Enlightenment architectures

The reconstruction of Sir Hans Sloane's cabinets of 'Miscellanies'

Kim Sloan and Julianne Nyhan

Focusing on Sir Hans Sloane's catalogue of 'Miscellanies', now in the British Museum, this paper asks firstly how Sloane described objects and secondly whether the original contents of the cabinets can be reconstructed from his catalogue. Drawing on a sustained, digitally augmented analysis – the first of its kind – of Sloane's catalogues, we respond to these questions and offer an initial analysis of the contents of the cabinets that held the miscellaneous objects at Sloane's manor house in Chelsea. Knowledge of how and why Sloane catalogued this part of his collection has hitherto remained underdeveloped. We argue that his focus on preservation and documentation in his cataloguing did not preclude a research role, but rather was founded on immersive participation. Our work was undertaken as part of a Leverhulme Trust funded research project, Enlightenment Architectures: Sir Hans Sloane's Catalogues of his Collections (2016–19), a collaboration between the British Museum and University College London.

In 2010, a conference titled From Books to Bezoars was held to celebrate the 350th anniversary of the birth of Sir Hans Sloane (1660–1753) and the achievements of the Sloane Printed Books Project at the British Library.[1] The conference brought together an international group of librarians, curators, scientists and university academics from a variety of disciplines, all working on aspects of Sloane's life, career and vast – but now well dispersed – collections. The overriding concern of the delegates was that, apart from the Sloane Printed Books Project itself, a database of Sloane's Jamaican herbarium volumes in the Natural History Museum, and the British Museum collection online facility, almost no printed or digital catalogues of his collections were available to researchers that might help to establish what remained of his collections and where they are now.[2] A small consortium of curators and librarians decided to meet thereafter on a regular basis to see what could be done to enable understanding and access to the foundation collections of the three national institutions concerned.

In 2012 this consortium furthered their Reconstructing Sloane project with Sloane's Treasures, an AHRC-funded series of interdisciplinary workshops held at all three venues, with invited participants from across the museum, library and university sectors.[3] They reached a consensus that identified Sloane's own manuscript catalogues as the fundamental key to unlocking his collection, and the need to prioritize them in any future research project. The original fifty-four catalogues recorded not only how his collection was formed – through direct acquisition and the incorporation of the collections of others – but also how it was stored and cross-referenced, both to itself and to other collections and catalogues.[4] They also reveal the way Sloane and his network of correspondents organized and exchanged scientific and cultural knowledge in order to understand the past and the world around them. In constant use over seventy years during his own lifetime, as well as by curators for two centuries afterwards, these manuscript catalogues had never been fully transcribed let alone studied with digital technologies that are commensurate with their complexity and scale.

The project Enlightenment Architectures: Sir Hans Sloane's Catalogues of his Collections, funded by the Leverhulme Trust, was launched in the autumn of 2016 with research on five catalogues from the three institutions mentioned above.[5] It is one of the first attempts to undertake a digitally intensive analysis of early modern manuscript catalogues of such a collection. This article, which will focus on the 'Miscellanies' catalogue in the British Museum, explores the new knowledge delivered by the project in

doi:10.1093/jhc/fhaa034

response to two questions: how did Sloane describe the objects that are included in his catalogues? and to what extent can the original contents of the cabinets in which Sloane stored his objects be reconstructed from his catalogues? Along with our responses to these questions, and the searchable digitized versions of the five catalogues now available through the Reconstructing Sloane website, in this article we also present a number of research tools derived from our work in the form of downloadable datasets available online; these include a record of eighteenth-century terms for materials and colours, as well as lists of personal names and places that occur within the catalogue – all of which can be used as authority files by other projects examining early modern catalogues.[6] An online Appendix to this article presents an initial tabular summary of the contents of the cabinets – sometimes the contents of the individual drawers or shelves – containing objects from Sloane's collection of 'Miscellaneous Things . . . both Natural and Artificial'. In the course of this paper we also reflect on the differences made by digital treatment, not only with regard to tangible scholarly outputs, but also in terms of process; for example, the kinds of attention and 'defamiliarization' our work has required and the different ways of engaging with Sloane's catalogues that these can prompt.

We begin with a discussion of the Miscellanies catalogue in the British Museum and the meanings ascribed by Sloane and his contemporaries to the term. An overview of the wider research context, in terms of current understandings of the purpose of Sloane's catalogues, and relevant scholarship on the Miscellanies in particular, is provided in order to situate the research questions. This is followed by a discussion of the digital underpinnings of our work. We then explore the two research questions pursued by Enlightenment Architectures, as outlined above – Sloane's use of descriptive terms and a reconstruction of the arrangement of his objects; where appropriate, more detailed discussions are interjected of the digital methods employed during this research. We conclude with a discussion of the new research questions opened up by this work and a reflection on the wider rationale of applying digital tools to early modern archival documents.

Sloane's catalogue of Miscellanies proves particularly rewarding as the focus of this study, given its relations to an especially wide and global network of collectors during the time of Britain's rapidly expanding trade and empire, its close connections with continental *Wunderkammern* and other cabinets of curiosities, the survival of actual objects and their associations with the modern disciplines of ethnography, anthropology, archaeology and comparative religion.

Sources and essential preliminaries

Sloane and his amanuenses prepared some fifty-four catalogues of the vast collection of natural and artificial rarities that formed a 'dazzling spectacle which amazed Sloane's visitors' at his manor house in Chelsea.[7] The necessity – indeed, vital importance – of cataloguing his collections – 'The putting into some kind of Order my Curiosities, numbring them, and entring their Names, and Accounts receiv'd with them, in Books' – was clear to Sloane, not only for their preservation but also their 'Uses'.[8] He considered 'the collection and *accurate arrangement* of these curiosities' to be his 'greatest contribution to the advancement of science'.[9]

Here we focus in particular on the 2,107 catalogue entries on 'Miscellaneous Things'. Sloane himself inscribed the word 'Miscellanies' on the title page and above the first entry for this catalogue, which comprises 152 folios (including 27 versos). It now forms part of a larger volume in the British Museum that contains other Sloane catalogues, including Antiquities, Seals, Pictures, Mathematical Instruments, Agate Handles, Agate Cups and Spoons. Clearly the 'Miscellaneous Things' were seen as forming a distinct category within the *artificialia*. A second volume included Intaglios, Cameos, Annuli and Rings, while a third listed Islamic Amulets.[10]

The list of contents shown in Table 1 was first described by Sloane in his *Natural History of Jamaica*, vol. II (1725), pp. ii–iii, and the same list was used by his executors to account for objects when they were transferred to the museum's first home, Montagu House, in 1753.[11] Along with the ten manuscript catalogues of his 23,000 coins and medals,[12] the eleven catalogues listed above and identified in italics in Table 1 constitute Sloane's collection of artificial (man-made) rarities; their titles provide the categories under which he organized them.

What did Sloane and his contemporaries mean by 'Miscellaneous', 'Miscellanea' or 'Miscellanies'?

Table 1. Catalogues within the volume labelled 'Miscellanea' with the numbers of objects in 1725 (recorded in Sloane's *Natural History of Jamaica*, vol. II) and 1753 (from the list transmitted to his executors); entries in *italics* are the titles as actually inscribed in the volume, with the number of catalogue entries in each catalogue. After A. MacGregor (ed.), *Sir Hans Sloane: Collector, scientist, antiquary* (London, 1994), p. 29.

