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Research Article

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The virtual and the real. Digital culture and the body in the study of handwriting

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Abstract: Since Traube (1861-1907) paleography has been concerned primarily with methods for transcribing, dating and placing texts. This paper responds to two changes in perspective that have occurred within western culture over the last century: the arrival of a digital world which saw the transformation of computers from calculating devices into new tools for writing and reading and a cultural shift away from a Cartesian perspective that distinguishes between body and mind and privileges self aware rationality over felt experience. For the purposes of this paper the link between these trends is that both throw new emphasis on writing as an activity rather than a product. This paper looks at how insights from the digital, and body-based disciplines of document creation might then interact with the paleographical and each other. The influences all run both ways, the paleographical can effect the digital as much an understanding of the digital can bring new ways of seeing to the paleographical.

Keywords: Paleography; materiality of manuscripts; digital paleography; calligraphy and design.

1 Introduction

This paper sets out some thoughts on the potential of incorporating tacit and activity based understandings of handwriting into paleographical studies which, for much of the last century, have focussed principally on concept based knowledge production around the text and its apparatus. The shape this paper has taken reflects the writer's experience as a working calligrapher who views the activity of writing and designing as fundamentally constitutive activities in the making and use of documents, both now and in the past. It is also influenced by the writer's work as a consultant at Xerox's Palo Alto Research Centre (PARC) over a twelve-year period (1988-2000). PARC was the interdisciplinary laboratory that invented the desktop networked computer, the concept of windows, the Ethernet and laser printer, as well as the look and feel of the computers we use today. This combination of experience delivers a broad perspective on the digital humanities that is typical of a think-tank (which PARC was) rather than that of a strictly academic computational scientist or digital paleographer. Within the research lab what is valued is generative discussion rather the critical defence of a thesis. There is a thesis here, that our contemporary culture suggests that an activity based perspective on paleography can reveal new objects of knowledge and new perspectives on older practices, but this paper has also retained some of the discursive discussion which was the original purpose of the talk upon which this paper is based.

Informed by two trends, the transformation of computers into writing instruments and a cultural shift away from Cartesian self awareness both of which throw new emphasis onto the activity of writing, this paper inquires into the broad potential of a renewed digital and physical partnership. This proposed partnership between paleography, the hand-based disciplines of document production (calligraphy and handwriting) and the digital goes beyond envisioning the digital as contributing to the accessibility of paleographical data and its quantitative analysis and points towards the possibility of creating new objects of knowledge within the discipline.

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The writer's experience in teaching type design (a contemporary as opposed to an ancient letter making discipline) has reinforced the desire for a broad perspective. Current digital design methods often bypass the experience of using paper, ink, pencils and hand-eye co-ordination, replacing them with software programmed to construct letters using modular component parts. This features-based approach has deadened the variability and spontaneity brought to designing letterform and generates a certain scepticism that an essentially modular analysis of writing (often also used in digital paleographical work) fully exploits the richness and appeal of this unique human behaviour – even whilst one acknowledges it may be a useful aid for searching for patterns within large quantities of digital data, or, in the case of type design, yields quick but not necessarily subtle results in the design of a type face.

Where can we look for the basis of a broader understanding that a digital contribution can make? We find it in the first of the two trends that provide the stepping off points for this paper: the story of the historical journey that the digital has made, where once it was simply a numerical phenomenon, eventually it also manifested as fully fledged text and image.

1.1 The computer as a new writing tool

Whilst at one time computers were essentially giant calculating devices that ran statistical experiments, modelled planned economies and helped put men on the moon, the last fifty years have seen the transformation of computers from mathematical instruments into new writing tools. It was shortly after the Second World War that computing began to move away from using physical input devices (such as punched cards) and became linked to keyboards for programming purposes. It was not long before the potential of this method for handling text itself was understood, especially once a screen had become attached to computers and operators could see character strings on the screen that helped them check and edit programmes. It was the linking of these tools to sophisticated digital printing devices in the early 1980s that really enabled digital text to have a widespread commercial and cultural impact. And it was the design software originally developed by Adobe Inc. for making digital type that ultimately led to the pioneering editing suits of software for handling documents, photographic imagery and animation that are all now key ingredients of online documents.

David Levy, a colleague at PARC and now Professor in the Information School at the University of Washington in Seattle, documented the moment when it first dawned on him that computers were going to be the writing tools of the future, it was at a working seminar on digital type design run by the International Typographic Association (ATypeI) at Stanford University in 1983. The conference saw an unprecedented gathering of computer scientists and typographers, graphic designers, calligraphers and historians. The first part of the conference is reported in *Visible Language*, (Bigelow, Ruggles, 1985), the second part was never published. In his book *Scrolling forward: making sense of documents in a digital age* (Levy 2001), David Levy recalls, 'Sometime around the middle of the conference I had an epiphany: *The computer is the writing tool of the future*. On the face of it this is hardly an earth shattering insight. For me though, it required a significant leap in both my intellectual and emotional life. I had been programming and using computers for nearly twenty years, and had been educated to view the computer primarily as a very powerful calculating device or, in the tradition of AI, as an artificial mind. It was therefore something of a leap for me to see it as a tool in the lineage of the quill, the pen, the printing press and the typewriter. But once so located, it acquired a historical and cultural context – a past, *and* a future.'

There followed many years of development that saw design for print becoming fully digital, commercial printing itself moving to embrace digital methods and accessible communication via electronic text and images became a global phenomenon.

This historical journey, the shift away from computers as calculating devices and towards the concept of the computer as a new writing tool, could encourage us also to extend our concept of the digital beyond its computational aspects. We can understand that exploring the digital's visual and textual potential, interaction with screens and the moving image, its ability to communicate across platforms at speed are part of what the digital can bring to the paleographical world for this is the trajectory that the medium itself has taken as it has evolved. We should not limit our thinking to an older model of what the technology can achieve for us.

