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Who's Afraid of Patterns?

The Particular versus the Universal and the Meaning of Humanities 3.0

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The advent of Digital Humanities has enabled scholars to identify previously unknown patterns in the arts and letters; but the notion of pattern has also been subject to debate. In my response to the authors of this Forum, I argue that 'pattern' should not be confused with *universal* pattern. The term pattern itself is neutral with respect to being either particular or universal. Yet the testing and discovery of patterns – be they local or global – is greatly aided by digital tools. While such tools have been beneficial for the humanities, numerous scholars lack a sufficient grasp of the underlying assumptions and methods of these tools. I argue that in order to criticise and interpret the results of digital humanities properly, scholars must acquire a good working knowledge of the underlying tools and methods. Only then can digital humanities be fully integrated (humanities 3.0) with time-honoured (humanities 1.0) tools of hermeneutics and criticism.

What are patterns?

The three authors of this Forum[1] seem to agree on what is the main argument of my inaugural lecture[2]: the greatest change that the digital turn in the humanities has brought about is the identification of *patterns* in large-scale humanistic materials (music, literature, art, history, language, film, texts, et cetera). Here, however, their agreement ends. Perhaps my main argument raises more questions than it provides answers. For example, what exactly are patterns, and what is their role in humanistic scholarship? Although it seems hard to give a single definition of patterns that holds for all disciplines[3], we might come up with a more narrative description of the term, which elaborates

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on the definition given in my recent book *A New History of the Humanities*.[4] A pattern is a trend or a tendency that can range from the local to the global. It can consist of a regularity (often with exceptions) but also of a grammatical rule, or a historical trend such as the increase of the number of democratic states during the last decades. Some patterns may be similar to 'laws' such as the sound shift laws in linguistics or the laws of harmony in music. The notion of 'pattern' is thus an umbrella term that covers everything that can be found between inexact trends and exact laws.

I have shown elsewhere that the search for patterns is found in all humanities disciplines (from linguistics to historiography), in all periods (from Antiquity up to the present day), and in all regions (from China to Europe).[5] Although not all scholars will refer to their results as 'patterns', the notion of pattern is part and parcel of humanistic practice.

Here are some documented examples of patterns from various disciplines:

1 The division of Beethoven's compositions into three style periods.[6]
2 The way in which poets and painters have represented the wind in a girl's hair.[7]
3 The knowledge network in Amsterdam's Golden Age.[8]
4 The use of recurrent phrases, themes and episodes in (oral) literature.[9]
5 The shift from voiceless to voiced consonants (and vice versa) in language change.[10]

1 I am grateful to the authors Inger Leemans, Andreas Fickers and Marnix Beyen for their stimulating contributions, to Geert Janssen and Kaat Wils for their Introduction to this Forum, and to BMGN's editors for inviting me to write a response. I am indebted to H. Floris Cohen, Annelien de Dijn and Daniela Merolla for excellent suggestions on a previous version of this paper.

2 Rens Bod, *Het einde van de geesteswetenschappen 1.0*, Inaugural Lecture, 14 December 2012 (Amsterdam): http://www.oratiereeks.nl/upload/pdf/PDF-1433Weboratie_Rens_Bod_-_def.pdf.

3 There are definitions of pattern for individual disciplines, for instance for the notion of pattern in literary studies, see Stephen Ramsay, 'In Praise of Pattern', *TEXT Technology: the Journal of Computer Text Processing* 14:2 (2005) 177-190.

4 Rens Bod, *A New History of the Humanities* (Oxford 2013) 9. Extended and translated version of Rens Bod, *De vergeten wetenschappen* (Amsterdam 2010).

5 Bod, *A New History of the Humanities*, 352ff.

6 Charles Rosen, *The Classical Style: Haydn, Mozart, Beethoven* (London 1971).

7 Aby Warburg, *Renewal of Pagan Antiquity* (Los Angeles 1999), originally published in German as Aby Warburg, *Die Erneuerung der heidnischen Antike* (München 1932).

8 Bod, *Het einde van de geesteswetenschappen 1.0*, 14. For the knowledge network of Golden Age painters, see the *Ecartico* database (http://burckhardt.ic.uva.nl/ecartico/database.html) by Marten Jan Bok and Harm Nijboer.