Miscellaneous Things not comprehended with the foregoing, both Natural and Artificial [*Miscellanies:* 2107]	1169	2098
Things relating to the Customs of ancient Times, or Antiquities, Urns, Instruments, &c. [*Antiquities*: 1129]	302	1125
Large Seals [*Seals*: 268]	81	268
Pictures, many relating to natural History [*Pictures, & drawings in frames* 471, a number struck through, to be left with family]	319	310
Mathematical instruments [*Mathematical instruments*: 57, some post 1753]	54	55
Large Vessels, Handles, and other Things made of Agats, Jaspers, Cornelians, Christals besides many Camei and Seals, excisa, and incisa [*Agate Handles, &c.*: 239; *Agate Cups and Spoons, &c.*: 275] and in separate volumes [*Intaglios*: 232; *Cameos*: 290; *Annuli, rings*: 115; *Islamic amulets*: *c.*50]	441 total *c.*1200	700

Whereas in seventeenth-century *Wunderkammern* the relationships between art and nature played off against one another, as embodied in the objects and in their physical arrangement, the catalogues and inventories of such collections imposed other forms of classification, often by material or type of object. Antiquities, coins and medals preserved the material past, but in the *naturalia* incorporated in medical collections only a thin line existed between *materia medica* and rarities such as unicorn horns, bezoars or quinine bark.[13] Daston and Park have observed that 'The charitable description of this concerted diversity is encyclopedism; the uncharitable description is miscellany. But neither quite fits the variety peculiar to the cabinets of curiosities.'[14] Do the ways in which Sloane catalogued and described the objects in this part of his collection, and the way he organized them in their cabinets, indicate that this aspect of his collection did indeed form a cabinet of curiosities? Were they items that failed to fit into the other categories, or did Sloane mean something else by his use of the word 'Miscellanies' – something that might help us to form an idea of the contents of a catalogue labelled as such?

A search for these words in the British Library's Sloane Printed Books database reveals over 150 books that included some version of the word in their title. Most refer not to catalogues of collections but to a library classification for papers or books, often in sale catalogues (as in 'divinity, history, philosophy and miscellanies – being a curious collection', or 'Bibliotheca miscellanea: or, a collection of curious and valuable books'). The veritable catalogues include Deutsche Akademie der Naturforscher Leopoldina, *Miscellanea curiosa medico-physica academiæ naturæ curiosorum, sive Ephemiridum medico-physicarum germanicarum curiosarum* (Leipzig, 1670), Jacob Spon's *Miscellanea eruditæ antiquitatis: in quibus marmora, statuae, musiva, toreumata, gemmae, numismata . . . etc.* (Leiden, [1679]–1685) and Sir Robert Sibbald's *Miscellanea quædam eruditæ antiquitatis, quæ ad borealem Britanniæ . . . partem pertinent . . .* (Edinburgh, 1710).

In these instances, 'Miscellanea' is used synonymously with 'mixed', especially in descriptions of collections of antiquities, or in other instances in association with *materia medica* to denote curious cases or observations. It is also used in addition to the word 'curiosa', a term that was beginning to denote not only rare and new but also useful or experimental, and in terms of collections to imply a dynamic 'heap' of objects that were not only collected but also diligently selected.[15] But seldom, if ever, does 'Miscellanies' appear, as Sloane used it, entirely by itself to describe a group of objects. Was he creating a new collection category by the use of this term?

In the mid-seventeenth century, Ole Worm (1655, often cited by Sloane in his bibliographical references in the catalogues) did not use the term 'Miscellanies,' dividing instead his section on *Artificialia* according to the materials of which they were made: things made of the earth (earthenware, urns, etc.), marble and alabaster (including statues), metals and minerals (Roman fibulae, armour); these were followed by numismatics,

then things made of glass, plants, wood (instruments, clogs), fruit, animals (skins and horns) and lastly *De variis artificiosis* (Chinese, Japanese and Ethiopian writing, a Lapp drum, *micrographia*, costumes).[16]

Although not labelled as such, there were also sections devoted to miscellaneous material in contemporary catalogues of the Ashmolean, the Royal Society and several private collections, where the groupings tended to reflect the use of the object rather than Worm's organization by materials. The Ashmolean's manuscript catalogue of 'Artificial Works' (*c.*1685) has lost its original title page but at some later point was labelled 'Equipment of war and civil use, and of all kinds of ancient utensils'; certainly, it included the same type of material as Sloane's Miscellanies catalogue. Unlike his catalogue, however, the Ashmolean objects were carefully organized and listed in the following groups: [weapons] shields, muskets, bows, etc.; [habits] caps and crowns, garments and accessories, and *Utensilla varia* from various cultures, baskets, hammocks, stirrups, inkwells, spoons, glasses, pipes; [antiquities] ancient earthenware, wooden and stone objects; and the final category, *Artificiosa varia* [artfully made], which included mosaics, models of the Holy Sepulchre, worked boxes, instruments, fishing spears, models of wrecked ships, iron spurs, figures, a mummy and a palanquin.[17] The descriptions were all in Latin, the use of which Sloane restricted mainly to natural history or medical preparations, but they shared the descriptive method he used to describe objects in his catalogue, only occasionally including measurements, and they included the names of only more recent donors, since the bulk of the collections came from the Tradescant collection or from Elias Ashmole.

Nehemiah Grew's published catalogue of the Royal Society's much smaller collection of *artificialia* (1681) divided it into 'Artificial Matters relating to Chemistry and Parts of Natural Philosophy' (oils, spirits and salts); 'Instruments relating to Natural Philosophy' (air pumps, weather clocks, microscopes, burning glass, model of the eye); 'Things relating to Mathematicks and some Mechanicks' (such as telescopes, models and weapons); 'Chiefly of Mechanicks relating to Trade' (including money, dishes, clothes, ornaments, pictures); and finally 'Coyns'.[18] Grew ensured that not just things strange and rare but also common objects were included and given 'clear and full descriptions'; Michael Hunter considered the descriptions and analysis of the collection 'was erudite and in places innovative in its classification and interpretation of objects'.[19] The text is all in English and employs capital letters for the object type and italics for the material, source country and name of the source person or donor, making it visually easy to skim the entries for these types of information. Sloane does something similar in his manuscript Miscellanies catalogue by underlining the object and the person's name (see Fig. 1). He also specifies the manner of making and use of an object but, given the private purpose of his catalogue, his descriptions are briefer and not replete with the subjective adjectives employed by Grew, whose catalogue was always intended for publication.

The order for the *artificialia* in most of these earlier catalogues, if not by material, seems to have been by use – in effect, weapons, tools, clothes or 'habits', household objects, including religious objects, and 'art' (sculpture, models, beautifully worked items), with pictures, coins and medals often listed separately. Ralph Thoresby's slightly later catalogue (1715) of his extensive collection in Leeds included them all under the overall title 'Artificial curiosities', with subsections for 'Things relating to WAR', 'Instruments relating to the Mathematicks', 'Houshold [*sic*] stuffs, Habits, etc.', 'Statues Bass-Relieves, etc.', 'Seals', 'Heathen Deities, Amulets, Charms', 'Curiosities enamel'd gilt; Paintings, etc.'[20]

Sloane collected in all the categories described in these earlier catalogues, but in his *artificialia* he separated out antiquities, coins and medals, pictures, seals and agates into separate catalogues and clearly saw the remainder as fulfilling the category of Miscellanies. Within that category, he demonstrated that he shared the still current fascination for 'curiosities': intricate carving and spectacular pieces of workmanship, technical virtuosity in the work of goldsmiths, on hardstone vessels, intricate lathe-work, the microscopic detail of carving on nuts and seeds, and the intriguing dialogue between art and nature ('altered or wrought') and the one imitating the other.[21] But not all the objects within Sloane's *miscellanea* were *curiosa*, although all were certainly *artificialia*. It was not, then, a cabinet of curiosities and we shall return to Sloane and his contemporaries' use of the word 'curious' later in this paper. Where Sloane's collection of miscellaneous *artificialia* differed from others was in its sheer scale. His was indeed an encyclopedic *miscellanea* – his arms and armour, tools, clothes, religious and household objects came from peoples around the globe, historic and

