

Value, Authority and the Open Society. Some Implications for Digital and Online Archaeology

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Abstract

This paper argues that two major related trends – the now substantial circulation of digital archaeological datasets and the increasing number of ways in which people engage with archaeology via online media – should encourage us to reassess what value we and others wish to place on the past, how we share archaeological information and what kinds of archaeological communities we wish to promote. One useful approach to these questions is via social anthropological theory that addresses valuation, authority and the structuring of inter-personal relationships. Understanding the degree to which these features of social life are, or are not, transformed by new digital communication technologies also helps us to reconceptualise archaeological communication with new priorities and opportunities in mind. This paper explores these ideas further via two case studies involving the sharing of spatial or spatio-temporal knowledge: (a) open data and open source software for spatial analysis, and (b) neogeography and geocaching.

1. Introduction

Conventionally, archaeologists are seen as detectives and analysts, connoisseurs and enthusiasts, or guardians and interpreters of past human culture. These are often complementary but occasionally conflicting roles that have always demanded some pretty deft costume changes, but the altered realities of the modern digital and online world now expose them to renewed scrutiny. This paper argues that two major related trends – the now substantial circulation of digital archaeological datasets and the similarly substantial presence of archaeology online – should prompt us to revisit questions such as what value we and others wish to place on the past, how we share archaeological information and what kinds of archaeological communities we wish to promote. One useful approach to these questions is via bodies of social anthropological theory that addresses valuation, authority and the structuring of inter-personal relationships. Elsewhere, I have argued that archaeologists can benefit from paying greater attention to how such concepts operate in different ways in different past societies, but the discussion below focuses on the fact that they also have relevance to public archaeology in the present. The mass uptake of digital technologies in general, and the Internet in particular, have been touted as marking a hugely transformative threshold in which traditional hierarchies are subverted, value systems turned upside down, and social relationships enhanced or degraded, depending on your point of view. Whether or not these claims are strictly true is something worth reconsidering below, but regardless, there clearly remains a pressing need for us to re-conceptualise archaeological communication with new priorities and opportunities in mind. The section that follows therefore begins by theorising about concepts of value and authority,

with particular attention to the relevance of these concepts for archaeological communication, as well as how this relevance is altered by digital technologies and online interaction. The next section then focuses on inter-personal relationships and questions of individual and group agency, particularly in terms of how these are affected by new forms of physically-remote interaction and collaboration. Finally, I will consider two useful case studies involving the sharing of spatial or spatio-temporal knowledge that have important consequences in archaeology: (a) open data and open source software for spatial analysis, and (b) 'neogeography'.

2. Value and Authority

Value is an ambivalent concept that we ascribe both to tangible and intangible things. It is something we sometimes pretend is objective or innate, but which in fact is not, and something that we can promote as either ethically-progressive or ethically-bankrupt. In fact, it is part of a wider moral economy and English terms such as 'value(s)', 'taste', 'free' and 'worth' carry just this kind of semantic flexibility and moral overtone, as do equivalents in several other languages (Simmel 1900; Bourdieu 1994; Graeber 2001; Miller 2008; see also Bevan 2007: 8–18; 2010). Archaeologists grapple with the term value from a variety of different perspectives. We discuss the value ascribed to objects and landscapes in the past and the degree to which: (a) their character can be understood in terms of the impetus of profit, supply, demand, social signalling, etc., (b) they reflect ethno-taxonomies or particular societal norms, and (c) they are transformed by major changes in technical know-how (e.g. from stone to metal tools). Likewise, museum staff and cultural heritage managers in particular are often asked to pronounce on the relative value of an archaeological site (e.g. for management or conservation purposes) or the commercial value of an archaeological object (e.g. in the ethically fraught context of antiquities trading). In the latter world of cultural heritage management and public archaeology, assessments of value in the present sometimes involve declaring, from a position of perceived authority, that X is a priceless cultural relic and worth saving for the nation, regardless of effort and cost. At other times, an assessment of equivalence (we have X number of equivalent artefacts in our collection or know about X number of similar type sites and hence further focus on them is not currently necessary) or alternatively of relative ranking is involved (e.g. this locality is worthy of being a World Heritage Site, while this other one is not). Sometimes we can measure such value in more flexible and market-driven ways (e.g. through visitor numbers, revenue, etc.). The degree to which these different approaches reflect some prevailing ways in which human beings organise their social relationships with one another is returned to in the next section.