9 Albert Lord, *The Singer of Tales* (Cambridge, MA 1960).

10 Jacob Grimm, *Deutsche Grammatik*, Volume 1 (Second edition; Göttingen 1822).

6 The declining ratio of rural to urban population during the last century.[11]

7 The hierarchy of zones within a world economy.[12]

8 The convex structure of traditional musical scales.[13]

These patterns reflect the full spectrum of the humanities, from the special to the universal. Pattern 1 is time and place dependent; it counts (if it counts) for Beethoven only. Pattern 2 makes generalisations about different periods and styles, but it is certainly not universal, though there may be similarities in the way the wind in a girl's hair has been visually or verbally represented across cultures. Pattern 3 is also time and place dependent, even though the knowledge network of Amsterdam may be similar to its counterparts in other Dutch cities. Pattern 4 *may* be universal, but currently it is time and place dependent although the use of recurrent phrases and themes has been studied for a large number of genres and languages. Pattern 5 was believed to be near-universal in the nineteenth century, but is now known to hold only (and not even always) for Indo-European languages. Pattern 6 currently seems to be independent of place (peasants move to cities virtually everywhere in the world), but it is certainly time dependent since the opposite trend occurred in the post-classical period. Only patterns 7 and 8 may still be claimed to be universal and thus to be time and place *independent*: in all periods where we can speak of a world economy there is a hierarchy of zones; and for all known cultures in the world, the traditional musical scales form convex structures when the notes of the scales are represented as fractions of integers and placed in a grid.

Thus patterns can range from the particular to the universal. As I have argued at some length in my inaugural lecture, the identification of these and other patterns is immensely aided by the use of digital techniques. This is because digital tools allow us to search in massive amounts of data. For the first time it has become possible to compare thousands, even millions of books[14],

11 Peter Stearns, *World History* (Oxford, New York 2011) 182.

12 Fernand Braudel, *Civilisation matérielle, économie et capitalisme, XVe-XVIIIe siècle* volume 3 (Paris 1986).

13 Aline Honingh and Rens Bod, 'In Search of Universal Properties of Musical scales', *Journal of New Music Research* 40:1 (2011) 81-89.

14 E.g. the *Google Ngram Viewer* tool (https://books.google.com/ngrams) allows for comparing ngram-patterns in 5.2 million books, published between 1500 and 2008, containing 500 billion words, while *Early Dutch Books Online* (http://www.earlydutchbooksonline.nl) gives full-text access to more than 2 million pages in 10,000 books published between 1781 and 1800.

paintings[15], historical sources[16] and musical pieces[17] – provided that they have been digitised in a searchable format. This means that patterns already *known* – and *intuitions* about patterns – for the first time can be tested on a much larger scale on big data, which has led some to conclude that the digital turn has brought experiment into the humanities![18] However, apart from testing known patterns, many other patterns are entirely new and, moreover, could not have been found without digital means. This is true, for example, of patterns 3 and 8: the representation of the knowledge network of Amsterdam cannot be constructed without digital techniques applied to massive data, and the *discovery* of pattern 8 is the outcome of a complex algorithm that represents the geometric structure of all known (over 1,000) traditional musical scales in the world.[19] Thus the first thing we should note is that some patterns can be obtained 'by hand' while others cannot, and that digital techniques are useful (and often indispensable) for both kinds of patterns as well as for further questions arising from them.

Thus while the three authors of this Forum are right in noting that my main interest is in discerning patterns by digital means, they are mistaken in claiming that my main interest lies in finding *universal* patterns. In my lecture I use the term pattern mostly *without* the adjective 'universal' (90% of the time); only twice do I use it *with* the adjective 'universal'. Moreover, the two times where I do use 'universal', it is not in the context of history, but of musicology (pattern 8 above) and literature (roughly pattern 4 above). Of course, I believe that the search for universal patterns is also of great importance, but my main interest is in the (digital) identification of patterns *in general* – be they local or global.

This terminological confusion is fairly insignificant compared to the strikingly contrasting views between the three authors regarding the notion of universality. To put it in a nutshell, Fickers opposes any notion of universal pattern in history whatsoever; Beyen may or may not accept universal patterns

15 E.g. the RKD*images* tool (http://english.rkd.nl/Databases/RKDimages?set_language=en) gives access to descriptions and images of more than 195,000 (mostly Dutch and Flemish) works of art from the fourteenth up to and including the nineteenth century.

16 E.g. the search tools for digital archives like the *National Archives of the Netherlands* (http://en.nationaalarchief.nl/) or *America's Historical Documents* (http://www.archives.gov/historical-docs/) allow for searching directly in historical sources.