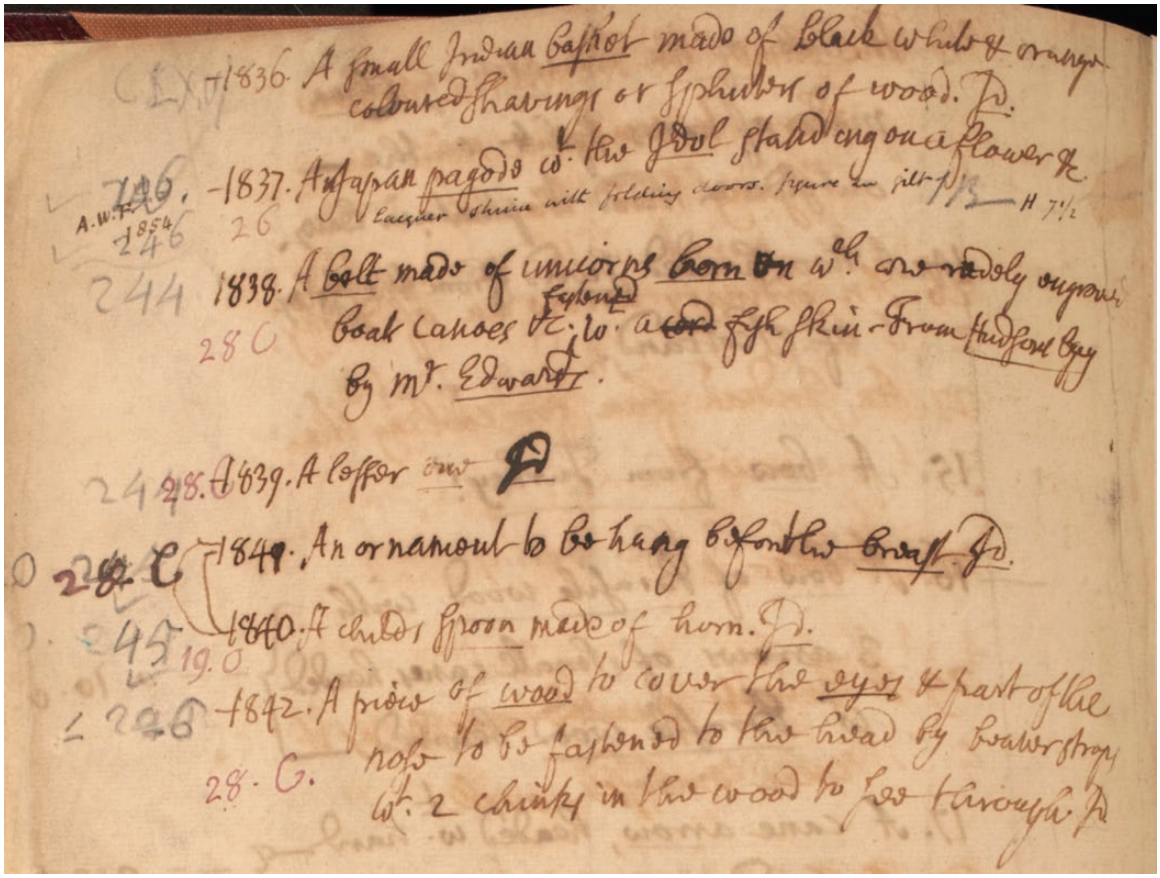


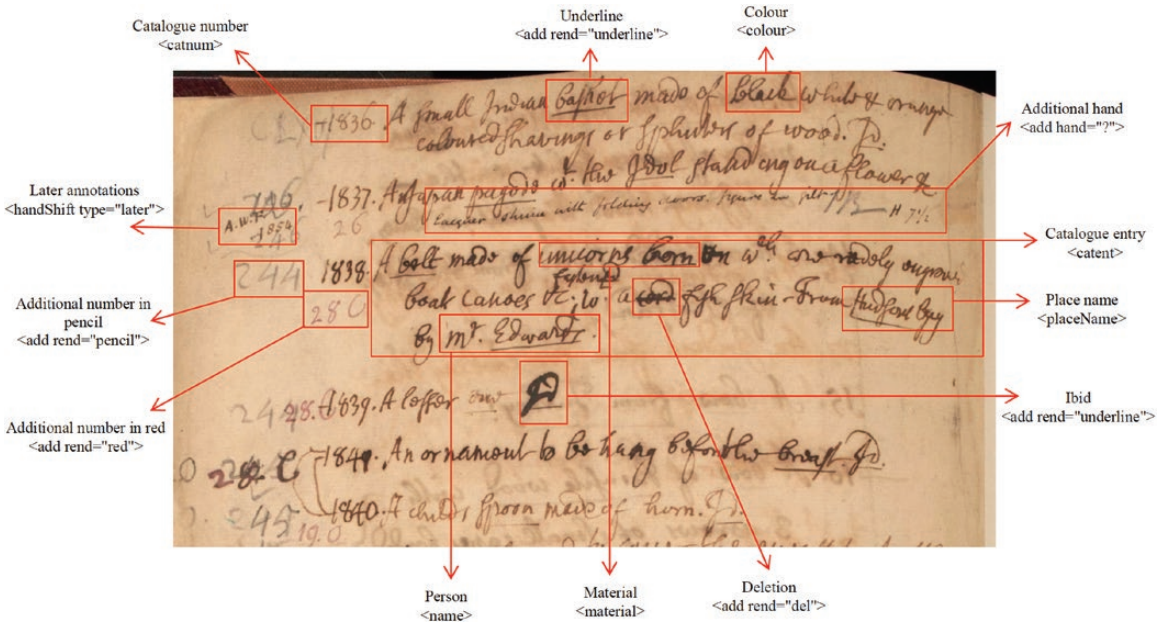
Fig. 1. British Museum Miscellanies, fol. 4v (detail) (AOA library). An annotated extract from Sloane's catalogue of Miscellanies, showing composite parts of individual catalogue entries. This is a good example of a catalogue page in Sloane's later hand with cabinet numbers 246, 244 and 245 in pencil, including: a change of mind; swapping catalogue numbers (1841/1840); Roman numerals; ticks; 'A.W.F. 1854' annotation; annotation in another hand with size but no drawing; initials 'S B'; hyphens before catalogue numbers; red ink numbers; underlinings (including object, place name and name of donor or source); use of 'Idem' (in cat. no. 1839 etc., 'Id.' is 'Mr Edwards'). The explanation of the TEI XML markup of this extract appears below in Fig. 2.

contemporary, and, combined with the *naturalia*, they enabled him to provide a true 'theatre of the world'.

Research context and research questions

We have looked above at what Sloane and his predecessors considered to be the type of object to be included in a catalogue labelled 'Miscellanies', how these objects were grouped – by material, by use or by type – and the language and variety of hands used to structure information in their catalogues. But until the research described here was undertaken, knowledge of how and why Sloane catalogued this part of his collection remained minimal.

