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Toward a Deeper Understanding of the Scientific Method of the Humanist

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INTRODUCTION

For 20 years or more, humanities research has been engaged in a defensive battle against challenges to its viability and utility as a collection of areas of study. In some cases these challenges come in the form of a strong bias toward STEM subjects. In Ireland, for example, secondary school students and the general public are bombarded with government messages about the need for engineering graduates, but the real cost/benefit calculation comes much earlier, because choosing mathematics as a subject in the qualifying exams (Leaving Certification) brings a significant points bonus. This kind of bias is disconcerting, but pales against the public discourse in Australia, where the senior government Minister responsible for national economic policy and expenditure (the Treasurer) took the national research council to task for funding “absurd” humanities projects that would not pass a “pub test” (Owens, 2016) and in Switzerland, where the future of the humanities has also been publicly debated (Le Temps, 2015; Haller, 2015). Humanists are perhaps used to accepting the bias and ignoring the inflammatory rhetoric, but developments in Japan, where humanities and social science departments were mandated to cease admitting students in favour of more ‘economically viable’ courses demonstrate that real threats can lurk behind the words (Kingston, 2015).

In the face of such destabilising ruptures as those seen in Japan, not to mention the more incremental, but still damaging, cuts to funding for arts and humanities research and programmes, an astonishing range of counterarguments have been formulated, discussed and published, in every form from the scholarly book to the popular article or blog. From these we learn that study of the humanities makes us better citizens, better able to navigate the complicated cultural challenges of the modern era, more empathetic, more fulfilled and better thinkers (Small, 2013; Nussbaum 1997 and 2012). We learn about the humanities graduate’s attractiveness to employer for their passionate and flexible minds (Bryant, 2015), how business leaders should themselves study literature and philosophy (Schumpeter, 2014) and how a

liberal education instills key transferable skills for an age of outsourcing and fast technological change (Zakaria, 2016). We have seen not one but two major historical accounts of the development of the humanities (Bod, 2013; Turner, 2014). We hear of course as well the conservative voices guarding the humanities' inability to be reduced to utility value - in some cases as an absolute, in others as springboard to encourage the study of what you love, as preparation for a professional doing what you love (Fish, 2008). We read of senior high tech managers, such as Google's 'Philosopher in Chief' Damon Horowitz and Slack's CEO Stewart Butterworth and creative industry stalwarts like Element Picture's Ed Guiney who studied philosophy, and openly advocate this path in a world where understanding human motivation is the key to developing better technology (West, 2015). We also hear of only limited evidence hard of economic disadvantage associated with the choice to study humanities, which is balanced off by a better ability to ride out uncertainty and hard economic times (Edmond, 2014; Chiose, 2015; see also Kay, 2016 and Dorfman, 2015).

In spite of the creativity, vibrancy and variety of these arguments and strategies, the battle to preserve and protect the humanities is raging on. If anything, we seem to be losing ground (Busl, 2015). If evidence of the value of an education in or at least including the humanities is so readily available, then why do we see this sustained, if seemingly paradoxical, slide into underinvestment and risk of closure? And, more to the point, how can we address what appears to be an ingrained and tenacious misunderstanding of the contribution these disciplines make to research and education?

It is unfortunately possible that the efforts to defend the humanities are doing as much harm as good. To defend the value of the humanities as an exceptional case is to reinforce a perceived difference between these disciplines and their counterparts in Science, Technology and Engineering. This is, of course, a constructed difference, and the origins of scientific disciplines (eg. in the trivium and the quadrivium and other early models for the 'liberal arts') show much greater interconnectedness between what we would now call science and the arts. The name that is consistently associated with the now engrained schism between the 'two cultures' is of course CP Snow, whose 1959 Rede Lecture of that title now seems both dated and divorced from what his lecture title has now come to represent (Snow, 2001). For one thing, Snow was writing about what he termed 'literary intellectuals,' a somewhat different category with only a partial overlap with the modern humanities faculty. For another, such pronouncements as the fact that scientists are more optimistic than their counterparts ring hollow, anecdotal and essentialistic to modern ears.

Snow's dichotomy has stuck with us for a reason, however, and like any stereotype this may indicate a kernel of truth: in some ways the sciences are different from the humanities. The challenge, therefore, is to take on this perception of difference in kind, and come to understand it as one of degree. Both of these areas (or indeed 'all' of them, for neither the term 'humanities' nor 'STEM' nor indeed 'science' can claim to represent a homogenous approach or unified discipline) stem from common roots in in what in German is called '*Wissenschaft*,' fields of endeavor constructed for the purpose of creating knowledge from evidence. As such, when we speak of these disciplines, we should not be thinking of polarities, with science on one side and

humanities on the other, but rather of a sliding scale of ‘epistemic cultures,’ which, like human cultures, blend with and branch from each other in a wide variety of modes at a number of border regions. Only by developing our understanding of how the epistemic cutting edge of the humanities operates can we clearly describe its strengths and weaknesses, relieving these disciplines from their current tendency toward exceptional status, and placing them back into a continuum of knowledge creation approaches suited to different problems and different forms of evidence.

The SPARKLE PROJECT

“I’m not sure that...historians talk enough about the process to each other, I think it would be... fun to know more, our horror stories, but also encouraging stories about what people go through.”

This quotation expresses the core motivation behind the SPARKLE Project, short for “Scholarly Primitives And Renewed Knowledge-Led Exchanges.” The literature defending the humanities is rich in evidence of impact and positives downstream effects, but there is very little evidence to show exactly how the humanities disciplines fulfill their epistemic mission, how they create knowledge alongside the other disciplines, using something that can be seen as an equivalent to better understood, more transparent forms of experimental scientific method. The project’s aims were to provide the humanities with an evidence base similar to that provided for scientific disciplines in works such as Karin Knorr Cetina’s 1999 ethnographic study of high energy physics and microbiology labs, “Epistemic Cultures: How the Sciences Make Knowledge.” (Knorr Cetina, 1999).

As the SPARKLE project’s name implies, its inception was not directly inspired by Knorr Cetina’s work, but by the body of evidence often cited in digital humanities and information science circles regarding the so-called ‘scholarly primitives’ that structure work in the disciplines of the humanities, in particular text-based disciplines such as the study of history and literature. Although there have been many variations and glosses on the work of John Unsworth dating back to the year 2000, his original list of primitives still gives a valid representation of many of the stages and activities that make up a humanist’s repertoire of activities: Discovering, Annotating, Comparing, Referring, Sampling, Illustrating and Representing (Unsworth, 2000). That work with an ethnographic foundation such as this would arise from the digital humanities is no great surprise, for two reasons. First of all, digital humanities is highly interdisciplinary, and highly collaborative. Knowing how your counterpart creates knowledge is not merely useful, it is essential for productive work driven by an approach such as this. Second, in the digital humanities, there is a strong tradition of making and building tools and environments in which the work of humanistic investigation can be carried out. To develop such tools for a user base with such subtle and time tested methods as the humanities researcher is a challenge that requires evidence upon which to focus interventions and ensure positive uptake from users.

