full electronic discussion which accompanies it.

There are quite a number of things that might be discussed under the heading "Philosophy and Electronic Publishing." For instance there are issues related to how computers, networks, and software can support scholarly collaboration and publishing within the philosophical community. However, this discussion does not take up these topics but focuses on a topic in the philosophy of electronic publishing, pursuing a particular set of philosophical issues that have emerged from within the electronic publishing community.

The issues in question concern the nature of text and those parts of texts, or features of texts, which are identified as important by the designers of text processing systems and other practitioners concerned with the representation of text on the computer, such as

scholarly editors and systems analysts. The natural history of these discussions is a case study in theory construction and reveals engineers, systems analysts and scholarly editors to be concerned with practical problems which raise philosophical issues. The course of this theory construction is a familiar philosophical dialectic from a kind of Platonism, through a more pluralistic Realism, to pragmatic Constructivism. The philosophical topics raised include the boundary between philosophical and scientific ontology, the nature of classification and natural kind terms, and Realism and Antirealism. The ensuing discussion in the electronic discussion group continued to evolve these arguments, mostly commenting directly on the target paper, but also commenting on an alternative theory introduced by Selmer Bringsjord, the so-called "JoPP" proposal.

1. Edited Version of Renear's Target Paper

Discussions of theoretical or philosophical issues in text encoding have always been important to our community and there has throughout been a certain amount of published critique and engagement: Mamrak et al. (1988) and Raymond et al. (1993) respond to Coombs et al. (1987), Fortier (1995) responds to an early version of the TEI Guidelines; Sperberg-McQueen (1991) responds to Fortier (1995); Huitfeldt (1995) to DeRose et al. (1990) and Renear et al. (1992), etc. I am particularly interested in how the views of textuality have evolved from a kind of Platonic essentialism to positions that seem more Antirealist.

Both the representation of linguistic content and the inclusion of additional information about either the editorial structure or the format of a document are generally included in the notion of text encoding.

Early computer systems used "format-based text processing." The data file typically consisted of (i) the linguistic character content (e.g., the letters of the alphabet, punctuation marks, digits, and symbols) and (ii) interspersed codes indicating information about that content. The identification of linguistic content is relatively unproblematic. Obviously certain patterns of formatting codes tended to recur and in the systematic use of these codes there was a natural tendency to identify a code not with its formatting effects, but directly with a type of text element. In the 1970s a number of software designers and computer scientists came independently to the conclusion that the best way to design efficient and functional text processing systems was to base them on the view that there are certain features of texts which are fundamental and salient, and that all processing of texts should be implemented indirectly through the identification and processing of these features. These features have been called "content objects" (DeRose et al. 1990) and this approach to text processing "content-based text processing."

The earliest endorsement of this approach was by software engineers who offered a theoretical backing which both explained and predicted its efficiencies (Reid 1981, Goldfarb 1981). But in the course of the discussion, some partisans of content-based text processing inevitably claimed more directly that alternative representational practices

were inefficient because they were based on a "false model" of text (Coombs et al. 1987, DeRose et al. 1990).

The two different approaches to text processing; format-based and contentbased, seemed to locate their differences in the kinds of markup they deployed. Text encoding theorists explored its nature, providing taxonomies and distinctions. Three types of markup in particular are typically identified: Descriptive Markup which identifies a particular textual element, e.g., "<paragraph>," "<title>," "<stanza>"; Procedural Markup which specifies a procedure to be performed, typically a formatting procedure, e.g., ".sk 3;.in 5;" meaning "skip 3 lines, indent 5 columns"; and Presentational Markup which consists of graphic devices such as leading, font changes, word spaces, etc.

The interplay between these three categories of markup during a typical instance of text processing suggests both that they mark salient aspects of text processing and suggests a certain priority for descriptive markup. An effort to standardize markup systems begun in the early 1980s and eventually resulted in an international standard for defining descriptive markup systems, ISO 8879: "Information Processing, Text and Office Systems, Standard Generalized Markup Language." (SGML) SGML is a "meta-grammar" for defining sets of markup tags. The technique for specifying these syntactical constraints is similar to the production rule meta-grammar developed by Noam Chomsky to describe natural languages. The principal vehicle for the development and standardization of descriptive markup for the humanities is the "Text Encoding Initiative" (TEI). There are several advantages to this kind of content-based text processing: composition is simplified, writing tools are supported, alternative document views and links are facilitated, formatting can be generically specified and modified, apparatus construction can be automated, output device support is enhanced, portability is maximized, information retrieval is supported, and analytical procedures are supported.