James Delbourgo has recently written 'it bears repeating that preservation and documentation were Sloane's priorities, not his own research'.[22] He noted that Sloane's catalogues were 'accession registers designed for endless extension to incorporate new items', where the description of an object – and sometimes its source and use – were recorded by Sloane and his successive assistants, with a number. This allowed them to take up an object from the collection and, through the number on its label, find the corresponding description and other relevant information in the catalogue.[23] The Natural History (*Naturalia*) catalogues follow the usual taxonomical divisions for this period, ending with *Humana*, and the organization of the other




```
<div3>
 <catnum xmlns="http://www.example.org/ns/nonTEI" type="primary" place="margin">-1836.</catnum>
 <p><catent>A <sizeWeight>small</sizeWeight> Indian <add rend="underline">basket</add> made of <colour>black</colour> <colour>white</colour> &amp;amp; orange<lb/>
 coloured shavings or splinters of wood. <add rend="underline">Id.</add></catent></p>
 <add rend="pencil">CLX. VI</add>
</div3>
```

Fig. 2. Explanation of the expanded TEI markup of British Museum Miscellanies, fol. 4v (detail) (see Fig. 1), with one example of a catalogue entry fully marked up in XML.

catalogues of *Artificialia* (see Table 1) is also standard for the time. Delbourgo's assessment of their compilation and use works well with Sloane's catalogues of natural history material, such as insects, shells and 'Vegetable Substances' and with his smaller artificial rarities such as cameos, intaglios, rings, amulets and agates, which could be kept together in drawers, their numbers clearly visible, and reflecting their catalogue order.[24] As the above discussion of Miscellanies shows, however, this was not necessarily so with miscellaneous objects. This observation prompts the question of whether Delbourgo's description accurately describes the process of how Sloane catalogued this part of his collection.

To understand Sloane's process, we need to know when he began to acquire and to catalogue his artificial rarities, whether they came with some of his natural history collections or whether he acquired them as a separate category in his ambition to form a universal collection. These apparently straightforward questions are in fact quite difficult to answer, even by close reading the original manuscript, for the principal reason that Sloane recorded no dates for the catalogue entries, nor indeed for the acquisitions to which they relate; neither were items catalogued in the order in which they were acquired, nor grouped by donor, nor in the order they were stored or displayed. The only clues provided by the catalogues are contained in his scattered notes concerning the person from whom the object in question had been acquired.

The act of digitizing sources such as manuscript catalogues transforms them from 'boundary objects' to 'open sets of data'[25] that may be searched, analysed and further interlinked with other sets of data. A simple, though powerful, benefit arising from the digitizing and transcribing of the catalogues has been the ability to search for and group together objects from individual donors that are scattered through the Miscellanies. For example, we can now establish that the earliest named sources of objects in the Miscellanies catalogue include the Jesuit Father Fontenay, who was

in China in the 1690s and remained there until at least 1704; Dr Adair (d. 1693); Robert Hooke (d. 1703); and especially William Courten, whose entire collection was bequeathed at his death in 1702 to Sloane. That Sloane's collecting and cataloguing continued apace is clear from the increased numbers between 1725 and 1753 in each category of Table 1, but especially in the Miscellanies catalogue.

Once the previously dispersed references to objects from individual donors had been 'reunified', it was possible to establish a rough chronology for the catalogue, but other questions then arose, which will be explored in detail below: were the objects sorted into subcategories within the Miscellanies catalogue? Was this apparently random approach to cataloguing reflected in the cabinet contents? What words were employed to describe objects, their values, uses and their origin cultures? What might such an analysis reveal of other underlying organizing principles and processes?[26] By exploring these questions, this paper argues that Sloane's focus on preservation and documentation in his cataloguing did not preclude research, as Delbourgo has suggested, but was rather founded on an immersive participation in it. For Sloane, collecting and cataloguing constituted a research process for furthering knowledge, and the catalogue was an integral part of knowledge production rather than just a finding aid. It was a research process and outcome in and of itself, just as it is for collectors, cataloguers and curators today.

The digital methods and methodologies that underpinned our research on Sloane's cataloguing are presented in the following section.

Methods

The 'seven qualities of digital media and networks that potentially allow us to do things better' have been identified as capacity, accessibility, flexibility, diversity, manipulability, interactivity and hypertextuality.[27] In a parallel exercise, John Unsworth has attempted to identify a set of 'scholarly primitives', or methods that humanities researchers acknowledge in common, irrespective of specialization, which 'form the basis for higher-level scholarly projects, arguments, statements, interpretations – in terms of our original, mathematical/philosophical analogy, axioms'.[28] These, he proposes, are discovering, annotating, comparing, referring, sampling, illustrating and representing. A key goal of Enlightenment Architectures, then, has been effectively to interlace the outputs from digital media and networks with the scholarly primitives of humanities researchers in order to formulate questions to be posed to Sloane's catalogues that would be difficult or impossible to address with paper tools alone. Our approach to this problem was built on four pillars: close reading, source criticism, document analysis and semantic text encoding.

Semantic text encoding, or markup, has been defined as 'any means of making explicit an interpretation of a text'.[29] It is a core and long-established approach of digital humanities.[30] At present, a common way of making historical texts machine readable is by way of 'markup' applied in accordance with the internationally recognized guidelines of the Text Encoding Initiative (TEI). For the purposes of Enlightenment Architectures, this involved inserting descriptive labels into the digital versions of the transcribed catalogues to identify and differentiate between the informational units (such as folio numbers or annotations) and entities (such as person or place names) of which they are composed.

Why was this necessary? The inherent flexibility and manipulability of the digital medium means that it is reasonably straightforward to make a digital representation of a primary source, such as a catalogue. Once that catalogue has been transcribed and represented with an appropriate character encoding, simple searches can be made of the terms contained in it (as mentioned above). However, since a computer has no innate intelligence, it remains difficult, without further intervention, for a computer to make semantic rather than literal or pattern-based searches of that material.

Without further intervention, for example, a computer will not interpret the numbers that appear in the left-hand margin of the Miscellanies catalogue as catalogue numbers, and to the left of them – pencilled, often crossed out (sometimes more than once) and replaced with a new number – as cabinet numbers (see Fig. 1). Yet, once a semantic label is applied to those numbers, possibilities beyond simple number-by-number search are opened up.

Enlightenment Architectures has used markup to identify catalogue numbers and to distinguish them from cabinet numbers, prices and bibliographic volume numbers. In this way, it is possible to identify, extract and analyse key components of the catalogues, like detailed descriptions of objects that were stored in their

respective cabinets. Moreover, additional interpretative information that is not recorded in the manuscript catalogue can be supplied and made machine readable – for example, that we have a reasonable level of certainty that a given annotation, such as 'A.W.F.' (for Augustus Wollaston Franks), was made by a much later curator.

Although it is possible to make most aspects of Sloane's catalogues machine readable, the constraints of time and budget meant that it was necessary for us to prioritize some aspects of the catalogues over others, established with respect to Enlightenment Architecture's overarching research questions. For the purposes of the present article, discussion is restricted to the markup designed to allow the questions outlined above (regarding descriptive words and cabinet contents) to be explored.

With regard to catalogue entries, we aimed to determine the informational units that could be analysed to reveal how 'descriptions' as well as categories varied. Thus, we asked: What counts as information worthy of recording and why? What contexts frame the records (e.g. the physical attributes of items and/or their socio-cultural contexts)? A sustained close reading and document analysis of the catalogues was undertaken, a process of analysis that was iterative, enfolding regular workshops with the project team. Researchers – curators, librarians and university academics – with contiguous knowledge specialisms in the histories of the book, of natural history, of antiquities and ethnography, and of collections, as well as historians of science and information science were regularly consulted. As a result, we marked up the names of people, places and bibliographic references, and also the descriptive terms used by Sloane to describe objects, especially with respect to colours and materials. The encoding of objects themselves as single words ('shoe' or 'whisk', for example) proved more difficult because of the possibility of imposing a subjective or anachronistic interpretation and was unresolvable in the time-frame of the project, though we did record when a word was underlined.[31] Moreover, we noted that ticks, letters, Roman numerals and a clear series of three-digit numbers in pencil appear regularly, often crossed out or written over, in the margin to the left of the catalogue numbers. These were all marked up; we knew that the three-digit pencil numbers were cabinet numbers, and that a deletion indicated an object had been moved, which we were anxious to record in order to sort by cabinet number (see Figs. 1–2 and Appendix). We hoped to be able to identify the other markings once this exercise had been completed, by aggregating and analyzing them with the aid of the markup.