In any case, archaeology often retains a strong traditional sense of expert intervention. In the media, our discipline has to some degree always thrived on its ability to usher forward one or more antiquarian gurus who can pronounce definitively on the material and historical value of the past. In a sense its popularity has therefore been under-written by a strong sense of intellectual authority, from Mortimer Wheeler's appearances on *Animal, Vegetable, Mineral* onwards. For the public at large, antiquarian connoisseurship (authority-over-old-objects) is the archaeologist's superpower but also often a way for socially

aspiring groups to express perceived refinement and social taste, to make claims to powerful lineage or indeed to assert a kind of moral superiority. Furthermore, authority in general (i.e. rarefied responsibility, knowledge and/or power over something or someone), like value, is a powerful but ambivalent term. It possesses an ultimately nebulous and fleeting quality despite society's best efforts to institutionalise it, and is typically something that people both love and hate in equal measure. Individuals claim such authority in a variety of curious ways, via big hats, impressive certificates, fancy badges, appropriate dress, choreographed coronations, etc., and groups have equally innovative authority signalling mechanisms (imposing architecture, ranked uniforms, official affiliation networks, branded product marks, etc.).

Of particular interest for the discussion below is the way in which value and authority are affected by the kinds of mass interaction and mass collaborative creations that are made possible by the Internet. For example, there have been real teething problems associated with how we express value in this brave new online world. The combination of rapidly developing, low-cost, freely shared or illegally pirated creative outputs (including data), have been very unsettling for existing value regimes. For different kinds of commercial venture, the challenge has been how to develop a viable long-term business model, for which a range of advertising-led, pay-for-content, pay-for-service, 'freemium', 'Street Performer Protocols' and/or personal data harvesting strategies have been advanced (Anderson 2009a, and for the ensuing debate Gladwell 2009, Anderson 2009b; see also Kelsey and Schneier 1998). For those less interested in, or sometimes just delaying, the goal of commercial profit (e.g. public sector institutions, charities, academics), the challenge of measuring the relative value or impact of their digital and online efforts (e.g. blogging, web pages, data archives, etc.) versus more traditional outputs has been addressed by adopting specialised digital metrics based on 'nano-endorsements' such as hit counters, hyperlink networks, click-throughs, cloud-sourced reviews, shares, likes, re-tweets and citation indices (Morozov 2011: 99, see also Richardson, this volume; Zimmer, this volume).

Signalling and agreeing on what constitutes authority in an online and data-centric world has raised some interesting challenges and equally innovative solutions. Traditional ideas of authority often evoke a sense of near-blind trust whether this is with regard to secular power, economic decision-making or sources of information (e.g. Divine Right of Kings, the Bank of England, the Oxford English Dictionary, etc.). Authoritative brands of information in particular often drew their traditional strength from a perceived longevity of use (e.g. Encyclopaedia Britannica), but this is now sometimes undermined both by the existence of widely shared digital data and by the structure of human interactions online. Certain equivalent kinds of information loyalty are slowly emerging online, but nonetheless remain harder to pin down given a wider propensity for cloud-sourced knowledge (i.e. information produced by the collaborative offerings and amendments of multiple authors, many of whom are hard to trace as people with trustworthy pedigrees in that particular domain of knowledge). The uncertainty over how best to exploit and be critical about

Wikipedia¹ as an information resource is a good example (e.g. Magnus 2009; also Thornton, this volume). Further ways in which online authority is preserved and conveyed are through user badges, community standards, compliance certificates and institutionally-explicit URLs.

Digital data offerings (e.g. spreadsheets, databases, spatial coordinates, photo archives, video) also suffer from similar problems of authority. For example, there is not always as clear-cut an end product and various versions can happily circulate for long periods – in theory the latest one is often supposed to be the most authoritative, but the experience is often unsettling for those who are used to the physically-imposed and hence transparent versioning of hard copy publication. Second, even when there is a clear-cut final digital dataset, the latter can thereafter be transformed and used in a wildly imaginative set of new ways, with the original producer potentially having very little control over the results. For some this is a freeing experience and immensely creative if properly enabled (e.g. by appropriate metadata, proper open licensing and transparent primary publication), but for others it is a fear- and legislation- inducing problem.

What relevance do these insights have for archaeology? As mentioned above, the authoritative pronouncements of an expert are often something we expect as part of outreach in archaeology. Indeed, they are also built into our recording systems and our academic publication structure. While we might use new media to break these hierarchies down, from the trowel's edge onwards (Hodder 1997), there will probably always remain a creative tension, as our efforts at multilateral engagement can only ever be piecemeal and, if we are honest, often conceal a desire to retain some control over the final consensus or narrative. The next section comes back to how we might approach such issues with regard to digital archaeological data and archaeological communication online.