Phase one of the textual ontology was a form of Platonism. The earliest arguments for the content-object approach to text processing were not intended to make an ontological point about "what texts really are," but rather to promote a particular set of techniques and practices as being more efficient and functional than the competing alternatives. The straightforward ontological question posed by DeRose et al. (1990) "What is Text, Really?" was given a straightforward ontological answer: "text is a hierarchy of content objects," or, in a slogan and an acronym, text is an "OHCO." The claim is that in some relevant sense of "book", "text," or "document" (perhaps "qua intellectual objects") these things "are" ordered hierarchies of content objects. They are "hierarchical" because these objects nest inside one another. They are "ordered" because there is a linear relationship to objects: for any two objects within a book one object comes before the other. They are "content objects" because they organize text into natural units that are, in some sense, based on meaning and communicative intentions. In the writings and conversations of the text encoding community in the 1980s and early 1990s at least these five broad categories of arguments that text is an ordered hierarchy of content objects can be discerned.

Pragmatic/Scientific: Texts modeled as OHCOs are easier to create, modify, analyze, etc. The comparative efficiency and functionality of treating texts "as if" they were OHCOs is best explained, according to this argument, by the hypothesis that texts "are" OHCOs.

Empirical/Ontological: Content objects and their relations figure very prominently in our talk about texts, e.g., titles, stanzas, lines, etc., and in our theorizing about texts and related subjects such as authorship, criticism, etc. If we resolve ontological questions by looking to the nominal phrases in our theoretical assertions, then we will conclude that such things exist and are the components of texts. The persuasiveness of these arguments is increased by the fact that theories from many diverse disciplines, and even conflicting theories, are committed to content objects as fundamental explanatory entities.

Metaphysical/Essentialist: This is the classic argument from hypothetical variation, used to distinguish essential from accidental properties in scholastic metaphysics or, in a more contemporary philosophical idiom, to establish "identity conditions" for objects. Here one argues that if a layout feature of a text changes, the "text itself" still remains essentially the same; but if the number or structure of the text's content objects changes, say the number of chapters varies or one paragraph is replaced by another, then it is no longer "the same text."

Productive Power: An OHCO representation of a text can mechanically generate other competing representations, e.g., an OHCO representation can be formatted into a bitmap image, but none of these other representations can mechanically generate an OHCO representation. This is closely connected with the pragmatic/scientific arguments: that OHCO representatives are richer in information and are more effective for managing text processing.

Conceptual Priority: Understanding and creating text necessarily requires grasping the OHCO structure of a text, but does not essentially involve grasping any other structure. Therefore it is the OHCO structure that is essential to textuality.

If the forgoing arguments are good then the OHCO thesis: explains the success of certain representational strategies; is logically implied by many important theories about text; matches our intuitions about what is essential and what accidental about textual identity; is richer in relevant content than competing models; and matches our intuitions about what is essential of textual production and consumption.

Phase two was pluralistic. When researchers from the literary and linguistic communities began using SGML in their work, the implicit assumption that every document could be represented as a single logical hierarchical structure quickly created practical problems for text encoding (Barnard et al. 1988). For example, a verse drama contains dialogue lines, metrical lines, and sentences, but these do not fit in a single hierarchy of non-overlapping objects. Taking one particular sense of textual identity led the SGML community to assume that there was only one logical hierarchy for each document. However,

researchers from TEI found that there seemed to be many "logical" hierarchies that had equal claim to be constitutive of the text. Thus where the original OHCO Platonists and the designers of SGML took the editorial hierarchy of genre to be primary, the literary scholars of the TEI took the structures elicited by specialized disciplines and methodological practices to be equally important.

The natural modification of OHCO Platonism was to see texts not as single ordered hierarchies, but as a "system" of ordered hierarchies. Each hierarchy corresponds to an "aspect" of the text and these aspects are revealed by various "analytic perspectives," where an analytical perspective is, roughly, a natural family of methodology, theory, and analytical practice. Each analytical perspective (AP), e.g., prosodic, on a text does seem to typically determine a hierarchy of elements. The doctrine affirms the following hierarchy-saving principle:

AP-1: An analytical perspective on a text determines an ordered hierarchy of content objects.