However, a momentary diversion before introducing our second theme, once having conceived the computer as a new writing tool it soon becomes clear we are already entering a second phase of its development. The potential of

the digital to record multiple aspects of physical phenomena means that today the digital is also outgrowing writing in several ways, shifting the kinds of tasks it has been called upon to perform. For instance the digital enables us to create text by using our voice alone; biometric data is replacing signatures as a means for authentication; YouTube videos are supplanting instruction booklets and some elements of craft education. Podcasts and audio books are edging into the space where text was used as entertainment. Sometimes, as with an app like Instagram, we communicate primarily through pictures, on other apps we reach out to each other by sharing music. The burden that writing carries is shifting and writing is also interleaving itself with other genre and media. Tracking such shifts in genre is certainly one of the things our contemporary digital reality suggests might usefully be applied also to the past.

As a result of these and similar developments some people have asked if writing has a future? Practical consequences have followed such questions. The teaching of joined-up writing has been dropped by some educational authorities (in Finland for instance). Resources devoted to the teaching of handwriting, classroom time and teacher training have diminished. This in turn has implications for the future of paleography itself. Will future students of the subject be confronted by a steeper learning curve than current generations who, nonetheless, had some schooling in daily handwriting practice?

These changes both towards and away from digital writing make it a particularly fertile moment to re-examine how we conceive many of the disciplines that surround the written word and, naturally, that will include paleography. And if the idea of the computer as a writing tool suggests we look at the nature of its writing activity, i.e. as a tool with certain propensities, then in a complimentary way the second cultural trend that this article discusses will invite us to consider the significance of the original activity of writing, writing by hand, with its locus in the body.

1.2 The second trend - text as a somatic phenomenon

The second dynamic from the last fifty years that is foundational for this paper's point of view is the increasing significance given to the human body and embodied somatic experience in many aspects of our politics, the arts, and in our understanding of the human condition. This cultural dynamic is also suggesting we can reach beyond the computational aspects of modelling that traces of human behaviour like handwriting.

Descartes distinction between body and mind has been weakened, we understand that our consciousness, 'our feeling of what happens' to use the neuropsychologist Antonio Damasio's phrase (Damasio, 1999), is the product of systems that work below the conscious level. The economists Daniel Kahneman and Amos Tversky and subsequent teams of researchers have shown that decision-making around risk often happens at a felt preconscious level rather than at a rational one (Kahneman, Tversky 2000). We are increasingly understanding the way the whole body works as an interrelated complex and think of it in less mechanical and isolated terms, this is leading to many scientific breakthroughs as paradigms shift. Within disciplines like philosophy, schools of thought, such as the phenomenologists, have for many years helped us explore the hidden in-built intentionality within perception that assists us to make sense of things and live with a functional automaticity as we go about being in the world over the course of our daily lives. This automaticity is worked for in both our reading and our writing.

We experience these intuitions about the body as powerful. They are working their way outwards into reconstituting our society in various ways, through the feminist movement and new sexual politics for instance, in the practical deconstruction of patriarchy and discrimination of all kinds in civil society using the law as well as mass protest; there is also a significantly heightened environmental consciousness and activism. So in the light of these dynamics at work within our culture it is certainly appropriate for us to re-examine how a common definition of paleography sits with them and us today.

2 Paleography now

Traditionally paleography (and diplomatic) would appear to have two parts: the transcription (reading) of texts and their placement in space and time, in other words their location, ownership and date, all of this in service to tracing the history of thought itself (Brown, 1993).

Yet is the transcription of human thought in written language our only goal? Can our material yield more if we move beyond a Cartesian anthropology and embrace for instance a tactile and felt understanding? Julian Brown's teaching practice, rather than his writings, suggested it could. Over the years he invited a number of calligraphy practitioners to attend his student seminars on a regular basis, beginning with the calligrapher Irene Wellington and including the present author. He would ask for our perspective at many points in the class. His practice suggested he found a maker's perspective helpful for a fuller appreciation of a document in hand. In renaissance studies, between the 1950s and 70s a number of calligraphers and printers contributed towards fledging out an account of Renaissance writing masters, amongst them Alfred Fairbank, Berthold Wolpe and Arthur Osley (Fairbank & Wolpe, 1960) (Osley, 1965, 1980). The trend towards embodiment within our culture suggests this role, that of the calligrapher paleographer, could be taken up again. And might the calligrapher paleographer, have a role to play in the digital world also? The thrust in research over the last few decades towards encouraging interdisciplinary and collaborative research, suggests it would be worth exploring. But if the maker, designer and calligrapher is brought further into this work, might that not represent a fatal weakening of academic rigour? Are they not arts rather than science, intuitive more than they are deductive? And as such how might they sit alongside a statistically driven digital paleography?

2.1 Digital Paleography: the status quo

As Peter Stokes of Kings College, London, has shown in his paper 'Digital Approaches to Paleography and Book History: Some challenges present and future' (Stokes, 2015) real steps forward have been made in using quantitative descriptions and data since Arianna Ciula's elegant paper on digital paleography (Ciula, 2005) first coined the phrase and seemed to crystallise something about the field. That paper set out what work a digital paleography might aim to accomplish. Adrianna Ciula, and no doubt Peter Stokes, saw it as a complement to the work of the human eye. Ciula described it in the following terms.

'The aim of this research is to use the digital representation of book hands as a tool to support palaeographical analysis by human experts. Taking a humanities-computing approach to the traditional study of medieval manuscripts, its purpose is to show how digital representation may help to describe a certain graphic style of handwriting, and how it may help in the comparison of different scripts that are geographically and chronologically related. If the palaeographical comparison between dated and undated codices makes assumptions and hypotheses of correlation based on an individual's expert eye, the possibility to be explored here experimentally is whether the eyesight can be made sharper by the use of a computational instrument. The point is not to replace the inadequacy of graphical comparison by the power of numerical precision or to misrepresent the richness of the assessment of clues by absolute statistical data. Rather it is to explore a different, complementary, methodology.'

