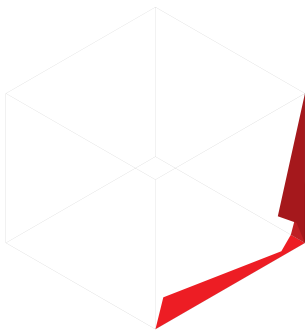


# Studies in Material Thinking



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VOLUME 13

**VISUAL / TEXTUAL: DOCUMENTING THE REALITIES  
OF RESEARCH THROUGH DESIGN PRACTICE.**

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PAPER 07

**Visualising text-based data: Identifying the potential of  
visual knowledge production through design practice**

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**ABSTRACT**

*An increase in the availability of digitised data coupled with the development of digital tools has enabled humanities scholars to visualise data in ways that were previously difficult, if not impossible. While digitisation has led to an increase in the use of methods that chart, graph and map text-based data, opportunities for visual methods that are non-aggregative remain underdeveloped. In this paper we use 'Writing Rights', a collaborative project between design and humanities scholars that examines the process of writing the 'Déclaration des Droits de l'Homme et du Citoyen' (1789), to explore this issue. Through a series of visual experiments we discuss how the production of knowledge is enacted textually, within the written language, and graphically with the visual arrangement of the text. We argue that by drawing on the domain expertise of design, with its commitment to the semantic potential of the visual, practices that more wholly account for the qualitative nature of humanities data can be developed.*

**KEYWORDS**

*Visualisation, digital humanities, design research, design methods,  
visual epistemology*

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## Visualising text-based data: Identifying the potential of visual knowledge production through design practice

### INTRODUCTION

Visualisation has become increasingly prevalent in the context of humanities research. A motivating factor has been the amount of digitised material available to humanities researchers. As Dan Edelstein points out, ‘historians now have the capacity to download, refine and visualise large amounts of data on a scale and at a speed previously unimaginable...ten years ago’ (Edelstein, 2015, p. 8). The interest in visualisation can also be attributed to the increasing number of digital tools that have been designed for and by historians working with large-scale databases.<sup>1</sup> However, some scholars have questioned the capacity of these digital tools to take into account a more humanistic approach to visualisation, one which is not predicated on aggregation, quantification and accuracy, but that also takes into account the subjective, partial and interpretative nature of data. Johanna Drucker writes ‘we [humanists] need to take on the challenge of developing graphical expressions rooted in and appropriate to interpretative activity’ (Drucker, 2011, p. 2).

This paper focuses on a current project called ‘Writing Rights’. Initiated by the Humanities + Design Lab at the Centre for Spatial and Textual Analysis (CESTA),<sup>2</sup> it is a collaboration between the authors at the School of Design, University of Technology Sydney,<sup>3</sup> Stanford University historians Keith Baker and Dan Edelstein, and the lab’s research director Nicole Coleman, also at Stanford University.<sup>4</sup>

The centrepiece of ‘Writing Rights’ is the ‘Déclaration des Droits de l’Homme et du Citoyen’ [Declaration of the Rights of the Man and the Citizen] (1789). This canonical document, which contains 17 Articles, emerged under extreme political pressure over the summer of 1789. It includes the principles that inspired the French Revolution and forms the basis of modern human rights charters.<sup>5</sup> The most widely known is the first principle or ‘Article’<sup>6</sup> which states: ‘Les hommes naissent et demeurent libres et égaux en droits. Les distinctions sociales ne peuvent être fondées que sur l’utilité commune’ [Men are born and remain free and equal in rights. Social distinctions may be based only on considerations of the common good].<sup>7</sup> The Déclaration did not emerge fully formed, rather it was the product of 48 individual drafts and a long series of debates in the National Assembly (Baker, 1994).<sup>8</sup> As Baker explains, the document was ‘drawn up with enormous difficulty and great urgency, at the cost of bitter argument, inevitable linguistic compromises, and dramatic theoretical tension, by an assembly profoundly divided over the nature and purpose of the text it was struggling to construct’ (1994, p. 157).

1 / Examples of online databases include: Eighteenth Century Collections Online (ECCO) and Early English Books Online (EEBO) to name but two.

2 / CESTA comprises the Humanities + Design Lab, the Spatial History Lab and the Literary Lab. See Center for Spatial and Textual Analysis <http://cesta.stanford.edu>. Humanities + Design aims to produce ‘through the lens of humanistic inquiry, new modes of thinking in design and computer science to serve data-driven research in the humanities.’ See Humanities + Design <http://hdlab.stanford.edu/>.

3 / The School of Design consists of six programmes (Animation, Fashion and Textile Design, Integrated Product Design, Interior and Spatial Design, Photography and Situated Media, and Visual Communication Design) that share interdisciplinary approaches.

4 / Keith Baker is J. E Wallace Sterling Professor in Humanities, Jean-Paul Gimon Director of the France-Stanford Center for Interdisciplinary Studies, and Professor of Early Modern European History—and, by courtesy, of French and Italian. Dan Edelstein is Professor of French and, by courtesy, Professor of History. Nicole Coleman is the research director of the Humanities + Design Lab, Humanities Faculty, Stanford University. She has been involved in many projects including *Mapping the Republic of Letters* and the design and development of tools such as Palladio—a web-based platform for the visualisation of complex, multi-dimensional humanities data, amongst others.

5 / The Articles (adopted between August 20 and August 26, 1789, by France’s National Assembly) served as the preamble to the Constitution of 1791.

6 / An ‘Article’ refers to a clause of legal agreement not a written document.

7 / The English translation can be found at: Conseil-Constitutionnel [http://www.conseil-constitutionnel.fr/conseil-constitutionnel/root/bank\\_mm/anglais/cst2.pdf](http://www.conseil-constitutionnel.fr/conseil-constitutionnel/root/bank_mm/anglais/cst2.pdf)

8 / Some of the draft declarations ‘projets’ were single-authored such as ‘*le projet de Déclaration Gallo*’, while others were multi-authored—as is the case with ‘*le projet de déclaration du sixième bureau*’. They also varied significantly in length, for example, Arnaud Gouges-Cartou’s *projet des Déclaration de droits* contained 71 Articles whereas Marie-Joseph Paul Yves Roch Gilbert du Motier de Lafayette’s initial draft contained just 15 Articles. These ‘projets’ provide the source material for the visualisations discussed in this paper.



Figure 1 /  
'Déclaration des Droits de l'Homme et du Citoyen'  
(1789).

There are two reasons why we identified this material as a project for a humanities and design collaboration. First the material is well known to the historians whose expertise lies in eighteenth-century France, particularly the French Revolution.<sup>9</sup> Their familiarity with the material makes clearer the gains made through visualisation. Second, as it is a pilot study the scale of the source material (small in comparison to other digital humanities projects) makes iterative experimentation achievable.<sup>10</sup>

As design researchers, we aim to visualise the 'complex, contingent and improvised nature of the writing of the Déclaration' (K. Baker, personal conversation via skype, 19 Nov 2014). A part of this process is to show which phrases and ideas appear 'haphazardly' and which appear consistently and are 'thus "over-determined" for inclusion' (D. Edelstein, personal conversation via skype, 19 Nov 2014). To this end we experiment with graphic strategies that organize, track and reframe the discursive formulations in order to reveal patterns, rhythms, repetitions and silences. This line of inquiry is informed by Drucker's argument that 'reading possibilities [are] potentiated by structuring the text through multiple lines and pathways, levels and hierarchies of relations, and by fragmenting text blocks into relations that alter the linear presentation conventionally assumed' (Drucker 2013, p. 86). Thus these visualisation strategies provide alternative ways of interpreting the text. They reveal the extent to which the Déclaration 'can be understood as a political improvisation responding to specific contextual issues or the expression of a coherent philosophical program'

(K. Baker, personal conversation via skype, 19 Nov 2014). In this paper we describe these processes and reflect on the contribution of design to broader debates about visualisation in humanities research.