The fact that the scholarly primitives originated largely from the information science branch of the digital humanities endows it with certain limitations, however. By and large, the original scholarly primitives and their many refinements focus on how the individual researcher interacts

with the world of sources and people and dissemination channels. While hugely useful and very robust, they are not comprehensive enough to function as a tool for understanding knowledge creation. While the collection of information is certainly a prerequisite for knowledge creation, the point at which a scholar feel they have passed from swimming in the information produced by others and actually knowing something new, of value for the community and worthy of being formally communicated, remains obscure. A similar blind spot can also be found in a more recent work, Smilijana Antonijevic's massive ethnographic study *Amongst Digital Humanists* (Antonijevic, 2015). Although impressive in its scope and rigour, the fact that the work is built upon an interest in how digital humanists come to adopt methods and tools, while we still don't have a firm understanding of what the humanistic baseline is, saps depth from some of its conclusions.

In response to this, the the SPARKLE project team (comprising expertise from the humanities, computer science and design) began looking for alternative models to the primitives that might shed light on the more cognitive, hidden knowledge creation processes that might be occurring in the humanities research process. From a cognitive perspective, research into the fundamentals of the generation of insight supplies a number of relevant questions: in particular around the issues of failure and the responses to failure, including the very important phase of incubation, allowing the mind to loosen its hold on a problem so as to approach it from a fresh angle (Seifert et. al., 1995). From educational psychology, the concepts of induction and abduction¹ proved relevant to the question of whether researchers might be seeking and privileging evidence to confirm suspicions, rather than using it wholly and somehow objectively, and Piaget's foundational concepts of accommodation and assimilation (Piaget, 1952). Finally, Lucy Suchman's ethnographies of work practices highlight phases in the process of knowledge creation that the primitives approach did not represent fully or at all. Though Suchman's work did not seek to organise observed patterns into larger categories, it still revealed categories of observed activities without direct analogue in the primitives approach, such as seeing (a particularly important concept that will be discussed in greater detail below), manipulating, mapping, referencing, flattening, incorporating, accounting for, and recording, among others (Suchman, 1995). While these alternative models raise questions and propose possibilities for what the knowledge creation process in the humanities might be, confirmation could only come from targeted ethnographic work. While small in scale and limited in disciplinary coverage, the SPARKLE project interviews did provide some exceptionally useful results to this end, incorporating the method and findings not just of Knorr Centina's work and Unsworth's but also of the other fields and approaches described above.

As such, the interview protocol was designed to capture both the research process as a set of observable activities, but also as a transformational process constructed by the researcher to make a cognitive leap from information to insight. To approach this highly inchoate process, we followed two related lines of questioning. The first looked to develop a general sense of how the subject viewed and carried out his or her work. In this section, the questions focussed on what their discipline was, and what a recent or typical research day looked like. The more focussed

¹ "Abduction or 'retroduction' [as called by the original proponent of the concept, Charles Sanders Peirce, 1935] can in fact take two forms: 'empirical' (recognize patterns in data and posit laws that can regulate

questioning narrowed down to a single piece of scholarly writing, how it was conceived of, developed, roughed out, written, revised, how notes were taken and incorporated, how it was placed for publication, how secondary research was integrated, how major challenges were dealt with, and how communities and networks were engaged in its development. In some cases, where the most current piece of work was deemed 'atypical,' other work was brought in to provide a more complete picture of both the typical processes and the exceptional cases. This tight focus on the individual act of scholarship as paradigmatic for the knowledge creation process formed a very stable structure from which the subjects offered a rich series of reflections on their epistemic processes.

The project team carried out eight extended interviews with working humanities scholars at a range of career stages, and with a range of research approaches (though all clustered around historical, art historical or literary historical methodologies). Each interview was one hour in length. The participants were chosen to represent diverse examples around a somewhat homogenous methodological core, with three historians, two archaeologists, one art historian and two literary historians in the group. The gender balance was five male to three female participants, and the group covered a wide range of career stages, from two PhD candidates through to one Associate Professor.

Over the course of the interviews themselves as well as the subsequent transcription and analysis phase, a number of areas emerged where either huge variation or unexpected convergence were observed. In particular, the manner in which these researchers actively managed the limitations of space, time and attention, placed upon them by both their environment and their own limitations, were striking, especially so because it would not be possible for a lab-based scientist to deploy such strategies. Other such issues were raised in the context of how note-taking and writing formed a part of the process, how interactions with other people played a role in knowledge creation, and the place of serendipity. Among other things, these findings have enabled us to develop a model for the humanistic 'instrument,' an analogue to the devices and documented processes in the sciences, as described by Knorr Cetina. All of these issues are discussed in detail over the course of the following sections.

Humanistic Management of Research Space and Time

Aside from the obvious need to work in archives or museums or (for the archaeologists) landscapes, where primary sources are kept and access carefully controlled, there was essentially no agreement, even in our small sample, of where the 'best place' to work might be. In part this was a reflection of adaptation to different life circumstances: senior academics with teaching and administrative responsibilities seemed generally to find their offices more rife with distraction than their home spaces, for example. But even this general rule had exceptions, where the desire for work-life balance created more variation (libraries or coffee shops, for example, or working in the office but out of business hours, on weekend or in the evenings). A separation, or multiple separations, between administrative work, personal life and research work was, however, omnipresent. A typical statement about places of work was as follows: "Well, my desk is like where all the college work is, and I might do small things like if something

comes through, but I very rarely write anything extended to do with my own research, I would rather do it at home or ... outside.” Another interviewee said: “I do different types of work in different places... I do some writing in [in my office] but only writing, I don’t do any research work.”

It was not just the variations on where these researchers worked, but the specificity of some of their responses that was continuously surprising: “I’ll sort of sit in a swivel armchair with my feet up and my laptop on my knee and write, but far too often I write on the sofa. The nice about the sofa is that you can spread your books around you.” The same respondent also mentioned writing at an ironing board, and reading “...on the bus, or in the bath, or ... waiting for the kettle to boil.” Another expanded on the specificities of physical position: “At home I sit on the sofa, and I sit yoga cross legged... I mean I think better if I do this (crosses legs) if I’ve got my legs down, I know it’s bizarre.” It is particularly clear that the place and the physicality of the research space is not just a matter of managing the environment, but of managing oneself: in reference to managing ‘moments of despair’ in the writing process, one scholar stated that he had “...to remain at my desk, because if I didn’t, it would never get done. So I have to lock myself in and I’m afraid it’s very childish, I usually require a couple of all nighters ... it’s completely undisturbed, no emails, families asleep, my mother’s not ringing, other stuff”

The idea that location and spatial configuration are integral to productivity as a humanistic scholar applies to both physical and virtual spaces: “And I’ll have a laptop and a computer at home that are creative spaces only, and I’m actually in the at this moment beginning to separate these things out physically and I’ll simply remove work email in so far as is possible from as many devices as I can, and partly because I’m finding it difficult to separate the activities a few years in as I kind of work on a bigger project I need to, as you say, walk over to a different place in the room, and this is what I do here, and this is what I do here.” Separation (of tasks, of ideas) and integration (of source material, with a community) are constantly in balance in the epistemic process, to the extent that one interviewee stressed the importance of technology for him in making it possible to access his entire personal source library from his computer at all times: “I can be at a conference and still have my library... I can’t imagine being without it, and it’s only three years since I started it’s a big big jump. Because I used to spend endless time tracking back and forth trying to find a photocopy.”