In Peter Stokes's Digipal project at Kings (*DigiPal: Digital Resource and Database of Manuscripts, Palaeography and Diplomatic*. London, 2011–14. Available at <http://www.digipal.eu/>) he and his team showed how it was possible to develop structured descriptions and characterizations of writing involving a new theoretical model for handwriting and apply it to script from over 1300 examples of Royal Scribes in England working between 1000–1100. He provided a new language in which to talk about letters and from that basis a tool was developed that enabled us to view visual evidence for comparison on a wide scale. Its application to other script systems was also explored. His work showed just how complex this task is both as a descriptive exercise and in terms of the amount of data that might have to be encoded for the methodology to be useful.

Having acknowledged how useful these methods can be it nonetheless remains worth asking how objective is a digital paleography of this kind? Even though a comparative statistical interface may appear to be less subjective and more rigorous a method than trusting the individual eye, someone is still making choices about what to encode. This kind of digital paleography simply constitutes another form of 'professional vision' with some powerful statistical tools attached.

2.2 Professional vision

The social scientist Charles Goodwin established in his 1994 paper on ‘Professional Vision’ (Goodwin, 1994) that such vision, involving coding schemes, highlighting salient features and the interpretation of graphic representations, is always ‘a socially situated, historically constituted body of practices through which the objects of knowledge which animate the discourse of a profession are constructed and shaped.’ So within this field of activity, it remains relevant to ask who is being given the power to authoritatively see in this way for me? What specific communities are we learning from? What is the nature of their expertise around the shape of letterform and writing practise and consequently what kinds of subjects of study is this method likely to bring to the foreground?

Once this kind of digital paleography is seen as another form of professional vision it should be clearer that many communities can contribute their own understandings towards constituting objects in the paleographical field. One can indeed ask what might the field look like if further cross-disciplinary studies were incorporated? What indeed might the calligrapher or designer contribute to Paleography or even the digital in its broadest framing?

If the calligrapher paleographer could define some of the objects of knowledge that constitute the discipline these objects are likely to be understood as sites of embodied practice (the substrate, the workplace, the human body) rather than simply shapes for contemplation and comparison or helpfully transcribed passages of thought. And they are likely to move away from the Cartesian subject with its detached knowledge about phenomena towards a kind of enquiry and descriptive language that comes from within the activity itself.

The contribution that paleography and calligraphy can make to the digital on broader terms is along the lines suggested by David Levy who I quoted earlier in this article. The paleographic and calligraphic may contribute a sense of history and culture that carries some common research themes over into the digital. They may also expect a new cultural and aesthetics sensitivity from the medium.

Let us explore both these points, firstly from the point of view of the digital medium and the breadth of the contribution it might make.

3 What more can the digital contribute to paleography

3.1 Tools for collaborative work

From the point of view of the computer as a new writing machine it is as a tool for collaborative working that the technology can recommend itself to cross-disciplinary studies. Such tools were a central part of the original vision for the computer as a writing and thinking tool developed by Douglas Engelbart in his Lab, the Augmentation Research Center at the Stanford Research Institute in the 1960s. In what ways might this perspective be useful in the paleographical field? It can help us both figure out new activities for the tool and reconfigure ones with which we are already familiar.

Whilst the digital paleographic examples that I have mentioned so far have focused on letterforms the digital can also give us improved insights into entire manuscript structures and indeed libraries, the codicological part of paleography. One example of the reach of the new digital writing tool is that it can reconstruct materials in various ways. In one online data-base parts of a manuscript or materials that have become split from each other over time and divided between several physical sites can, through collaborations, be reunited and subjected to study as entire artefacts. This can have both scholarly and political dimensions. The bringing together of all the parts of the Codex Siniaticus in the Codex Siniaticus Project (available at <http://www.codexsinaiticus.org/en/project/default.aspx>) is one such example. It allows a new account of the modern history of the fourth century biblical manuscript to be built, the conservation needs of different elements to be examined, a virtual re-unification of the manuscript to be attempted and a new transcription made from the digital images, as well as alliances to be formed around meeting these needs or requirements. Another such project is the International Dunhuang Project begun in 1997 with thirteen institutions across eight countries taking part and a database of 391,410 images covering the many dispersed manuscripts, paintings, textiles and other artefacts from Dunhuang and the Eastern Silk Road, effectively allowing them to be studied as a collective whole for the first time.

Digital tools that overcome some of the limitations of time and space could provide us with many new tools for collaborative work. In the calligraphic, art and design area for instance they could give us access to sequential design intentions within an artefact. Visual sequencing is often a primary concern in the making of texts. Movement is also part of the offering that the digital can make in the codicological area. Projects such as *Turning the Pages*™ at the British Library could be developed to highlight how the art of the manuscript book is an art of sequential design. In static images and display cabinets we simply cannot appreciate this aspect of the book which often has an almost musical structure of rhythms, pause, climaxes and endings structured around the text or, for instance, in a Christian monastic manuscript relating to an entire liturgical year and particular theological positions.

3.2 Tools for collaborative work – rigorous methods

Ease of access to manuscript material is obviously one of the chief benefits of projects to digitise manuscripts but as the sophistication of these images and tools develop they will demand a new kind of rigour from their creators and users. A century ago the great palaeographical project was the publication of collections of dateable locatable manuscripts, E. A. Lowe's volumes of *Codices Latini Antiquiores* (CLA) for European manuscripts before the year 900 was the outstanding example from the first half of the twentieth century. Lowe was following on from the work of his teacher, the philologist Ludwig Traube, and both of them had been preceded in their work by publications in the field of epigraphy. The *Corpus Inscriptionum Latinarum* was begun by Mommsen in 1863 and this process of publication continues down to the present day. Whilst books from the late nineteenth century were illustrated by line block drawings, CLA used black and white photography. These images gave us a benchmark against which to read development in script and to a far lesser extent in codicology. Today, as a result of many projects to digitise collections, we are certainly entering another golden age for dating and placing. Not only have the local resources of different institutions become accessible internationally, relieving us of some of the necessity of travel to visit them and to search archives physically ourselves, but the nature of the digital image makes citation and cross reference (linking) so much easier to do. Digital catalogue systems can also contain much more material than the previous paper ones. The British Library's on-line catalogue of western illuminated manuscripts is an example. On the other hand, to be really useful, a lot of work needs now to be done in relating the documentation of one collection or system to another, in other words some kind of standard coding or reference system seems required. Fashioning instruments for collaborative working with the new writing tools (computers) requires this kind of work be done. L. C. van Lit O.P. in *Among digitized manuscripts. Philology, codicology, paleography in a digital world* (van Lit, 2020) takes some steps in this direction from the individual scholar's point of view. Because not all repositories of digital manuscripts are equal, he proposes ten points of comparison to be made in any discussion of a digital image. His work also contains many suggestions for handling a scholar's workflow when using digital materials.