## THE ROLE OF VISUALISATION IN DESIGN RESEARCH

Visualisation has three distinct roles in design research: as a method of inquiry; as means of documentation; and, as a way of disseminating findings. In design visualisation has a heterogeneous history. For example, in design methods visualisation is understood as a process of sketching (Goldschmidt, 1991; Suwa & Tversky 1997). While sketching can be used in all stages of the design process much of its value is attributed to early ideation where the individual designer's thinking is externalised. Although we share the design methods view of visualisation as a means to open up previously inaccessible connections through the use of spatial and abstract relations a key difference exists. In our visualisations the 'previously inaccessible connections' are being opened up for the historians, not the designers. Equally, unlike sketches these visualisations follow a less intuitive process, one that is repeatable and transferable.

A second role of visualisation is documentation—that is, tracking or recording the research process. While this role is less significant in the context of the experiments we discuss in this paper, it is nonetheless important to make the distinction between visualisations that actively engage with the data and visualisations that act as evidence of a research activity or process. While they may produce an artefact, they function very differently: the former a 'thing to think with,' and consider possible relations, etc., and the latter a thing that documents the research process. This distinction is important because the epistemological potential of the visual — 'what it knows'—is often overlooked in favour of 'what it records.'

9 / Keith Baker and Dan Edelstein are both distinguished historians and have written extensively on eighteenth-century France and the French Revolution.

10 / See: A Quantitative Literary History of 2,958 Nineteenth-Century British Novels: The Semantic Cohort Method, [https://litlab.stanford.edu/?page\\_id=255](https://litlab.stanford.edu/?page_id=255).

A third role of visualisation in design research is to disseminate and represent findings. This final stage may more usefully be aligned with ‘information design’, rather than ‘information visualisation’ so as to distinguish between the related but different functions. Through the following descriptions Lev Manovich begins to untangle the terms:

Information design starts with the data that already have a clear structure, and its goal is to express this structure visually...In contrast, the goal of information visualisation is to discover the structure of a (typically large) data set. This structure is not known a priori; a visualisation is successful if it reveals this structure. A different way to express this is to say that information design works with information, while information visualisation works with data. (2011, p. 38)

Although all three types of visualisation will ultimately have a role to play in ‘Writing Rights’, the fledgling nature of this project demands first the engagement of visualisation as a method of inquiry. Without inquiry the other forms of visualisation fail to exist: there would be no process to document and, more importantly, no findings to disseminate. However, before we discuss what we have done so far, it is necessary to conceptually frame the humanities within the information visualisation landscape.

## CONCEPTUAL FRAMEWORK/BACKGROUND

As we have outlined above, the context of this paper is the emerging intersection between design and the humanities. This intersection is largely a function of digitisation processes that have led to an enormous increase in the availability of data and innovative research techniques in large-scale data analysis. Nicole Coleman and Charles van den Heuvel (2011) argue that while the digitisation and networking of collections provide us with exciting ‘new opportunities to draw together disparate archives,’ they also present us with new problems. While these problems are practical (integrating and managing large corpora can be difficult), they are also epistemological. How does this access to data refract methodological approaches such as visualisation and, subsequently, how does this approach impact on the production of new knowledge? While visual forms of knowledge have been integral to disciplines such as design, they have been far less common in the humanities. However, an increased understanding of the scholarly potential of visualisation is emerging (Jessop, 2008).

In this context, it is important to distinguish between visualisation that values empirical qualities and neutrality over visualisation that acknowledges subjectivity, partiality, and the interpretative nature of data (Drucker, 2010 & 2014). Tools that combine quantitative analysis with visualisation have long been associated with the humanities. They can be found in software used for statistical analysis and text analysis—applications that are designed for retrieving key words, phrases and linguistic patterns across large bodies of texts (Jockers 2013; Moretti 2013). In contrast, visualisation lends itself to qualitative analysis where the effects of graphic and spatial values combine to develop alternate semantic possibilities for engaging with data.

To date, many visualisations derived from text-based data have favoured models of aggregation, quantification, efficiency, impartiality, and certainty at the expense of more qualitative models of inquiry, all of which are central to humanistic scholarship.<sup>11</sup> However, in the humanities, there is a growing recognition of the limitations of these practices and how they fail to take into account subjective and probabilistic concepts of knowledge (Bonnett, 2007; Coleman & van den Heuvel, 2011; Drucker, 2010, 2014; Jessop, 2008; Ramsey, 2011; Staley, 2002/2013). As Stephen Ramsey points out:

Most of the visualizations one sees in text analysis are there to demonstrate the facts of the case—to prove to the reader that things cluster this way or that, that there are indeed more instances of this feature than of that feature. Relatively few of them are there to offer the open possibilities of interpretative insight. And this is odd, when we consider the kinds of texts that interest humanists are solidly of the later variety—less concerned with proving a point, and far more concerned with allowing the reader the intellectual latitude to see something new. (Ramsey, 2005, p. 180)

The significance of this point lies in the realization that visualisation can be more than just a means for representing tables and plotting charts. Rather, visualisation has the potential to enhance humanistic inquiry by transforming texts into visual artefacts, which enable new interpretive possibilities through the use of generative approaches. In this sense ‘Writing Rights’ is about working with text-based data to explore the methodological possibilities of visualisation as a critical platform for humanities research.

<sup>11</sup> / It is important to note that the humanities are not entirely defined by textual projects, although we largely focus on text-based issues in our paper.



## 'DIRECT VISUALISATION'

With this intention, we turn to design and more specifically, 'direct visualisation,' a method identified by Lev Manovich as an alternate visual strategy (Manovich, 2011). According to Manovich, from its beginnings in the mid-eighteenth century information visualisation has depended on two key principles. The first is reduction, where 'graphical primitives such as points, straight lines, curves and simple geometric shapes' are used 'to stand in for objects and relations between them' (2011, p. 38). The original data, for example text or images, are represented by points or bars in a chart. While this reduction reveals 'patterns and structures' within the data, writes Manovich, it comes at the price of 'extreme schematization': '[w]e throw away 99 per cent of what is specific about each object to represent only 1 per cent—in the hope of revealing patterns across this 1 percent of the objects' characteristics' (2011, p. 38).

The second principle is the privileging of spatial variables over other visual dimensions. The positioning of graphic primitives, their size and shape, and the curvature of lines, are all spatial variables that are used to represent the most important patterns and relationships in the data. Manovich writes:

[W]e map the properties of our data that we are most interested in, onto a topology and geometry. Other less important properties of the objects are represented through different visual dimensions—tones, shading patterns, colours or transparency of the graphical elements. (2011, p. 39)

While Manovich acknowledges that these two principles 'do not account for all possible visualisations produced during the last 300 years,' they give information visualisation a consistent identity, and one that separates it from 'other forms of visualization such as maps, drawing, photography, oil painting, film, video, etc.' (2011, p. 41)

This identity remained largely unchallenged, Manovich argues, until the 1990s when forms of information visualisation emerged that no longer relied on the reduction of data into graphical primitives, nor the privileging of spatial variables. Take, for example, the tag cloud, Manovich's rather crude, but nonetheless useful, starting point. A tag cloud is a simple text analysis tool that visualises word frequency: the larger the font size the more frequent the word. A quick glance at a tag cloud reveals the dominant themes or subject matter of a text. Importantly, rather than replacing the words with bars or points to represent frequency—that is, using graphical primitives to represent the data—the words themselves are used: 'text remains text'. Manovich refers to this method of building 'new representations out of the original media' as 'media visualisation' or 'direct representation' (2011, p. 41).

