



Tools of Archaeology: Toward an Integrated History of Archaeology

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RESEARCH NOTE

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ABSTRACT

Histories of archaeology have, in the last decade, widened their scope of analysis. As Archaeology is seen as a network of practitioners, practices, ideas, institutions, and other elements, the possibilities for discourses on invisible elements in its historiography are increasingly surfacing. The present article strives toward an integrated History of Archaeology, uniting human and non-human elements. Tools and instruments bridge the gap between both, and will thus be analyzed, from the beginning of the 20th century to the present day (c. 120 years). For this purpose, 17 archaeological fieldwork manuals were selected. The tools and instruments were grouped in several distinct assemblages, reflecting their characteristics and roles during fieldwork. With this empirical data, some considerations on how tools and instruments are used, viewed, and discarded are offered. Ultimately, we will ponder how post-anthropocentric and anthropocentric histories of archaeology can enrich themselves, thus striving to open new research horizons for the discipline.

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Histories of archaeology are often fundamentally distinct from each other, in their objectives, methodologies, contexts, and protagonists. Historiographical accounts of the discipline encompass histories of archaeological thought,¹ histories of research of particular chronological periods² and geographical spaces,³ histories of ideas and concepts,⁴ histories of biographical nature,⁵ histories of practitioners,⁶ histories of publishing,⁷ and even histories of theory and historiography.⁸ This diversity is a testimony to the future directions that the discipline is taking. In this sense, and notwithstanding the notorious increase in literature, there is still room to address some invisibilities that may be brought to light in contemporary discourse. For this purpose, we strive toward an *integrated* History of Archaeology, uniting human and non-human elements. Tools and instruments shall be analyzed within the archaeological discourse. This becomes, thus, an approach to the History of Archaeology through non-human agents.

In any scientific endeavor, tools and instruments are required. The symbiotic relationship established between them forges a metonymic link. In archaeology, trowels, spades, and picks are frequently taken as symbols of the discipline, and, in a broader view of the majority of the media and the public, archaeologists are almost always accompanied by some tools or instruments. An excavation, be it scientific or not, presupposes their usage and several distinct *corpora of techniques* – here seen as an *embodied practice*, bridging the gap between the organic body and the extrasomatic appendage through a *technique du corps*.⁹

Historiographical approaches to tools/instruments rest mostly on general accounts of instruments,¹⁰ scientific instruments,¹¹ and corresponding general chronological studies,¹² such

1 E.g., Glyn Daniel, *Hundred and Fifty Years of Archaeology* (London: Duckworth, 1975); Glyn Daniel, *Towards a History of Archaeology* (London: Thames and Hudson, 1981); Andrew Christenson, *Tracing Archaeology's Past: The Historiography of Archaeology* (Carbondale: Southern Illinois University Press, 1989); Bruce Trigger, *A History of Archaeological Thought* (Cambridge: Cambridge University Press, 1989); Alain Schnapp, *The Discovery of the Past* (London: British Museum, 1996); Jennifer Croissant, "Narrating Archaeology: A Historiography and Notes Toward a Sociology of Archaeological Knowledge", in *It's About Time: A History of Archaeological Dating in North America*, ed. Thomas Nash (Salt Lake City: University of Utah Press, 2000).

2 E.g., Bo Gräslund, *The Birth of Prehistoric Chronology* (Cambridge: Cambridge University Press, 1987); Marc Groenen, *Pour une histoire de la préhistoire: le paléolithique* (Grenoble: Jérôme Millon, 1994); Arturo Ruiz, Alberto Sanchez and Juan Bellon, "The history of Iberian Archaeology: Ane Archaeology for Two Spains," *Antiquity* 76 (2002); Margarita Diaz-Andreu, *A World History of Nineteenth-Century Archaeology: Nationalism, Colonialism, and the Past* (Oxford: Oxford University Press, 2007); Alain Schnapp, "Hacia una historia universal de los anticuarios," *Complutum* 24 no. 2 (2013).

3 E.g., Annette Laming-Empeaire, *Origines de l'archéologie préhistorique en France: des superstitions médiévales à la découverte de l'homme fossile* (Paris: Picard, 1964); Ole Klindt-Jensen, *A History of Scandinavian Archaeology* (London: Thames and Hudson, 1975); Peter Robertshaw, *History of African Archaeology* (London: James Currey, 1990).

4 E.g., Bruce Trigger, "Major Concepts of Archaeology in Historical Perspective," *Man* 3 (1968); Oscar Moro Abadia, "Towards a Definition of Time in Archaeology: French Prehistoric Archaeology (1850–1900)," *Papers from the Institute of Archaeology* 13 (2002); Peter Rowley-Conway, *From Genesis to Prehistory. The Archaeological Three Age System and its Contested Reception in Denmark, Britain and Ireland* (Oxford: Oxford University Press, 2007).

5 E.g., Barbara McNairn, *The Method and Theory of V. Gordon Childe* (Edinburgh: Edinburgh University Press, 1980).

6 E.g., Jefferson Reid, "On the History of Archaeology and Archaeologists," *American Antiquity* 56 (1991); David Fleming, "The Internationalization and Institutionalization of Archaeology, or, How a Rich Man's Pastime Became an International Scientific Discipline, and What Happened Thereafter," *Bulletin of the History of Archaeology* 30, no. 1 (2020).

7 E.g., Geoffrey Anderson Clark, "Quantifying Archaeological Research," *Advances in Archaeological Method and Theory* 5 (1982); Amara Thornton, *Archaeologists in Print* (London: UCL Press, 2018).

8 E.g., Bruce Trigger, "Writing the History of Archaeology: A Survey of Trends," in *Objects and Others: Essays on Museums and Material Culture*, ed. George Stocking (Madison: University of Wisconsin Press, 1985); Tim Murray, "Razones por las que la historia de la arqueología es esencial para la teoría arqueológica," *Complutum* 24 no. 2 (2013).

9 Marcel Mauss, "Techniques of the Body," *Economy and Society* 2 no. 1 (1973[1935]).

10 Albert van Helden and Thomas Hankins, "Introduction: Instruments in the History of Science," *Osiris* 9 (1994).

11 Deborah Warner, "What Is a Scientific Instrument, When Did It Become One, and Why?," *The British Journal for the History of Science* 23, no. 1 (1990); Robert Anderson, James Bennett and William Ryan, eds, *Making Instruments Count: Essays on Historical Scientific Instruments Presented to Gerard L'Estrange Turner* (Aldershot: Variorum, 1993); Allison Morrison-Low, Sara Schechner and Paolo Brenni, *How Scientific Instruments Have Changed Hands* (Leiden: Brill, 2016).

12 E.g., Gerard Turner, *Nineteenth-Century Scientific Instruments* (London: Sotheby Publications, 1983).

as found in, for instance, chemistry,¹³ electrical engineering,¹⁴ meteorology,¹⁵ architecture,¹⁶ and artistic illustration.¹⁷ In this sense, a history of tools and instruments in archaeology enriches the history of archaeology and science, as they, nevertheless, represent a paradox: they possess an implicit, invisible presence in the discourse. Their major appearances often assert their functionality in opposition to others (e.g., a trowel is better used for this task than a spade) and are not viewed individually or within categories. Tools/instruments offer a way not only to analyze archaeological field practices throughout the years, but also to dwell in the mechanisms of transmissions of knowledge between generations of archaeologists that read, learn, and study from field textbooks.

The call for such a take on the History of Archaeology has already been invoked.¹⁸ Henceforth, this paper represents an attempt to decenter the human from the narrative, following closely the aforementioned works. In this light, this research is inserted within symmetrical, new materialism, and posthuman archeological schools of thought placing the object – in this case, the tool – as the story’s main character in archeological practice.¹⁹ Do tools and instruments undergo changes in their usage, roles, and importance in fieldwork? What significance do they hold for the archaeologists who use them? Do their levels of importance fluctuate over time? Lastly, we will summarize how this exercise can enhance the historiography of archaeology, emphasizing its distinct epistemological attributes. In the end, we do not intend to build a historiography of tools in archaeology, but rather, through discursive analysis, to potentiate future diachronic studies of tools in archaeology/historiographical accounts.

METHODOLOGY

To establish a robust empirical basis that will allow us to thoroughly discuss the historiography of archaeological tools and instruments we will analyze their position in field archaeology – through discursive analysis – textbooks and manuals from the beginning of the 20th century until now. More than simply describing any given action to be taken during fieldwork, we seek the direct association between tools, actions, and the desired effects – e.g., trowels allow us to dig deposits carefully: the basis for meticulous stratigraphical analysis.