A recent example of creating new standards in the digital visual area can be found in the work of Riccardo Olocco from the University of Reading. He has been tracking copies of the printer Nicholas Jensen's roman types to see how quickly and widely they spread and were imitated. To do this he developed a method of photographing and comparing type at high levels of magnification (and identical size) in order to see the small differences involved (Olocco, 2018). A description of his methodology will be available in future publication but for now one can see him talking about it in action at <https://vimeo.com/279408465>. It is not hard to see how this kind of standard could be applied across our field. This is another example of the new methodologies we can develop around the production of digital images themselves. Common standards will enhance the digital's natural propensity for cross-institutional and cross-disciplinary work.

The fact that the above example of developing specialised digital tools for the palaeographer is taken from the world of type, rather than manuscript studies, highlights the potential of the digital for loosening the boundaries between disciplines. The digital compression of objects in to a single accessible medium, whilst having obvious disadvantages in terms of representing three dimensions, nonetheless allows the palaeographer, the diplomatist, the epigrapher, the type historian and the bibliographer, the chemist, the movement specialist and designer to study each other's materials. This is helpful (for instance in studying the evolution of letterforms) because, to the practitioner, the written world can be seen as an ecology with information flowing through different media and forms of representation at different times, all made to work together as one system by human agents (Suchman, 1997). In such an inter-related environment innovations in one area inevitably, eventually, affect the others. Such writing ecologies are all around us, see for instance the illustration of the surface of this writer's desk as a lecture is being prepared (Fig. 1).

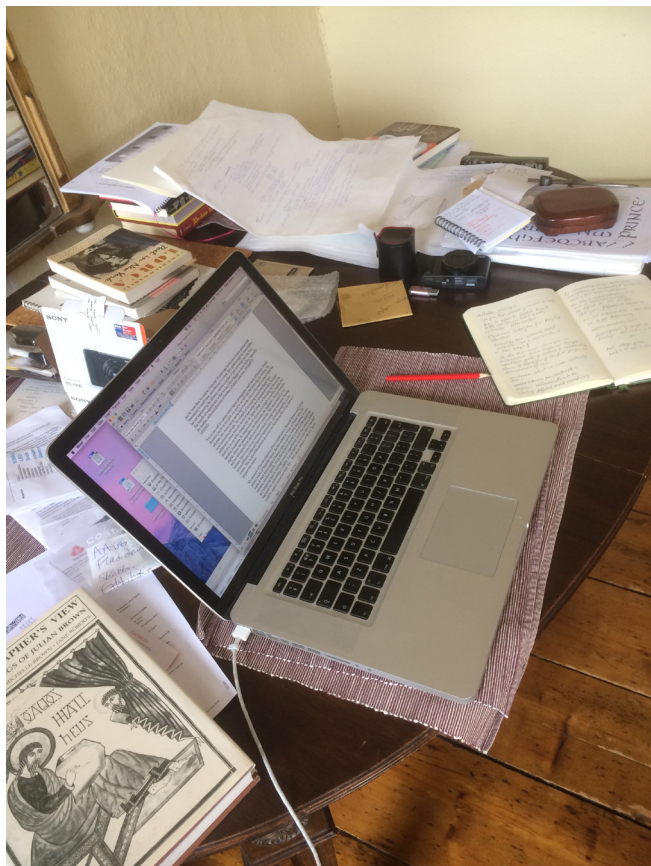


Figure 1:

What is true today would also seem to be true of the past. In ancient Rome a wide variety of substrates and tools were used involving surfaces of stone, metal, wax, papyrus, plaster and vellum using chisels, reeds, brushes, and styli in scroll, codex, panel and many other forms. If innovation in one medium does flow across into another and we just study handwriting or handwriting in just one material, papyrus for instance, we may only ever have a partial handle on how forms actually evolved.

Having said that the digital has enabled cross-institutional and cultural studies this is not so true for all areas of scholarly work. With institutions receiving less and less public money the search for additional sources of revenue has been intense. The selling of digital imaging rights has been one area that institutions have turned to as a source of income (there are some public-spirited exceptions). The high cost of rights has made publication more expensive than in the past and potentially discourages the uptake of the latest imaging technologies in published work. Making this work financially accessible can also be considered part of the work required to make effective digital writing tools.

3.3 The digital can record movement

For writing, rather than for type, traces of the way our hands move are important in understanding the forms that letters take. Whilst good digital photography and magnification can allow us to see exactly how the pen is placed and what stroke overlaps another, how ink hits a fibre and from what direction, the digital can also give us an insight into movement itself and the significance of the hand and body of writers. Unlike the photograph or manuscript page, this medium can easily show moving images. This opens the possibility for developing different kinds of tools that show writing in action. One benefit of this is that an understanding can be concisely and naturally conveyed about how a

shape came to be as it is. Although not a letterform example a small vimeo demonstration on the internet showing a quill being cut (available at <https://vimeo.com/68078367>) conveys a richness of detail that it would take pages of text to describe, and even then there would be many subtleties that were un-explored.

3.4 The instability of digital materials

Nonetheless, for all their potential, digital resources are not without their own difficulties – the medium’s fluidity is not all positive. The downside of its remarkable flexibility is a lack of continuity over time. If links are broken or an institution changes its policies material found one day can disappear another, the digital is inherently less stable as a medium than paper. Stencilled lettering by the eighteenth century French calligrapher Jean-Pierre Rousselet, found in an online record in Bordeaux whilst researching Baskerville, now lacks any digital links, it can no longer be easily verified or precisely cited by the page in a publication without summoning additional resources; ‘now you see it, now you don’t!’ When funding stops website development can stall or cease completely: the Digital website is a case in point. Of course this is partly to do with the medium but perhaps also related to the nature of digital humanities projects which often require large-scale collaborative funding and are thus time limited. How can we make our materials and policies more permanent? This is one of the challenges the digital medium presents us with if we are to build stable scholarship with these tools.