A similar strategy is played out in Manovich and Douglass' *Mapping Time* (2009), although in this example 'images remain images.' (Manovich, 2011, p. 41) (Figure 2) Every issue of *Time* magazine (4,535 in total) from 1923 to summer 2009 is placed chronologically into a rectangular grid. While the covers are made smaller they are at no stage reduced to a graphic primitive: the covers stand in for themselves.

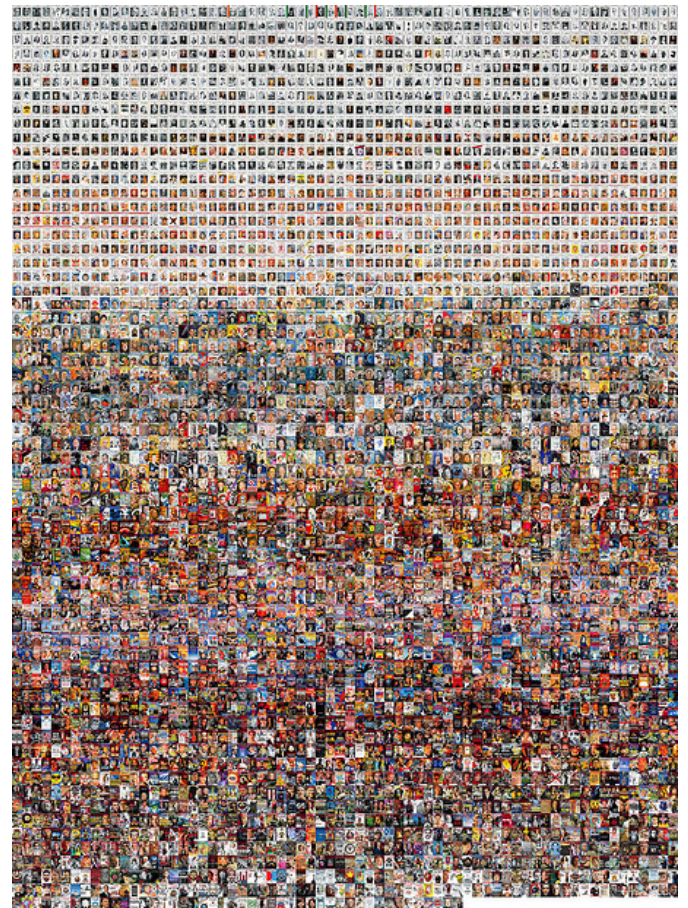


Figure 2 /  
*Mapping Time* (2009), Jeremy Douglass  
and Lev Manovich.

*Mapping Time* also challenges the second key principle, the privileging of spatial arrangement. In this example the position of the covers is fixed as they are placed in accordance with their publication date. They are positioned by the singular value of time, which is determined prior to data collection. In conventional information visualisation the positioning of each vector is determined by more than one value and only at the stage of visualisation. Take, for example, a two-dimensional scatter plot, where each point refers to the values set by the x and y-axis (quantity, temperature, expenditure, cost, hours, etc.), and equally, the relationships established between the points. By fixing spatial variables, argues Manovich,

attention to other visual dimensions such as image tone, saturation, contrast, colour and composition can occur. When analysing *Mapping Time*, Manovich reports on the unsurprising increase in the colour saturation of covers until the end of the 1960s, as well as the surprising decrease in contrast and saturation from the beginning of the twenty-first century (2011, p. 45). This analysis is enabled by the representation of the data set in its original form (the covers not having been reduced to graphical primitives) and a singular, fixed spatial dimension. Both of these factors enable the visual qualities of the data set to be foregrounded.

It is important to note that although *Mapping Time* does not privilege the spatial dimension, this dimension still exists. The ordering of covers is chronological not random, which enables the possibility of temporal patterns to emerge. So while the arrangement of the *Time* covers is not orchestrated by the confluence of two (or more) data sets, typical of information visualisation that privileges the spatiality, the singular parameter of time ensures that the spatial positioning is not 'value-less'.

Therefore, prior to the 1990s, 'the idea that visualization takes data that is not visual and maps it into a visual domain,' (2011, p. 41) was an adequate account for the majority of information visualisation practices. This is no longer the case. Alongside *Mapping Time*, Manovich also cites *Listening Post*, *Cinema Redux* and *Preservation of Selected Traces*<sup>12</sup> in order to build his case for the emergence of 'direct visualisation.' But rather than revisit these well-known works, we will discuss projects that not only fall into the 'direct visualisation' paradigm but also relate more directly to the 'Writing Rights' project, insofar as they too, draw on text-based data.

In *To See and Hear* (2013) Owen Herterich visualises the entire dialogue of a novel, claiming that through dialogue we can see 'the overarching hierarchy and plot of a novel.' (Figure 3) The collection of novels, he has selected, spans a 'wide range of time, genre and intended audience.' Each line represents one line of dialogue in a book (Figure 4), the lines are then mapped around an imaginary circle, whose diameter is reflected by the length of the book.

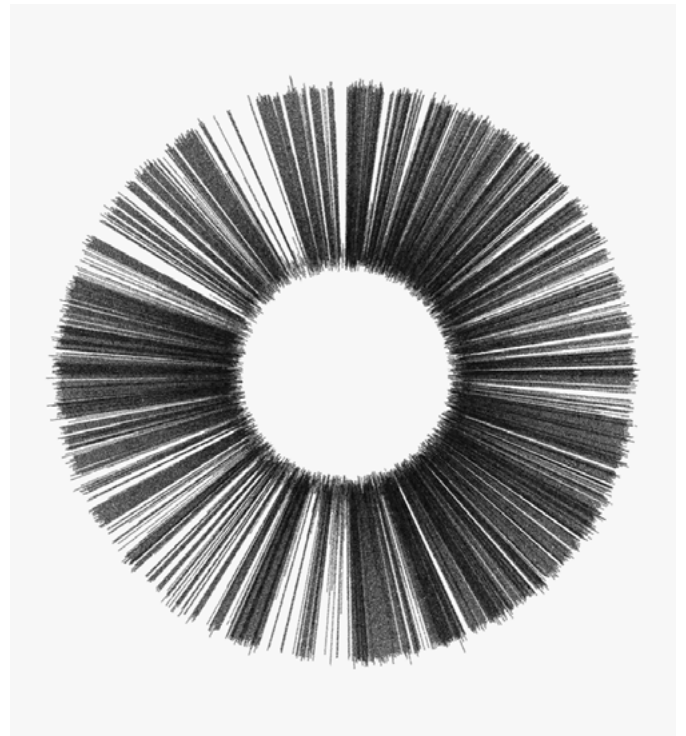


Figure 3 /  
*To See and Hear* (2013), single novel, Owen Herterich. See <http://owenherterich.com/projects/dialogue/index.php>. Retrieved 1 October 2014.

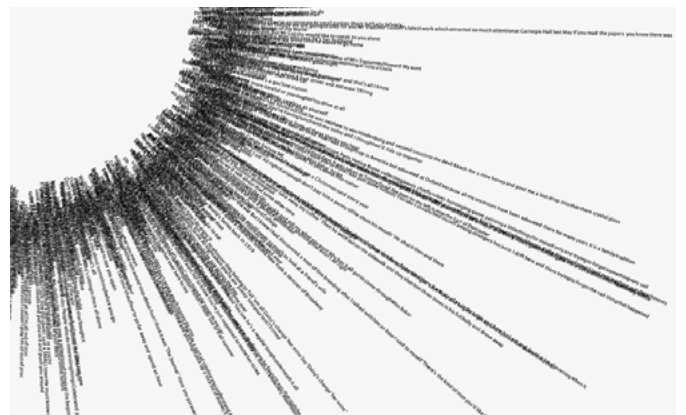


Figure 4 /  
*To See and Hear* (2013), detail from a single novel, Owen Herterich.