AP-1 seems to reflect actual text encoding practices in the literary and linguistic text encoding communities. However, there are technical terms, such as "enjambment" and "caesura," that specifically refer to relationships between objects from overlapping families. Because a technical vocabulary can be considered a sign of an analytical perspective the existence of this terminology suggests that some analytical perspectives contain overlapping objects. However, one might attempt to accommodate this counterexample with a revision still very much in the spirit of recognizing hierarchies as fundamentally important:

AP-2: For every distinct pair of objects x and y that overlap in the structure determined by some perspective P(1), there exist diverse perspectives P(2) and P(3) such that P(2) and P(3) are subperspectives of P(1) and x is an object in P(2) and not in P(3) and y is an object in P(3) and not in P(2)

where: "x is a sub-perspective of y" if and only if x is a perspective and y is a perspective and the rules, theories, methods, and practices of x are all included in the rules, theories, methods, and practices of y, but not vice versa. Our simple Platonic model of text as an ordered hierarchy of content objects has given way to a system of concurrent perspectives. Moreover, Huitfeldt has pointed out that despite the apparent hierarchical tendency within analytical perspectives, not only is there no assurance that decomposition into ultimate sub-perspectives without overlaps is possible, but we can also demonstrate that it is not possible. Possible element tokens in some perspectives clearly overlap with other element tokens "of the same type." Examples of this are strikeouts, versions, and phrases (in textual criticism), narrative objects in narratology, hypertext anchors and targets, and many others.

Phase three was Antirealistic. Modifying OHCO Platonism to Pluralism introduces the role

that disciplinary methodologies and analytic practices play in text encoding. Some text encoding theorists see text encoding not as merely identifying the features of a text but as playing a more constitutive role. Pichler has made a number of statements that seem to be clear expressions of Antirealism, e.g.,

Machine-readable texts make it... clear to us what texts are and what text editing means: Texts are not objectively existing entities which just need to be discovered and presented, but entities which have to be constructed. (Pichler 1995b, p.774)

Pluralistic Realism allowed that there are many perspectives on a text, but assumes that texts have the structures they have independently of our interests, our theories, and our beliefs about them. The Antirealist trend in text encoding rejects this view seeing texts as the product of the theories and analytical tools we deploy when we transcribe, edit, analyze, or encode them. Just as Landow (1992), Bolter (1991), and Lanham (1993) have claimed that electronic textuality confirms certain tenets of post-modernism, Pichler and others also suggest that texts do not exist independently and objectively, but are constructed by us. The passage from Pichler is ontological but he also endorses a companion Antirealism that is semantic:

... the essential question is not about a true representation, but: Whom do we want to serve with our transcriptions? Philosophers? Grammarians? Or graphologists? What is "correct" will depend on the answer to this question. And what we are going to represent, and how, is determined by our research interests.., and not by a text which exists independently and which we are going to depict. (Pichlet 1995a, p.690)

Our aim in transcription is not to represent as correctly as possible the originals, but rather to prepare from the original text another text so as to serve as accurately as possible certain interests in the text. (Pichler 1995a, p.6).

Huitfeldt (1995) also presented a number of criticisms of OHCO Platonism. His Antirealist tendencies are subtle for the most part:

... I have come to think that these questions [e.g., What is a text?] do not represent a fruitful first approach to our theme... The answer to the question what is a text depends on the context, methods and purpose of our investigations. (Huitfeldt 1995, p.235)

But here and there they are unmistakable:

`devising a representational system that does not impose but only maps linguistic structures' (Coulmas 1989) is impossible (p. 238).

Both Huitfeldt and Pichler emphasize two particular claims about text and seem to see arguments for Antirealism. The first is that our understanding (representation, encoding, etc.) of a text is fundamentally interpretational: "there are no facts about a text which are objective in the sense of not being interpretational" (Huitfeldt 1995, p.237). Although he

assures us that this does not mean that all facts about a texts are entirely subjective as "there are some things about which all competent readers agree" (ibid.). The second is that there are many diverse methodological perspectives on a text: "a text may have many different kinds of structure (physical, compositional, narrative, grammatical)" (ibid.).

The first claim is that representation and transcription is interpretational at every level. Assuming that "interpretation" here means inference, what is the significance of the claim that our knowledge of text is inferential? The missing premise would be that entities that could only be inferred in principle, are not real. That is, the argument depends on an extreme form of positivism. The second claim is that there are many diverse analytic perspectives on a text. Here the premise needed to get to the Antirealist conclusion would be that if what we find in the world is determined at least in part by our interests and by the methodologies and theories we choose to deploy in the course of inquiry, then what there is in the world is determined by our interests, theories, and methods.