In this scenario, a vague description of what should be done – e.g., ‘A distinct and more comprehensive recording system will ensure that the precise location of each find is recorded in three dimensions by triangulation and depth measurements.’ – will not count for the present discussion.²⁰

The selected works were chosen for their importance in the discipline’s history – such as with Wheeler’s *Archaeology from the Earth* – and provided a balanced sample throughout the 20th century. Seventeen books were chosen, keeping in mind the diachronic consistency

13 Peter Morris, *From Classical to Modern Chemistry: The Instrumental Revolution* (London: National Museum of Science and Industry, 2001).

14 Robert Friedel, Paul Israel, and Bernard Finn, *Edison’s Electric Light: Biography of an Invention* (New Brunswick: Rutgers University Press, 1987).

15 William Middleton, *Invention of the Meteorological Instruments* (Baltimore: Johns Hopkins Press, 1969).

16 Tom Avermaete and Merlijn Hurx, “The Tools of the Architect: Towards a New Historiography,” *Architectural Histories* 7, no. 1 (2009).

17 Susan Piedmont-Palladino, *Tools of the Imagination: Drawing Tools and Technologies from the Eighteenth Century to the Present* (New York: Princeton Architectural Press, 2006).

18 Bjørnar Olsen, “Material Culture after Text: Re-Membering Things”, *Norwegian Archaeological Review* 36, no. 2 (2003): 100; Christopher Witmore, “On Multiple fields. Between the Material world and Media: Two Cases from the Peloponnesus, Greece,” *Archaeological Dialogues* 11, no. 2 (2004): 159; Bjørnar Olsen, Michael Shanks, Timothy Webmoor and Christopher Witmore, *Archaeology: The Discipline of Things* (Berkeley and Los Angeles: University of California Press, 2012): 49–50, 58, 78; William Rathje, Michael Shanks and Christopher Witmore, eds., *Archaeology in the Making: Conversations Through a Discipline* (London and New York: Routledge, 2013): 98–99.

19 E.g., Olsen et al., *Archaeology*; Witmore, *On Multiple Fields*; Oliver Harris and Craig Cipolla, *Archaeological Theory at the Millennium: Introducing Current Perspectives* (London: Routledge, 2017); Christopher Witmore, “Archaeology and the New Materialisms”, *Journal of Contemporary Archaeology* 1, no. 2(2014); Rachel Crellin and Oliver Harris, “What Difference Does Posthumanism Make?”, *Cambridge Archaeological Journal* 31, no. 3 (2021).

20 Jim Grant, Sam Gorin and Neil Fleming, *The Archaeology Coursebook: An Introduction to Themes, Sites, Methods and Skills* (London: Routledge, 2015 [2001]): 42.

of the sample.²¹ We selected books that provided a diverse range of field practices – based on geography and chronology – and manuals that aimed to teach tool usage in a clear and instructive manner.

In order to organize the vast heterogeneity of tools used in more than a century-long discipline such as archaeology, they will be reduced into common denominators – in this case, *assemblages*. This can be defined as groups of materialities that are held together by a uniting link other than chronology, or, in other words: ‘An assemblage is the coming together of multiple different kinds of things into what we can consider a single whole.’²² Archaeology has used this term in multiple ways,²³ the preceding quote being one of their many applications.²⁴

With this in mind, we envisioned six major assemblages:

- Power Assemblage – concerned with identity, hierarchy, and power dynamics. More than possessing a particular *physical* function, they undoubtedly ascertain any given hierarchical order or identity.
- Telluric Assemblage – the tools that physically engage with the earth.
 - Detail Assemblage – a subgroup of the Telluric Assemblage that deals with tools that require precision and slow movements.
 - Force Assemblage – a subgroup of the Telluric Assemblage that deals with tools that do not necessarily require precision and deal mostly with brute, blunt force.
- Epistemic Assemblage – a group of tools/instruments that allow archaeological knowledge to be created – i.e., reduces the infinite variables of any archaeological endeavor into predefined categories.
- Kinetic Assemblage – tools that deal with movement, facilitating the transportation of equipment or artifacts from one position to another.
- Storage Assemblage – the group of tools used to store and contain archaeological finds in the field.
- Complementary Assemblage – an assemblage composed of useful, yet heterogeneous, tools that aid in the idiosyncrasies of archaeological fieldwork.

Afterward, tools were further reduced into common denominators, being grouped into a *tool-family* – such as the multiple instances of brushes (e.g., *stiff brush*, *hand brush*, and *brush*²⁵) were grouped under *Brushes*, or the group of dentistry instruments, encompassing *wooden toothpick*,²⁶ *dental picks*,²⁷ or *dental probes*.²⁸ We grouped instruments and tools according to their function in the field – if a pencil served as a recording instrument it would fall under that category. Given the heterogeneity of the instruments, these categories were as ample as possible, due to statistical concerns. After the data collection, the analysis grouped every mentioned

21 Flinders Petrie, *Methods and Aims in Archaeology* (London: Macmillan and Co. Limited, 1904); S.P.F., *Manuel de recherches préhistoriques* (Paris: Libraire C. Reinwald/Schleicher Frères, Éditeurs, 1906); Leonard Woolley, *Digging up the Past* (London: Ernest Benn Limited, 1930); I.I.I.C., *Manual on the Technique of Archaeological Excavations* (Paris: International Museums Office, 1940 [1937]); Richard Atkinson, *Field Archaeology* (London: Methuen & Co. Ltd, 1946); Robert Heizer, *A Guide to Field Methods in Archaeology* (Palo Alto: The National Press, 1966 [1949]); Kathleen Kenyon, *Beginning in Archaeology* (London: Phoenix House Ltd, 1956 [1953]); Mortimer Wheeler, *Archaeology from the Earth* (Oxford: The Clarendon Press, 1956); John Coles, *Field Archaeology in Britain* (London: Methuen & Co, Ltd, 1972); Phillip Barker, *Techniques of Archaeological Excavation* (Chipping Norton: Taylor & Francis Group, 2005 [1977]); Andrea Carandini, *Storie dalla terra. Manuale di scavo archeologico* (Torino: Einaudi, 2000 [1991]); MoLAS, *Archaeological Site Manual* (London: Museum of London, 1994); Peter Drewett, *Field Archaeology: An Introduction* (London: UCL Press, 2001 [1999]); Grant, Gorin and Fleming, *The Archaeology Coursebook*; Gavin Lucas, *Archaeological Field Manual* (Reykjavik: Fornleifastofnun Íslands, 2003); Thomas Hester, Harry Shafer and Kenneth Feder, *Field Methods in Archaeology* (Routledge, 2016 [2009]); Heather Burke, Michael Morrison and Claire Smith, *The Archaeologist's Field Handbook* (London: Routledge, 2020).

22 Harris, Cipolla, *Archaeological Theory*, 139.

23 Yannis Hamilakis and Andrew Meirion Jones, “Archaeology and Assemblage,” *Cambridge Archaeological Journal* 27, no. 1 (2017); Ben Jervis, *Assemblage Thought and Archaeology* (London and New York: Routledge, 2019).

24 Many archaeological perspectives stem from a Deleuzian base: see Mark Bonta and John Provetti, *Deleuze and Geophilosophy: A Guide and Glossary* (Edinburgh: Edinburgh University Press, 2006): 54.

25 Barker, *Techniques*, 78.

26 Barker, *Techniques*, 78.

27 Drewett, *Field*, 117.

28 Coles, *Field*, 173.

instrument found within the empirical basis under a category. In total, 346 specific tools and instruments were grouped under 87 categories: Aerial photography, Air pump, Awl, Bags and Sacs, Bar, Basket, Box, Broom, Brush, Bucket, Carpentry tools, Cartography, Chain, Chainsaw, Chemicals, Chisel, Clothing, Crowbar, Dentistry instruments, File, Fork, Gardener's tools, Grinder, Hammer, Hand, Health supplies, Heavy machinery, Hoe, Jack, Knife, Labels, Ladder, Ladle, Lever, Lifter, Lighting, Machete, Machinery, Mattock, Measurement tool, Nail, Navigation tools, Needle, Notebook, Office supplies, Optical instruments, Pan, Paper, Photographic equipment, Pick, Pickaxe, Pincer, Plank, Plastic, Pliers, Provisions, Pump, Rake, Recording instruments, Rope, Saw, Scissor, Scoop, Scratcher, Screwing tools, Scythe, Shovel, Sieve, Sledgehammer, Spade, Spatula, Sponge, Spoon, Spray, Sprayer, Syringe, Tool maintenance, Tray, Trowel, Tube, Turf cutter, Tweezer, Vehicles, Wagon, Wax, and Wheelbarrow.