¹ <http://www.wikipedia.org/>, last accessed 02.09.11.



Suppose information doesn't want to be free?
Suppose what information really wants is to be meted out
in tiny, controlled doses at an outrageously high price?

Figure 1. A Noise to Signal cartoon (riffing on Stewart Brand's well-known aphorism 'information wants to be free') that nicely captures the fraught relationship between value, authority, information flow and the structure of social relationships (with the kind permission of Rob Cottingham, <http://robcottingham.ca/cartoon> [last accessed 02.09.11]).

3. Agency and Social Relationships

All of these issues to do with value and authority reflect the wider social context of human relationships both online and offline. The simple challenge behind any relationship involving two or more people is how to establish some predictable ground rules for how to behave in a given social situation. People use a wide range of contingent cultural cues – involving objects, dress, language, spoken inflection, spatial and temporal context – to make sure everyone can coordinate their behaviour appropriately. When these cues fail and people's behavioural rules and relational expectations conflict, they become offended and/or are disapproving (see also Appadurai 1986: 14–16; Kopytoff 1986; McGraw and Tetlock 2005; Pinker et al. 2008; Tuk et al. 2009). So, for instance, the monetising of objects originally acquired as significant personal gifts involves actions and actors that often frowned upon (e.g. pawning a wedding ring or a family heirloom). When such an act does occur, it is at best assumed to be personally traumatic for the seller or at worst greeted with outrage. This takes us back to the semantic flexibility of words such as value(s), taste, free and worth that convey a subtle combination of economic, social and moral messages.

The different conceptual models which people use to coordinate their interpersonal relationships has been the subject of anthropological enquiry for over a hundred years at least (e.g. see some of the classifications advanced by Douglas, Mauss, Piaget, Ricoeur, Sahlins, and Weber amongst others: Whitehead 1993:

11–12). In particular, Alan Fiske's suggestion (1991; 2004) of four main structuring models for human relationships is a useful starting point for thinking about archaeologists' interactions with each and with the wider public. Depending on the context, people can agree to interact via: a) undifferentiated relationships of inclusion or exclusion (what Fiske terms 'communal sharing'), b) ordered relationships of unequal status ('authority ranking'), c) peer-to-peer relationships ('equality matching'), or d) certain very flexible kinds of metrical relationship ('market pricing'). Different kinds of human communities clearly prioritise these in different ways and give them culturally-relative shapes, but there are good reasons to think that they also reflect some innate human proclivities (e.g. Haslam 2004).

It is fair to say that prevailing wisdom (and some of the commentary in the previous section) sees the Internet as an environment that heavily promotes relationships coordinated via the first of these four social logics ('community sharing'), sometimes at the expense of relationships that were previously modelled via the other three. Web-based technologies (collaborative information, search engines, blogs, social networking, discussion groups, etc.) are often seen through a very cyber-utopian lens (Morozov 2011: xiii), as things that promote democracy of action, subvert traditional hierarchies, undermine existing commercial regimes and encourage new virtual tribes (see also the next section). A useful question however to raise in passing is whether all of this represents a truly different configuration of social relations or has simply been an unusually free-spirited pioneer episode, prior to the re-establishment (or dissembling the continuing operation) of a wider set of traditional social mores (see especially Barbrook 1998; O'Neil 2009, Lanier 2010)?

In answer to the above question, it is first worth re-emphasising that there undoubtedly are certain technological features of the Internet as we have it today that promote acts of sharing and broadly egalitarian interaction. One is the very low costs and largely unrestricted character of online information flow, at least in western countries. Related to this is also the massive reduction of many of the traditional tyrannies of geographical distance, at least for certain individuals in certain favoured social and economic contexts (e.g. Castells 2000). Another is the fact that online interaction, as currently configured, can easily dissolve or disrupt traditional, physically-embodied forms of human agency in favour of new or different online forms. Not only are there instances of character impersonation (with both positive and negative consequences), but also of companies tweeting as individuals, individuals fronting as companies and 'communities' without any physical coherence or geographic proximity (e.g. ones of shared experience, endeavour or culture). As ever in cases of surprisingly intense social interaction and ambivalent identity, the fallback behavioural model is that people often emphasise neighbourliness and the politics of the small village (for a similar choreography of long-distance elite contacts in the Bronze Age Mediterranean, see Bevan 2010: 44-5, with further references). This hyper-local thinking, whether the topic is in fact large or small, is arguably something that archaeology could foster more aggressively.