The above comments pertain directly to ontological Antirealism. Epistemological Antirealism in text encoding probably derives in part from the ontological, so my response to ontological Realism also removes the support it gives to epistemological Antirealism. But as epistemological Antirealism can also draw some support from other sources we might consider these Antirealist claims independently. Considering again the quotation from Pichler:

Our aim in transcription is not to represent as correctly as possible the originals, but rather to prepare from the original text another text so as to serve as accurately as possible certain interests in the text. (Pichler 1995a, p.6).

I would argue that the apparently Antirealist formulations of this claim are either (1) non-antirealist truisms, (2) covertly Realist truths, or (3) false. It is certainly true that our aim in transcription is to help researchers and that this guides our encoding decisions. If this is what Pichler is saying it is a truism of encoding. But if he is saying that truth doesn't matter to encoders, then he is saying something false. Suppose a transcription has nothing at all to do with the text but helps the researcher win a prize. In such a case a (false) transcription would serve the researcher's interests quite well, but no one would claim that it is thereby a reasonable encoding, or one which is to be in any sense commended as a transcription.

In their articles both Huitfeldt and Pichler are making very profound observations about text encoding, transcription, and texts. I have ignored coming to grips with what is deep and perhaps correct in their arguments in order to make my own points about their apparent Antirealism. But regardless of their intentions I think that what they say, particularly against the current post-modern background, raises Antirealist questions about the nature of theories of text and text encoding.

2. The Edited Discussion

In response to Renear's summary, Pichler prefers to draw attention to the problems raised by "intertextuality" rather than post-modernism. In particular, he discusses some limiting cases of intentional intertextuality, e.g., the reader interprets text A as referring to text B in conditions where it is not known whether the author knew of text B, or where it is known that the author did not know text B. A further limiting case may be represented by the author asserting a reference to text B when the attribution should be to text C. Pichler sees the capacity for intertextuality as inherent in our notion of text in a way which cannot be removed by refining our definition of it. Clearly the "intentional" component is a weakness, partly on the basis of identity and partly as a result of the "intended but mistaken attribution" limiting case. Pichler comes to the conclusion that it is always the reader (i.e. the interpreter, which also includes the author) who is the decisive authority in questions of intertextuality. However, he defends this against relativism by claiming that all readers belong to a community which not only establishes, but also controls practice.

Pichler also raises an ontological argument leading to similar conclusions. As a transcriber of Wittgenstein's manuscripts he was confronted with the Wittgenstein Archive's guideline for transcription: "the aim of transcription is to represent the original manuscripts as accurately as possible." This guideline seemed to be accepted by several transcription and manuscript-editing projects in a "realistic" sense. However, definition fails to determine what of the original manuscript should be represented as accurately as possible, and what is meant by accuracy. It is clear that one cannot be supposed to represent every structure (linguistic, prosodic, etc.) of the manuscript as accurately as possible. Also "accuracy" is determined by one's interests in the text. Therefore his inclination to identify textual structures as a reader's concept was strengthened, along with his denial that there is an objectively existing structure which just needs to be depicted.

The Antirealist has still to establish why any representation may not be regarded as simply a selection from an objectively existing entity called the text. Pichler draws a comparison between his position and the Kantian distinction between "Ding an sich" and "Erscheinung fur uns." Pichler's preference is to agree with Fichte and find no necessity for "Ding an sich." Similarly, if "meaning" is taken as the essential property of texts disclosed through interpretation, then there are as many essential texts as there are alternative interpretations. Pichler's experience of encoding Wittgenstein strengthens this view. Wittgenstein's Nachlass, with its corrections, alternative readings, instructions etc. requires "constructing" by the reader or encoder. There are multiple constructions, any of which must be defended by the reader. In this case there is a considerable disparity between the Nachlass-object which might be regarded as the text in its physical sense, and the necessary intervention of the reader in forming one of many possible constructions.

Pichler emphasizes that his position, which may be called a pragmatic Constructivism, does by no means lead to an uncontrolled relativism. Furthermore, with the growing practice of machine assisted text encoding the process of construction is easily

controllable, it is revisable, and it can be made explicit.

Biggs already identifies two distinct models of text being discussed. On the one hand Renear describes a process in which the linguistic content is fixed, or completely determinable. On the other, Pichler describes a text that is open to some degree of interpretation. One encoding problem is to identify the OHCOs. However, this task will vary in difficulty between a fairly straightforward "academic" text in which the Realist finds "the medium is not the message;" and a text about radical typography, or the example from Goethe introduced later by Sperberg-McQueen, in which "the medium is the message."