Once all the components had been made machine readable, it was possible to identify, extract and further examine these units of information across the catalogue so as to analyse it at the micro- and macro-levels. This underpinned our research on Sloane's object descriptions and the arrangement of the objects in the cabinets, as discussed below.

Descriptive terms: new perspectives

In the first instance, Sloane's use of words and terms most obviously provides a useful point of comparison with current usage. When marking up the Miscellanies catalogue with TEI, Sloane's own descriptors or 'thesaurus' terms were captured – the words he used for materials, measures, quantities, colours, shape, texture, size and weight, as well as place names and personal names.

This had the immediate objective of facilitating searches of the material characteristics of objects in the collection, by allowing searches to be run – for objects of the same colour, size or material, for example – or to make comparisons of his own spellings of a descriptive word (see Fig. 3). In the course of this

Fig. 3. A wordcloud of the top 35 colour terms that occur in Miscellanies. Approximately 565 words pertaining to colour occur in Miscellanies, of which 56 are unique word forms. In the figure, the larger the font size the more frequently the colour term appears; the colour and proximity of colour terms do not carry meaning. Analysis and visualization were undertaken with Voyant Tools, Stéfan Sinclair and Geoffrey Rockwell (https://voyant-tools.org/ 2019).

exercise it became clear that the lists provide invaluable insight into the language available to Sloane, the conventions he used, whether he himself made any attempt at systematizing his cataloguing, and how and whether the descriptors changed in the different catalogues. For example, some thirty-three words are used to describe materials in the Antiquities catalogue that make no appearance in Miscellanies.[32] As for the terms that were most commonly used in Antiquities, the distribution across the catalogue of the five most commonly used material terms is given in Fig. 4.

The resulting lists provide a glossary of terms used in early modern collections catalogues of *artificialia*. They are understandably inconsistent in spelling and, for example, in the variety of words that might be used to describe a colour or material. They are remarkable, however, in revealing the importance of comparisons – with other objects in Sloane's own collection, with other collections known to him (such as those of James Petiver or the Royal Society) and with oral and written accounts of objects in yet other collections. These data participate in the creation of a systematic taxonomical language for describing specimens that natural historians were engaged with at this time, but it is fascinating to see it applied to artificial objects. For example, the twenty-five most frequently occurring words in his catalogue of Miscellanies are shown in Table 2.[33]

Like Figs. 3 and 4, these are revealing of Sloane's concept of taxonomy, his idea of the defining characteristics of an object and the particular importance of its provenance or source. The term 'id' (*idem*), the second most frequently occurring word, was used almost exclusively to record the same source of an object, the same donor or place of origin, or both; 'vid' (*vide*) was used with a bibliographic reference to direct the reader to a book or catalogue in Sloane's library, where a similar object was described. The titles 'Mr' and 'Dr', the geographical terms 'Chinese' and 'Indian', and the term 'given' likewise demonstrate the importance of provenance or source. The fact that 'used' occurs so frequently indicates his emphasis on recording the source 'use' or purpose of an object – a medicinal use sometimes, but as frequently its place in a culture. Sloane's need to describe accurately and to distinguish leads him to use a descriptive language largely devoted to colour and material and comparative (but, interestingly, not measured) size for these objects. This reflects the contemporary movement away from fascination with the marvellous and wondrous to a concern with the more prosaic, with 'truthfulness' or accuracy, and the same kind of diligent and careful attention that formerly had been lavished on novelty and the extraordinary – what the *Encyclopédie* praised as the more learned and thoughtful 'noble curiosity' that 'demanded continuous work and application'.[34]

The process of marking up Sloane's text forced a sustained and detailed engagement with its descriptive elements that led to a view of the contents that was more historically attuned. The close attention to descriptive language provided insights into Sloane's attempts to categorize and explain in his own terms and from his own point of understanding. This point is crucially important: it alerts us to the great

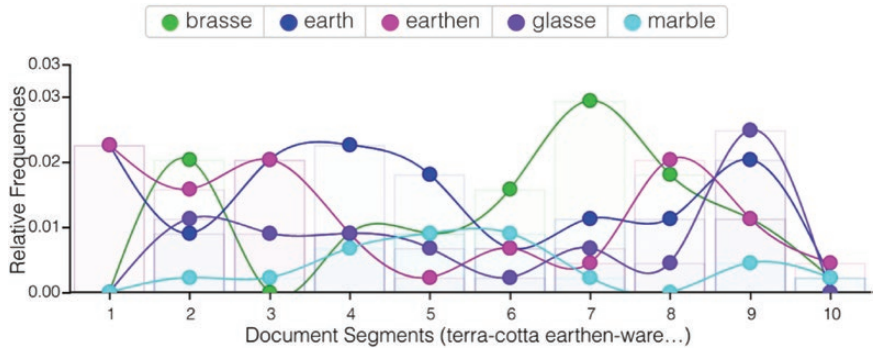


Fig. 4. This distribution graph shows the occurrences of the five most commonly occurring material terms in Antiquities. The ten document segments were calculated by Voyant for the purposes of running this analysis and do not refer to pre-existing segments in the Antiquities catalogue. Analysis and visualization were undertaken with Voyant Tools, Stéfan Sinclair and Geoffrey Rockwell (https://voyant-tools.org/ 2019).

Table 2. The twenty-five most frequently occurring words in Sloane's Miscellanies catalogue. Information derived from Voyant Tools, Stéfan Sinclair and Geoffrey Rockwell (https://voyant-tools.org/ 2019).

	Word	Count
1	wt	381
2	id	371
3	mr	228
4	dr	140
5	glasse	137
6	chinese	136
7	white	136
8	indian	127
9	china	115
10	given	111
11	small	99
12	red	94
13	wch	91
14	piece	90
15	wood	80
16	large	76
17	black	75
18	stone	72
19	Head	70
20	pipe	70
21	box	69
22	tobacco	69
23	Used	67
24	vid	61
25	Ivory	60

difference in Sloane's way of working from present-day curatorial practice. It also reminds us of the particular approaches to information retrieval that present-day databases require. When a modern curator catalogues an object on a database, there are a number of conventions that must be followed in the format and content of the basic title and free-text description, and a number of controlled thesaurus fields that dictate which terms can be used for object type, maker, measurements, material, find place or location, origin culture, associated event and current storage or display location. Sloane and his contemporaries were forced to look at these objects through their external characteristics, rather than predetermined taxonomies; consequently, their own criteria for arrangement and categorization were constantly changing with additions to the collections. This, we argue, is fundamentally important for understanding how these catalogues were intended to be used – not just as finding tools, but as a source of further information about the object in the hand, taken from a cabinet containing other objects in Sloane's own arrangement. The catalogues gave details of the object's comparators, its source and any original cultural information about it, and provided references to other examples in his collection and to published or manuscript texts in his library. This might lead Sloane to new ways of describing or understanding it and to a new placement, in a different cabinet and context, as changes to the location codes often reveal (see below).