This allowed for the recognition of additional patterns, proving essential when dealing with large amounts of data,²⁹ which were further articulated with the following elements: quarters, manual title, assemblage, tool name, and whole count, organized in circular dendrograms.

RESULTS

The analysis of the manuals resulted in 494 instances of instruments being mentioned, divided into six different assemblages, and two sub-assemblages (force and detail). Detail was the most abundant (130–26.3%), followed closely by the epistemic assemblage (108–21.9%). Of the remaining assemblages, three account for c. 40% of the sample (complementary: 94–18%; force: 61–12.3%; kinetic: 58–11.7%), and the remaining two for less than 10% (storage: 37–7.5%; power: 6–1.2%).

The results also show that the sample has diachronic consistency, for the number of instances of tools referenced was somewhat stable (1900– 1925: 91–18.4%; 1926– 1950: 74–15%; 1951–1975: 104–21.1%; 1976–2000: 88–17.8%; 2000+: 137–27.7%).

Of the 17 manuals, the references were also somewhat evenly spread out, although some differences can be noted: Hester, Shafer and Feder 2016 [2009]: 72–14.6%; Petrie 1904: 52–10.5%; Coles 1972: 50–10.1%; Drewett 2001 [1999]: 42–8.5%; Wheeler 1956: 42–8.5%; Burke, Morrison and Smith 2020: 40–8.1%; S. P. F. 1906: 39–7.9%; I.I.I.C 1940 [1937]: 35–7.1%; Barker 2005 [1977]: 27–5.5%; Heizer 1966 [1949]: 19–3.8%; Grant, Gorin and Fleming 2008 [2001]: 14–2.8%; Atkinson 1946: 14–2.8%; Kenyon 1956 [1953]: 12–2.4%; Carandini 2000 [1991]: 12–2.4%; Lucas 2003: 11–2.2%; MoLAS 1994: 7–1.4%; Woolley 1930: 6–1.2%.

POWER ASSEMBLAGE

Can a tool used in archaeology convey power? Beyond their functional attributes, a category of assemblage here represented enunciated power relations with their agents. Although scarcely expressed in the analyzed sample, with only two cases – Petrie and Wheeler.³⁰ In the same fashion, few are the tools directly connected to power: knives (2–33.3%), picks (2–33.3%), ropes (1–16.7%), and crowbars (1–16.7%) (Figure 1).

In Petrie, there is a stark distinction between the participants in an excavation, where semantics are paramount: there are workers, groups of men organized according to their physical capacities, and a master, who supplies equipment and supervises the archaeological endeavors.³¹ The birth of an assemblage of power in Petrie happens in two distinct moments:

‘Where anything is found it should be the hands of the master that clear it from the soil; the pick and the knife should be in his hands every day...’³²

29 e.g., Michael Johannesmeyer, Ashish Singhal and Dale Seborg, “Pattern Matching in Historical Data,” *AICHE* 48, no. 9 (2002): 2032–4.

30 Petrie, *Methods*; Wheeler, *Archaeology*.

31 Petrie, *Methods*, 33.

32 Petrie, *Methods*, 6.

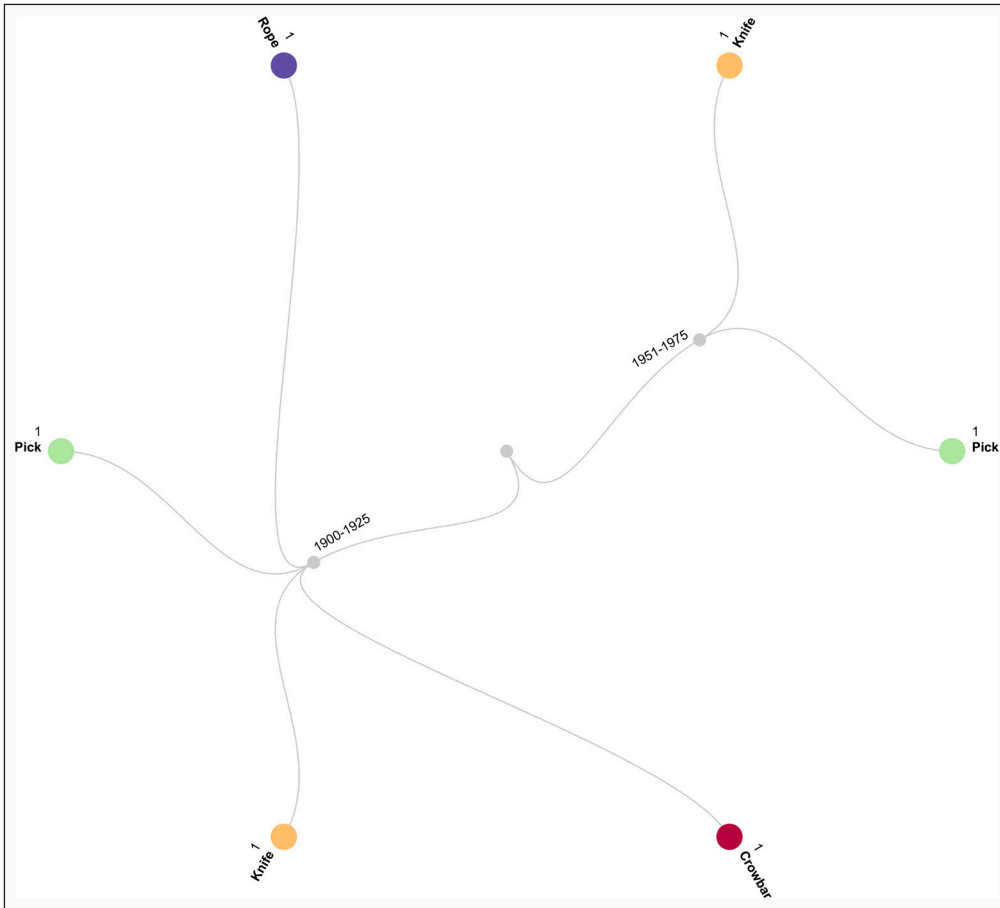


Figure 1 Circular dendrogram of the Power assemblage, organized by quarters.

‘It may be mentioned that the workers are always expected to provide their own picks and baskets in Egypt; while ropes, crowbars, and other tools only occasionally wanted are found by the master.’³³

Here, we observe that some tools are supposed to be provided by the workforce – baskets – while the master is responsible for bringing picks, ropes, crowbars, and his own knife.

It is with Mortimer Wheeler that we find a direct association between a tool – the *supervisor’s knife* – and a status of prestige and power within the hierarchical structure of the excavation (Figure 2).



Figure 2 A set of tools for archaeological fieldwork (Supervisor’s Knife – bottom-right corner). In Mortimer Wheeler, *Archaeology from the Earth* (Oxford: The Clarendon Press, 1956): 57.

'The knife or trowel should accompany the supervisor everywhere, as an indispensable and inseparable instrument. Indeed, it is almost a badge of rank; without it, the supervisor can scarcely begin upon his task.'³⁴

It is impossible to refrain from highlighting the militaristic metaphor, as Wheeler, also knighted in 1952, was a decorated Major in the British Army. But this information is not a mere parable. The supervisor can only truly work with this tool, as his identity and status depend on the capacity to execute tasks.

Moreover, a clear distinction is made when listing the directing staff equipment and the laborer's equipment.³⁵ It is also stated that any supervisor/foreman – or an especially experienced laborer – must also have a '(...) small pick or trenching-tool' with him.³⁶

This assemblage does not allow a thorough diachronic analysis, although it exemplifies fieldwork practices within precise geographies – India and Egypt – clearly inserted in a broader context regarding the history of archaeology. The recruitment of locals, the distinction between master and worker, the maintenance of status, all these points are visible through tools. The apparent absence of relations between both in the other manuals constitutes a clear change, as no more tools can be assuredly correlated with power. If power continued to stem from archaeological tools, it would have been in more nuanced, subtle ways, and thus less perceptible.

TELLURIC ASSEMBLAGES

Detail Assemblage

Some tools/instruments are employed for more minute fieldwork to achieve a degree of detail. The Detail Assemblage can be defined in two main aspects: careful removal of sediment from archaeological artifacts, structures, features, and preparation for a more heedful engagement with said archaeological elements (e.g., preparing for photography). The three most prevalent tools are: brush (23–17.7%), trowel (18–13.8%), and dentistry instruments (10–7.7%). Unlike power assemblages, this subcategory of telluric tools can be viewed diachronically. At the beginning of the 20th century, Petrie delegated a function of cleaning to brushes and precision to knives, as they can scrape sediment from objects.³⁷ In the S.P.F. manual, these aspects are mostly assigned to shovels and hand shovels, advising not to use other tools when an artifact, or structure, is in a position to be unearthed.³⁸ An initial period of homogeneity spans the literature between 1925 and 1950 while the brush becomes the prime instrument used for detail even nowadays (Figure 3). Then, we have spades, shovels, scissors, and air pumps that work in conjunction with it, working as scrapers/cleaners, while in the next quartile the use of dentistry instruments rises. From the 2000s onwards, the reality in the archaeological manuals remains relatively unchanged, while some other tools enter the scene.