Biggs also discusses Pichler's notion of "correctness" quoted by Renear. This notion might lead us to say that the Real text is the correct text for a particular user. Unfortunately the encoder of Wittgenstein is in the position of supplying a tool which users will employ to determine the semantic reference of ambiguous passages. Biggs therefore finds it difficult to see how the encoder, who is not the end-user, is in the position of isolating one correct text for any user.

An additional difficulty with Wittgenstein is that the linguistic content also refers to the business of reading (cf. transcribing) and interpretation. Firstly, when we read under normal circumstances (Renear's conditions) we do not interpret. However, in extremely ambiguous conditions such as those described by Pichler there may be insufficient syntactic evidence to decide between two alternative readings. Then we may be forced to make an interpretation on the basis of (semantic) evidence gained elsewhere in the text or beyond. This will be determined by our analytical perspective.

In addition to the signifying function of the alphanumeric string, the interword space is also significant. Likewise, the grouping of concepts at a paragraph level, indicated by line-breaks rather than an alphanumeric character, may have a bearing on the interpretation of the text string. It is therefore false to identify the linguistic content only with the alphanumeric string. An example from Wittgenstein would be the truth-table. It is the case, however, that some other features of the layout of the text string on the page/screen are mainly design functions rather than linguistic ones.

Biggs proposes more radical conditions which at first sight seem to favour the position of the Antirealist. They frequently occur within the context of a discussion of "seeing as." As a reader one may react to the ambiguous feature and "read-it-as" an instance of "this" or an instance of "that,", e.g., as a duck or as a rabbit (Philosophical Investigations, p. 194). However, as an encoder one must preserve the ambiguity. One must first recognise the deliberate ambiguity, and then encode it so that the linguistic content and the on-screen presentation preserves these two senses. But Wittgenstein also introduces the concept of aspect blindness whose purpose is to suggest that we might be aspect-blind ourselves under other circumstances. Biggs suggests that these more radical conditions are the meta-conditions under which the Antirealist text-encoder works. One does not know which

are the signs which bear meaning and which are simply accidentals. A prototype text may reveal the possibility of another approach to the use of signs either by showing that the first reading of the text is senseless, or by showing that arguments regarding alternative signification may be advanced, e.g., the editorial process of publishing Wittgenstein. However, one might assert that by the 1990s there is an established convention for the content of "the published works of Wittgenstein" which places those texts in the Realist's domain.

Raymond concentrates on the structural approaches epitomised in Renear's OHCO discussion. Raymond rejects the efficiency arguments which objectify OHCOs in preference to other analytical constructs. In particular, he finds the transfer of computer terminology such as "text file" insidious. The implication that the text file "contains" text is as misleading as the suggestion that a payroll database "contains" the payroll. In general he draws the distinction between manipulating texts successfully using frameworks such as OHCOs, and the lack of any necessity to also provide a coherent theory of text. For example, advocates of OHCO seem to suggest that the structure of a document is a property of the document that is independent of the operations to be performed on it, or of other issues such as how we decide the equivalence of documents. He suggests that to "structure" information means to encode it in such a way that certain operations are efficient and others are not. By the time one has structure, one is already halfway to operations. For example, the computer text file, with no embedded markup, is designed to facilitate sequential reading and appending to the end of the text, but not insertions into the middle of the text.

Raymond's external argument criticises advocates of OHCO for suggesting that OHCO-like structures should capture only structure and not semantics (e.g., SGML). He argues that structure always involves semantics, and there is no such thing as "pure" structure, because structure always has mathematical and combinatorial properties that make certain types of operation possible or efficient. Hence structures are chosen which support the operations we think we want to do, which in turn reflect the semantics that we implicitly attach to the text. Even the idea that OHCO captures the essence of a text is a statement of some semantic import. He cites the Web as an example of what people actually do when they have to commit real resources. The "best" approach to text has to take into account not only the text, but the uses that are planned for it. OHCO can provide advantages in accessing highly structured information and in permitting flexibility in presentation. There is a prima facie case that flexibility in presentation is not that important, that portability via Postscript is sufficient, that structure-based editing is not that popular, and that searching by simple string matching goes a long way. However, OHCO and SGML advocates suggest that the benefit comes later, when new applications are developed and one does not have to re-encode texts.

Sperberg-McQueen's comments elaborate the problem of document identity, an issue raised by Raymond (1996). If we see some of our objects as text representations we can

consider their representational validity in their ability to maintain or to lose information in relation to the original. However, this does not avoid the definition of what constitutes the original text, and how to determine whether for some feature F of the text, a given reproduction of the text preserves or loses that feature.