In any case, of additional relevance to archaeologists is the increased degree of agency that can adhere to virtual archaeological artefacts online – a picture or 3D model of a decorated pot, can for example, often tell you information about itself, can interact with the online user in a variety of ways, can have a pseudo-physical presence in one or more online worlds, can have a Facebook page, can be tagged and monitored via location-based services, etc. We should see these newly empowered archaeological objects as an enormous opportunity: just as tangible culture in the physical world is often used by people to promote certain views of themselves and cue for certain kinds of relationships with others, so online objects have the potential to do something similar. If we can produce sufficiently attractive online avatars for archaeological objects (or enable others to create their own) then there is no reason that they will not be invoked by the public as part of their online social personas, just as photos, video, page styles, group or campaign memberships and topical experiences already are on sites such as Facebook.²

While the above technological affordances are indeed responsible for the communal sharing ethos pervading many interactions online today, they do not necessarily reflect a hard-wired feature of digital technologies in general or even of the Internet in particular. Digital technologies can, of course, also foster very hierarchical forms of surveillance (e.g. via remote sensing, video, location-based services) as well as very extreme forms of market pricing (e.g. the automated and semi-automated exchanges that make up an increasingly large slice of the commodities trading market). Untrammelled online access still relies on infrastructure that can be controlled, with effects that could also promote one or more of the other relational logics discussed above. Likewise, it is clear that a more diverse range of social relational models *are* emerging online or have been there all along but have gone little-noticed (see the excellent, O’Neil 2009). Certain online relationships require careful tit-for-tat and/or reciprocal (‘equivalence matching’) behaviours to build trust (e.g. Steinmueller 2005). People gain ranked forms of status over one another in all sorts of ways online: for example they can receive extra permissions, earn user badges, become the ‘mayor’ or ‘sheriff’ of a physical location in a virtual space, if they are popular among other users, flag/moderate inappropriate comments in a list, visit a location regularly, or buy premium levels of functionality. All of these lead to a sharper hierarchy of users, on top of the fact that there already exists a geographically and economically skewed hierarchy due to different speeds of, and limitations on, Internet access worldwide. Rightly or wrongly, ‘sharing’ is a concept whose social boundaries online are also now being redefined legally, with strong calls in some quarters for greater restriction (e.g. via digital rights/restrictions management; e.g. Stallman 2010 for a strongly opposed position). As the range of business models for the monetisation of online spaces and products has developed, various forms of market led transactional relationship have also become more common, and virtual worlds such as Second Life³, if anything, have been more rather than less commercial in ethos. It is thus

² <http://facebook.com/>, last accessed 02.09.11.

³ <http://www.secondlife.com/>, last accessed 02.09.11.

highly likely that the same sense of outrage about mis-communicated relational intentions will also become an ever more common feature of online life.

The relevance of these sociological insights for archaeology should hopefully become clearer still in the case studies below, but a general point to make at this stage is that it would be short-sighted to assume that archaeological communication online will grapple with anything less than the full suite of relationships and agendas. The value and authority of archaeological data in digital form or of online archaeological outreach initiatives is something to be argued over just as it is in real life, and the key is an explicit understanding of the kinds of academic and public cooperation (in short, the kind of social relationships) that we might wish to foster.

4. Open Communities, Open Data and Open Source

With these broader issues of value, authority and social relationships in mind, it is worth having a look at the first of two case studies that consider some spatial or spatio-temporal resources that are increasingly relevant to archaeologists. At the moment, there is a huge emphasis on 'openness' in various areas of public and private life, engendered in part by the community sharing norms that currently prevail online. Hence we can talk about initiatives that promote 'open societies' (e.g. fostering democracy and greater communication) or open access (e.g. to academic publications in archaeology, see Carver 2007), open software and data exchange, etc. In particular, I want to focus here on a two sub-themes of the open digital society and archaeology's role in it: a) a growing emphasis on the dissemination of digital datasets under very liberal use licenses, and b) the sharply increasing importance of software distributed under similarly generous licensing and for which the source code is visible to, and modifiable by, everyone.

In academic archaeology, as in many other disciplines, it is fair to say that the publication of 'data' remains the afterthought and the very poor cousin of more discursive publications, despite the clear interpretative and design input involved in generating the former (i.e. 'raw data' is usually a misleading term). This situation is, I would argue, very likely to change to a more balanced emphasis in the near future (see Hole, this volume). At any rate, open archaeological data can be thought of as part of a wider realm of well-documented and largely unrestricted knowledge ('from sonnets to statistics, genes to geodata' as one major advocacy group styles it⁴), and there is by now a substantial move towards making archaeological data freely available in this manner, and several initiatives to promote good practice.⁵ One particular driver for open data in general is the growing assertion of a citizen's democratic right to access, re-use and re-distribute digital data collected partly or wholly with public tax money. Hence government bodies increasingly now release spatial (and other) datasets free of charge and with very limited use restrictions, while academic funding bodies often insist on a clear plan for digital archiving in a suitable repository. Making data available under Creative Commons⁶ or Open

⁴ <http://okfn.org/>, last accessed 02.09.11.