The denser the visualisation presented, 'the higher the proportion of the dialogue that exists in the specific work of literature.' Apart from the overall sense of a novel being more or less dialogue driven, you can also see how the dialogue is dispersed over the course of the novel. While the dialogue in some novels is quite consistent, others have obvious moments of intensity as is represented by the way the dialogue text begins to cluster around the centre of the circle. Some circles (see the last circle in row 2) are so dense that it is no longer possible to read the dialogue at close range.

<sup>12</sup> / *Listening Post* (2001) by Ben Rubin and Mark Hansen (<http://o-c-r.org/portfolio/listening-post/>); *Cinema Redux* (2004) by Brendan Dawes ([www.brendandawes.com/sketches/redux/](http://www.brendandawes.com/sketches/redux/)); *Preservation of Selected Traces* (2009) by Ben Fry ([www.benfry.com/traces](http://www.benfry.com/traces)). Retrieved 1 October 2014.



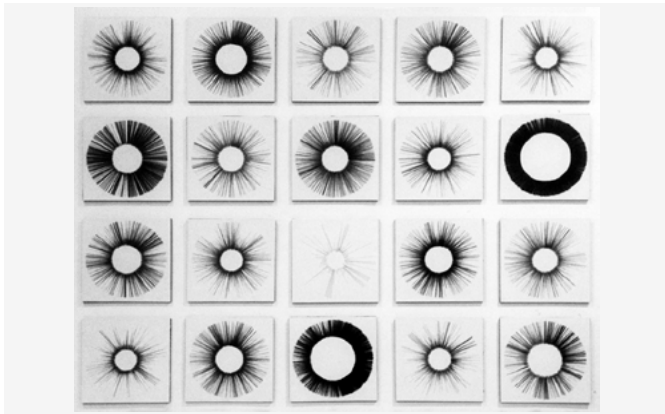


Figure 5 /  
*To See and Hear* (2013), Visualisation of dialogue  
 from twenty novels Owen Herterich.

These circular structures not only visually represent the level of noise (the more dense the diagram the more intense the dialogue and the less dense the diagram, the more sparse the dialogue) but they provide the reader with a context—a situatedness that is made possible by Herterich's inclusion of the text. In accordance with Manovich's 'direction visualisation' Herterich represents the dialogue with the actual text rather than transforming the dialogue into a numerical value. This faithfulness to the text creates a measure that is unlike a measure created by a node or vector. It suggests that the materiality of the text has semantic possibilities that a node or a vector cannot replicate. It alludes to the texture—the intensity, the frequency, the loudness or softness—of the dialogue of the novel.

Another project that draws on textual data is Jonathan Puckey and Peter Ström's *Zeitgeist* (2006), a series of visualisations that depict different aspects of online news, which is no longer reported once or twice daily but instead in a constant state of flux. One of the visualisations, *A story told in headlines*, analyses headlines collected over a period of two days about the same story from different news sources. (Figures 6 and 7) Each time a word is repeated the weight of the font is reduced, 'this way unoriginal headlines slowly disappear (old news) and new unused words are bold' (Puckey, 2006).



Figure 6 /  
*A story told in headlines* (2006), Jonathan Puckey  
 and Peter Ström.





Figure 7 /  
A story told in headlines (2006), [detail]  
Jonathan Puckey and Peter Ström.

Similarly, *Wikinews.org* (Figures 8 and 8a) presents the evolution of an article covering the death of former Yugoslavian president Slobodan Milosevic through direct visualisation. Over a period of eight days it goes from a small story to a detailed report. Puckey's next project, *Portrait of Madman* (2007), visualises the Fox News headlines during the Virginia Tech shootings. (Figure 9) Puckey set up an automated system that captures every change in the headline—the first headline claiming 'Imminent danger.' Thirteen revisions later it reads 'Madman's torment'. Again, in collaboration with graphic designer Peter Ström, the edits are translated into a typographic system: inverted in black is text that has been added and struck out, in red is text that has been removed.

All three of Puckey and Ström's projects are examples of 'direct visualisation' as the original text is both the collected data and the visualisation media, avoiding the reduction of source data into graphical primitives: 'text remains text' albeit with typographic intervention to code editorial changes. And while they may not, at first glance, look like information visualisations, even in a way that Manovich's examples do, they display properties that align themselves to the field. *Story told in headlines* visualizes word frequency by diminishing the font weight of the oft-repeated words and *Wikinews.org* performs word counts, where the lengthening columns resemble inverted bar charts. Both reveal the editorial processes behind the production of news.

Equally, these examples resist spatialisation as a key method of communicating meaning, preferring to use colour and strike-throughs. While the text blocks in *Portrait of Madman* have x and y values, they are placed in accordance with the conventions of newspaper design not at the convergence of data points. Here, the primary role of the spatial arrangements is to set up a relationship between the texts that, along with black all-caps sans serif typeface, mimics news headlines. The space between the text blocks is designed to encourage a hierarchy of reading, not to suggest



Figure 8 /  
*Wikinews.org* (2006), Jonathan Puckey and  
Peter Ström

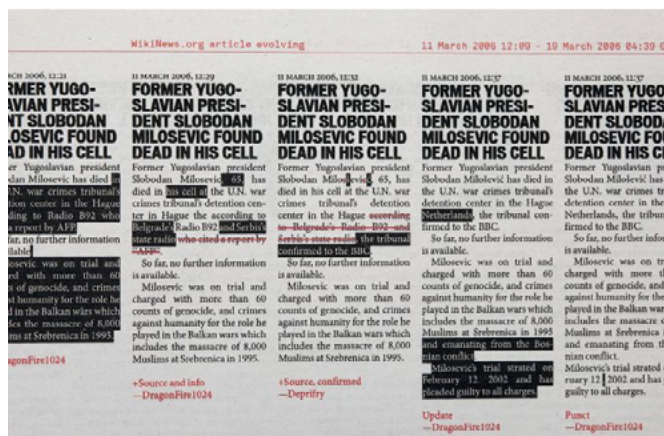


Figure 8a /  
*Wikinews.org* (2006), [detail] Jonathan Puckey and  
Peter Ström.

relational information typical of, say, network diagrams. So while every spatial decision is rhetorical the nature of the arguments is different. In *Portrait of Madman* space is used along with typographic choices to construct a contextual argument: this data is derived from, and is about, newspapers headlines. In conventional information visualisation, space is more likely to be used to construct quantitative arguments using points, position, size and curvature of lines.

These projects are undoubtedly examples of 'direct visualisation' as the words are not reduced to graphical primitives, remaining as both the source data and the visualising media. Equally, spatialisation is not privileged: in the case of Heterich's work, it is fixed to a single structure, predetermined by the order in which the authors wrote the dialogue; and in Puckey and Ström's work spatialisation is in the service of contextualisation more than quantification, as the text blocks are arranged to suggest headlines not to plot coordinates.

## VISUALISATION EXPERIMENTS

In the third and final section of the paper, we apply direct visualisation strategies to the 'Writing Rights' data. We discuss how making the text visible in new ways can operate as a method of inquiry, revealing aspects of the source material that would otherwise remain hidden. Through direct visualisation we show how certain words and phrases appear and reappear, align and cluster, remain whole or are reconfigured, and how some Articles are consistently present and how others appear only occasionally. These findings speak to a key question identified by the historians: are the Articles largely improvised or overdetermined?