He also disagrees with Renear's assertion that the identification of linguistic content is relatively unproblematic. For example, the characters of the text must be represented; in some cases, this requires an analysis (a priori or a posteriori) of what characters actually exist in, or should be used to represent, the text. Spoken material may be transcribed phonetically, phonemically, or orthographically. The creator of an electronic text must also select which material is to be included as part of "the text." Is the title page of the First Folio part of the text of Shakespeare's Hamlet? Is the title "Hamlet" part of the text of that play? Finally, the transcriber of written material into electronic form must reduce the two-dimensional page to a one-dimensional data stream. Footnotes must be transcribed at their point of reference, etc. It is hard to find plausible rules for this without grounding them in some view of what the "text" is.

It appears obvious to most computer-literate speakers of English where the boundary between characters of the text and markup should lie, but this is an illusion fostered by the success of the ASCII character set. In non-European writing systems, such as that of Japanese, the absence of a long tradition of prior art for mechanical writing means that it is not clear whether furigana and similar phenomena should be handled in the character set or in markup. In their simplest form, furigana provide a full or partial phonetic reading of a Han character, thus making clear how it should be read, if it would otherwise be ambiguous.

Commenting on what constitutes "the same text," Sperberg-McQueen considers changes in the margins or font size. The argument rests not on the ways we talk about texts in electronic form, but on the existing practice of publishing and copyright law. If one consults a library for copies of Moby Dick, one will find that while different editions take care to retain the words of the text, in the same sequence, they take no care to retain the page breaks, margins, or fonts. On the other hand, if a publisher adopts the same page design and font for a whole series of books, we have no trouble at all distinguishing the volume devoted to the works of Plato from that devoted to Aristotle, from that containing Moby Dick. Changing the typography does not, in general, count as changing the text.

A contrary case is presented by Goethe's manuscript of the Roman Elegies which uses a Latin hand, not German. The early editions printed the work in Roman fonts (Antiqua), rather than in Fraktur. Modern editions print all German texts in Antiqua, so the information contained in the typographic distinction between the Roman Elegies and Goethe's other poems has been lost. In this case the typography therefore forms an essential part of the representation, or as Biggs summarised "the medium is the message."

Concentrating on individual analytic perspectives, Sperberg-McQueen claims they do not necessarily determine ordered hierarchies of content objects. Individual disciplines may deal with typographic rather than content objects: analytical bibliography, codicology, palaeography, and other disciplines of the history of the book are examples. They may deal with sets or other unordered groups of objects, rather than with ordered groups: lexicology, for example, and many forms of quantitative stylistics, often address a text as an unordered set of lexical items. Most critically, disciplines may address phenomena which are not themselves hierarchical, e.g., morphophonemic analysis, since phonemic phenomena may overlap morphological boundaries. Traditional stylistic analysis of verse includes the study of enjambment, end-stopping, and other phenomena of the interaction between non-nesting metrical and syntactic phenomena. It has been held that the consistent overlapping of phenomena is prima facie evidence that they belong to two different types of analysis. But this should not be taken to mean that they will never be considered together in the same scholarly work.

Broderick finds agreement between the Realists and the Antirealists that "text is a system of structures." However this agreement seems to emphasise the lack of clarity in what is asserted or negated by the Realists or Antirealists. Broderick finds that the essence which is asserted or negated may be one of four possibilities: the meaning, the structure, the means to reconstruct the text and the organising principle of the text itself.

The literary Antirealist, which Broderick identifies with a certain Postmodern position, as opposed to the coding Antirealists focused on in the discussion to date, denies the existence of any objective interpretation, or meaning, of a text. It could be Sacred Text, mythology, naive history, fiction or nonsense. Concerning the coding of a particular text, the Realist could remain neutral with regard to the validity of these interpretations. In general there is nothing preventing a coding Realist from simply coding text while remaining neutral about whether the meaning of the text is reader constructed or discovered, hence a coding Realist could be a literary Antirealist.

The coding Antirealist may claim that the structure discovered within the order of the alphabetic characters and punctuation (what Renear calls linguistic components) is not real. This argument might be suggested by the possibility of format-based processing or other alternatives to OHCO. However, the Antirealists could not draw on this structure as evidence for their position, as Renear suggests that they do.

Broderick proposes the thought-experiment that after knowledge of English has been completely lost, an archaeologist digs up an issue of the Monist. Is it still a text? If the inhabitants of this age exchange knowledge in electronic format and no longer read the appropriate kind of character strings? Does a text contain knowledge if there is no one around to read it? These questions point out what seems to be the most credible Realist/Antirealist distinction. The Realist would answer "yes" to the above questions, the Antirealist, a "no," qualified only be the possibility that the future archaeologist might figure out some way to decode the artifact and return its textuality to it.