3.5 Future developments

The commercial development of algorithms for recognising handwriting in many different writing systems is proceeding at high speed, there are bound to be spill-over benefits for more academic applications of the technology, we can look forward to increasingly sophisticated automatic transcription. We can also hope for more online resources for the transcription of specialist scripts that might include guides or educational tools enclosed within the same database, one thinks of challenging transcriptions such as an author’s or scientist’s own shorthand system. These tools can also be linked to sound and writing instruction.

4 What can paleography bring to the digital?

The introduction to this paper indicated that influences run both ways between the digital and the paleographical worlds. It is, of course, not just a question of what range of things the digital can bring to paleography but what a paleographical perspective can bring to the digital. Once we see computers as new writing tools we realise that as such they become part of a history of presenting the written word that runs back through typewriters to the illuminated letter, from books to scrolls. The digital thus becomes placed in a cultural and aesthetic context and we can raise our expectations on designers of digital materials to become familiar with this skilled tradition, *their* tradition. We can hope that our digital tools will engage with the field of writing where visual aesthetics are important to the task in hand, important to a degree that they were not for the scientific work that computers were originally used for. Our databases could become very visually rich and interestingly structured.

One pre-existing example of the historical affecting the digital can be found in the design of letters for the screen. It was the application of this historical perspective to digital letterforms on screen and programmed into printers in the 1980s that helped changed the face of computing. It was not inevitable that it would move in this direction. We were historically fortunate that much of the development of computers as digital writing tools was happening in a special location, in an area south of San Francisco where, since the 1920s, there had been a community of calligraphers and fine press printers and then, because of the nature of that community at the time, they decided to get involved (hence for instance the ATypeI Conference at Stanford in 1983 mentioned earlier in this article). It was not a given that computers could become the sophisticated graphic design tools that they have indeed become, nor is it inevitable that digital paleography will become graphically more sophisticated, but that kind of connoisseurship is one of the things that the

digital calligrapher paleographer can contribute. Wider design influences could also be investigated. The glossed text for instance, which achieved great beauty and complexity in the medieval manuscript, was dropped by the second and third generation of printers with moveable type who found it too complex and unprofitable to take in to the new technology; that line of work came to an end. But in the digital text format there are no technological barriers to its revival.

4.1 Common Themes

Paleography also offers the digital common themes to study and, because the historical process is one of continuous back and forth dialogue, this can also then reflect back on paleography itself. The centrality to the study of books and documents of place, date, authorship, sources, authenticity, privacy, accuracy, the nature of access, of visual textual structures, of permitted degrees of modification (as in legal documents) is crucial and they extend to whatever medium one is operating within. How to restrict access to documents in the paper, papyri and parchment world was a matter of seals and wafers and strings and messengers, boxes, locks, drawers, even rooms of special construction. I am told, for instance, that even the sound of the keys of a typewriter being tapped was enough to work out what a document might contain so that up into the 1980s for some documents such work had to be done in special acoustically protected contexts. All this physical paraphernalia requires its digital equivalents. And no doubt digital categories will also one day be read back into paleography.

4.2 Amplifying touch and sound

Whilst one's first thought is about how the digital can be used to amplify sight, for the scribe at least, touch too is also one of the most revealing experiences one can have from a surface. It can reveal much information about how it can be written upon and what the conditions might have been to allow that to happen, from surface preparations (additions of pounce, sandarac etc) to atmospheric conditions. Listening to vellum, as it moves in the hand, can also help one understand its propensities; these things, at present, are not represented digitally but could be. Experimental responsive interfaces/surfaces are also being developed by some scientists, we already have some forms of touch interface. Sophisticated development of such tools lies in the future, but there is no doubt that they could be a useful tool as well.

5 The craftsman's perspective

So what if we now turn specifically towards considering that other dynamic, the increasing significance of the body to understanding the nature of our experience? Under a Cartesian model of what it means to be human, once the body is separated from the mind, the body becomes simply an instrument of labour, and our paleographical questions would relate to that perspective. Typical questions might be how long does something take to do, what tools are used, how much does it cost, how many people were employed on the job? These were the questions that I used to be asked as a calligrapher. But the embodied understandings of a calligrapher and designer can bring much more both to an analysis of letter shape, to workplaces for writing and written projects. The reason is that the craftsman has a knowledge of the materials that comes from years of sensory immersion, their knowledge is not *about* the artefacts in question but rather it comes from inside, *within* the act of making itself, in terms of all the senses as well as the kinaesthetics of writing.

Although we have used the phrase 'embodied understanding' such experience is more open-ended than the word embodied seems to suggest. It is not an understanding that comes simply from within a contained envelope, a skin, because to be embodied is to be alive (Ingold, 2013), so we are always actually in an open-ended state of becoming, responding to and handling flows of different materials and excitements moment by moment. Form emerges or is woven from those factors. The calligrapher paleographer would bring an understanding from and through the body rather than simply knowledge about it.

5.1 Languages for writing

The descriptive terms that calligraphers have developed to describe their experience can be helpful. Just like Peter Stokes has usefully developed descriptions of different kinds of letterform (the alligraphic and idiographic for instance that distinguish between the form of a given letter common to a group of people and the way one individual writes that letter) descriptive terms literally help one to see more, they bring a new world of phenomena into being. It is in the gap between the alligraphic and the idiographic that a calligrapher paleographer might be particularly interested because as the anthropologist Tim Ingold writes in his book of essays *Making* (Ingold, 2013) ‘designs don’t magically transmute into the forms they specify. Their fulfilment calls for workmanship’... ‘In the tension between hopes and dreams and the drag of material constraints... lies the relation between designing and making.’ Forms are the result of many moment-by-moment decisions and micro-adjustments as the writing proceeds.