We argue here that the catalogues were working documents, designed for use not merely as registers of objects in Sloane's collection but also as reference tools, and as such were completely different from an inventory, a list, sale catalogue or published catalogue that recorded finite static collections and were written and used in an entirely different way.[35] Sloane memorably referred to auctions as the 'grave of science'; indeed the transfer of the materials from early collections was seldom if ever accompanied by any kind of contextual information, which placed an evident limit on their ability to bring with them much in the way of utilitarian value in the sense that Sloane apprehended it.[36] When Sloane's objects did arrive with information, in a letter or via verbal communication, he was careful to record it; if there were similarities to an object published elsewhere, that too was referenced. The question has been raised as to whether the markup might reveal that the objects in the Miscellanies fell into further subcategories: it is now clear that the Miscellanies catalogue was a growing, working document and that Sloane kept his references and descriptions as consistent as possible; the objects were not catalogued by use, material or source, however, but seem to have been treated as groups in a roughly chronological order, either as they came in or as they were put aside into the Miscellanies. As we shall see, it was the cabinet numbers that imposed taxonomic order on the contents.

The Enlightenment Architectures project has helped us understand that it was not just *what* Sloane was collecting that is of importance but *how* he described it in his catalogues and the intellectual processes he employed. In a codicil to his will, dated 1749, Sloane famously insisted that his collection should be 'rendered as useful as possible, as well towards satisfying the desire of the curious, as for the improvement, knowledge and information of all persons'.[37]

As such, his intellectual processes were Baconian: his search for objects aimed to demonstrate all of God's creation, through collecting not only the regular but also the 'curious', and he studied his collections by reading and writing about them 'curiously' – in a manner deriving from the word 'cura', meaning 'with minute attention'.[38] Noting how important the diversity of nature was to Sloane in 'manifesting the glory of God', his curator James Empson recorded Sloane's insistence that:

> when Things distinguish themselves from one another, either by their Colour, or Shape, or Impressions and Marks on them, Transparency or Opacity, Softness or Hardness, different Mixtures either in them or adhering to them, Places of Nativity, to which a good many other Characteristics could be added, that all these so differently distinguish'd Productions cannot be called the same, or be represented by one Sample, but that they are different Specimens, though going under one general Name.[39]

This passage reinforces the points made above concerning the significance of language in the catalogues for distinguishing objects; without modern aids such as photographs, the description was the only means of identifying an object or explaining the differences between two very similar objects or distinguishing one from another. But this discussion of diversity in fact formed part of Empson's explanation of his proposed plan for the display of Sloane's collection in the new British Museum, and the point he was stressing was that Sloane always protested against the notion of displaying only one object in its class or division. In the following discussion of the arrangement of the cabinets, it will be of interest to see whether the descriptive terms he used demonstrate implicit and explicit links between the objects and the way they were displayed.

Arrangement of objects: new perspectives

In this section we discuss how digitally augmented research and inductive analysis of the data so extracted, have allowed the creation of new knowledge on the ways in which Sloane's catalogue of Miscellanies translated into the organization and categorization of objects on the shelves and in the drawers of his cabinets. These arrangements were to be superseded very swiftly by public-display strategies and practicalities and by other taxonomies as new specialist disciplines emerged, when this part of the collection was transferred to the British Museum.[40] The following discussion demonstrates the way in which these categories can be induced from the contents of the catalogue.

There are no surviving images of the interiors of Sloane's various houses, nor of Montagu House, in which his collection was installed and opened to the public as the British Museum in 1759. Until recently, the arrangement of Sloane's collections in his several homes has been known to us only from analysis of descriptions of visits by contemporaries, and by its subsequent display in the British Museum as described in the first guidebook by Edmund Powlett in 1761.[41] In 2003 Marjorie Caygill provided from these accounts and from reports to the museum's trustees the most detailed account to date of how Sloane's collection was arranged (and rearranged) in the museum; in 2012 this was followed by an article attempting to reconstruct its arrangement at Chelsea, after Sloane moved there from Bloomsbury in 1742, and until his death.[42] The latter article was based in part on a transcription Caygill had made of the contents of the Miscellanies catalogue in a Word table format. With a simple 'search and find' facility, this enabled her to list together all the contents of a selection of cabinet numbers, and it was these first findings that were examined in the article.[43]

In the 1750s the trustees had noted that the collection at Chelsea was in numbered cabinets that were referred to throughout the catalogues: insects, for example, were in Cabinets 234 to 237 and some were in 181.[44] Caygill noted that this last cabinet contained *materia medica* but also a number of Miscellanies items. Other items from the Miscellanies catalogue were elsewhere: in Cabinet 245 were mainly musical instruments and items associated with smoking; the largest number of shoes was in 226; weapons were in 252, which also included horns; and Cabinet 253 contained all the mathematical instruments along with a selection of objects that might be described as tools.[45] The initial purpose of creating the Word document was to help locate and identify surviving objects in the collections now, but it also allowed this tantalizing glimpse of the contents of Sloane's cabinets and their arrangement. After the full marking up of the Miscellanies catalogue, our new digitized version has been able to build on and extend Caygill's work.

The marking up of the Miscellanies catalogue was approached with a number of questions in mind. By

using the marginalia in the catalogue, would it be possible to simulate a reconstruction of the contents of Sloane's cabinets in order to understand the way he organized and classified his collection? Would the contents of the cabinets help us to understand how he catalogued or vice versa, or is there in fact any relationship between them? Through deletions and changes in cabinet numbers, could we also follow changes to these classifications and ways of cataloguing over time? Could any relationship be established between the way Sloane organized the collection physically and the arrangement and classification of other collections?

After carrying out various experiments and proofs of concept, we established the categories of information to be extracted from the TEI-encoded catalogue and manipulated in order to allow these questions to be explored.[46] It was possible to order the resulting subset of information by places, persons, peoples, underlined key words, materials, etc., so that one could see where a collection of objects from one person or collector was distributed throughout the cabinets, or a collection of material from one country or peoples was distributed, or all objects relating to tobacco, etc. From these findings, for the purposes of this article, we have produced an online Appendix – an initial tabular summary of the contents of the cabinets, and sometimes the individual drawers, shelves or sections that contain objects from the collection of 'Miscellaneous Things . . . both Natural and Artificial'.[47] It is organized by cabinet number and within each cabinet by catalogue number. It also records changes to cabinet numbers, so that we can see where Sloane changed his mind about the order, and moved things from one cabinet to another, as well as enabling us to see objects and collections that were split up between different cabinets. The table in the Appendix has enabled us to create a summary list of contents of each cabinet number that contains Miscellanies; this summary list (Part A of the Appendix), along with the table (Part B of the Appendix), form a basis for the more detailed analysis of the cabinet contents below.

Miscellanies in the cabinets

What is instantly clear is that Sloane's own list of his catalogues in 1725 (see Table 1) provides us with his own basic taxonomy for the catalogues but not for the physical arrangement of the collection, since objects in the Miscellanies catalogue were placed throughout many of the cabinets; this is less marked in the lower cabinet numbers, where presumably the *naturalia* and *materia medica* were to be found. (In the following discussion, bold type indicates cabinet numbers, while numbers in parentheses are Sloane's catalogue numbers for these specific objects.) For example, some Miscellanies objects were assigned lower cabinet numbers such as **8**, which contained earths; **99** included a group of objects that became brittle, friable or glass when heated; **151** had two alchemical objects; **161** held a handful of medals with portraits, including Sloane's enamel of Elizabeth I – the 'Phoenix jewel' (1778); **163** flints, arrows, and objects made of asbestos, including the purse (1205) purchased from Benjamin Franklin; **181** earths, oils and salts, mostly *materia medica*; **183** a distinctive group of mostly Chinese cups and saucers made of curious materials; and one puzzling item, housed with the lapis and cornelians in **185** – 'A chinese Idol God graved upon a Pebble by Tortoises urine From Mr. Bell' (1134); **190** had only a coral hand and beads (794: possibly the one included in Jan van Rymsdyk's *Musaeum Britannicum*, 1778) and a figure cut in white amber set in yellow (795); while **191** included handles for knives etc. that were made of unicorn horn and of other materials that appeared black.