Ore comments on Broderick's thought-experiment. He compares this to the case of Cretan Linear A in which Packard was still able to produce so-called "word-lists." Such "texts" still meet Pichler's defining characteristics of semantic and syntactic dimensions. Another limiting case may be provided by Runic inscriptions (and, mutatis mutandis, by other extinct but known writing systems): these may be represented today in normalised Norse (or whichever language they are supposed to represent). However, Ore claims that we will never have full knowledge of the text as the carver intended or as contemporary readers would have read it. So every representation is an entity which has, in Pichler's terms, to be constructed.

Selmer Bringsjord proposes an alternative to Renear's OHCO theory. The basic thesis of this view is that text, at bottom, is "jottings plus procedures" - hence the proposal is referred to as the JoPP view. Like the OHCO theory, this is a Realist position, and according to Bringsjord all or most of the arguments in favour of OHCO also lends support to the JoPP view. However, the objections to Platonic OHCO which push toward Pluralism and Antirealism, fail to threaten the JoPP position.

The fundamental intuition behind this view is suggested by a thoughtexperiment described by Wittgenstein in Zettel: Wittgenstein imagines someone (J) jotting down inscriptions as someone else (R) recites a text, where the jottings are necessary and sufficient for J to reproduce the document in its entirety. "What I called jottings would not be a rendering of the text, not so to speak a translation with another symbolism. The text would not be stored up in the jottings" (Zettel, 612). Wittgenstein goes on to ask: "And why should the text be stored up in our nervous system?" (ibid.).

The sort of jotting to which Wittgenstein draws our attention here is suggestive of what Bringsjord regards text to be at bottom. In order to fix the thought-experiment, suppose that J jots down a list L of 5 bullets:

u1
u2
u3
u4
u5

where each ui is associated with a short string from some natural language. Suppose, in addition, that R recites an essay E of over 2000 words. We assume, as well, that J can, at any point after hearing R's essay, reproduce E from the list L. So far, the thought experiment involves characters, actions and objects interacting in a manner we could certainly witness in the "real world."

The JoPP view is that E is L plus whatever procedure allows for the expansion of L into E. More generally, the view is that text is really, at bottom, jottings plus procedures (for reproducing a final text, where such a text can be in written or oral form).

The so-called logicist or symbolicist approach to artificial intelligence (AI) represents the knowledge, belief and reasoning of sophisticated agents (including human agents) in a logic (Bringsjord 1992; Russell & Norvig 1995). Often, the logic used is a particularly well-understood one, namely first-order logic. In the logicist approach to AI, a document in natural language is "compressed" to a set of formulae. In other words, the document is captured by certain jottings. Given certain algorithms, the jottings, or formulae, can be used to reproduce the story (Bringsjord & Ferrucci 1997).

Thus, it is a basic assumption underlying the JoPP thesis that it should be possible (at least in principle, though Bringsjord's view is that it is also possible in practice) to design intelligent computer systems for text processing and analysis in which texts are represented in some logic, and which operate on these representations via procedures in the form of computer algorithms. For moderately complicated texts, JoPP is already instantiated in some working computer programs.

Bringsjord argues in some detail that most of the arguments in favour of Renear's OHCO thesis are also arguments in favour of JoPP.

The JoPP view of texts commits us, according to Bringsjord, to Realism. If it is correct, one of the main arguments in favour of Antirealism (as given by Renear) fails: the JoPP thesis entails that there is a key set of facts about a text which are thoroughly objective.

The second rationale in favour of Antirealism - that there are many diverse methodological perspectives on a text - is one that the JoPP approach embraces. In order to produce different kinds of structure (physical, compositional, narrative, etc.), the procedures going from jottings to final text need only be suitably adjusted, but the jottings needn't change.

The observations that force modification of OHCO Platonism toward what Renear calls "pluralistic Realism" are ones the JoPP view accommodates from the outset: the JoPP approach is designed to allow for distillation of disparate documents. Whether the final text is a short story, a proof, a physics textbook, a poem, etc. the JoPP thesis is that such texts can be captured as a set of assertions in a logical formalism.

In the ensuing discussion, one of the first objections to the JoPP view is that first-order logic, which Bringsjord initially used as an example of the kind of formalism in which the "jottings" will be captured, does not seem sufficient to represent the basic propositional structure of texts.