Despite the consistency in the meaning of detail in most archaeological manuals, there are some exceptions. Perhaps the most notorious one is the pick. Although generally considered a detail tool (Figure 3), the mid-20th century has the pick's most articulate defenders, such as Wheeler: '(...) the lightness of this instrument makes it particularly sensitive to slight changes of soil or even of sound.'³⁹ Another significant shift is that of the trowel, which since the 1950s onwards has been closely associated with detail. Atkinson refers to it as a delicate tool;⁴⁰ Kenyon only advises its use for a finer excavation,⁴¹ and Carandini, in possibly the most extensive record of how to use archaeological tools effectively, dedicates an extension to the analysis of the trowel's motions and telluric engagement with the stratigraphic units.⁴²

34 Wheeler, *Archaeology*, 154.

35 Wheeler, *Archaeology*, 153.

36 Wheeler, *Archaeology*, 84.

37 Petrie, *Methods*, 47.

38 S.P.F., *Manuel*, 5.

39 Wheeler, *Archaeology*, 155.

40 Atkinson, *Field Archaeology*, 47.

41 Kenyon, *Beginning*, 65.

42 Carandini, *Storie*, 183–184.

Force Assemblages

Contrasting with detail, tools of the Force Assemblage are mostly associated with blunt force – arising from a necessity to dig through compact soil. The three most prevalent tools are: picks (14–22.3%), spades (7–11.5%), and shovels (7–11.5%). Despite some instruments having a place in this assemblage that can be used without damage when properly handled – e.g., the entrenching-tool – the pick is widely considered to be the prime force tool (Figure 4).⁴³ Advice is often given on its usage, as it can cause significant damage to artifacts and structures or to the excavators themselves.⁴⁴ While Coles refers to them as lethal tools, not to be used with violence,⁴⁵ Barker establishes an analogy with blindness, for the pick lacks a sense of vision for detail.⁴⁶

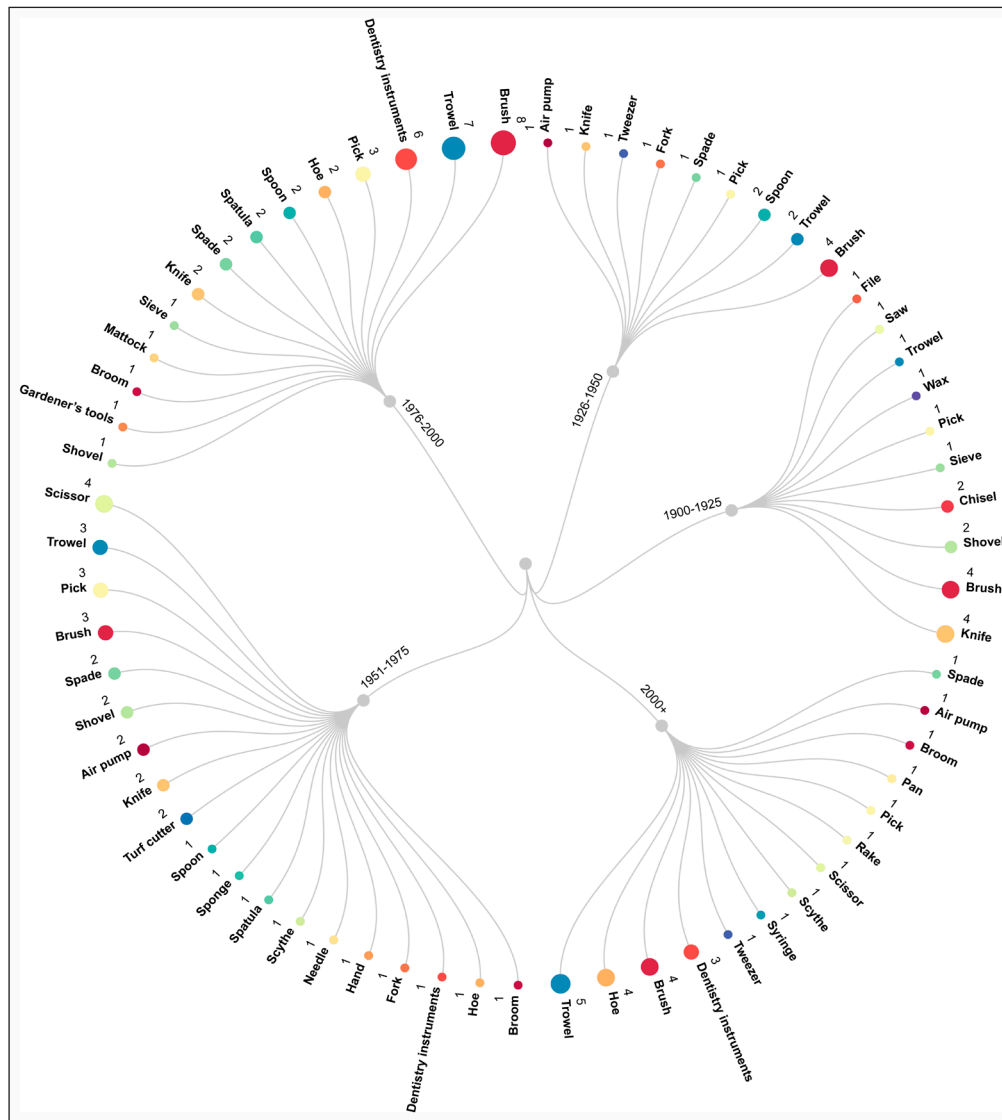


Figure 3 Circular dendrogram of the Detail assemblage, organized by quarters.

Hammers and sledgehammers are worth mentioning as well. In the first decade of the 20th century, they are regarded as powerful tools to chisel or break stones during the excavation,⁴⁷ while in the following decades, despite their initial function, they are only referred to as auxiliary tools for building rails or fences.⁴⁸

43 Woolley, *Digging*, 43.
44 S.P.F., *Manuel*, 6; Heizer, *Guide*, 32.
45 Coles, *Field*, 167.
46 Barker, *Techniques*, 78.
47 Petrie, *Methods*, 112; S.P.F., *Manuel*, 4.
48 I.I.I.C., *Manual*, 118; Hester, Shafer and Feder, *Field*, 72.