⁵ e.g. The Open Knowledge Foundation Archaeology Working Group, <http://archaeology.okfn.org/>, last accessed 02.09.11.

⁶ <http://creativecommons.org/>, last accessed 02.09.11.

Data Commons⁷ licenses (that offer a range of generous options for onward use, often stipulate no restrictions, or only the requirement of proper attribution) is now very popular as is the use of a range of international, national and subject-specific data archives (e.g. the UK Archaeology Data Service;⁸ also Kansa and Kansa 2011; Richards et al. 2011).

Moral and practical arguments about property underpin most perspectives on data dissemination and the debate is often ideologically framed in the context of resource rights, and particularly the idea of resources held by everyone versus those controlled by a few. The historical and archaeological point of reference is typically the shift from 'commons' land to enclosed land in Medieval England and one frequently-invoked morality tale is that of the 'tragedy of the commons' in which individuals acting in their own self-interest gradually exhaust a finite shared resource, even when it might be in everyone's longer-term interest to husband it more carefully. Open data, access and software initiatives emphasise the continuing value of resources held in common (and hence are in step with other concerns about shared resources such as those associated with the global environment), and seek to develop communities whose ethos, amongst other things, avoids or manages tragedy-of-the-commons situations. One important point is that data is for all intents and purposes an infinite resource and hence not something whose sharing poses the same risks as a plot of land. It is useful to also think of a tragedy of the anti-commons (Heller 1998), where notions of private ownership over a resource are dominant, but where these individual rights of use are so disaggregated into a host of small permissions that they are inadequate on their own to facilitate practical use of a resource (e.g. due to an over-proliferation of licensing restrictions) and stifle all forms of coordination (see also Yakowitz 2011).

Archaeology is a discipline that produces substantial amounts of data with a very clear spatio-temporal quality (i.e. typically with dates of production, deposition, and/or recovery, as well as locations). While the particular qualities of temporal data in archaeology offer their own important academic challenges (Crema et al. 2010), it is the spatial aspect of these datasets that pose the most challenging problems for those who espouse (as I do) a very open approach to dissemination. One of the well-known fears of complete sharing of georeferenced archaeological datasets is that they will promote some kind of spatially-enhanced looting (e.g. Ur 2006: 37-8; Parcak 2009: 224).⁹ This gets especially tricky of course when our open data efforts cross modern political borders: consider for example, the now regular practice of international research projects publishing fairly high resolution mappings of archaeological sites in a different country. The unrestricted publication of the project's digital results and the retention of the physical archaeology in-country goes some way to addressing a traditional 'colonial' problem of the expropriation of national heritage. However, a different

⁷ <http://opendatacommons.org/>, last accessed 02.09.11.

⁸ <http://archaeologydataservice.ac.uk/>, last accessed 02.09.11.

⁹ It is ironic that, while there are a whole range of non-spatial datasets such as material science analyses, radiocarbon dates, artefact databases etc., that do not raise any looting concerns over any spatial component, initially these were perhaps more rarely made available under open licenses than spatial datasets.

kind of digital plunder arguably persists if we fail to consult with local heritage authorities about how untrammelled access to spatial data might facilitate forms of accurate looting that they are ill-equipped to counteract. Behind such conundrums is a much older and wider archaeological problem linked to the sociology of property rights: who gets to decide how to restrict or share archaeological information (or indeed artefacts)? Is it done for the good of the individual, the community, the state or the world and what happens when these interests collide?