17 E.g. the *Humdrum* toolkit (http://www.musiccog.ohio-state.edu/Humdrum/) can be used to search for a wide variety of types of musical patterns.

18 Willard McCarty, *Humanities Computing* (Basingstoke 2005).

19 These scales have been brought together in the SCALA database: http://www.huygens-fokker.org/scala/scl_format.html.

but argues in favour of local patterns, while Leemans seems to embrace both notions of patterns. I must admit that I do not understand Fickers's opposition to universal patterns. There are already for many years thriving historiographical communities that seek and find global, universal patterns, as Leemans also observes correctly when she writes:

> Take the Braudel branch of the *Annales* school, take diachronic research into revolutions, revolts, strikes but take also literary scholars trying to trace universal story patterns in folk stories, fairy tales or nursery rhymes, take research into visual or musical *topoi*, or research into 'the romantic' as a universal motif.

These communities of historians in search of pattern have their own journals, book series and conferences, such as the fields of *world history* and *global history*.[20] Thus Fickers is wrong when he writes that

> [t]he search for universal principles or patterns might be of interest for philosophers, natural scientists or computational linguists, but makes no sense for historians who share a basic believe in the radical historicity (and therefore necessarily changeability) of all human nature and culture.

Does Fickers want to deny the existence of an entire historical community that investigates patterns at a universal scale, such as patterns of reactions to hunger, of migration, disease, science, technology, trade et cetera?

What is humanities 3.0?

Having cleared up the notion of pattern, it seems that my views are most congenial to Leemans. Yet I think I can also agree with most of Beyen's and even with much of Fickers's views, and perhaps in the end they can even endorse mine. To demonstrate this I will have to go a bit more into the meaning of humanities 3.0, which admittedly I discussed only briefly in my inaugural address. First of all, I was very pleased to see Beyen's prominent inclusion of two digitally produced graphs in his paper. This, in the terminology of my inaugural address, is a direct move to humanities 2.0, i.e. the use of digital results based on big data.[21] More than that, the fact that

20 See *Journal of World History* and *Journal of Global History*. For an introduction to these fields, see Patrick Manning, *Navigating World History: Historians Create a Global Past* (Basingstoke 2003); Stearns, *World History*.

21 My use of the term humanities 2.0 roughly corresponds with its current use in Digital Humanities. For a popular introduction, see Patricia Cohen, 'Humanities 2.0: Digital Keys for Unlocking the Humanities' Riches', *New York Times* 16 November 2010.

Beyen additionally interprets and criticises these digitally obtained charts is evidence of a subsequent move to what I have coined humanities 3.0.

Simply put, humanities 1.0 refers to the hermeneutic and critical tradition as it was developed during the nineteenth and early twentieth century; humanities 2.0 refers to the identification and representation of patterns by digital means in the humanities as it has been developed in the second half of the twentieth and the early twenty-first century, and finally humanities 3.0 refers to the hermeneutic and critical tradition applied to these tools used and patterns obtained by humanities 2.0. In my inaugural lecture I describe this third stage as the fulfilment of the technological turn in the humanities where the positivist and the hermeneutically inclined humanities scholar each find their proper place. Thus the digital approach of humanities 2.0 alone does not usually deal with questions like *why* certain patterns occur and *why* certain tools might be adequate. On the contrary, most research in digital humanities is confined to the identification and representation of patterns (however fascinating otherwise) by the hybrid use of any tools one can get. Apart from some of the examples given above, I am referring here to such research as digital visualisations of narrative structures of novels, or computational analyses of folksongs, or representations of economic disparity over time, or distributions of syntactic phenomena in different languages, et cetera.[22] While all this is very interesting work, in my view it is incomplete and often ill-informed. It does not go into the deeper questions as to how these digitally obtained results are to be understood, how the underlying methods and tools can be justified and how the patterns thus found relate to the main business of the humanities. I readily admit that much of my own past (and even recent) work also lacked these deeper questions.[23] In digital and computational humanities for a long time it was taboo to deal with why-questions. It was the 'discovered' pattern, and that pattern alone, that counted. Hermeneutic discussions were not appreciated – as if the digitally obtained graphs and charts could speak for themselves. This is exactly the critique of humanities 2.0 that I have insisted on in my inaugural lecture.