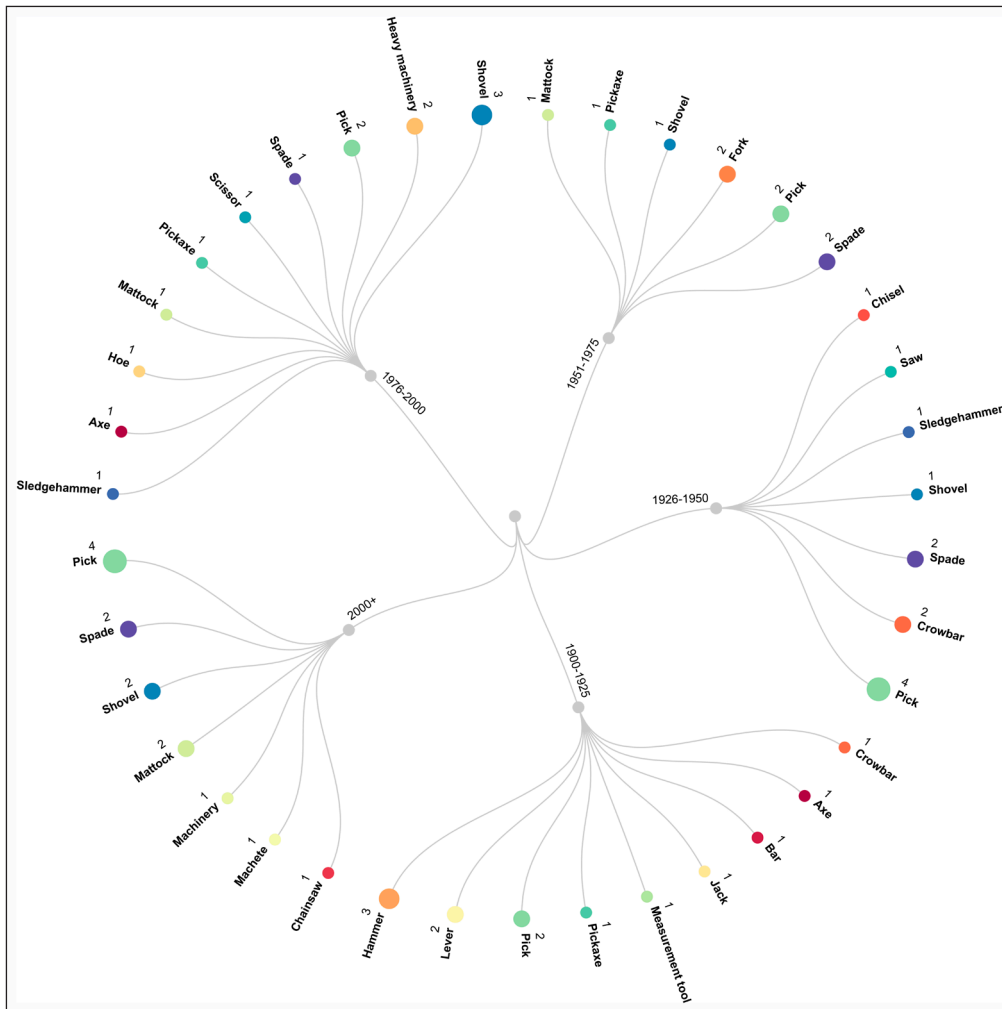


Figure 4 Circular dendrogram of the Force assemblage, organized by quarters.

EPISTEMIC ASSEMBLAGE

Beyond power, detail, and force, some tools/instruments render data into intelligible supports for archaeologists, such as the sieve, which is frequently mentioned during the timespan, primarily for recovering small artifacts (Figure 5). The three most prevalent tools/instruments are: drawing instruments (23–21.3%), recording instruments (15–13.9%), and measurement tools (15–13.9%). However, most tools in this category are not intrinsically related to the materialities themselves, but to their position within a recording system.

The most prevalent example is that of drawing equipment. In Petrie, as one of the main characteristics of the archaeological excavation is to produce ‘...plans and topographical information...’, it is no surprise that these kinds of objects – paper, boards, or compasses – are extensively described.⁴⁹ The I.I.I.C. manual follows the same logic, while adding photographic equipment, now considered to be indispensable, as ‘[t]he work of every archaeological expedition requires the production of a general map of the whole site, maps of the different fields of excavation... and plans of separate structures’,⁵⁰ and thus a great innovation in recording archaeological data, both in speed and accuracy.⁵¹ It is probably not surprising that all these instruments are only used by the directing staff – responsible for drawing and photographing (Figure 6).⁵²

On another note, some tools provide numeric correspondence and establish a logical order for each excavation. For this, using cards and labels is the means to avoid forgetfulness, which will invariably occur, and to provide a safer transport of materialities off the site.⁵³ Surprisingly, the

⁴⁹ Petrie, *Methods*, 33.

⁵⁰ I.I.I.C., *Manual*, 122.

⁵¹ Atkinson, *Field Archaeology*, 148.

⁵² Wheeler, *Archaeology*, 153.

⁵³ S.P.F., *Manual*, 3.

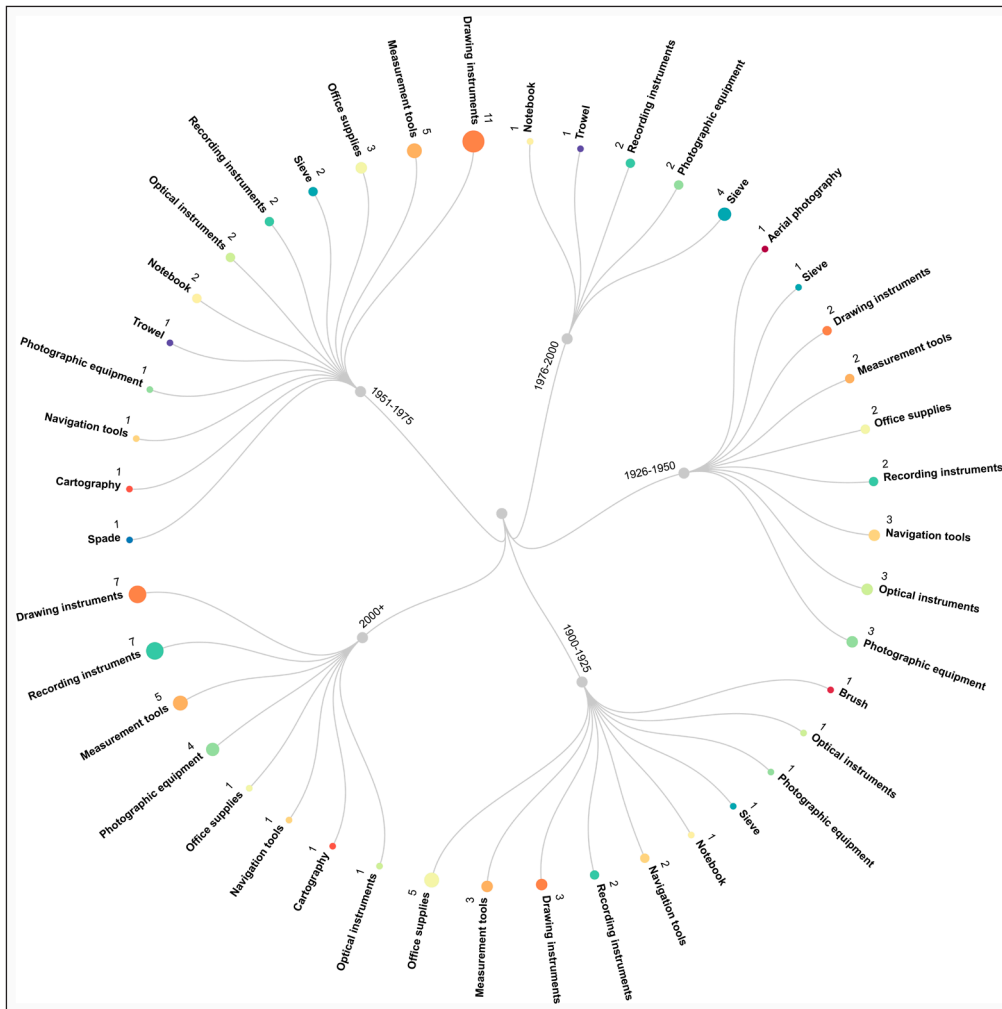


Figure 5 Circular dendrogram of the Epistemic assemblage, organized by quarters.

notebook or field journal, a symbol of archaeological record, is not so often mentioned. Despite its ambivalence in recording information, quotidian tasks, and observations, its importance is often recognized (Figure 7).⁵⁴

It may be advantageous to divide these epistemic tools into two categories: 1) the *data repositories* – e.g., notebooks, journals, and papers; 2) and the *epistemic translators* – e.g., drawing materials and measurement tools. The conjunction of both results in maps, drawings, or schematics: elements that stem from a degree of interpretation. Translators can be tools that are directly related to the telluric side of fieldwork, for *historicity* is better perceived with the trowel:

Clean, sharp angles between the divergent planes of a section, carefully and emphatically cut with a trowel, knife, or edging-tool, are essential if the section is to tell its story with the minimum of confusion.⁵⁵

In Carandini we encounter one of the most thorough descriptions of trowel usage, profusely illustrated with motions and gestures, rendering it as a most ambivalent tool, and thus an optimal epistemic instrument: ‘Lo scavo con la trowel consente una raccolta dei reperti piuttosto completa.’⁵⁶

KINETIC ASSEMBLAGE

An excavation presupposes various degrees of *movement*: soil leaves the site, archaeologists walk among it, and transports arrive and depart. The three most prevalent tools are: shovels (14–24.1%), wheelbarrows (11–19.0%), and buckets (7–12.7%). This kinetic assemblage

⁵⁴ e.g., Barker, *Techniques*, 115.

⁵⁵ Wheeler, *Archaeology*, 174.

⁵⁶ Carandini, *Storie*, 183.