### 1. SELECTING AND IDENTIFYING PARTS OF THE TEXTS

To begin the process of visualisation, Baker and Edelstein highlighted keywords and phrases from the final Déclaration, which we used to search the drafts texts.<sup>13</sup> Initially we piloted only three Articles (I, II, and VI) from the Déclaration. In each case, this meant searching for the highlighted single words and phrases using Text Wrangler. (Figure 10) This process was revised after we realised the selected phrases rarely appeared in their entirety until the final draft.

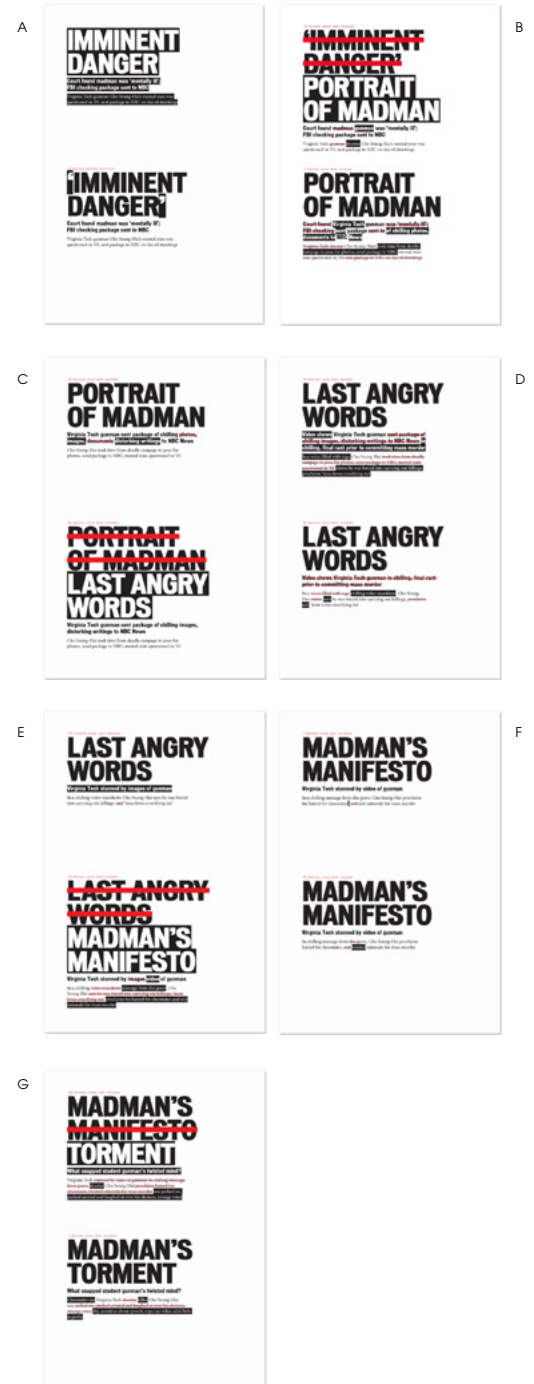


Figure 9 / *Portrait of Madman* (2007) Jonathan Puckey and Peter Ström.

<sup>13</sup> / While this process might seem analogous to text mining, a more apt term would be 'enhanced search.' As literary theorist Matthew Jockers points out if you 'combine a traditional literary training focus on close reading with the most common text-analysis tools focused on the same thing then what you end up with is enhanced search.' (2013, p.17)

aux besoins individuels. Celui qui est chargé des besoins, doit donc disposer librement des moyens. Ce n'est pas seulement un droit, c'est un devoir.

*txt: 25: Relations' which have the force of origin, are bad and illegitimate. Two men are also men, to an equal degree, all rights deriving from human nature. Thus, every man is his own person, or no one is. Every man has the right to dispose of its resources, or no one has that right. Individual means are attached by nature to individual needs. Whoever is responsible needs, must freely dispose of means. This is not only a right but a duty.*

txt:31: Puisque tout homme est chargé de vouloir pour son bien, il peut vouloir s'engager envers ses semblables; et il le voudra, s'il juge que c'est son avantage.

txt:32: Il a été reconnu plus haut que les hommes peuvent beaucoup pour le bonheur les uns des autres. Donc une société fondée sur l'utilité réciproque est véritablement sur la ligne des moyens naturels qui se présentent à l'homme pour le conduire à son but ; donc cette union est un avantage, et non un sacrifice, et l'ordre social est comme une suite, comme un complément de l'ordre naturel. Ainsi, lors même que toutes les facultés sensibles de l'homme ne le porteraient pas d'une manière très-réelle et très-forte, quoique non encore éclaircie, à vivre en société, la raison toute seule l'y conduirait.

*It was recognized earlier that men can do much to the happiness of each other. So a society based on mutual utility is truly on the line of the natural ways that come to man to lead him to his goal; so this union is an advantage, not a sacrifice, and the social order is like a suite, as a complement to the natural order. Thus, even when all the sensitive faculties of man does not wear a very real way, and very strong, although not yet cleared to live in society, reason alone will lead the*

txt:33: L'objet de l'union sociale est le bonheur des associés. L'homme, avons-nous dit, marche constamment à ce but; et certes, il n'a pas prétendu en changer, lorsqu'il s'est associé avec ses semblables.

txt:38: Donc l'homme, entrant en société, ne fait pas le sacrifice d'une partie de sa liberté : même hors du lien social, nul n'avait le droit de nuire à un autre. Ce principe est vrai dans toutes les positions où l'on voudra supposer l'espèce humaine : le droit de nuire n'a jamais pu appartenir à la liberté.

txt:40: Ainsi puisque, dans l'état social, l'homme croît en moyens moraux et physiques, et qu'il se soustrait eh même temps aux inquiétudes qui en accompagnaient l'usage, il est vrai de dire que la liberté est plus pleine et plus entière dans l'ordre social, qu'elle ne peut l'être dans l'état qu'on appelle de nature.

txt:49: Les limites de la liberté individuelle ne sont placées qu'au point où elle commencerait à nuire à la liberté d'autrui. C'est à la loi à reconnaître ces limites et à les marquer. Hors de la loi, tout est libre pour tous: car l'union sociale n'a pas seulement pour objet la liberté d'un ou de plusieurs individus, mais la liberté de tous. Une société dans laquelle un homme serait plus ou moins libre qu'un autre, serait, à coup sûr, fort mal ordonnée; elle cesserait d'être libre; ifr faudrait la reconstituer.

*It is the law to recognize these limitations and the score. Outside the law, everything is free for all: for the social union not only subject] reedom of one or more individuals, but the freedom of all. A society in which a man would be more or less free than another, would certainly badly ordered; it would cease to be free; ifr should reconstitute.*

txt:74: L'établissement public est une sorte de corps politique qui, ayant, comme le corps de l'homme, des besoins et des moyens, doit être organisé à-peu-près de la même manière. Il faut le douer de la faculté de vouloir et de celle d'agir.

txt:94: Le mandataire public, quelque soit son poste, n'exerce donc pas un pouvoir qui lui appartienne en propre, c'est le pouvoir de tous ; il lui a été seulement confié; ii ne pouvait pas être aliéné, car la volonté est inaliénable, les peuples sont inaliénables; le droit de penser, de vouloir et d'agir pour soi est inaliénable; on peut seulement en commettre l'exercice à ceux qui ont notre confiance ; et cette confiance a pour caractère essentiel d'être libre. C'est donc une grande erreur

Figure 10 /  
Initial results of search for relevant words and phrases.