The nature of historical research as being not so much physically unbounded as loosely and alternately bound to multiple places (the office, the archive, the classroom, indeed even the virtual environment or page of writing etc.) places it in stark contrast to laboratory science, in which the nature of the work space is very specific and determined. The contrast between the closed physical space of the laboratory and nomadic nature of the humanistic knowledge creation process, with its constant refreshing of sources and inspirations, is reminiscent of the contrast between farmed agriculture and the hunter gatherer, with the pre-agrarian mode of subsistence being perhaps more dependent on shifting availability of resources in a wider space, but benefitting instead from a more multisensory, kinetic and synthetic mode of cultivation.

A recurrent subtheme within the topic of spaces and places for work is that of clutter,² a nearly universal topic that was not prompted by the interview protocol in any way. “[T]he problem with the desk is that often you have to clear a space on it, whereas the sofa is generally kept clear,” said one interviewee, while another made the very insightful comment that: “my desk space tends to be extremely cluttered and messy and and not conducive to reading, so I ... tend to take everything off the table and move it or try and minimise what I am looking at.” The primary reason clutter seems to be such a strong recurrent theme is because of the need to balance focus and attention with the parallel requirement to have certain things – notes, primary or secondary source materials of many types, objects, data, computer environments or tools, or comfort objects such as water, coffee or a lap desk – “at hand” or “beside me.” One interviewee even described this arrangement for her as “almost like a nest.” “I tend not to write in ... my departmental office in Trinity which I use more as a teaching and meeting space, even though I have books shelf space here, but I tend to write in a box room at home where the stuff is very close to my desk, um, it’s not very scientific, there are piles and piles of paper, the paper somehow forms a useful order.”

In some cases, this desire for a particular physical arrangement of space is clearly indicative of a similar process of arranging ideas, building a knowledge organisation system to assist information retrieval and prepare for insight. In some cases, the researchers’ understanding of this system is somewhat ad-hoc and intuitive: “I don’t really have [a system], I just flick - I have a good idea of the order when I did something.” In most cases, however, the interviewees were very aware of the underlying structure of their personal information landscape: “I break down the reading by all the different topics that I’m interested in... so that when I come back to it ...I have that all stored in logical chunks that will turn into chapters.” In fact, curating and caring for this system was an oft neglected, but very serious task: “I seem to have created and extremely elaborate system of filing on my Dropbox ... I’m actually on research leave next January and one of the things I’ve pencilled in to do is work through my Dropbox folder and try and bring some order to the chaos.”

The idea that objects should be organised in physical and mental space also interconnects with another theme that appeared across the interviews, which is that knowledge creation was an embodied process, encompassing far more than just the brain as an organ for processing source inputs. “...the body is never separate from the world ... consciousness never exists separate from the world, we’re always conscious of something.” Not surprisingly, this was particularly pronounced among the archaeologists, whose sense of the spaces and objects they were working with came out in their narratives: “the body has learned how to think about objects through handling them ... you don’t have to have necessarily have to handle that particular object... your body tells you how to think about it, so you’re bringing in an embodied sense to it.”

Although this kind of thinking was less explicit among the textual scholars, their constant curation of their spaces and environments, as well as their highly developed systems of taking notes (discussed below) and organising information, speak to this embodiment. The richness of

² Interestingly, a forthcoming popular economics book by journalist Tim Harford, entitled *Messy*, promises to come to the defense of clutter, making us “creative and resilient in a tidy minded world.”

these mental and physical environments, as well as the broader sensory world, of those engaged in historical humanistic research leads to an enduring dominance of multimodal personal research environments. In spite of the rise of digital humanities (which some, but not all, of the interviewees had embraced), the historians still preferred to have notes, notebooks, pencils, post-its, books, printouts, and all manner of stimuli around them, in addition to their laptops and digital tools.

Some of this active management of spaces for research work functions so as to optimise concentration and minimise distraction. Focus a key to constructing a valid argument, but it is also an efficiency concern serving the purpose of managing time constraints. Time pressure was keenly felt by all of the interviewees: "...there are so many claims on my time, kind of 200% claims on my time, so how can I start to segment out?" But there are specific constraints as well. Sometimes these time constraints arise because of externally limited time, such as the limited hours of an archive or museum, for example, which encourage certain kinds of binge photography and condensed note-taking. Interestingly, however, what might be thought the most obvious strategy for maximizing time (by focusing narrowly on one project before moving on to the next) is not one that fits comfortably with the humanities researcher's modes of work. In fact the researchers, in particular those at the more senior level, consistently referred to the fact that they would work on several projects at the same time. While this was sometimes viewed in the pejorative ("...when I was at school my Latin teacher called me a 'flibberty-jibbet' which ...I think I still am," "I like to flit around to lots of different things and I try to keep my view broad, "I have too many projects on the go"), it was also clearly also a strategy to manage the implications of potential blockages in insight, access to sources or sustained time for research, ensuring that a mix of activities was available at any given time to provide a good 'fit' for the kind of environment, attention and other cognitive resources an individual had to devote to their research.

For this reason, the interviewees often struggled to tell us, for example, how long it took to create a given piece of scholarship: "I would say that it's a fair assessment that I've been working on this since 2010, on this particular playwright, thinking about his importance and his relevance ... but if we were to think about it in terms of man hours maybe.... from the moment I was invited to the conference to giving the paper probably 40 hours I would guess, a solid week's work. But obviously much more in bits and pieces before that, but without the specific reading... and then working on it then afterwards, um, I guess roughly about the same I would say." The ability to work on multiple projects simultaneously supports this kind of long gestation period. It also is a pragmatic solution to the multiple professional roles the academic inhabits: as a teacher, an administrator, and as a member of an institutional and a wider disciplinary community. "Um, before I go back to archives and note taking I'll just look through where I got to last time, because it's quite unusual to have a concentrated block of time - I quite often just have to revise what I was thinking about the last time and then pick up from there and go on from where it seemed I had got to." It struck us continually how expert the interviewees were at the decomposition of large tasks into chunks (Miller, 1956) or microtasks (Cheng et al., 2015), common recommendations for enhancing productivity, but also emerging areas of interest for

software developers trying to produce environments and tools to support busy lives characterised by information overload.