It was Jean Mallon who introduced us to the notion of *ductus* in paleography nearly ninety years ago, but unless we actually experience using a tool we may not understand that *ductus* is not just a theory, it is bound by material conditions and their interaction. Broad edged pens for instance are difficult to push unless the edge is narrow and the writing is small scale and the surface very smooth and the ink thin and the pressure of the hand light and the pen held upright. Lack of this kind of understanding led Nicolette Gray, who taught design at the Central School in London, to pose an unworkable handwriting reform with new roman cursive as a basis (Gray, 1979). The forms became un-necessarily complex following movements that probably came from trying to push a pen up ridged papyrus and which were redundant on other materials, it was a neat idea but it had little grounding in felt experience.

One example of a well used calligraphic descriptive system is the calligrapher Edward Johnston’s table of seven normal pen constants that he uses to analyse and then recreate a piece of writing (Johnston, 1971) (Fig. 2). This table of constants had to wait on publication until 1971 following his death in 1944. The ‘normal constants’ are not there in his popular handbook *Writing & Illuminating, and Lettering* of 1906 (Johnston, 1906), which in English and German certainly influenced some twentieth century palaeographers. E. A. Lowe for instance was known to have a well-thumbed copy on his shelves and would demonstrate letters on a chalkboard. Julian Brown would show the difference between a flat pen angle and slanted pen in the opening lecture of his course on paleography at Kings. ‘Straight and slanted’ was how Johnston described differences in pen angle in his 1906 manual. Later, however, Johnston started specifying degrees of angle made by the edge of the nib in relation to the base writing line (Johnston, 1971). This is a helpful refinement for getting the thick and thin strokes in exactly the right places in a script, but in addition one thing that one starts to notice when applying this additional definition is that the angle the nib is held to the writing line may slightly rotate in some people’s hands as they write, it’s a detail you would completely miss if you were just thinking ‘straight or slanted’ (Fig. 3).

Johnston’s table is really a dynamic opening up of the concept of *ductus* into a number of inter-related constituent constraints and forces that are useful for an artist who wants to synthesize them back into a script in their own hand, they give one just enough information with which to improvise as one weaves a line of text and then a mass of it. Getting more precise around aspects of this movement is important because movement is one of the forces that the calligrapher knows drives change in form. Speeding up a particular letter construction can lead to a new form: for a more general discussion on cursiveness in scripts from a paleographical view see Desrolez (2003). Changes in the order of strokes can also lead to new forms arising at speed, as for instance may have happened when old roman cursive B and D transitioned into new Roman cursive b and d (Fig. 4). Yet there remains a problem with Johnston’s table of seven normal pen constants for there is a layer of invisible knowledge that makes it useful in action, for the calligrapher understands through experience how these factors inter-relate or affect one another. Simply as a table they are much like a list of chemical components lacking any active quality until they meet with the chemist’s knowledge of how these components will react with one another when placed together in certain orders or quantities.

Geometry is another tool that calligraphers have used to analyse and visualize structures; they can be applied to any letterform. The geometry can range from elaborate constructional schemes that provide a framework for thinking in related forms across an alphabet to looser thinking like that of the German calligrapher Hans Joachim Burgert who analysed work in terms of the dominance of various form themes: brackets, arches, verticals, triangles, circles etc. (Burgert, 2002). Geometry relates to what Peter Stokes calls the allograph (the ideal platonic form) and the rules (rhythms, repetitions) that bind letters together into a certain recognisable script or hand, in other words the factors that make a pattern of it. Calligraphers think of these as systems of related form and often they hold them in their

50. A table of the seven constant features which distinguish manuscripts.

N.B. The examples given in the third column, are from a particular hand (viz., 'The foundational hand', figure 18) and show its distinctive constant features. Any other type of hand would show its own characteristics, differing from the above examples in some or all of the seven features.

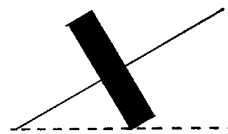
Pen stroke 'constants'

Features normally constant in any manuscript
The 7 features Definitions of features

Examples from a special hand
(the MS of figure 18)

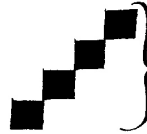
Three features which determine the character of the writing

'Angle' of MS The angle at which the nib's edge is set – relatively to the horizontal line of the writing



In this particular hand the angle = approx. 30°

'Weight' of MS The width of the thick stroke of the letters in relation to their height. (This ratio is conveniently inverted as letter-height to nib-width: e.g. LH = abt. 4 × NW.)



Its 'stem' or nib-width is approx. 1/4 of height of letters (o, a, & c.)

'Shape' of MS Briefly, the curve of the curved strokes, and the finishes of the straight strokes (commonly set, by the o & the i, for the rest)



Its (mean) o is approx. circular: its i is headed & hooked.

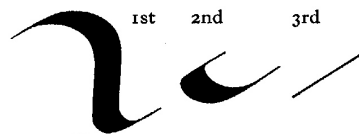
Three features affecting the construction of the letters

Number of strokes The number of separately made strokes (in each letter)

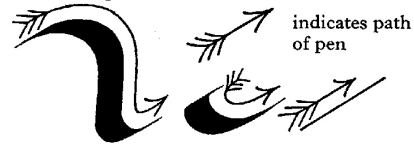


In its a (e.g.) there are three separate strokes

Order of strokes The order in which the strokes are written (in each letter)



Pen-direction in strokes The direction in which the pen nib travels in making each separate stroke (commonly downwards & forwards, with short edge sliding up).



indicates path of pen

The modifying features of speed

Speed of writing The proper rate for each movement of the pen, or the actual speed of the scribe in writing the original MS or copy.