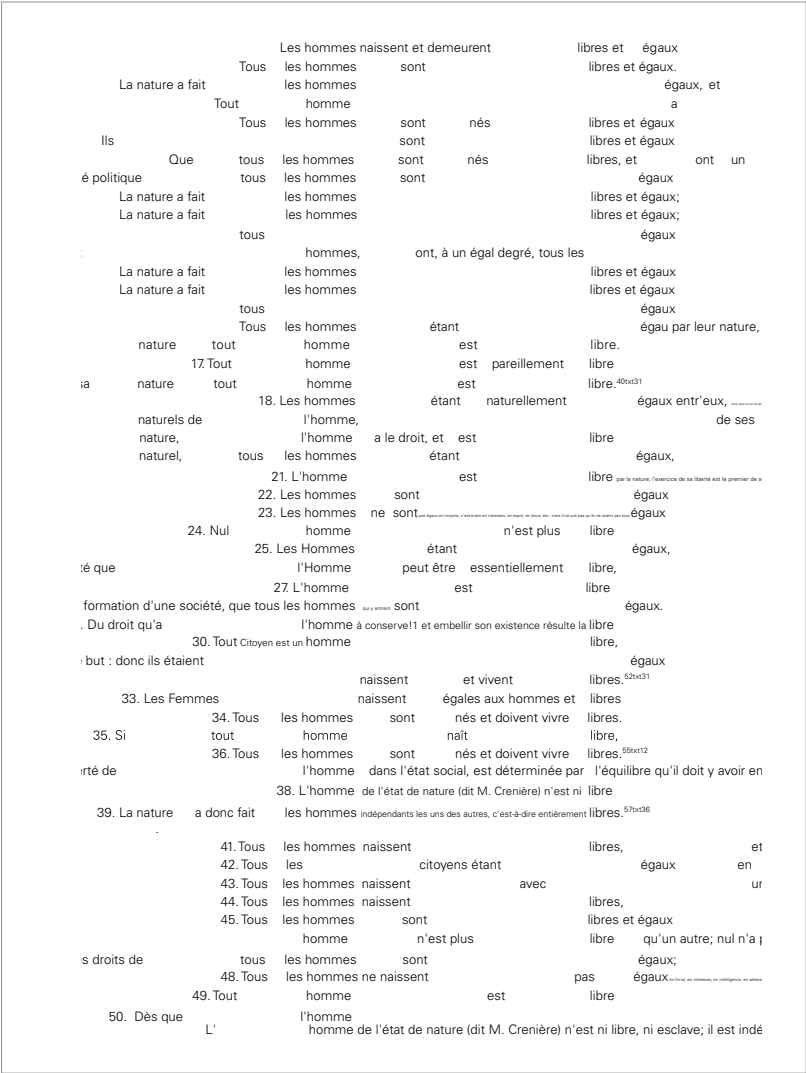
To overcome this issue, we began searching for combinations of individual words instead of whole phrases. We repeated this until all possible combinations had been exhausted. In the event of repeated combinations turning up no results we searched for words not identified by the historians. This expanded approach also enabled us to search for synonyms, which revealed similar ideas and themes that were not identified in the initial search. We then extracted all the sentences that combined at least two key words or phrases. The historians confirmed the relationship of the sentences to the final Articles. These sentences then formed a master list for each Article. We now had a way to trace the ideas that formed the final Articles through the text.

2. SENTENCE AND SINGLE-WORD ALIGNMENT

In this experiment, we took each sentence from the master list and aligned matching words to the final Article (i.e. Article 1 as shown below).<sup>14</sup> Words that we could not align were left to float within close proximity to the original text or were moved to the edges. (Figure 11) This process of rough alignment enabled patterns to emerge, revealing not only the common search words or combinations of words (e.g. ‘égaux en droits’), but also similar words such as ‘un égal’ that were not found in the Article.

Identifying repetition in the draft texts led to a second iteration. In this iteration, the alignment of words from the final article and other commonly occurring words (such as ‘tous’ instead of ‘les’, and ‘sont’ which followed ‘homme’ most often) were grouped in columns. In the third iteration, we aligned words that had the same function. For example, ‘L’utilité commune’ to ‘l’utilité generale’ and ‘l’interest commune’. We also aligned singular and plural words such as ‘tout’ with ‘tous’ and ‘les’ with ‘l’. (Figure 12) Interestingly, this process of narrowing the gaps in the layout revealed that the core principles often remained the same despite the variation in single words.

Figure 11 /  
Sentence alignment experimentation (Article 1).



14 / This process was repeated for all 17 articles.



Les hommes naissent et demeurent libres et égaux en droits. Les distinctions sociales ne peuvent être fondées que sur l'utilité.									
Par sa	naturel	tout	est						
la nature a fait	tous	l'	ne	sont	nés	égal		doiv	
				naissent et demeurent libres et égaux en droits. Les distinctions sociales ne p					
La nature a fait	Tous	les hommes		sont		libres et égaux.			
	Tout	les hommes				égaux		les distinctions	
	Tout	homme						droit	
	tous	les hommes		sont	nés	libres et égaux en droits.			
	tous	les hommes		sont		libres et égaux en droits,			
	tous	les hommes		sont	nés	libres et		droit	
La nature a fait	tous	les hommes		sont		égaux en droits,			
La nature a fait		les hommes				libres et égaux		les distinctions	
		hommes,				libres et égaux		les distinctions	
	tous					égal		droits	
	tous					égaux en droits.			
La nature a fait		les hommes				égaux en droits			
La nature a fait		les hommes				libres et égaux en droits. Les distinctions sociales		doiv	
	Tous	les hommes		étant		libres et égaux en droits; les distinctions sociales		doiv	
Par sa nature	tout	l'homme		est		libre.			
	Tout	l'homme		est		libre			
Par sa nature	tout	l'homme		est		libre.			
	Tous	les hommes		étant					
naturels		l'homme				égaux		droits,	
nature		l'hommes		est		libre			
naturel,	tous	les hommes		étant		égaux			
		l'homme		est		libre		droits	
		Les hommes		sont		égaux en droit			
		Les hommes		sont		égaux en droits			
		homme				libre			
		les hommes		étant		égaux		les distinctions sociales,	doiv
		l'Homme				libre,			
		l'homme		est		libre			
	tous	les hommes		sont		égaux			
		l'homme				libre			
	Tout	l'homme				libre,			
						égaux en droits.			
				naissent		libres			
				naissent		libres			
	Tous	les hommes		sont	nés	libres.		égaux	
	tout	l'homme				libre,			
	Tous	les hommes		sont	nés	libres.			
		l'homme		est				droits	
La nature	fait	les hommes				libre			
						libres.			
	Tous	les		étant					
	Tous	les hommes		naissent		égaux en droits,		les distinctions sociales	doiv
	Tous	les hommes		naissent		droit			
	Tous	les hommes		naissent		libres,			
	Tous	les hommes		naissent		égaux		droit	
	Tous	les hommes		sont		libres et égaux			
		homme				libre		droit	
	tous	les hommes		sont		égaux			doiv
	Tous	les hommes	ne	naissent		égaux			
	Tout	l'homme		est		libre		distinctions	
naturels		l'homme,				égaux			

Figure 12 (LEFT) /  
Sentence alignment experimentation (Article 1).

Figure 13 (BELOW) /  
Single word alignment experimentation (Article 1).

Another variation of this experiment is the alignment of a single word at a time. (Figure 13) This process reveals which ideas surround key words, for example, 'egaux', 'droits' and 'nature' are often proximate. It also reveals where keywords are positioned in the sentence and how this position varies in the other related sentences.

[illegible]

### SEEING PATTERNS

Through sentence alignment, we can see the way a word or combination of words might relate to one another as well as the number of times a word appears in the text. Put slightly differently, the order of the text or how it evolves or comes together with other words and/or phrases is important to the research. Not only do the visualisations show how the ideas have formed (merged), but they also hint at how they might have come apart (separated). They also give a sense of how this might have happened across drafts by multiple authors. These insights are revealing as they enable the lifespan of words and phrases (and therefore ideas) to be tracked. This technique enables the similarities between the draft text and the final text to be compared, which is not immediately apparent in the preliminary search phase. Another way to look at this experiment is to examine the way particular words disappear or reappear. The efficiency of the text, in other words how quickly the draft authors are able to formulate an idea, is of interest to the historians.