One sensible interim way to handle the problem is to degrade the spatial locations made available with open datasets (i.e. round-off the precision to, for example, the nearest kilometre), but allow affiliated academics and other vetted users access to full spatial resolution data upon request (e.g. the approach adopted by the UK's Portable Antiquities Scheme¹⁰). While the creation of two- or more tiers of access is not ideal from an information-should-be-free point of view and could conceivably lead to unfortunate kinds of gate-keeping, at least it responds decisively to the issue, rather than using it as an excuse for locking the information away in a cupboard. More broadly, the problem of spatial precision in open archaeological data recapitulates in small-scale, wider privacy and protection debates about holding back certain categories of personal, military, state or diplomatic information from full public disclosure (e.g. the challenge posed by Wikileaks¹¹). What is clearly missing but very necessary for the dissemination of spatial data in archaeology is a careful risk-utility analysis (a good model is recently conducted risk-utility study of how to release data which respects the anonymity of individuals but does not aggregate or blur the data so heavily that it loses all analytical potential; Yakowitz 2011). In fact, the widespread fear amongst archaeologists that greater looting will result from freely available spatial data (i.e. of cases where looters have used the digital data of archaeologists as a superior guide to their looting than local knowledge) is at present a largely theoretical argument in need of further documentation and too often simply invoked as a plausible-sounding reason not to making any data available whatsoever. To reiterate, we may conceivably risk much by making precise archaeological locations widely available, but the magnitude of this risk is at present wholly unknown, and we also stand to lose a great deal by imposing too many spatial restrictions. Furthermore, in many cases, the issue is slowly being taken out of our hands by the fact that site visitors with cameras, hikers with GPS, metal detectorists, locals promoting their community heritage, and the enthusiastic uploads of archaeological fieldwork participants can now contribute fairly precise locations of cultural heritage finds and sites to Google Earth, etc.

Another important aspect of open knowledge in a computing environment is the right not only to use computer software without a fee, but also to inspect the source code from which it was built, alter such code and pass on in either modified or unmodified versions without any licensing restrictions. Under various names, open source software has been popular amongst certain groups of computer scientists for a long time, but has only become better known

¹⁰ <http://finds.org.uk/>, last accessed 02.09.11.

¹¹ <http://wikileaks.org/>, last accessed 02.09.11.

amongst the public at large over the last decade or so. In fact, arguments about the semantics of the term itself evoke just the same moral and practical ambiguity discussed above: the software has been called 'Free', 'Open Source' or 'Free/Libre and Open Source' (with acronyms such as FOSS, FLOSS, F/LOSS): one characterisation of such software is that is akin to 'free speech' not 'free beer' (i.e. a basic right rather than a giveaway; e.g. Stallman 2009; also Berry 2008). Open source software explicitly contrasts itself with closed source and/or proprietary software, in terms of its code development, testing procedures and dissemination practices (e.g. Raymond 1998). Two major bugbears for those promoting open source software are the 'black boxes' produced by commercial closed source alternatives (where the exact working software algorithms are not visible to the end-user) and 'vendor lock-in' practices (where it becomes difficult for users to switch to other software once they have bought into one company's solution, e.g. by promotional licenses, proprietary formats, etc.)

The peculiar collaborative communities behind open source software are arguably part of the broader set of digital sharing economies mentioned above (what von Hippel 2005 calls a 'free revealing' strategy). Overall, open source projects have been variously likened to a gift and homesteading economies (Raymond 1998: 65-111; albeit unlike the Maussian reciprocal gifting familiar to many anthropologists), guild systems (Coleman 2001), 'cooking pot' economics (Ghosh 1998) or a kinship system (Zeitlyn 2003). Regardless of these distinctions, the normative view is they are or should be largely volunteerist, meritocratic and driven by reputation-based competition, community-minded but sometimes tribal, democratic but with a strong sense of mentoring relationships and intellectual lineage (see also Berdou 2011). Most projects therefore fall very comfortably into Fiske's model of 'community sharing' (see above). People who relate to one another in this general way often emphasise membership of a carefully defined in-group (e.g. the family or the small village providing a common metaphor for the way these relations are framed). Members of the community are often prepared to perform altruistic acts and possessions may often be shared at need without any perceived accounting, specific taboo behaviours are sometimes present that reinforce group cohesion, and ostracism is a common mechanism for dealing with conflict situations.

While the above description is both the ideal- and the stereotype of open source communities, real projects are often more complicated and increasingly so (see O'Neil 2009: 93-168). First of all there is usually a clear hierarchy of decision makers (with lead developers, other developers, code testers, translators, users, etc.). Second, certain groups have so far been underrepresented in open source projects: for example, several studies have suggested that an unusually small fraction of participants are female, particularly amongst the actual programmers (and fewer proportionally, it seems, than female in commercial programming roles: Nafus et al. 2006). Likewise, there are, in fact, a variety of F/LOSS forms, including some initiatives that are promoted and largely developed within corporations, and others primarily driven by non-commercial cooperatives. While these two spheres can produce quite different authority structures and exchange mechanisms, they lead to examples of hybridisation in either direction (Söderberg 2008: 137-55; Berdou 2011). There have also been efforts to

incentivise open source development via either money offered by companies for the best solution to one of their problems (e.g. the GNOME Bounty Hunt, which led to discontent within that particular community over the way workflows were being distorted: Berdou 2011: 61-66) or sponsored mass coding initiatives (e.g. Google Summer of Code¹²).