In most of these instances these cabinets contained mainly *naturalia* with the Miscellaneous objects probably placed there to demonstrate specific points. As Caygill noted, it appears that most cabinets in this range contain no Miscellanies at all (such as **158** and **159**, which contain rings, cameos and intaglios), while other cabinets mix *miscellanea* with other things such as *materia medica*, antiquities, seals, vegetable substances, seeds and the Echinoderm collection.[48] On the whole, we tentatively conclude that *naturalia* were contained in cabinets **1–198**, although they may have been interspersed with library bookcases and, as noted above, with a good number of *artificialia*, including some Miscellanies. Cabinets **199–304**, where most of the Miscellanies appear, were for all of the *artificialia*, but mixed with some *naturalia*, since it appears that if insects were in cabinets **234–7** (as inscribed on the title page of the Insects catalogue) they were sharing their space with a handful of *miscellanea* objects also recorded there, which, if so, were probably confined to a drawer or two. But this will be difficult to establish conclusively until more of the natural history catalogues are transcribed and marked up.

It is challenging to judge the contents of the cabinets from this one catalogue alone, without knowing which cabinets contained the items listed in the natural history and library catalogues. The remainder of the British Museum volume, which includes the catalogues of Antiquities, Instruments, Seals, Agates, Pictures, etc., plus two Library and two 'Fossils' catalogues that have also been transcribed and marked up, will add to the picture, but not conclusively so. It is also difficult to assess the contents and arrangements of the Miscellanies objects because so few objects from the original collections survive and have been identified (perhaps 15 per cent).[49] There is a hope that the markup will enable the identification of further objects in the British Museum collections and allow identified objects to be seen in their original context in Sloane's catalogue and in virtual cabinets, but that is for a potential future project. However, by combining what we know of surviving objects that have been identified with their Sloane catalogue numbers and the descriptions provided in his catalogue, the table in the Appendix provides enough information to support the following analysis of the place of Miscellanies in Sloane's cabinets. The complexities of the arrangements being described will also be rendered more easily comprehensible by direct reference to the Appendix.

Displaying Miscellanies

Cabinet **199** is the lowest number that has enough content to merit describing it as the first cabinet devoted to 'Miscellaneous Things not comprehended with the foregoing [natural history collections] both Natural and Artificial'. The cabinet was probably mainly for display, since an entire series of blue and white china, japanned items, and other objects of interesting craftsmanship from various cultures, are numbered just **199**, while a series of others, with added letters **a**–**e**, describe groups of items, most of which are of a size and type that would represent the variety and type of curiosities in this part of the collection. There are 378 objects with cabinet number **199** and **199**a–e, the sub-letters possibly representing drawers or shelves, although some contain over a hundred objects and hence the sub-letter **199**b, for example, might represent the equivalent of a press within a very large cabinet (such as one panel in the ornate glazed central section of the lower design in Fig. 5). Most of the objects described without sub-letters in **199** have the characteristics of show pieces that might be pulled out for special guests, to introduce and represent this category that partook of the natural and artificial. A large number of the Chinese items, mostly figures and boxes, were moved to this cabinet from **249** and **251**.

One part of this cabinet in particular, **199a**, included nearly forty objects made of one material that represented another – a citron made of glass, flowers of silk, busts made of seeds – and long rolls of different kinds of paper from China, Japan and the Indies; these were objects that transcended natural and artificial boundaries and were particularly prized by collectors.[50] Another part of this cabinet, **199b**, was devoted to nearly a hundred things made of glass and enamel, many of them this time also sharing a cultural and geographical source – Mughal India. And **199c**

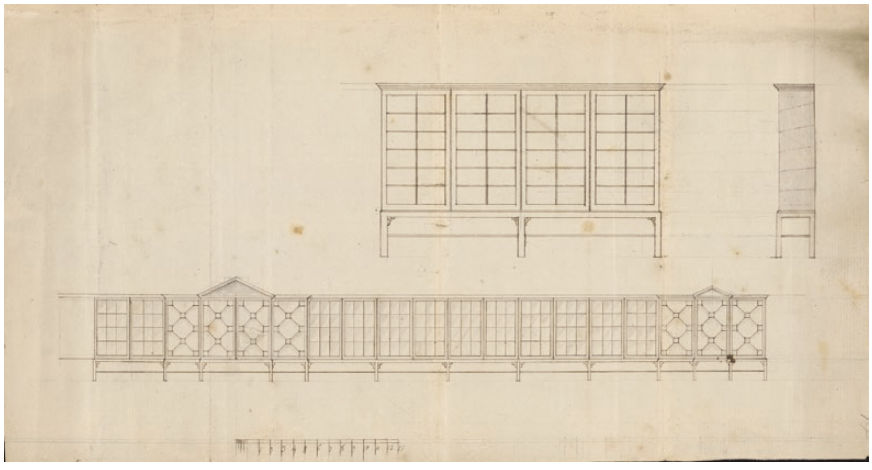


Fig. 5. British Museum Central Archives, William Hallett's Plans of Hans Sloane's Cabinets and Book Cases (uncatalogued, Flitcroft and Braiser Plans of Montagu House), plan for cabinets, fol. 15. © The Trustees of the British Museum.

was another showcase, of around eighty objects, many from China and Japan with a similar theme to **199a**, but this time also including items beautifully crafted from nature, such as a carved and gilded rhino horn cup, a box made from a nautilus shell decorated with garnets, and some of Sloane's most beautiful decorative objects, such as his silver sculpture of Venus and Adonis, (168) attributed to Fiamingo (François Duquesnoy). Along with the cut and carved stones and nuts in **199d** and beads, necklaces, jewellery and ornaments in **199e**, the contents of the whole of cabinet **199** contained objects of a larger size than those kept in drawers, but not too large to handle or to display on shelves. These prized objects that demonstrated the elusive boundaries between art and nature must have made this cabinet one that Sloane went to frequently with his visitors, where they could admire the curiosities on the shelves while Sloane took out those of particular interest, pointing out their merits.

Cabinet **216** was similarly a 'show case', representing transformations between nature and art – either natural objects transformed by human intervention (horn made into spoons, wood made into a book), or man-made objects that imitated nature, such as paste made to look like jewels, with a particular focus in **216b** on man-made objects that had been transformed by fire, lightning or 'thunder'. It also included a small representative group of antiquities and a selection of mechanical instruments including a German hygrometer, a prospect glass by the Italian instrument maker Giuseppe Campani, glass from a camera obscura, and a collection of microscopes made by James Wilson, Benjamin Mellin and Johan Joosten van Musschenbroek (181). Several items representing religious observances came from the collections of Samuel Brown and Alexander Brown, while a miscellaneous group of objects came from James Petiver, including the 'head of a tobacco pipe graved by Mr. Petiver Gaz. nat. 74.7. belonged to the King of Carolina' (1452).[51]

As noted above, whether three-digit cabinet numbers with letters indicated a single drawer or perhaps a section within a larger cabinet is not always clear: items marked '**216 a**' and '**216. a**', for example, totalled nearly 150 separate catalogue entries. Although a set of microscopes, an abacus and a 'weather machine' were listed among them, they were mainly small objects, including beads, 'popish trinkets', knives, glass, and a number of items from Petiver's collection, such as China ink and an Indian hatchet, all listed on the same page in the Miscellanies catalogue.[52]

The items listed in Cabinet **220** were few and reasonably large, so they must have been housed in the display part of the case; they include Lapland boots and gloves and Carolina Indian garters, hair ties and amulets, along with larger pieces of sculpture including a boy carved in wood from China, a statue of Victory in brass, and Sloane's busts of Newton (1984), Virgil and Charles II (1987).