Notetaking Strategies in Humanities Research

Quite a lot of the rich sensory landscape of the historian, with its spatial diversity, multimodality and connectedness with time management strategies comes together in his or her note-taking strategies. Notetaking strategies exist in space and tend themselves to be highly multimodal, sometimes in certain software environments, on certain kinds of paper - whole pages, cut up bits, or post its - or in certain kinds of notebooks, sometimes existing as marginal paradata written on copies of documents, sometimes in words, but also in highlight or diagrammes. They engage the senses and organise thought, but they also serve the purpose of assisting researchers in managing time constraints. The physical arrangement of notes can take a longer term form (that is of a filing system: "sometimes there are they will get put into piles with the notebooks. In addition to notebooks there are also piles of photocopies and um, loose pieces of paper where I've made plans and diagrams quite often get those piles ") of it can be a more immediate exercise: "I print them off so I can circle bits and I can highlight bits, and I can write 'this is important' or something or whatever in the margins."

The SPARKLE team was not the first to look into the note-taking strategies of historical and humanistic researchers - indeed, a very good overview of statements made by prominent historians on their strategies can be found in Keith Thomas' excellent diary piece published in the London Review of Books (Thomas, 2010). From clippings to the card index to various forms of organisational technology, from the pigeonholed desk and white envelope, Thomas' account is as learned and engaging as it is modest. Herein lies the problem with many discussions of the humanistic method: the inability to see the power of the method for the perception of it being haphazard, not meticulous, curious, outdated. To truly appreciate these note taking strategies, they must be understood not just for the many things they lack, but for the power with which the triangulate between the elementals of humanistic scholarship, such as sources and peer opinion, and the path and cognitive strengths of the individual scholar. They must also be viewed at the macro level, not just at the level of the individual's curious habits, but as an almost endless set of variations that nonetheless share common goals and structures.

Although many of the researchers interviewed for the SPARKLE project displayed a similar lack of appreciation for the power and rigour of their notetaking processes (describing their notes, for example, as "messy ways of putting things together") almost every researcher was able to speak in great detail of their processes, which were often quite complex and unique, such as one researcher who reports using three different physical formats for the organisation of her records and ideas: "lined notebooks for archives," "scribble books," and "scrappy bits of paper." Another uses Post-it notes to record ideas or references that are outliers within an otherwise more coherent stream of material he is recording (so they can be moved later, when it is clear how they fit into an argument or context). While some of these notes serve a purpose and are then expendable, in most cases, the notes themselves become key research assets for the scholar. Notebooks of "mostly quotations, um with sort of additional comments" were cited as a

source of long term inspiration and reference; in another case, photocopied primary and secondary materials marked up with the interviewee's own personal paradata (marginal scribbles, mostly) were viewed as "very very important."

In fact, in many cases, notes either cascaded, with more detailed notes becoming condensed through one or more iterations into a representation of the big picture or went through a series of iterations, from digital to print and back, before the argument and evidence base were complete: "I'd taken long-hand notes and then I typed those up so I'd be able to search out particular phrases if I wanted to and then printed them out, did the highlighting, put them in the binders." For another interviewee, this same migration between physical manifestations of the material acted more as a statement of commitment: "No I guess it's something to do with space, there's part of that feels ... that once I've printed them out I'm committed to writing and I should try and write something rather than continually make notes ... the act of printing something means also that I do tend... to use pen and paper a little bit more at that point ... it might be to physically cross out paragraphs, or a note that I've made and I've written about that so I can cross that off, so there's something systematic about that or it feels satisfying and gives me a sense of progress that I'm working through my notes and crossing off a list, it feels that that's important to me psychologically."

Many researchers found value in 'sketching out' their ideas or otherwise trying to contain them within a reasonable space. This extended quote not just how many formats may be used, but also how each has a purpose in the overall system: "...anything that I do begins begins on a blank A4 sheet of paper and only one and I will structure it out. So until I can see it, almost like a table of contents, but it'll be messier than that, believe me, but then it'll change, it'll change at 3 months, and at 2 months two years in it will constantly evolve but it will only evolve from that one page A4 format, and if I can't understand it there I don't think anyone else is going to want to read it or have anything to do with it, and that will be the same for an article, so before I write an article I will plot it out like that too, and definitely stick to it...3-6 or 7 headings on it, and it will have titles which are bigger and explanatory bullet points that go on to what each section of whatever I'm trying to do is going to accomplish, and that will be it I guess it will have, I meant this is conditioned by the text that I've read all of my time, it's obviously a way of understanding the world and reproducing it through my own brain on the paper, but if I can't structure that then I can't see the logical flow of what I'm trying to argue and I can't see how I'm going to get to where I want to get to... I can see my argumentation will take me to different places, I mean I need a map." This extended meditation on one example of how notes can be used to traverse between levels of focus and pools of evidence illustrates not just the process, but another key concept that will be discussed in the next section, that is the humanist's "instrument."

The Humanist's Research 'Instrument'

For Knorr Cetina's researcher objects of study, the idea of instrumentation was much more than a conceptual: it was something that took an external form, either as a device or as a documented procedure. These filters for knowledge creation, made tangible, would become a significant contributor to the shared lab capital, and a hallmark of the overall advantage or

distinctiveness one lab would have over any other in their ability to produce scientifically relevant results. For the historian, the idea of using any kind of shared or sharable devices or procedures in the knowledge creation process does not resonate with actual practice. Instead, the process of building a scholar's apparatus is as individual (which is not to say subjective) as it is robust. An appropriate mental image or metaphor for this process is not that of the lense or the dissection manual, but of the dry stone wall, where building blocks of irregular shapes and sizes are laid upon each other to create a matrix through which, depending on its density and maturity, light or air may pass.

The first challenge in constructing this wall is to create the footing or foundation, which is almost inevitably comprised of knowledge of the primary sources, the objects of study. Being 'source-led' was a point of pride for many of the interviewees, and the arguments and research questions were seen by and large to emerge from the direct engagement with the primary objects of study: "I don't really arrive at the argument until the evidence takes me there." But also of importance was the idea that a single contact with a primary source was never enough to fully comprehend it: "you don't just look at something once ever;" "reading it five or six times over;" "...doing lots of reading, but also by reading it multiple times." In most cases, this rereading is however also a process with a time component to it: "...it's no good reading anything once ... having read something once you may return to it because at a later point you may find it'll solve a problem for you, or it will have a suggested connection." As implied in this quotation, the rereading process as it takes place over time is widely viewed not only as essential but transformative: "...that involved kind of going back over some of the older stuff that I'd looked at beforehand as well, oh yes very much changed the kind of thing that I was looking for."