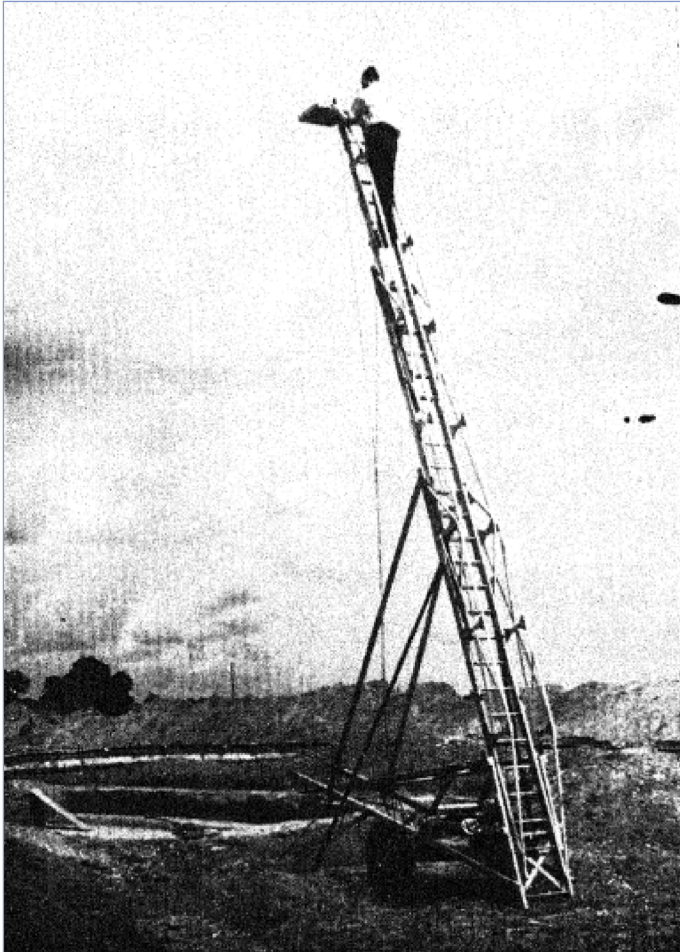


Figure 6 Photographing an archaeological site from above. In Richard Atkinson, *Field Archaeology*. (London: Methuen & Co. Ltd, 1946): 250.

represents all tools that facilitate transportation of artifacts, soil or equipment related to the fieldwork. Two protagonists here are baskets and buckets. Laborers make baskets with local *flora*, common in Near East manuals,⁵⁷ while buckets are produced in metal, rubber, or plastic frames.⁵⁸ However, this is but one of the multiple differences between them. Distance is also



Figure 7 Assessment of daily findings. In Leonard Woolley, *Digging up the Past* (London: Ernest Benn Limited, 1930): 49.

⁵⁷ Petrie, *Methods*, 33.

⁵⁸ Coles, *Field*, 169–170.

a defining factor: baskets are to be used in a work chain where backdirt mounds are farther from the site, normally associated with light railways,⁵⁹ while buckets are deployed in a close to medium range use,⁶⁰ associated with lower amounts of soil removed.⁶¹ Moreover, how bucket laborers are addressed also changes through time, more often than not being associated with a specific sex: be it as ‘boys’,⁶² ‘women’,⁶³ or depreciatingly, where ‘...the basket-men are either the older fools or the young recruits...’ (Figure 8).⁶⁴



Figure 8 Basket-laborers at work. In Leonard Woolley, *Digging up the Past* (London: Ernest Benn Limited, 1930): 44.

Accompanying these tools, we encounter a relatively transversal system consisting of shovels, wheelbarrows, and railways. Shovels represent a way to transport loose soil. The act of shoveling is made for throwing materials into trucks,⁶⁵ mounds,⁶⁶ and wheelbarrows.⁶⁷ For some, it is a movement of precision,⁶⁸ whereas for others it represents a danger to both the archaeologist and the archaeological site.⁶⁹ Wheelbarrows fall greatly in this last category and are a constant since the first instances of fieldwork.⁷⁰

59 Woolley, *Digging*, 43; I.I.I.C., *Manual*, 113.

60 Atkinson, *Field Archaeology*, 43.

61 Lucas, *Archaeological*, 7; Barker, *Techniques*, 77.

62 Petrie, *Methods*, 33.

63 I.I.I.C., *Manual*, 113.

64 Woolley, *Digging*, 43.

65 I.I.I.C., *Manual*, 114.

66 Coles, *Field*, 168.

67 Carandini, *Storie*, 185; Lucas, *Archaeological*, 7.

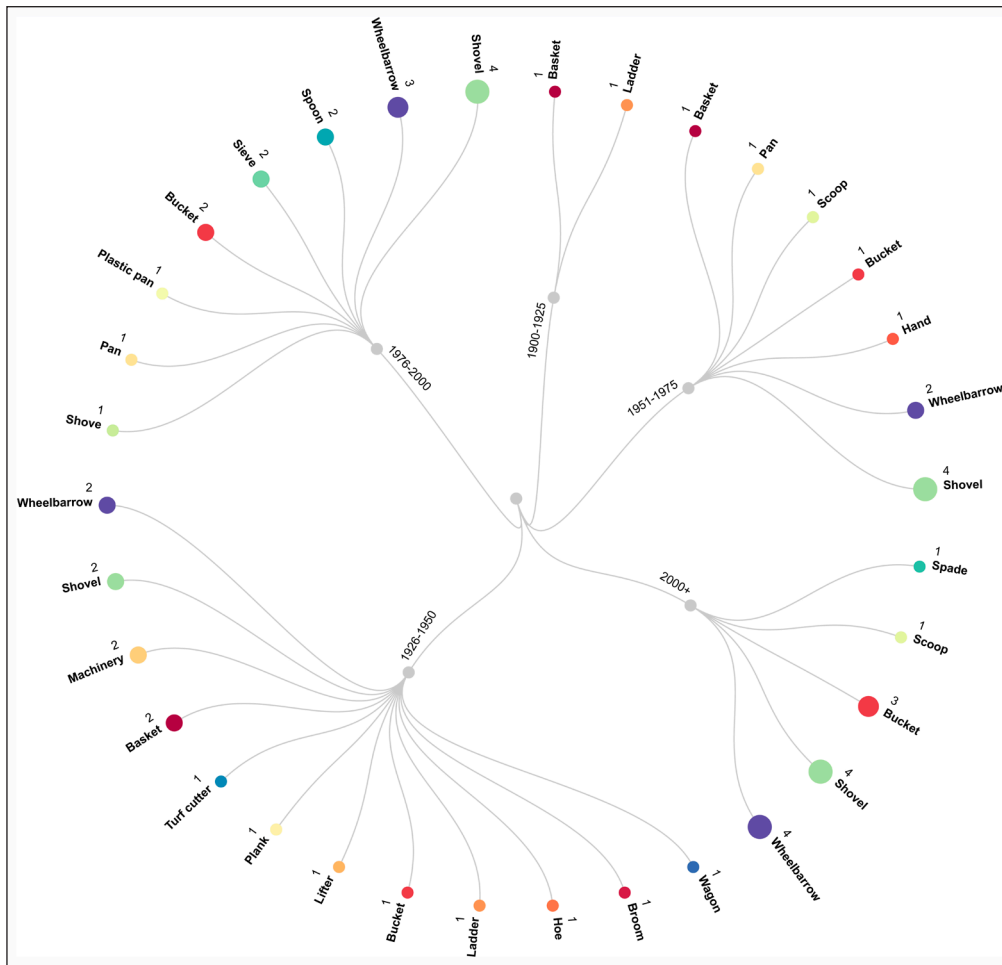
68 Coles, *Field*, 168.

69 Carandini, *Storie*, 180; Lucas, *Archaeological*, 7; Grant, Gorin and Fleming, *The archaeology coursebook*, 42.

70 I.I.I.C., *Manual*, 119.

The use of machinery and vehicles is documented as well. Their use is meant to be carefully employed as their destructive potential is not to be neglected.⁷¹ A wide range of terrestrial and aquatic vehicles is present in the post-2000 literature (Figure 9).⁷²

Figure 9 Circular dendrogram of the Kinetic assemblage, organized by quarters.