(e.g.) Overshot last stroke indicates rapid writing

Figure 2:

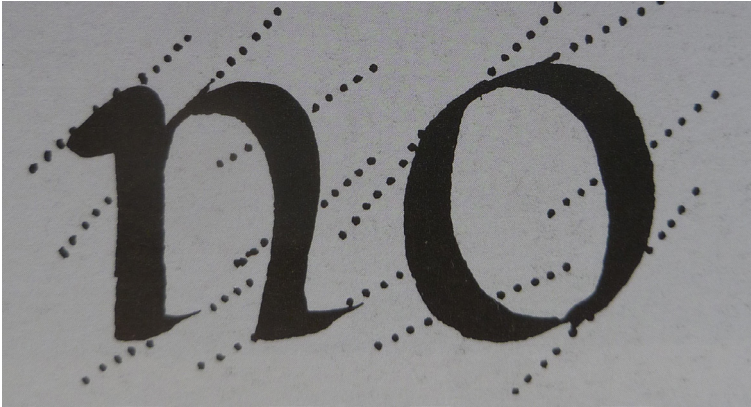


Figure 3:

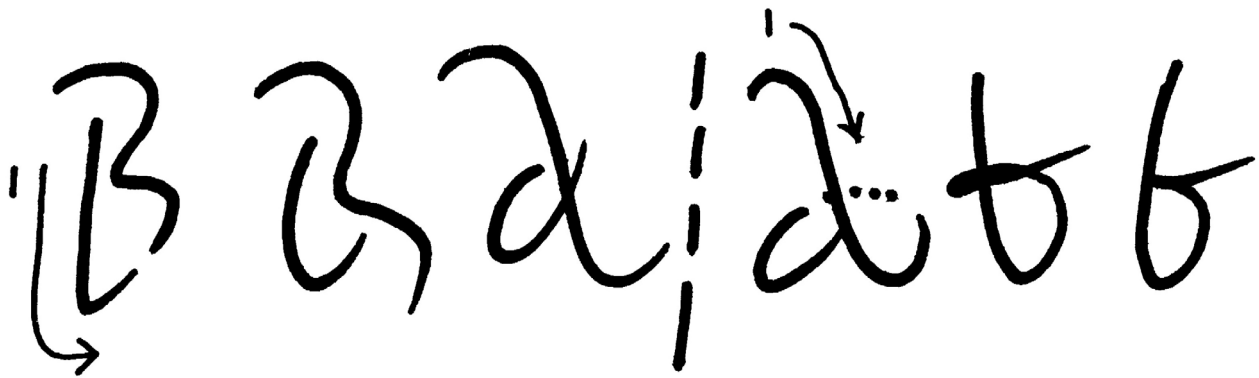


Figure 4:

minds eye as they perform a set of movements. This is where Geometry is useful, it is one of the ways our minds have of grasping relationships between forms

The Dutch typographer Gerrit Noordzij also has a technical geometrical vocabulary to distinguish various types of letters in his small but influential book *The Stroke* (Noordzij, 2005), whose first edition in Dutch was printed in 1985. His main distinction is between weight delivered as a translation and or as an expansion, with a broad edged nib or a pointed one using pressure. With Johnston he shares the ideal of a letter having an essential form, a skeleton shape clothed with flesh in different ways by the pen.

Today calligraphers also apply structural thinking to the overall organisation of documents and pages, employing grids and modular units for organising the elements in a design. This would also seem to hold true in the past. The twentieth century designer Jan Tschichold's recommendations for non-arbitrary proportions to page and type area comes from an application of the canon of harmonic proportions that he found in the sketchbook of Villard de Honnecourt, an architect from Picardy who lived in the first half of the thirteenth century (Tschichold, 1965). Honnecourt's book contains all kinds of working methods that would enable improvised solutions to the questions that come up when building, how to divide things into parts, how to ensure two columns are going to be the same height, how to measure the circumference of a cone. These tricks of the trade and the use of templates are part of the improvisatory nature of the workmanship that brings writing and written documents/books into being.

Making documents is a fascinating but complex process. It ranges from conceiving content in relation to structure, to the application of all one's senses in engaging with a wide range of material processes that unfold over time. One assesses the tackiness of a gesso for gilding by breathing on it, the readiness of a parchment surface by feeling for grease and a velvety nap, one listens for humidity in the crackle of a vellum page or the way it drapes across a hand, one

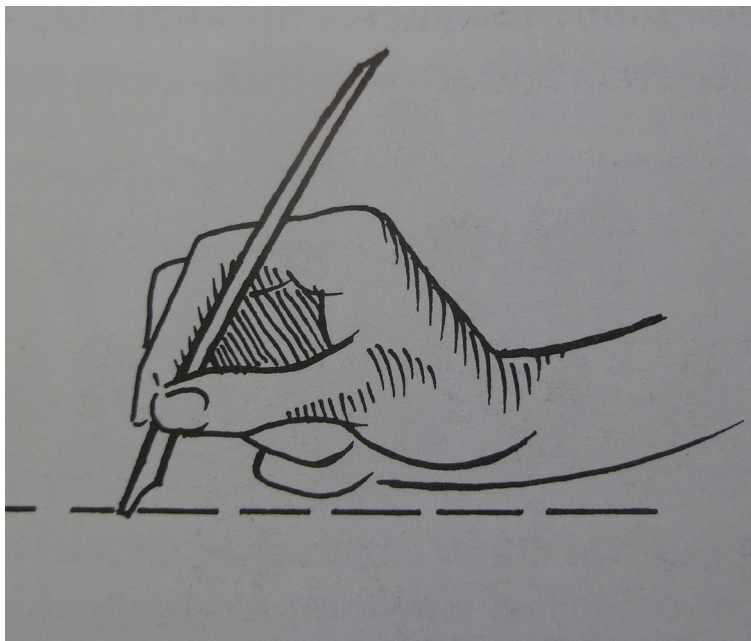


Figure 5:

plays with the tensile strength of a quill across the full breadth of its nib to get the ink to flow. The whole body writes and the whole body can ‘read’ this fact in the written word.