I thus agree with Beyen when he writes 'Entirely unsatisfactory does the digital approach become when we try to find out *why* and *how* these

22 For additional examples, see Rens Bod, 'How the Humanities changed the World', *Annuario* 53 (Rome 2012) 189-200.

23 See e.g. Rens Bod, 'Memory-Based Models of Melodic Analysis: Challenging the Gestalt Principles', *Journal of New Music Research* 31:1 (2002) 27-36; Rens Bod, 'From Exemplar to Grammar: A Probabilistic Analogy-based Model of Language Learning', *Cognitive Science* 33:5 (2009) 752-793; Rens Bod, Bernhard Fisseni, Adil Kurji and Benedkit Löwe, 'Objectivity and Reproducibility of Proppian Annotations', in: Mark Finlayson (ed.), *The Third Workshop on Computational Models of Narrative* (Cambridge, MA 2012) 17-21; Stefan Frank, Rens Bod and Morten Christiansen, 'How Hierarchical is Language Use?', in: *Proceedings of the Royal Society B*, 297:1747 (2012) 4522-4531.

appropriations took place'. Indeed that is why we need to move beyond these dry graphs, and make the step to humanities 3.0 which Beyen himself seems to have made, too. Surprisingly, however, Beyen claims that he is still working in the land of humanities 1.0 (the hermeneutic and critical tradition), which he feels no urge to leave. Of course Beyen may define humanities 1.0 as he prefers, but what he is doing in his contribution does not correspond to the terminology used in my inaugural lecture and taken up by others as well.[24] Beyen uses the digitally obtained results produced by humanities 2.0 (the identification of patterns by digital means) for subsequent critical reflection and interpretation, justly arguing that without specific knowledge of Belgian history one would interpret the graphs incorrectly. This way of working corresponds exactly with my definition of humanities 3.0: 'humanities 3.0 integrates 1.0 and 2.0: both the technology and the reflection, and both the patterns and the interpretation. But in order to reach 3.0 we must go through 2.0'.[25]

What Beyen has not done, however, is to make the full step into the digital realm of humanities 2.0. He admits that he had to rely on his student Kaspar Beelen for the digitally obtained graphs. Thus interestingly, Beyen has made the step to humanities 3.0 by skipping the details of humanities 2.0. This kind of border crossing may seem efficient but is potentially dangerous, as one becomes dependent on others who might have used inadequate tools to analyse the data and to identify the patterns (as Beyen admits likewise). Historians need to know themselves how to generate graphs from data by digital tools. Such tools are abundantly available and (once one has made the decision to engage with them in earnest) not at all difficult to learn.[26] Without knowledge of these methods and tools the historian will not be able to check whether a graph, and the pattern it is meant to reflect, was correctly derived from the data.

This is why I make a strong case in my lecture for moving to humanities 3.0 *via* deep knowledge of humanities 2.0.[27] Interpreting and criticising

24 My notion of humanities 3.0 is also used in e.g. Marieke Winkler, 'Interpretatie en/of patroon? Over Het einde van de geesteswetenschappen 1.0 en het onderscheid tussen kritiek en wetenschap', *Vooys* 31:1 (2013) 31-41; and also in Stephan Besser and Thomas Vaessens, 'Digital Humanities: The Next Big Thing? Enkele notities bij een ontluikend debat', *Tijdschrift voor Nederlandse Taal- en Letterkunde* (in press).

25 '[...] omdat Geesteswetenschappen 3.0 die van 1.0 en 2.0 verenigt: zowel de technologie als de reflectie, en zowel de patronen als de interpretatie. Maar om 3.0 te bereiken moeten we wel door 2.0 heen'. in: Bod, *Het einde van de geesteswetenschappen 1.0*, 19.

26 See e.g. our crashcourse *Digital Tools in the Humanities*: http://digital.humanities.uva.nl/.

27 See also Pieter Pauwels and Rens Bod, 'Including the Power of Interpretation through a Simulation of Peirce's Process of Inquiry', *LLC: The Journal of Digital Scholarship in the Humanities* 28:3 (2013) 452-460.

patterns generated by digital tools without knowing how these tools work – let alone how to replicate these patterns – is a scholarly sin we should and can avoid.[28]