Broderick points out that if the linguistic contents of a text are condensed and represented in the form of some logical symbolism, this symbolism will contain non-logical constants which are open to a number of different interpretations. It is difficult to see how the JoPP view should be able to identify one such set of interpretations as the "correct" interpretation of a specific text. Moreover, the claim that a literary text A should essentially consist of statements in some axiomatic system like first-order logic would seem to imply the somewhat implausible conclusion that it should be possible to prove A, or alternatively

not-A.

Raymond argues that since a JoPP representation of a text is not only supposed to be able to regenerate the propositional content of a text, but also to generate this content in some specific form, the JoPP representation must contain not only propositions about some world outside the text but also about the text itself- i.e., it must contain meta-textual propositions. Therefore a JoPP representation should potentially be able to represent logical flaws like contradictions and paradoxes. Thus JoPP is constrained by the limits of axiomatic formalisms - there must be some sentential forms that it cannot produce, otherwise it cannot be consistent.

Bringsjord's reply to these criticisms is that his initial reference to first-order logic was only meant to provide a simplified exemplification - in actual fact firstorder logic would be too limited. The logical system required for representing the propositional contents of texts would not be an axiomatic system at all, and thus the envisaged situation of being able to prove or disprove texts will not occur. Philosophical logic has provided a number of systems designed to allow for contradictions and several of those may cope with the paradoxes referred to by Raymond (Bringsjord & Ferrucci, forthcoming).

However, according to Raymond, even though it may be that logical formalisms exist which allow JoPP to handle inconsistencies and paradoxes satisfactorily, one serious problem with JoPP persists: while text is typically an informal, intuitive notion, JoPP is typically a formal one. Proving that "Text is JoPP" is analogous to demonstrating the equivalence between informal and formal notions of computability, suggesting that we need something like a Church-Turing hypothesis for texts.

Raymond claims that, on the one hand, JoPP captures too much. Like Sperberg-McQueen, Raymond refers to Goodman's distinction between allographic and autographic representations and indicates that JoPP should, but does not obviously, exclude autographic representations. On the other hand, JoPP is too low level a representation: that they can be represented in some kind of logic does not serve to distinguish texts from other kinds of information. Finally, Raymond raises doubts about the Wittgensteinian thought-experiment used to illustrate the JoPP view: it rests on the assumption that reciting a document is a valid form of reproduction. This implicitly defines away the possibility of presentational matter being part of a text. This assumption is confirmed when Bringsjord says that if the typeface of a document is changed, the text is not. Raymond has strong doubts about this.

Raymond, Sperberg-McQueen and Huitfeldt all point out that jottings and procedures themselves seem to be some sort of texts, thus suggesting that the JoPP view may lead to a regress or a circle. Huitfeldt and Raymond suggest that a way for Bringsjord to break this regress or circle would be to formulate principles for identifying a set of primitive jottings and procedures which cannot be further reduced.

Huitfeldt suggests that one of the problems with JoPP is that Bringsjord is not clear about what independent criterion is used to decide textual identity. At one point Bringsjord seems to suggest this might be an appropriate set of behaviours and Huitfeldt welcomes this inasmuch as it points in the direction of seeing texts as social, historical, and cultural phenomena.

Sperberg-McQueen and Huitfeldt draw attention to an obscurity in the JoPP view: on the one hand, texts are said to consist essentially of jottings representing a propositional content which allow us to generate for example translations into different languages, or paraphrases within one language, of the "same" text. On the other hand, Bringsjord sometimes suggests that the test of success of a particular JoPP-representation is that the original text is reproduced "word for word."

Sperberg-McQueen argues that one of the strengths of the JoPP view is that it would give us a way of explaining why some texts are felt to be similar in certain ways which are difficult to account for on other models. According to the JoPP view it is because they share the same "propositional content." However, the JoPP view also seems to reduce texts to their propositional contents. On the one hand, this makes it possible to explain what different paraphrases of "the same" text have in common. On the other hand, it may seem difficult to account for the differences between paraphrases. As there are indefinitely many paraphrases of the same propositional content, this account of textual identity also seems to be in some sense too loose.

In contrast, with reference to examples of how our criteria of textual identity varies from context to context, Sperberg-McQueen draws attention to a large number of different ways that texts may be identical or similar at different levels, and suggests that in an exhaustive typology of textual identity relations "JoPP identity" would be but one among many.

Editors: Michael Biggs, Claus Huitfeldt University of Hertfordshire
University of Bergen

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Selmer Bringsjord, Paul Bohan-Broderick Espen S. Ore Alois Pichler, Darrell Raymond Allen Renear and Michael Sperberg-McQueen

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