A further omnipresent 'course' in the wall of the humanistic research instrument is secondary research. Each researcher's relationship with their peers as it played out in part via the published scholarship of others was subtly different, but each expressed some kind of strategy for striking a balance between making one's scholarship appropriately robust and spending too much time reading the work of others. This layer presents a specific set of challenges, in particular one of volume: "I think has changed most dramatically if you look back 30 years on me is the volume of secondary literature, it's just exploding and getting faster and faster and we're still expected to stay on top of so much of it." John Guillory was already writing in the 1990s about the "clock time of scholarship" (Guillory, 2008) and its effect on an individual's ability to stay current with all that was written on one's topic of study, and it seems that this challenge continues to grow. In spite of the challenges, however, secondary literature is a key component in the humanistic instrument: without embedding and contextualising within the community of practice, scholarship feels insubstantial, and indeed even risky. Several interviewees were able to recall occasions of working on projects that extended their own reach and expertise, in the course of which they thought about how they "didn't want to make a fool of myself" or "wouldn't be sure if this had authority" or would need at least to recognise work "at level of nodding to them in footnotes." Ensuring that the this base was covered is not always possible, however: "[recognition of the secondary literature is] what I feel that I would need, but I

recognise the flaw in the piece but there's no way that I could commit to that either, so you know I gave them what I had!"

This simple strategy of managing time by accepting one's limitations within a certain piece of writing, was not the only one, of course: a different approach described was to focus on particular genres of scholarship (books being more important than articles, for example), or to set a certain representative sample and work within those constraints. The ideal situation, as described, was one of following the trails of connections and references until reaching a point of recursion, however. "[you know you are done] when you start just going round in circles... one of the things I like about [conferences] is that every time you stand up in front of people there's always the opportunity for someone to say 'ah but you haven't read X', or you haven't thought about Y, so that is a really important part of the process to really make sure that you've covered all your bases." In this way, reading (and rereading) secondary material is an exercise in itself, but also a dialogue with the primary sources and the researcher's growing understanding of them. In the process of going "round and round in a few circles and ... reevaluating what you already think, reevaluating what other people have suggested," knowledge of the secondary research provides that key layer of the documented thoughts of others. It helps to test the place of pieces of evidence in an argument, and also to shape the overall size and shape of a work, and to contribute to what can often be the long periods of semi-active or even inactive gestation. As ever, practicality and a recognition of time constraints is balanced in consideration with what the ideal scholarly output in a given situation might be, and what the capacity of the individual's scholarly instrument is to support a thorough presentation of a field.

These strategies for managing the 'clock time of scholarship,' also impacted on the level to which the interviewees felt they could or should engage with disciplines beyond their own, or with theoretical material arising from another discourse making another layer within the humanistic instrument. For example, one established researcher confessed about an interdisciplinary project: "I knew I had to be able to really try and not master, but at least engage sincerely with their literature. In fact given the reading I've done since, I'm amazed that I got away with it!" Although they present a further challenge, informing one's work through interdisciplinary investigation was also seen as one of the most invigorating ways to extend one's filter for research questions: "...the thing I get a real kick out of would be the things that are off to the side... the different ideas, and it is challenging." Such interactions create other layers in the scholarly stone wall of independent, but integrated sources and influences from which research questions and eventually scholarly output will flow.

Sources and scholarship were not the only contributors to this apparatus, however. Certain skills, like paleography or languages were key to specific disciplines or approaches: "if you're an early Irish scholar, those people are much more learned than me, it takes them probably a decade and a half before they can even begin - because they need to learn Hiberno-Latin as well as Old Irish - as well as probably Russian, German, French, maybe some Scandinavian languages ... the apprenticeship is very long." The mastery of such fundamentals can be a key differentiator between scholars, and will drive the definition of research questions over the course of a career, as new skills open up access to new source material.

Beyond this, however, external factors such as political imperatives or funding priorities can also create layers that highlight attention to certain seams of evidence, or encourage connections to be drawn between things that might otherwise seem disparate. But the personal experiences of the scholar form a layer in the apparatus as well. This is what one interviewee called “those itches you want to keep scratching” where your own subconscious urges and fascinations come up,” and these may or may not have a direct connection to a recognisable personal history. Even when they do not, however, the historian, or indeed any scholar of human culture, is also writing as a human being born into a particular decade and a particular society, and this side of the personal provides for some of the most enduring fascination and utility of the resulting research: “...every historian writes from their own context and how we see history from one generation is going to be completely different ... you read ... the research done in the 50s and 60s and it comes with a completely different set of assumptions about what’s right and what’s normal and what your basic default assumption about who you are and what history is for, that tells us something about why we tell and retell history. Its also how we explain us to ourselves as well which makes it a really interesting conversation to be part of, cos human beings are creatures of narrative, really!”

One increasingly present set of elements in the researcher’s apparatus are technology and tools. Although some of the interviewees would have had experience working on digital projects, none of them would have self-identified as primarily a digital humanist. In spite of that, they all give a sense of how technology was influencing their work. In particular for those historians who worked in archives, the ability to photograph and save images of archival materials was transformative “You notice a really big difference in somewhere like Kew where you can photograph and somewhere like PRONI [Public Record Office of Northern Ireland] in Belfast where you can’t. It does make a huge difference in terms of the volume of material you can get through ... certainly dictates why certain sources are used more than others.” This already ambiguous positioning of increasing access as something that not only supports, but incentivises scholarly attention (potentially to the deficit of other sources and collections that may reveal a different narrative) also comes with a further disadvantage: although the ability to photograph sources may maximise the time one spends physically in an archive (thereby also maximising one’s research travel budget) it doesn’t increase one’s overall available time for reading and analysing the materials captured: “...while it’s fantastic that we can now go into archives and take photos of materials, there is a problem that you take all these photographs and try to remember what you have, and trying to remember that taking photographs of stuff is great, but you have to, you also have to use the time, allocate the time to work through the material.”

Discussions of other technological interventions continued this theme of both benefit and compromise. Laptops are ubiquitous, and often used for analysis of sources or note-taking, but they are seldom seen as flexible and extensible enough to be the only place for these activities: notetaking, as we have already seen, is highly multimodal, and even for analysis one researcher was wishing for “multiple screens.” Databases were used for capturing structured information, but they had to be created for the purpose, and relevant information often then was exported

back out to another format, such as a flat spreadsheet or pdf. Even then, one particularly digital scholar commented about his method: “I think this is maybe a key point for Digital Humanities that, certainly for me anyway, the first time I go through a big body of evidence, the hard copy remains crucial and I still find it hard to really do close reading on screen.” On-line searches through bibliographical sources and repositories of scholarship were also common, in particular as a starting point, but never able to support the full scholarly process: “...the jumping off point is certainly always digital, and the majority of the resources that I use are digital, but again I think that tends to increase as you get to know the field better, because you have to read the big books and the big books are almost always in book form.” The common conception of humanist scholars as luddites is clearly not upheld by this data – instead, it seems that the available tools simply aren’t up to the standards of these consummate microtaskers and their highly refined, multimodal, embodied methods.