The above should make clear that open source software communities are more complicated in practice than they initially seem. Yet the opportunity presented by open source remains hugely important for archaeology. Currently, while there are archaeological contributors to a range of major open source projects (e.g. GRASS,¹³ gvSIG-CE,¹⁴ R, RePast¹⁵), the vast majority of archaeological practitioners use commercial software (for the GIS preferences of UK sites and monuments records, see Bevan and Bell 2004), which means that it has comparatively difficult for them to tailor methods to explicitly archaeological research questions (for a discussion of this issue, see Lake et al. 1998) or use more advanced techniques in poorly-resourced countries without major institutional support to cover licensing. Put simply, archaeology is a niche market. If we considered a hypothetical frequency distribution of spatial software users by their net financial outlay on licences, archaeologists would be very much on the 'long tail' of very small-scale consumers (for the latter concept in Internet-enabled economics, see Anderson 2006). We therefore need to engage with open source solutions as much as possible, as the code availability and development structures of such projects are far better suited to (occasionally) fostering the specific scientific needs of our discipline.

5. Place, Reinvented and Recolonised

The second case study considered here addresses the implications for archaeologists of a different, looser kind of openness, which has been promoted by the cloud-sourcing of geographic knowledge and the geo-social networking of modern online individuals. The former practice is often now called 'neogeography' and refers to various kinds of locational information created by individuals or communities who are typically neither paid for it, nor experts. It is an approach to mapping and publishing rich location-based content that is very much enabled by so-called Web 2.0 technologies and has taken an especially dramatic turn with the emergence of virtual globes or earth viewers (e.g. Google Earth,¹⁶ Nasa Worldwind¹⁷) over the last seven years or so. More generally, there has been a flurry of 'geotagging' (giving locational information datasets such as digital photographs or video that is otherwise not map-like in character) and 'georeferencing' (situating a map or aerial photo in correct absolute 2D space), as well as the emergence of a host of other automated or semi-automated ways in which geographic information is captured and made available online.

¹² <http://code.google.com/soc/>, last accessed 02.09.11.

¹³ <http://grass.osgeo.org/>, last accessed 02.09.11.

¹⁴ <http://gvSIGce.sourceforge.net/>, last accessed 02.09.11.

¹⁵ <http://repastr.sourceforge.net/>, last accessed 02.09.11.

¹⁶ <http://earth.google.co.uk/>, last accessed 02.09.11.

¹⁷ <http://worldwind.arc.nasa.gov/>, last accessed 02.09.11.

Neogeography, as Michael Goodchild points out (2009: 82), implies a quite different way of learning about spatial phenomena and promotes a kind of citizen science in which simple to moderately specialised recording and observation (counting, coarse-scale georeferencing, etc.) can be contributed by individuals without formal training. In some ways, neogeography poses a challenge to the traditional one-to-many, 'authoritative' outputs of the professional cartographer and is thus another example of an emancipatory, community-sharing ethos online. However, in other ways, it is merely part of a more widely diminishing distinction between the producer and consumer of goods (in this case, of maps) in present-day commerce and capitalism (Thrift 2006). For archaeologists, Google Earth dramatically lowers the costs of landscape research design and rapid public engagement, but it also is becoming a way of producing quick and easy coordinate data on the location of archaeological sites. In fact, the latter is a highly problematic practice, not because of the 10-30m absolute positional inaccuracies often present in even the higher resolution imagery, but because these base datasets remain under strict copyright, as do the polygons and placemarks produced by users from them.¹⁸ The onward use of such spatial data, outside of the original software and for commercial or academic purposes, may often be hard to identify (and thus likely to continue), but it is still technically in breach of current copyright law. This is also a relational faux pas, between the happily egalitarian consumer and various rights-aware producer, that is unfortunately just waiting for its day in court.