### 'ANT SCRIBBLE'

In 'ant scribble' we present all 48 drafts in one view (Figure 14). A column of text represents a draft. The drafts are organised chronologically from left to right and are centre aligned. This visualisation gives us a sense of the overall corpus. To enable the researcher to read the text both at a macro and micro level, we produced a print visualisation (3.6m x 1.1m). Again this affords the historians a different way into the drafts and the relationship between them. Using Figure 13 as a foundation visualisation, we developed two other versions that were designed to foreground different aspects of the text.

Figure 14 shows which drafts contain reference to Article I 'Les hommes naissent et demeurent libres et égaux en droits. Les distinctions sociales ne peuvent être fondées que sur l'utilité commune' [Men are born and remain and equal in rights. Social distinctions may be based only on considerations of the common good]. As the drafts are not numbered, the authors' identity remains hidden—shifting the focus away from who proposed the article towards which articles appeared more often, privileging one type of information over the other. Through comparison, this visual strategy reveals that Article XV is only mentioned in two drafts while Article XI is consistently discussed across the 48 drafts (Figure 16). This begins to speak to the historian's interest in the uneven way in which the Articles are represented.

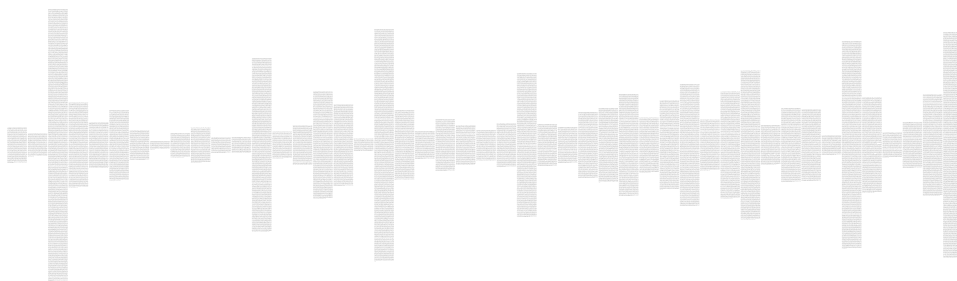


Figure 14 /  
'Ant scribble'. Overall view of drafts.

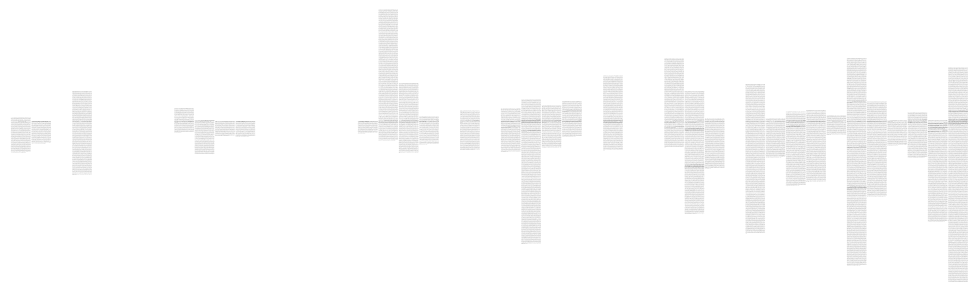


Figure 15 /  
Draft view of Article I.

Figure 16 /  
Single ‘Ant scribble’ compared.



**Article I**

Les hommes naissent et demeurent libres et égaux en droits. Les distinctions sociales ne peuvent être fondées que sur l'utilité commune.

*Men are born and remain free and equal in rights. Social distinctions may be based only on considerations of the common good.*

**Article II**

Le but de toute association politique est la conservation des droits naturels et imprescriptibles de l'homme. Ces droits sont la liberté, la propriété, la sûreté et la résistance à l'oppression.

*The aim of every political association is the preservation of the natural and imprescriptible rights of Man. These rights are Liberty, Property, Safety and Resistance to Oppression.*

**Article III**

Le principe de toute Souveraineté réside essentiellement dans la Nation. Nul corps, nul individu ne peut exercer d'autorité qui n'en émane expressément.

*The principle of any Sovereignty lies primarily in the Nation. No corporate body, no individual may exercise any authority that does not expressly emanate from it.*

**Article IV**

La liberté consiste à pouvoir faire tout ce qui ne nuit pas à autrui : ainsi l'exercice des droits naturels de chaque homme n'a de bornes que celles qui assurent aux autres Membres de la Société, la jouissance de ces mêmes droits. Ces bornes ne peuvent être déterminées que par la Loi.

*Liberty consists in being able to do anything that does not harm others: thus, the exercise of the natural rights of every man has no bounds other than those that ensure to the other members of society the enjoyment of these same rights. These bounds may be determined only by Law.*

**Article V**

La Loi n'a le droit de défendre que les actions nuisibles à la Société. Tout ce qui n'est pas défendu par la Loi ne peut être empêché, et nul ne peut être contraint à faire ce qu'elle n'ordonne pas.

*The Law has the right to forbid only those actions that are injurious to society. Nothing that is not forbidden by Law may be hindered, and no one may be compelled to do what the Law does not ordain.*

**Article VI**

La Loi est l'expression de la volonté générale. Tous les Citoyens ont droit de concourir personnellement, ou par leurs Représentants, à sa formation. Elle doit être la même pour tous, soit qu'elle protège, soit qu'elle punisse. Tous les Citoyens étant égaux à ses yeux, sont également admissibles à toutes dignités, places et emplois publics, selon leur capacité, et sans autre distinction que celle de leurs vertus et de leurs talents.

*The Law is the expression of the general will. All citizens have the right to take part, personally or through their representatives, in its making. It must be the same for all, whether it protects or punishes. All citizens, being equal in its eyes, shall be equally eligible to all high offices, public positions and employments, according to their ability, and without other distinction than that of their virtues and talents.*

**Article VII**

Nul homme ne peut être accusé, arrêté, ni détenu que dans les cas déterminés par la Loi, et selon les formes qu'elle a prescrites. Ceux qui sollicitent, expédient, exécutent ou font exécuter des ordres arbitraires, doivent être punis ; mais tout Citoyen appelé ou saisi en vertu de la Loi doit obéir à l'instant : il se rend coupable par la résistance.

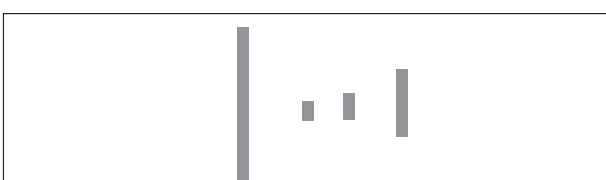
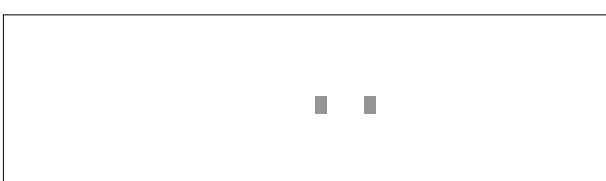
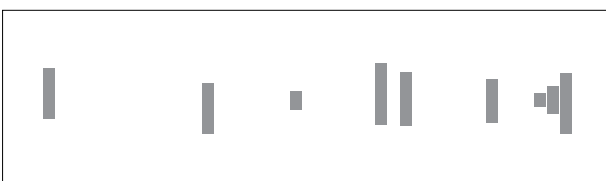
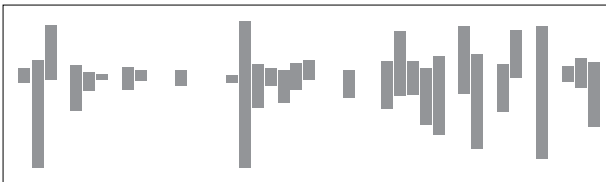
*No man may be accused, arrested or detained except in the cases determined by the Law, and following the procedure that it has prescribed. Those who solicit, expedite, carry out, or cause to be carried out arbitrary orders must be punished; but any citizen summoned or apprehended by virtue of the Law, must give instant obedience, resistance makes him guilty.*

**Article VIII**

La Loi ne doit établir que des peines strictement et évidemment nécessaires, et nul ne peut être puni qu'en vertu d'une Loi établie et promulguée antérieurement au délit, et légalement appliquée.