STORAGE ASSEMBLAGE

Storage assemblages are designed to accommodate artifacts and other tools, changing over time. The most recognizable instruments are boxes (8–21.6%), bags and sacs (8–21.6%), and screwing tools (3–8.1%). The first are used for packing objects that are found during fieldwork.⁷³ Interestingly, small artifacts are frequently deposited in tobacco-related storage: cigar boxes,⁷⁴ tobacco tins,⁷⁵ and matchboxes.⁷⁶ Advice is provided concerning the use of cardboard as it can crush contents, hence being ultimately replaced by plastic trays in later manuals.⁷⁷ Perhaps the most recognizable element in this assemblage could be the *Sac de campagne*, also known as the Museum (Figure 10), for storing artifacts.⁷⁸

The emergence of plastic was responsible for the demise of a plethora of practical instruments, whose purpose was to build wooden storage boxes at the archaeological site, such as ‘...hammers, saws, chisels, brace and bits, pincers, stout pliers, files, awls, spokeshave,

71 I.I.I.C., *Manual*, 117.

72 Drewett, *Field*, 89; Hester, Shafer and Feder, *Field*, 70.

73 S.P.F., *Manual*, 1.

74 S.P.F., *Manual*, 1.

75 Atkinson, *Field Archaeology*, 44.

76 Heizer, *Guide*, 35.

77 Coles, *Field*, 173; Hester, Shafer and Feder, *Field*, 72.

78 S.P.F., *Manual*, 7.



Figure 10 The *Sac de campagne*. In S.P.F., *Manuel de recherches préhistoriques* (Paris: Librairie C. Reinwald/Schleicher Frères, Éditeurs, 1906); 7.

screw- drivers, screws, wire nails, 1 square, hone-stone (Figure 11).⁷⁹ Cole's manual is possibly the most descriptive account of what storage should be, as it guides the user into taking matters into their own hands:

The standard open box used as a base for planking is made of four boards screwed together to form a rectangular box lacking bottom or top. A cross-member inside the box will prevent wobble. The timber is generally 2 cm thick, and the box measures about 40 cm long, 20 cm wide, and 20 cm high. This provides a working height of about 25 cm above the excavation. A series of interfitting boxes, like a Chinese puzzle, is easier to transport than a set all of the same size.⁸⁰

COMPLEMENTARY ASSEMBLAGE

This final assemblage pertains to the heterogeneous nature of complementary objects. Although they do not fall directly into other categories, some intelligible points can still be made. The most prevalent elements are health supplies (20–21.3%), clothing (19–20.2%), and lighting (6–6.4%). Examples include chemicals, chains, ropes, lighting, brooms, provisions, pumps, sprays, spoons, etc. But what is complementary to some may be inherently obligatory to others. Lighting is such a case, where it is obligatory,⁸¹ whereas in more recent manuals it is but a useful tool for specific tasks.⁸²

Health supplies and clothing are amongst the most representative elements in this assemblage. The first is stressed as being indispensable, where those responsible for the fieldwork must address the construction of a health station.⁸³ The beginning of the 21st century saw health supplies shifting toward being mostly a piece of quality-of-life equipment for tending wounds, the well-being, and the comfort of practitioners (e.g., cream for itches and insect bites) (Figure 12).⁸⁴

The second element relates to appropriate clothing for any given environmental and meteorological condition of the fieldwork.⁸⁵ A fundamental shift can be seen as the result of

79 Petrie, *Methods*, 112.

80 Coles, *Field*, 169.

81 E.g., Petrie, *Methods*; Wheeler, *Archaeology*.

82 Hester, Shafer and Feder, *Field*; Burke, Morrison and Smith, *Archaeologist's*.

83 I.I.I.C., *Manual*, 124.

84 Hester, Shafer and Feder, *Field*, 73; Burke, Morrison and Smith, *Archaeologist's*, 398.

85 Coles, *Field*, 175.

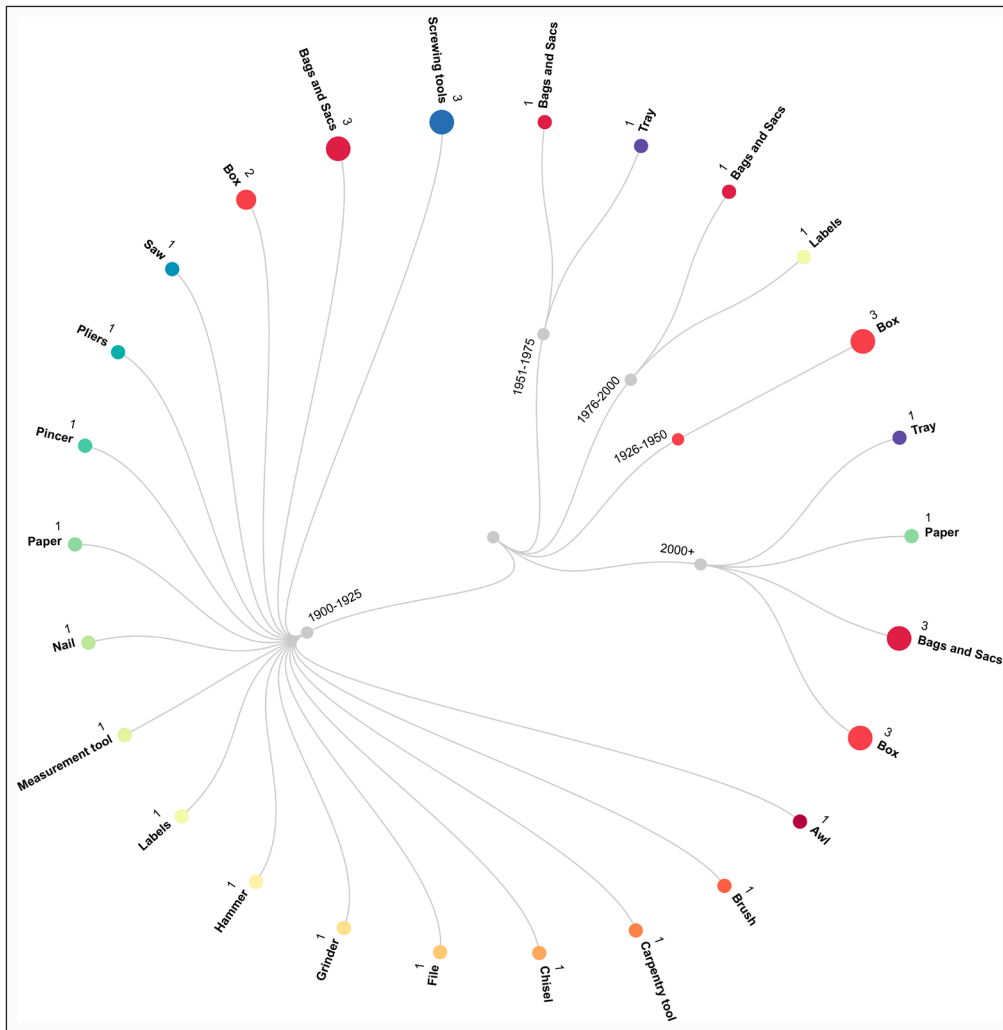


Figure 11 Circular dendrogram of the Storage assemblage, organized by quarters.

the proliferation of commercial archaeology, where an emphasis on protective headgear and boots,⁸⁶ as well as ‘...brightly-coloured (orange) overvest... [and] Steel toe-capped boots’ is given.⁸⁷

DISCUSSION AND FINAL REMARKS: TOWARD AN INTEGRATED HISTORY OF ARCHAEOLOGY

The presence of an Assemblage of Power is a meager one, only truly visible in Petrie’s and Wheeler’s manuals. Nevertheless, the relationship between field workers and supervisors is expressed through tools such as the supervisor’s knife or trowels, and a hierarchical verticality is all too present.

Telluric assemblages can be divided into two different strains: 1) detail – associated with minuteness, with brushes, knives, and picks –, and force – where blunt, brute force is employed, resorting to hammers, pickaxes, and picks, whose ambivalence can only be attributed to shifts in perspective.

Tools can also aid in pursuing knowledge, via their capacity to become repositories – notebooks, journals, and papers – drawing materials and measurement tools – and a conjunction of both, resulting in maps, plans, and illustrations. This process of inscription – where things become materialized as sign, or a document⁸⁸ – is an essential part of archeological fieldwork and its

⁸⁶ Hester, Shafer and Feder, *Field*, 73.

⁸⁷ Drewett, *Field*, 83.

⁸⁸ See Bruno Latour. *Pandora’s Hope: Essays on the Reality of Science Studies* (Cambridge: Harvard University Press, 1999): 306.