These many layers of the humanist’s instrument combine to create both a scaffold and a filter for the identification of research questions and the development of responses to them. The interviewees were able to describe the process of using these interconnections very vividly, often providing extensive narratives detailing the development of key elements of their argument: how influences from other areas of study became influential in understanding their own area of focus, or how a similar methodology was applied to a different corpus; how they work through the connections between both the evidence they want to present and wider disciplinary trends; how they traverse within and between the layers of their apparatus, knitting together notes and texts, primary and secondary sources, theoretical and methodological insights, extradisciplinary material, hard won archival gems and chance comments from friends and colleagues, gradually resolving any doubts about the reliability of connections and conclusions. The application of this method is about balancing the context in which a piece of is being situated, and the precise nature of the evidence itself, moving as well between reading, note-taking, filing or organizing, condensing information, following footnote trails, decomposing tasks or synthesizing them, and of course writing, all the while managing their space and their focus in the traversing of both the expected and the unexpected pathways across the evidence, which may be dense and extensive or consist only of fragments. “In most cases the evidence is quite fragmented and you need to compile your evidence across a number of archives, plus literary works, plus narrative sources, chronicles and so on, so you’re building a picture.” This fragmentation, like gaps in the wall, is a challenge to the epistemic authority of the scholar, but it should not be allowed to become a barrier: “I go as thoroughly as I can and within the range of what I can see I will gather as much information as I can before reasonably making a judgement on what I think happened... And I think that’s rigorous and I think sometimes more imaginative and brave or misguided than what scientists do in that you’re willing to take a risk and you’re willing to roam a little more freely outside of your [expertise].” The element of risk came across, implicitly or explicitly, in a large number of these narratives, most interestingly in the form of an imagined colleague from an older generation with a more thorough approach, research that lived up to the “old scholarly values where you would be able to identify every place name, and personal name and use complete linguistic competence over the sources and understanding.” These “old scholarly values” are seen as both a challenge, and something to be challenged, however: “Well how is the humourless, well humourless is unfair, but empiricist,

going to respond, you know and it's almost as a defensive way of monitoring my own practice, I'll try anticipate it by thinking of someone who will deconstruct what I'm doing and ask me the who, why, what, when, have you done all this work and have you done all this work and they can enrich it, then I consider myself to be doing a good job, but if I just do that and I leave it bare and naive then I'm not doing a good job ... so it's about finding the balance."

Like a climber planning a summit attempt, the researcher plans their angle of approach, aware of the fact that their own constellation of sources and influences may very well be leading across known territory, but in a new way: "there's a discussion in one of the chapters which ...had my approach been purely literary ... possibly wouldn't have been there at all." In the end, this researcher will follow the terrain, one hand or foot hold at a time, until it leads ... somewhere. That somewhere, like climber's peak is often shrouded in mist, but it can be inferred - "I was fairly sure that something would be produced of that would be interesting" - but the process of building some aspects of this journey can feel like "beating my head off what felt like a solid brick wall, to the point where I ended up talking to a couple of lecturers within the department and they were like 'yeah theory kind of always feels like that when you're building it.'" At some point, however, momentum takes over "... and then what happens is that all that snowballs and gathers speed and gets to the point where you're being carried along by it."

Gaps and Hooks

As befits an approach that is based upon the continual layering of differently conceived pieces of information and knowledge, the historians interviewed by the SPARKLE team would often speak about 'gaps' in the knowledge landscape. Rather than being a negative term however, the 'gaps' were generally the areas of most interest, the places where the research questions could be found. A good research question is one "that's reasonably broad. Also one that fills a gap in the scholarship. I think that has to be primary, it needs to fill some sort of gap." While not always expressed using this exact term (though very often it was this precise word), the feeling of having located the gap was very often met with incredulity or a mix of something like delight (at having identified a gap) and derision (that this had not been noticed before): "I remember having this odd feeling: why hadn't somebody made this obvious points before?" or "this collection of essays that had so thoughtlessly excluded drama in polite fashion." These gaps are perceived as something individual, unique to the specific process that has built the scholar's unique personal apparatus, making them want to offer a way to "fill in gaps that only I see, and that I think other people should see." In part because of this individual specificity, the finding and addressing of a gap can become quite an exciting prospect:

Let's say it's an idea and you can trace its impact and evolution and then there seems to be a moment there where you're missing a piece of the story and which is often an interesting thing to happen, because often that means there is something unexpected to you has happened, and filling that in can be quite interesting: what primary texts should I be reading to try and track the primary texts this, can i trace it from a different route, can I follow it through this branch of authors that I know, the guys I'm working on you know... it gives you courage to sort of stand back and see a bigger picture and see if there are patterns there that

can explain what doesn't make sense there when you're focussing on the small bit of the canvas that you're working on.

but there's always something new to say but so argument will come from that and an awareness of what's out there what's not done and what is done which only comes from a significant amount of reading, and just an awareness of what other people are working on I suppose which is sort of insider knowledge, and then use your creativity and that's the fun part, that's where your own subconscious urges and fascinations come up - if you start digging around in this stuff it gets very weird.

A related concept to the 'gap' seems to be the 'hook,' a sort of catchy 'edge' to the gap where other related pieces of information can be built up. In some cases these 'hooks' are rhetorical: "I'm annoying, I have to have a hook for the title as well, once I've thought of a title and usually it's some stupid pun, or something, as well" In other cases, however, the 'hook' represents that bit of what is known around the gap that allows it to be addressed, providing a way "into the subject."

The nature of this instrument means that a mature scholar has an inherently more powerful filter available to them. In the laboratory context, junior researchers tend to have a role with a limited scope, which Knorr Cetina characterises as 'dealing with objects.' By contrast, the senior scholar is able to take on a more integrative, "social" role, bringing together the insights developed by the lab's researchers, but also promoting and supporting them with an outward-facing role. This dichotomy does not stand well for the humanistic tradition, but it is true that scholars seem to develop over time an ever more nuanced and effective sense of what a robust research question in their area will look like and what an appropriate approach and treatment of that question will be. For some this is just the confidence of experience, but for others, it is quite rationally considered: "I would often have anxieties if what I write is good enough, and I still have that to some degree but at least I can try and rationalise it and say 'well I have published all these things, people think it's reasonable at least' so that's helpful, and I think people have backed me over the years for jobs and fellowships and you know people review proposals anonymously so you know it's not just your friends telling you you're ok." What was more noticeable, however, was how with maturity the scholars would have more thought-through methods for dealing with time pressures, and a better overall sense of the research landscape and openness to taking risks that would stretch their knowledge base (but not to the point of breaking).

Serendipity and Professional Seeing in Humanities Research

A key result of the application of this form of instrumentation for the interviewees was that it maximised the capacity to harness serendipity. This is not serendipity in terms of the 'happy accident' however: it is the serendipity of the prepared mind that can find subtle connections across spaces and times. "The time that you have the serendipitous find may occur a year or two years after the initial browse but because you've done that initial browse you have embedded a context for later on when you meet it. I think that certainly in my type of history it's

the endless building of more and more context in different context, laterally, chronologically or conceptually , and also mining downwards and piling more and more detailed evidence on top of it. I think that that's what expertise really is, in our world."