In any case, a related example of new location-based activity with which archaeology will need to engage enthusiastically but carefully in the future is geocaching (e.g. in archaeology and museums: Gray 2008; Witcher 2010). Geocachers use GPS to record the location of small boxes of items that they have placed somewhere out there in the physical world. They then upload the resulting coordinates of the cache, and allow others to search for and rediscover it via similar methods. Often, the token objects in the cache are taken and replaced by others of equivalent minor value. People log their rediscoveries both in a physical notebook kept with the cache and thereafter also online and an online community develops around both this direct experience and the wider one that often involves an individual, family and/or group on an outdoor hike or day-trip. At the time of writing, one of the main geocaching websites claims that there are 1.5 million active caches and over 5 million registered geocachers worldwide, with 5 million logs of rediscovered caches in the last month alone.¹⁹

At present there is no consistent link between geocaching and archaeology, but the fact that the activity can be described by the above same website as "a high-tech treasure hunting game played throughout the world by adventure seekers"²⁰ nonetheless implies a risk that it will morph into the search and discovery of antiquities as well. For example one recent geocache was located on some Mesolithic timbers on the Thames foreshore in London, with the label

¹⁸ Google Maps/Google Earth APIs Terms of Service 2011, section 10.3.1.
<http://code.google.com/intl/en/apis/maps/terms.html>, last accessed 02.09.11.

¹⁹ <http://www.geocaching.com/>, last accessed 02.09.11.

²⁰ <http://www.geocaching.com/>, last accessed 02.09.11.

'London's Oldest Structure' (GC2MD1B), and interestingly, is now only available to 'premium', paying members of the site. While this is potentially harmless and undoubtedly informative as a destination for visitors, there remains a risk that unregulated visitation, caching and re-caching (whether or not it actually involved excavation of the soil) will be damaging to this kind of fragile archaeological site.

A more positive view is that geocaching also exhibits a very strong turn-taking, reciprocal character that belongs to what Alan Fiske's might term an 'equivalence matching' logic. Such a logic is a generically effective way, in a whole host of social circumstances, to build up trust amongst comparative strangers, and the role of the cache itself, continually replenished by reciprocal gifts, anchors this trust in the physical world. Geocaching also currently has a strong ecologically-aware ethic, so if we can get the formula right, then there are useful ways in which to foster greater archaeological stewardship through such a pastime despite their superficial 'treasure-hunting' association. A recent initiative by the Museum of London involving a 'Captain Kidd' geocache²¹ on the waterfront in London is a step in the right direction, but further projects might to exploit the trust-building structure of such practices to tackle more sensitive archaeological topics that are of importance to professionals, well-informed enthusiasts and the wider public.

In any case, geocaching uses spatial information as a good excuse of an adventurous trip, and its online forums enable discussion before and after the event. At present, it is not however an activity that harnesses location-aware mobile services so remains slightly different from the kinds of activity now involved in 'geo-social networks' (e.g. the act of checking into certain locations via mobile phone, on sites such as FourSquare²²). For some, the latter kind of total surveillance is a gross violation of personal privacy (e.g. Stallman 2010), for others it is a natural extension of the kinds of location-agnostic online socialising that is already so popular. The opportunities for monetising geo-social life online are huge, with possible rewards of greater advertising money, greater investment or simply greater commercial throughput for more visibly popular destinations. Likewise, there are certainly incentives for archaeologists and museums to fine-tune both their non-commercial (e.g. improved conservation and circulation as a result of location aware visitor studies) and money-spinning activities (e.g. better sponsorship tie-ins based on being able to demonstrate the time-space links between visits to museums/sites and to nearby commercial venues).

A final way in which archaeology is increasingly harnessing location-aware services is through 'augmented reality', in which direct or indirect sensory experience of a real environment is enriched by the addition of computer-generated input via a mobile device (e.g. Jeater, this volume).²³ At present, such an approach is still very much in the traditional top-down mould of

²¹ <http://www.museumoflondon.org.uk/Docklands/Whats-on/Events/FeaturedEvents/Geocache.htm>, last accessed 02.09.11.

²² <https://foursquare.com/>, last accessed 02.09.11.

²³ See also <http://www.dead-mens-eyes.org/>, last accessed 02.09.11.

'authoritative' digital reconstructions and other institutionally vetted materials that augment the learning experience of the wider public. While this is undeniably powerful outreach method, there are also clearly opportunities to foster wholly freeform community interactions in AR, reciprocal or turn-taking archaeological reconstructions of the same location (e.g. rival interpretations) and/or various kinds of wholly monetised (or simply impact-tallying) AR venture.

6. Brief Final Thoughts

The above discussion has explored some recent trends in digital, spatial and online archaeology via broader questions of value, authority and sociality. It has sought to provide this wider context in order to debunk ideas that archaeological engagement online will inevitably become wholly egalitarian, even if aspects of this vision remain very attractive. In any case, with its visual and data-rich content, its overlap between the humanities and sciences, and its fundamental need for both expert knowledge and public participation, archaeology is well-placed to offer a very distinctive contribution to the evolution of 'open' and online communities. We gain much however from carefully thinking through the structure of the social relationships that we wish to foster in these arenas.

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