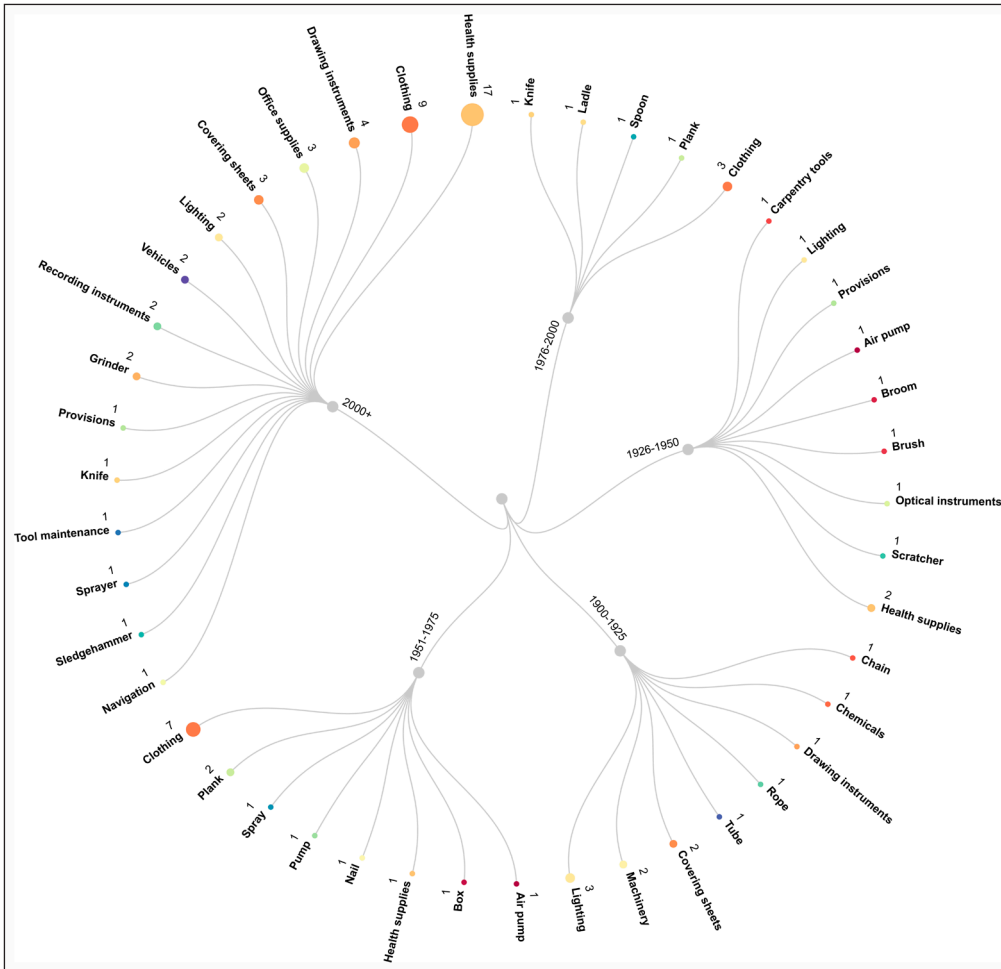


Figure 12 Circular dendrogram of the Complementary assemblage, organized by quarters.

ecology of practices – an assemblage of different practices with a distinct habitat⁸⁹ – that surrounds it.

Tools also help the archaeologist move things, be it soil, artifacts, using a plethora of equipment such as buckets, wheelbarrows, railways, and vehicles. Artifacts are stored in yet other kinds of tools created to protect them from harm – wooden boxes and plastic trays.

Finally, in a heterogeneous group, distinct tools and instruments are seen as complementary, bringing benefits for the archaeological excavation when employed, such as health supplies and appropriate clothing.

Assemblages permit that ambivalence between order and flexibility. If tools change over time and space, both in their physical shape and usage, the relationship between the tool and the user is bound to mutate as well. At present it would be difficult to assert if the pick, as a tool, conveys any sense of power or a higher status in the fieldwork hierarchy, although such was, as shown, part of the tool’s biography. An approach that conjoins object biography and assemblages may give new insights, in this case, for broader histories of archaeology. Tools are not neutral, nor simply props in the theater of excavation: basket-men were a symbiotic category of human and non-human elements; movement is made with tools and not without them; the way we interact with the earth, dirt, and soil depends on our own affinity with the instruments chosen, as well as academic tradition, the geography of the fieldwork, and the peculiarities of the archaeological context.

Some tools became obsolete, while others, fundamental to our practices, have endured the test of time. Some have limited applications, while others, due to their ambivalence, have a broader range of usages. This is only perceptible if tools are given the spotlight, a proper place to be the main characters of their own history: a historiography based on dialogue – between

⁸⁹ See Olsen et al., *Archaeology*; Isabelle Stengers, “Introductory Notes on an Ecology of Practices”, *Cultural Studies Review* 11, no. 1 (2005); Christopher Witmore and Michael Shanks, “Archaeology: an Ecology of Practices” in *Archaeology in the Making: Conversations through a Discipline*, eds. William Rathje, Michael Shanks and Christopher Witmore (London and New York: Routledge, 2013): 398.

archaeologists and tools, and tools and archaeologists. Doing archaeology implies both, and thus archaeological practice becomes “...sociotechnical mixtures or imbroglios; they are heterogeneous assemblages in that they combine radically diverse components...”⁹⁰

Discussing the nature of the sources is also useful to the subject at hand. In the present paper, manuals and textbooks were considered the primary historical documentation, hence forming the backbone of our empirical basis, for they describe tools and their usages. Albeit they proved their usefulness, other types of sources can also provide further insights, namely gray literature (e.g., field reports). In sum, thinking through assemblage theory enables us to write a history of tools that may be complemented with other sources, perspectives, and contexts.

A historiography of tools is also a historiography of technique: a historiography of the collective, bodily practices that take place during archaeological fieldwork. If tools have to be, indeed, both effective and traditional, for ‘[t]here is no technique and no transmission in the absence of tradition,’⁹¹ tools are simultaneously the embodiment of technique, opening a window to the instrumental techniques in archaeology and, because of that, to the ‘...ensemble of techniques of the body,’⁹² for the former requires the latter. Such an inquiry can map out the physical, quasi-cyborg extensions of technique – tools – as well as traditions that permeate archaeology.

They reflect not only an adaptation to an environment, for fieldwork in the deserts of Egypt and in the green pastures of Britain are substantially distinct, but also result from a constant process of knowledge transmission between generations and institutions, whether in an academic setting or not. This sociological adaptation to technique is also part of the construction of order: an imposition of several frameworks that aim at creating a coherent, logical, and scientific background to accommodate archaeological facts.⁹³ Moreover, the evolution of questionnaires and theoretical archaeology fundamentally shape fieldwork procedures and, for this reason, the chosen tools. Different methods require different *techniques du corps*, resulting in different tools and different tool shapes.

Humanities, nowadays, stand at the crossroads between the digital/analogical, a stable climate and a climate crisis, and between the human/non-human. Modernity enshrined the human as the main agent of change in the historical and archaeological discourses, only to be disrupted by the ‘crisis of man’ and the Anthropocene (i.e., the irreparable damages to the environment made by human hand).⁹⁴ All this forces an evaluation of anthropocentrism in the humanities. Verily, more than an infatuation with postmodernism of the first decades of the 21st century, post-anthropocentric agendas have set their tone in philosophy,⁹⁵ archaeology,⁹⁶ or history.⁹⁷

The call of post-anthropocentrism can contribute to new questionnaires to the historiography of archaeology, and frame ‘...the research itself in the context of the emerging paradigm of non-anthropocentric knowledge, or posthumanities’.⁹⁸ In this light, a historiography of tools does not seek to eliminate the human in archaeology, but to enrich further the dimensions encompassed by the discipline. This posthumanist displacement analyzes the complex meshes

90 Olsen et al., *Archaeology*, 71.

91 Mauss, “Techniques,” 75.

92 Mauss, “Techniques,” 76.

93 See Bruno Latour and Steve Woolgar, *Laboratory Life. The Construction of Scientific Facts* (New Jersey: Princeton University Press, (1986 [1979])).

94 Rosi Braidotti, “A Theoretical Framework for the Critical Posthumanities,” *Theory, Culture & Society* 36, no. 6 (2019): 35–38.

95 E.g., Rosi Braidotti, *The Posthuman* (Cambridge: Polity Press, 2013); Rosi Braidotti, “Yes, There Is No Crisis. Working Towards the Posthumanities,” *Journal of Diversity and Gender Studies* 2, no. 1–2 (2015); Braidotti, “Theoretical”.

96 E.g., Rachel Crellin and Oliver Harris, “What Difference Does Posthumanism Make?,” *Cambridge Archaeological Journal* 31, no. 3 (2021); Rachel Crellin, Craig Cipolla, Lindsay Montgomery, Oliver Harris and Sophie Moore, *Archaeological Theory in Dialogue: Situating Relationality, Ontology, Posthumanism and Indigenous paradigms* (London: Routledge, 2021).

97 Ewa Domańska, “Beyond Anthropocentrism in Historical Studies,” *Historiein* 10 (2011); Zoltán Simon, Marek Tamm and Ewa Domańska, “Anthropocenic Historical Knowledge: Promises and Pitfalls,” *Rethinking History* 25, no. 4 (2021).

98 Domańska, “Beyond,” 121.

of humans, non-human animals, and non-organic entities in typical posthuman fashion.⁹⁹ These are the dimensions that a post-anthropocentric approach may contribute to, and tools/instruments are just one of the ways toward an integrated history of archaeology.

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The authors have no competing interests to declare.

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⁹⁹ Andrew Pickering, “The Mangle of Practice: Agency and Emergence in the Sociology of Science,” *The American Journal of Sociology* 99, no. 3 (1999).

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