5.2 Workplaces for writing

The calligrapher can also contribute much to our understanding of the ergonomics of production and of workplaces (Gullick, 1996). In scribal portraits furniture, clothing, heating, desk construction, lighting, tools and their storage all yield interesting details. Desk construction for instance, from the low portable desks we see in some illustrations to the high sloped desks we see in others, both enables or discourages certain pen movements as a result of the way the arm and hand of a scribe seeks support for movement. A low desk means the scribe must move the elbow into the body so the upper arm is close to the flank of the scribe, this gives the arm stability in the absence of coming from the table but this tends to flatten pen angle. It is also easier to apply pressure in this position as the pen is moving in close to the body with a contracting movement, whilst on a high board it is moving more parallel to it and here it is also easier to turn the pen angle as one writes as the shaft tends to connect with page in a more upright fashion. One striking feature of author portraits are the pen holds they reveal, more often than not they show a position with the shaft of the pen resting up by the knuckle of the hand rather than down in the well between thumb and forefinger (Fig. 5). It is possible to write like this with a quill or reed whose edge you can trim to a left oblique angle but it is harder with a metal pen whose nib edge is difficult to modify. All of these things of course have implications for how and what you can write. Observations such as these come from enlarging the paleographical to incorporate the calligraphic, the view of the skilled craftsman whose knowledge is tacit and performative.

One of the interesting side angles on this is that for the scribe some movements are harder and more time consuming to make, others involve a totally different understanding of underlying form and how to move around it and to a calligrapher it is hard to see certain understandings coexisting with each other within a scriptorium at one and the same time (pre-carolingian Corbie is a provocative counter-example here). But that is why against the weight of current opinion, picking an example from English paleographic studies for instance, I personally find it hard to attribute the English Caroline minuscule hand of the Ramsey Psalter (British Library Harley 2904) to Winchester where attested contemporary manuscripts, like the *Benedictional of St. Ethelwold* (British Library Additional Ms. 49598), show a very different approach to penmanship with many manipulations of pen angle around forms (shifts probably not noticeable

to those not familiar with actually using a pen). The Ramsey Psalter has much more straightforward penmanship similar in fact to that found in manuscripts from other houses associated with Oswald, Bishop of Worcester, and in turn the founder of Ramsey. Use of Johnston's seven normal pen constants in a description would reveal these differences.

5.3 The psychobiological

From beyond the Cartesian model of what it is to be human comes an approach that might be called the psychobiological. One that acknowledges that human activity has rhythms of action, of awakening, increasing, containing, completing and that tasks involve things like moods that result in openness to change or retreats into the familiar and habitual, this can happen at stroke level and at manuscript level. This can account for the personal hand of a scribe and the way it may change over time or context. The scribe of the Lindisfarne Gospels for instance demonstrates an extraordinary array of technical innovation from the chemistry of the pigments to the blending of influences in the artwork that fuse the Greek, runes, Irish and roman decoration, he also develops new iconography and a newly defined half uncial script that Julian Brown christened phase two half uncial. But this must have been paralleled by an equally rare human achievement of engagement with the promise of newness in the world about himself. He clearly had an openness to change that overcame the fear of criticism that often runs alongside innovation within a community that has established certain ways of doing things. Where did that come from? Was it to do with the character of his community, the specific spirituality that he was raised in, was it simply a personal quality born from his experience of relationships? One can look for these things in the lives of Cuthbert that Bede seems to have written contemporaneously with the campaign to write the Gospel book, such a meditation can be fruitful...at least to an artist and maker, the setting of a way of life alongside a way of working.

The psychobiological also gives us one of the arguments for using calligraphic training to enhance transcriptional skills. If you learn to write letters there is much more that you can bring to those pre-conscious moments when reading automatically happens. You literally feel the letters rather than just read them with your eyes; they are more than visual patterns on a flat surface. Those of us who have worked in Japan or China will recall that when you hit a question of how to read a text people will often start tracing the characters in the air or on their hand, this activity wakes up their understanding of the form.

6 From paleography to calligraphy

Of course, as with the digital, things here again run both ways. The paleographical contribution to calligraphy and design has also been huge. In the English tradition it gives us our programme of training, we trace the history in our hands. But the history also gives us sets of forms that we can work with freshly. Manny Ling showed some of this richness in his presentation at our conference. Here we draw attention to one example, Jovica Veljovic's typeface for Adobe Inc. *Silentium pro* which is based on a mixture of his own calligraphy and the capital letters we can find in an Anglo-Saxon manuscript, the previously mentioned *Benedictional of St. Ethelwold* (British Library Additional Ms. 49598); this is one example amongst very many.

Finally the historical tradition gives us standards, collections of related forms that come from frequent practice and complete immersion in a world where writing was a daily occurrence. In the hands of the best scribes this sets us a high target to aim at in terms of skill. The most obvious recent example of this happening comes from brush written Roman capitals which have only been revived in the western tradition within the last 60 years, we did not really know they existed before then. Now a handful of people are reaching a level that is equal to that we see in the historical record (Stevens, forthcoming).

7 Conclusion

Two cultural developments from the last half century have informed this paper's basic thrust: the transition of the digital from a computational model towards its conception as a new writing tool and secondly the increasingly significant inclusion of an account of the body in all our academic disciplines. The link here between these two approaches is the focus they throw on the activity of writing itself, not only on its product. They highlight the possibility that we could move beyond applying the digital primarily as a statistical tool and see it as a locus for writing activity that forges new tools for collaborative work, including standards in the digital medium, and new ways of using the digital to reveal such things as design sequencing and writing process.

In disclosing this link, a focus on the activity of writing, the paper also argued for the possibility of the calligrapher (an agent in the activity of writing) to create new objects for attention and knowledge within the subject. We looked specifically at sites of embodied activity, the workplace and the human body, naming the forces that play out in the hand of the writer as, together with their visual imagination, they create form after related form.

In the spirit of an inter-disciplinary enquiry we ran the thought experiment in both directions and asked if paleography could itself contribute to calligraphy and the digital? Yes it can. For calligraphy paleography sets standards and a palette of forms, for the digital it suggests a number of themes that can be extrapolated from the past into the present, significantly it also frames the digital within a long history and an aesthetic context that we can encourage it to live up to in its own presentations and resources.

Overall this paper suggests a fertile blending of three perspectives that of the digital, the paleographic and the calligraphic in studying the genesis of writing and not only its fruit. The activity of writing itself draws on so many aspects of our senses and our humanity; it both feeds on and flows from us as artists, scholars, lovers of movement, of language, students of human culture and forgers of relationships. As writing draws on so many of our faculties - so too does its study.

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