Leemans thus rightly argues for making 'interpretative processes digitally accessible, measurable and visualisable', and that '[t]his applies to both historic processes – the ways in which people attribute meaning to the world around them, make classifications, comments, et cetera and the way we analyse and interpret these as humanities scholars'. Her interpretation of humanities 3.0 as the 'critical reflection on the methods' is in consonance with my lecture. Yet in opposition to her stance I do believe that we can expect humanities researchers to make the full turn to 3.0 from 2.0 and 1.0 – although perhaps not simultaneously, as Leemans urges. I agree with her that the (sub)fields are operating largely independently, but I believe that the tools used in these various fields can be taught jointly and coherently to new generations of humanities scholars. True, tools like GIS, textual analytics, acoustic processing, visualisation and annotation software have never been brought together in a coherent comprehensive way, nor has the teaching thereof. But this does not mean that it cannot be done. In fact it can.[29] The material of humanities scholars may almost always be fuzzy, fragmented and complex, but at bottom it comes in no more than three fundamental forms – textual, visual and acoustic data (which can also be integrated, as in multimedia products like films and websites).

In the end I may even agree with much of what Fickers writes, in particular when he makes a case for a new 'digital historicism' and 'the need for a critical engagement [...] with the many methodological and epistemological challenges of the digital era'. Although I probably cannot convince him of the great benefit that arises from working with large-scale digitally obtained patterns (let alone with universal patterns), I fully endorse Fickers's ideas about developing 'a computer game that simulates the historical past'. If such a simulation is not a major pattern, then what is it? It is further hard for me to concur with his statement that 'Bod's inaugural lecture is a speaking example of the fashionable plea for pushing digital scholarship simply because new

28 Cf. David Berry, 'The Computational Turn: Thinking about the Digital Humanities', *Culture Machine* 12 (2011) 1-22. See also Franciska de Jong and Stef Scagliola, 'Clio's Talkative Daughter goes Digital: Oral History and ICT', in: Rens Bod, Jaap Maat and Thijs Weststeijn (eds.), *The Making of the Humanities, Vol. III: The Modern Humanities* (Amsterdam in press).

29 For an attempt to bring these tools coherently together, see reference in footnote 26.

technologies offer new possibilities'.[30] Digital scholarship has been around since 1946, which is when Roberto Busa started to develop a lemmatised concordance of an electronic edition of Aquinas's works (11 million lemmas). It was impossible to create such a concordance by hand, and it was exactly digital technology that allowed Busa to carry out this job. Digital scholarship has not since disappeared from the humanities. Thus if Fickers wants to call my plea for digital scholarship 'fashionable', he is referring to a 'fashion' that has by now been around for some seventy years.[31]

Conclusion

In sum, if we want to take digital scholarship seriously[32], we should not underestimate the importance of a profound awareness and a solid knowledge of the various digital tools and methods and how these are used in the digital humanities with the view to identifying patterns. My notion of humanities 3.0 is nothing less than hermeneutics and criticism applied to these tools, methods and patterns. Historians and other humanities scholars need by no means to become programmers, yet they must gain an understanding of the possibilities and the limitations of these technologies. Only then can we enjoy to the full the unexpected vistas of humanities 3.0, and smell the higher honey that busy bees have for the first time in history put within our reach. ◀

30 Though I was flattered to find myself compared with Locke, Hume, Kant, Comte, Durkheim and Chomsky, Fickers's polemic regrettably involves some misrepresentations of my lecture, e.g. when he writes: 'While I fully agree with Bod that dealing with digitised and born-digital sources asks for a new practice of doing history in the digital age, I'm fundamentally opposed to his interpretation (or better: prediction) that the hermeneutic tradition of humanities has therefore come to an end'. As I have argued in my lecture (and once again in this paper), I say quite the opposite. I first note that the hermeneutic approach is seriously challenged by the digital, after which I argue that the digital identification of patterns in the humanities (humanities 2.0) should be extended with hermeneutics and critical reflection (humanities 3.0).

31 The historiography of the digital humanities has been taken up only very recently, see e.g. Julianne Nyhan and Anne Welsh, 'Uncovering the "Hidden Histories" of Computing in the Humanities 1949-1980: Findings and Reflections on the Pilot Project', in: *Digital Humanities 2013. Conference Abstracts* (Lincoln NE 2013) 326-329, available online at: http://dh2013.unl.edu. For the interaction between digital technology and the twentieth century humanities, see chapter 5 of Bod, *A New History of the Humanities*.

32 See also Christine Borgman, *Scholarship in the Digital Age* (Cambridge, MA 2007) 212-215.

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