Experiences of serendipity were reported in the finding of research materials in an archive ("coming across an object"), searching in an electronic source ("...you could put in the thing that you're looking for, but a whole lot of other entries come up and you go, oh that looks interesting, and it turns out to be a whole lot more interesting than the thing you were looking for") or through reading ("how did I find them? I found them by reading really widely... How do I come by that motley crew? My own interests, my reading exposure, my language limitations. "). These examples are all relatively conventional in some ways, in that they are based in the experience of insight coming through the finding of something new. Serendipity does not always work this way, however: very often the experiences of serendipity were of ideas sparking together, of connections arcing up across the time of exposure to certain sources and ideas. Serendipity comes from working through sources in a linear fashion and absorbing them for what they are, rather than for what you think you may need from them. Serendipity grows out of what you store in the background of your thinking for later use. "Those moments don't seem to come on call necessarily they just seem to pop up. But the way to get them is to sort of saturate yourself in the text."

This preparation for serendipity is actually a key part of the historian's method, and a cornerstone of their version of "professional seeing" (Goodwin, 1994) For the historian, the peripheral vision is as important as the central focus: it is here that the real connections may be found, and the next projects are being scoped and tested. In many interviews, seeing (or rather not seeing) became a central metaphor for the limits of scholarship. In the archival context, there is an awareness that some objects have been lost or removed from a collection, meaning that "there will be stuff that's not there that you'll never see and no one else will, or there's stuff that you won't know about." In secondary literature, there are potential blind spots as well: "I discovered that there was more said, or there had been more said in other disciplines and I didn't really see." It also can express how the scholarly method operates: "...when I sort of started seeing, when I started not seeing the parts where it didn't explain things, where it was adequate but not complete, where there were lapses sort of seeing that I started having a feeling that there was enough here that I could work with." But the importance of seeing for the harnessing of serendipity – across interactions, across spaces, across time - was one of the most interesting aspects of such utterances: "I have the kind of mind where later I think 'oh actually those things did fit together' and I only saw it later and actually it's only been in recent years I would see myself, and ... I actually think that all the things I do do actually fit together, but I think there was a sort of underlying motivation in my mind that I'm interested in that I didn't see originally."

The Place of Writing

The transition from written notes to the fully-formed work of scholarship was another process that illustrated some of the very distinctive aspects of historical research work. Writing has been

proposed by some to be the place where the epistemic leap is made by humanists (McCarty, 2005), and in some cases this appears to be more or less true: “And I will be writing ‘fill this gap; or ‘find out about this’ so then you’re going away and you’re doing targeted reading to find the missing piece of the puzzle.” As the most basic level, however, unless you consider writing to be an all-encompassing activity, it simply cannot be said of the SPARKLE sample that the process of writing incorporated the moment of knowledge creation, as the practices of writing are far too variant. As one interviewee stated it: “I can’t completely disentangle the research process from data collections to understanding and writing and reflection.” The writing process, like the notetaking process, is one modality for working one’s way across the layers of the humanistic scholarly apparatus: it is, however, by no means the only one documented in the interviews.

The interviewees by and large refuted the idea that there would be a separation between research and writing days or phases, describing instead an iterative process by which information gathering incorporates notetaking, and note-taking incorporates the formulation of the final ideas. For some this process was deeply integrated, with the feedback loops between sources, notes and draft paragraphs occurring often and quickly: “ I just work through my notes in an iterative way and I write and i might read, see all the notes I have again to see if I’ve missed something or if I can make further connections, and keep doing that until I’ve got as usual over the word limit and I have to cut back, and that’s basically what I do, I read the notes again and again until I’m absolutely certain I’ve extracted everything of essence from them that I would like to communicate to people.”

Starting writing can be for these scholars, as for so many writers, a challenge and a matter of taste, another theme within the SPARKLE interviews that displayed great variety and almost no consensus. Some start with a sentence (from anywhere in the text), while other feel a definite need to approach the final work in certain phases, always starting with a rough introduction or conclusion, for example, or by having an outline of the overall structure and intervening at various points according to that. For many, the writing is difficult and a slow process, but for others, the words seem to flow relatively easily. Some work from a preconceived structure, others write in a distinctly non-linear fashion, and then reconstruct their work via cutting and pasting of sections and paragraphs. We saw great variations in the level of revision different individuals made as well, with some revising a lot (as ideas and argument develops throughout the writing process), and others feeling their arguments were pretty well formed by the time they were committed to paper.

In the discussion of writing processes, again the notion of serendipity became important. One interviewee spoke of a “click moment,” while another expressed this as more of a gestation or incubation process, whereby leaving the material for a bit could resolve the gap between the ideas and the correct form of words to express them. Filling this time with activities other than scholarship was a key strategy – making coffee, walking the dog, cooking, reading social media, and walking around were only some of the ritualistic borderline activities mentioned alongside the writing process. In the end, the required connection is often made serendipitously: “Sometimes the sentence comes into my head that’s going to fix everything, I can’t explain it.”

This is not, of course, to underplay the importance of the writing process for humanistic research: “I do think that history anyway ought to be a genuine process of writing, not just reporting on the archives” Indeed, for scholars interviewed, the form of the argument is as important as the content, it seems: as one interviewee stated it, “unclear writing is the result of unclear thinking.” One interviewee recalled finding “this lovely little vignette ... I mean the probably will be one of the kind of opening bits in the book because it’s just so perfect, you know, there’s all your documentation it’s flowing around in the middle of nowhere” From another perspective: “the first aim is really to get the structure, the beginning middle end, the second phase then is getting all the details and depth in and then after that it’s just style, it’s getting the style” Many interviewees also expressed a keen awareness of their audiences, expressing in quite emotive and flowery terms how they wanted their scholarship to be apprehended. “As well as instructing, you should delight,” one said, while others spoke of wanting their writing to be “stylish,” “the reader’s part of the scholarly journey,” “challenging...witty,” “lively” or indeed even written with with “a certain ‘je ne sais quoi’ or indeed addition of “pixie dust.” The fact that scholarship is a “public performance” (to the point that arguments are sometimes tested by reading them aloud) marks a further distinct aspect of the humanistic apparatus.

The Importance of Networks and Cooperation

The question of audiences relates as well to one final issue about which the interviews in the SPARKLE project revealed a great deal. Anecdote would have it that humanists do not collaborate: at the most, their manner of work has been deemed ‘cooperative .’ (Unsworth, 2003) This perception is easy to understand in the perspective of the humanistic ‘instrumentation’ as described above: each ‘device’ is embodied and internal and only really accessible to one ‘operator,’ a very different situation from what ones finds in the laboratory or research team. But the fault lies not so much in any lack among humanists in collaborative skills, but in a widely promulgated, very narrow understanding of collaboration as consisting of co-publication and the pursuit of narrowly defined parallel strands of physically co-located work. The fact that much of humanities research is based on human interpretation of cultural and social artifacts means that the presence of the wider community is always strong and the researchers interviewed were in constant exchange with it. What is different, however, is that the modalities by which they collaborate are, like their instruments of analysis, highly varied and often unique to their personal circumstances, topic of research, or personal efficiency requirements. When asked about how they tested their ideas with peers before publication, we received a wide variety of responses.