*The Law must prescribe only the punishments that are strictly and evidently necessary; and no one may be punished except by virtue of a Law drawn up and promulgated before the offense is committed, and legally applied.*

Figure 16 (Continued) /  
Single ‘Ant scribble’ compared.



Article IX

Tout homme étant présumé innocent jusqu’à ce qu’il ait été déclaré coupable, s’il est jugé indispensable de l’arrêter, toute rigueur qui ne serait pas nécessaire pour s’assurer de sa personne, doit être sévèrement réprimée par la Loi.

*As every man is presumed innocent until he has been declared guilty, if it should be considered necessary to arrest him, any undue harshness that is not required to secure his person must be severely curbed by Law.*

Article X

Nul ne doit être inquiété pour ses opinions, même religieuses, pourvu que leur manifestation ne trouble pas l’ordre public établi par la Loi.

*No one may be disturbed on account of his opinions, even religious ones, as long as the manifestation of such opinions does not interfere with the established Law and Order.*

Article XI

La libre communication des pensées et des opinions est un des droits les plus précieux de l’Homme : tout Citoyen peut donc parler, écrire, imprimer librement, sauf à répondre de l’abus de cette liberté, dans les cas déterminés par la Loi.

*The free communication of ideas and of opinions is one of the most precious rights of man. Any citizen may therefore speak, write and publish freely, except what is tantamount to the abuse of this liberty in the cases determined by Law.*

Article XII

La garantie des droits de l’Homme et du Citoyen nécessite une force publique : cette force est donc instituée pour l’avantage de tous, et non pour l’utilité particulière de ceux auxquels elle est confiée.

*To guarantee the Rights of Man and of the Citizen a public force is necessary; this force is therefore established for the benefit of all, and not for the particular use of those to whom it is entrusted.*

Article XIII

Pour l’entretien de la force publique, et pour les dépenses d’administration, une contribution commune est indispensable. Elle doit être également répartie entre tous les Citoyens, en raison de leurs facultés.

*For the maintenance of the public force, and for administrative expenses, a general tax is indispensable; it must be equally distributed among all citizens, in proportion to their ability to pay.*

Article XIV

Tous les Citoyens ont le droit de constater, par eux-mêmes ou par leurs Représentants, la nécessité de la contribution publique, de la consentir librement, d’en suivre l’emploi et d’en déterminer la quotité, l’assiette, le recouvrement et la durée.

*All citizens have the right to ascertain, by themselves, or through their representatives, the need for a public tax, to consent to it freely, to watch over its use, and to determine its proportion, basis, collection and duration.*

Article XV

La Société a le droit de demander compte à tout Agent public de son administration.

*Society has the right to ask a public official for an accounting of his administration.*

Article XVI

Toute Société dans laquelle la garantie des Droits n’est pas assurée, ni la séparation des Pouvoirs déterminée, n’a point de Constitution.

*Any society in which no provision is made for guaranteeing rights or for the separation of powers, has no Constitution.*

Article XVII

La propriété étant un droit inviolable et sacré, nul ne peut en être privé, si ce n’est lorsque la nécessité publique, légalement constatée, l’exige évidemment, et sous la condition d’une juste et préalable indemnité.

*Since the right to Property is inviolable and sacred, no one may be deprived thereof, unless public necessity, legally ascertained, obviously requires it, and just and prior indemnity has been paid.*



These visualisations prioritize the seventeen Articles. Even though the drafts are represented in each Article view, they are always in the context of the Article to which they refer. The primary frame is the Article.

The next visualisation privileges the draft's authors. It enables us to see varied levels of authorial contribution to the final Déclaration. For example, Arnaud Gouges-Cartou refers to thirteen of the final seventeen Articles, whereas Jean Gabriel Gallot's draft only referred to one Article (Article II) (highlighted in Figure 17). This reframing gives the historians another way to view the drafts—that is from the perspective of the author not the articles.

It is important to note that, whilst these visualisations have started to evidence the ideas that formed the final Articles, the drafts are only one aspect of the source material. In order to more wholly account for the Déclaration's creation, we have had to turn to the National Assembly debates. These documents record the discussions that ultimately shaped the final Articles. They begin to pick up the process by which each Article was proposed, amended, contested and voted on. By recording the machinations of the National Assembly another layer of understanding is added. These experiments form the second stage of our research, which is necessary to give a more complete picture of the Déclaration's creation.

## CONCLUSION

While the role of visualisation as a method for quantification has a valid place in humanities research, it also has the potential to take into account non-aggregative approaches to text-based data. This research shows that by visually reconfiguring the drafts through strategies of composition, alignment and repetition we have created alternate entry points into the text. These entry points challenge conventional reading strategies that assume a (Western) top to bottom, left to right approach. By subverting typographic conventions, new spatial relationships force us to read the text associatively rather than in a linear way. It is this process of making strange something familiar that enables the possibility of new insights to be derived from the drafts. Design's commitment to the semantic potential of the visual to produce knowledge makes it a valuable partner in humanities research. By drawing on the domain expertise of design, we aim to develop practices that can more wholly account for human experience held within digital data sets.

Figure 17 (RIGHT) /  
View of drafts compared.

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Jacqueline Lorber Kasunic is a design academic with a background in ethnographic and photographic practice. Her research combines design history and theory, material culture and visual forms of knowledge production. Her current research spans the intersection between design and the humanities, where the digitisation of content has created new opportunities for rethinking how we engage with and share digital collections and archives. Her work has appeared in journals including: *Design Philosophy Papers*, *Journal of Design Research*, *Media/Culture and Studies in Material Thinking* (forthcoming). She is currently working with the Humanities + Design Lab at Stanford University on a project titled 'Writing Rights', where she is using visualisation to translate text-based data into visual knowledge. Recent exhibitions include *Durational Book* (an investigation into the historical idea of the book beyond the codex) at the *State Library of NSW*, as part of ISEA 2013. Jacqueline is a Lecturer in the Faculty of Design, Architecture and Building at the University of Technology Sydney. Her PhD in Design analysed colonial Australian images and their ongoing resonance in contemporary rural practices.

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Kate Sweetapple is a design academic with an interest in the intersections between language, literature and design. Her focus is the use of practice-led research methods to extract and visualise data sets from written texts. Her research is realised through a variety of practices: designing, curating, writing and teaching. She is interested in the positioning of design as an experimental practice, specifically the move away from design's more instrumental role. Kate is also drawn to design curation as a site to argue for an expanded understanding of the role of the designer as a cultural critic and agent. Current research projects include 'Writing Rights' with Humanities + Design at Stanford University. Kate is Associate Head of School, Design, at the University of Technology Sydney. She holds a PhD in Visual Communication. Three national institutions have acquired Kate's experimental cartographic work: National Library of Australia, National Gallery of Australia and the National Maritime Museum of Australia. She is regularly invited to be a judge, examiner, panellist, and design commentator.