Conferences are a very common (but by no means universal) outlet, but even within this response were degrees of variation: for some, the idea of an audience pushed them to ensure their ideas were robust, for others, it was the performative aspect of hearing oneself speaking the line of argument before an audience that was most useful. The actual questions and comments received at the presentation were of marginal value, but fitting one’s ideas into the theme or focus of a meeting was a key way of giving them form and shape, of focusing among many possible alternative routes of enquiry and of stretching one’s comfort zone in terms of content of approach. The fact that the presentation is ephemeral (though it may often lead to a

publication) makes the perceived barriers lower and reduces the necessary investment of time, but it is also important that a conference organizer and audience are present to validate the work. In this respect, the divergence in disciplinary convention by which science or technical papers are most often submitted ready to publish, while humanities papers are generally (but not always) presented either as ideas or, if a written text, as a work very much in progress, can be seen to have a specific purpose.

Beyond conferences, researchers also draw individually on peers, but only when they feel they can do so without wasting their precious time. In some cases, the peer input is used to extend the reach of a piece, in some cases to ensure that scoping of the secondary landscape has been robust enough to pass an initial friendly test: “If it’s something where you’re really reaching outside your comfort zone, it’s not only wise to ask other people’s advice, I think it’s also courteous, you know if you’re trespassing on somebody else’s patch, although scholarship shouldn’t be like that, I think it’s good idea just to open lines of communication, and mostly people are very well disposed.” Teaching is another avenue in which input is sought, not so much from the perspective of an expert point of view, but as a place to discuss, present, test the coherence of an argument, and quite importantly, to motivate the process of completing a full review of the secondary literature.

Other forms of consultation and cooperation we observed other included co-writing with a spouse or other colleagues, consulting family members or other non specialists to ensure an argument made sense outside of the jargon of a discipline or indeed chatting on-line with writers from outside of academia as a way of motivating progress and establishing a feeling of common purpose (“marching together”) in highly individualized work.

Conclusions from the SPARKLE Study

What all of this evidence seems to point toward is that the epistemic culture of historians - and perhaps of all text based humanists - is powerful and subtle and (most importantly) not externalisable. In HEP and microbiology, the physical instrumentation and the processural information that is documented in the microbiology lab protocols becomes not only the manifestation of the lab’s capital, it also becomes a product that can be examined, shared, patented and sold. It is the basis of the shared culture, which entrants absorb upon arrival. The impact of the humanists inability to place the components of their repertoire into a ‘value chain’ should not be underestimated for its impact on the fate of these disciplines. The refinement of this epistemic strategy may well be at the heart what the employers love about humanities graduates as well as what institutional management and policy makers find so frustrating: it is a model of knowledge creation that translates very well into teaching and mentoring for competency building across problem areas, but at the same time, it cannot easily be productised, scaled up, or aggregated. Individuals can certainly work together, but even these joins are complex and unique, not following recognisable, quantifiable proxies for laboratory sizes and hierarchies. The impact of this mismatch between the epistemic culture of the humanities and the market forces that drive and shape our society, even when it comes to research, is compounded by the humanists’ own reticence to discuss and define their methods,

and the all-too-common ‘tic’ of denigrating their methods as haphazard or capricious and of overseeing their value and the firm basis upon which they are built. One SPARKLE interviewee commented that he felt the process by which he would find inspiration seemed “completely self indulgent because this can’t be transferred into other people,” but the fact of the matter is that it can be transferred, and it every day, to students and colleagues seeking to develop and refine their own apparatus for engaging with an increasingly complex world of information.

Humanities research may therefore be under the same pressure not just as the arts and education generally, but (to return to the gardening metaphor introduced earlier) also as the suppliers of soft skinned, ripe peaches and delicate but fragrant old roses. Within their markets, they are perceived as having less value, not because their are of lower quality, but because they do not have the shelf life or transfer potential as their counterparts. Markets for ideas, for research and education are as globalised these days as those for soft fruit. The shocking amount of money that changes hands in order to acquire and assimilate small software companies with unique algorithms or popular platforms is a ready reminder of how microclimates of value can arise and proliferate.

But what is at stake here is more than the the loss of opportunities for students, or for the realisation of the potential that humanities research could achieve in the modern context, when we so need complex thinking on ethics, culture and what it means to achieve the upper reaches of Maslow’s pyramid of needs. We are at risk of narrowing our capacity as societies and cultures to understand and absorb, discarding tools and approaches from our repertoire at a time when the world is changing fast, challenges are growing and all forms of expertise are coming under severe pressure from the public and the public.

In his thought-provoking article “Beyond Epistemicide: Knowledge Democracy and Higher Education,” Budd Hall builds upon the work of the work of Grosfoguel and Dussel and de Sousa Santos (Hall, 2015) to lay out the concepts of both ‘epistemicide’ and ‘knowledge democracy.’ “Just as colonial political practices carved up the globe in the 18th and 19th centuries, knowledge, the intellectual energy by which humans operate became colonized as well. The process of dispossession of other knowledge is a process that Boaventura de Sousa Santos, a Portuguese sociologist, has called epistemicide, or the killing of knowledge systems.” Harkening back to what he refers to as the “four epistemicides of the Long 16th Century,” perpetrated against the Muslims and Jews expelled from Europe, the indigenous inhabitants of the Americas, the Africans taken and sold as slaves and the women persecuted as witches. These sustained acts of violence against communities with specific, unique knowledge practices not only did great harm and injustice to the individuals and cultures in question, but also diminished those practices to the status without epistemic agency, as folklore, magic or voodoo only. Libraries were destroyed, languages were lost, voices and perspectives were silenced and “...modern science ...[was granted] the monopoly of the universal distinction between true and false to the detriment of ... alternative bodies of knowledge.” We may believe that we have rooted colonial thinking out of our literary canons and social histories, but what this progress distracts from is the fact that the fundamentals of our system of distinguishing knowledge from ignorance themselves still bear hallmarks of an unquestioned colonial past. We need only look

at the struggles of colleagues in the creative and performing arts to gain acceptance for their practice-based approach to research to see how the higher education system struggles to expand its concept of epistemic agency.

It is a problem that may seem impact upon all of the humanities. Hall's call for 'Knowledge democracy,' a democracy that could empower not only the knowledge traditions sidelined in the 16th Century, but also provide a place to recognise the real contribution of the study of the arts and humanities, is inspiring, but raises concerns as well. If our interpretation of the results of the initial SPARKLE data can be trusted, then humanities research gains its power from precisely that ability to resist the forces of our current market-driven values system, which equates economic value with intrinsic value. The current trajectory of science policy and university management, however, raises serious questions as to whether we will be able to resist their power. If we are to have a chance, however, we will need not just eloquent champions, but deeply informed ones, and a more solid basis for humanists themselves to speak with confidence of the power of their methods. If the SPARKLE interviews prove anything, it is that we have much to learn from them.

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