As mentioned above, the cabinets numbered from **199** onwards were mainly devoted to *artificialia* but some contained *naturalia*, such as the insects. Cabinet **224**, for example, must have contained mainly *naturalia*, for the only *artificialia* were in **224u** – seven objects (javelin, bracelets, knives, etc.) from the Straits of Magellan.

The markup enabled us to record when cabinet numbers were deleted and changed. Cabinet **226** held mainly the 'habits' and tools of countries from around the world – a huge variety, including tomahawks, a box for tea, aprons, caps and especially shoes – along with a large selection of religious items (rosaries, reliquaries, etc.) that were moved to **226** from cabinet **244**. Several of the 'habits' in **226** were from Surinam, and a close scrutiny of William Courten's lists of 'Things Bought' finds them listed under 'Surinam. Mr Ostome', together with their prices; they include a beaded apron (133) which survives as Am.SLMisc.133.[53] Sloane's catalogue entries for these items do not record the Ostome or Courten provenance or price, but they do sometimes include the item's use and a more extensive description than is found in Courten's list. Sloane, then, did not hunt through Courten's papers for descriptions or prices, and his knowledge of the native source and use of these objects was provided by descriptions from other travellers or from memory.

This more detailed analysis of the cabinets has taken us up to the first that contained 'habits' or what we might describe as 'ethnographic' objects, number **226**. A short summary of the contents of most of the remainder of the cabinets is included in the Appendix.

The cabinets

Now that we have an idea of how the Miscellanies objects were arranged in the cabinets, it will be useful to know what type of cabinets they were. As noted above, many of the three-figured pencil cabinet numbers

have letters appended, indicating drawers or shelves. Thomas Stack, one of Sloane's amanuenses, noted in 1738 in an inscription in the Seal catalogue that 'All this Class is in Drawer t of Cabinet 216', and the seals were in boxes or attached to cards that were numbered to correspond with the catalogue.[54] Reports to the British Museum trustees recorded forty-one cabinets in twelve rooms on the first floor of the manor in Chelsea, and these provided the models for the cabinets that were commissioned for the newly established museum, some of them very large indeed at 11 feet high, 18 feet long and 14 inches deep, with locks, hinges and glass doors, and with shelves and seven drawers in the lower part. The ground floor at Chelsea probably contained 'repositories' of open, unglazed shelves; objects kept there would have a code that would not refer to a cabinet, but in the British Museum they would require presses with glass or wire for security if they were to be housed in public spaces.[55] In his close study of the arrangement of Sloane's herbarium in Chelsea and its transfer to Montagu House, Edwin Rose discovered the original designs by the notable cabinet maker William Hallett (1707–1781) for these large bookcases and for cabinets commissioned by Sloane to house his collection at Chelsea. There were thirty-three of these cabinets and a number of bookshelves alternating with them ranged down the manor's long gallery, allowing visitors to walk through all of 'the three general classes' of natural history (Fossils, Vegetable and Animal), followed by natural and artificial productions.[56]

Hallett's drawings of the cabinets for Chelsea (Figs. 5–6) are a mixture of the ornamental and the practical: fretwork glass-fronted cabinets alternate with plain glass-fronted shelves that could hold books or specimens, some with solid wood doors, others with wire-fronted doors which held drawers or shelves for objects requiring the circulation of air, and finally cases with plain adjustable shelves, with no doors, for books or objects. Each unit presumably could be numbered with a cabinet or press number, with subletters for the shelves or drawers within. Since these cabinets were made for the move in 1742, Sloane must have had earlier cabinets in his smaller residence in Bloomsbury, and it would seem reasonable to assume that at least some of these must have been kept for Chelsea; it makes practical sense that organized and labelled parts of the collection that were already catalogued – especially where the labels were integral to the drawers – would have been moved whole to Chelsea, or at least the new cabinets would have been built to a size to accommodate drawers from existing cabinets. Although Sloane wrote that he spent his leisure amusing himself with the arrangement of

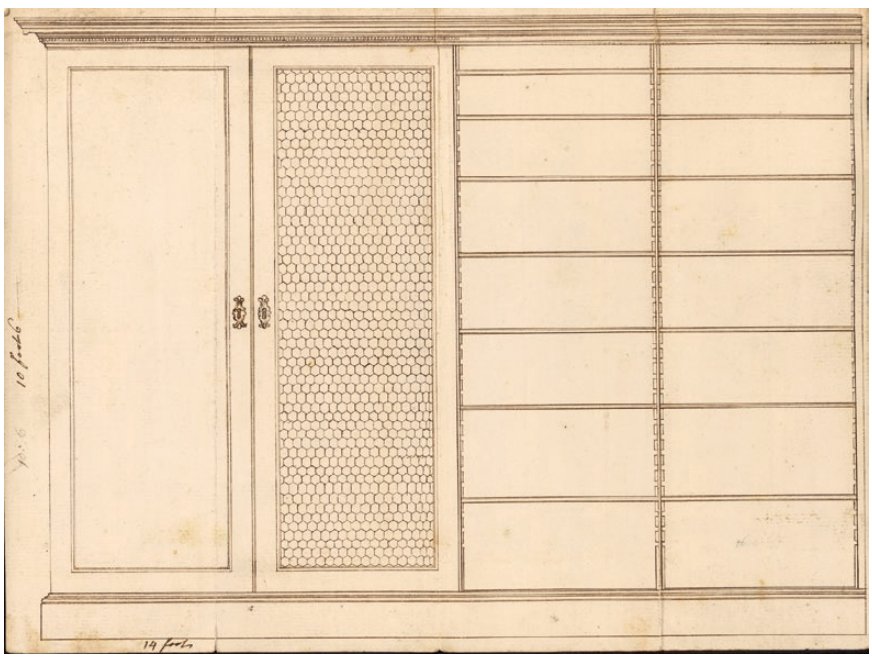


Fig. 6. British Museum Central Archives, William Hallett's Plans of Hans Sloane's Cabinets and Book Cases (uncatalogued, Flitcroft and Braiser Plans of Montagu House), plan for bookcases, fol. 16. Inscribed on the verso: 'Drafts of the Bookcases and Cabinets made for Sir Hans Sloane' © The Trustees of the British Museum.

his collection in 1742, given the number of specimens it would be near impossible to rearrange the contents of every pre-existing drawer. For example, three of the *materia medica* drawers survive, containing mineral, *humana* and *animalia* specimens, along with several drawers from the Vegetable Substances cabinet, all with their original labels and contents largely intact.[57] These would seem to have come from the less ornamental, more practical, 'working' type of cabinets that housed John Francis Vigani's *materia medica* (1704, oak, made by a joiner) or John Woodward's five walnut cabinets for his mineral, shell, fossil and other collections now at Cambridge.[58]

Glenn Adamson has described the type of storage and display indicated by the cabinets at Chelsea as the 'wall-system' approach, a format derived from bookcases, which was 'compatible with rigorous cataloguing: the numbering of each compartment completes the impression that a new taxonomic order has come to collecting practice'.[59] Incorporating books, drawings (in albums), larger specimens on open shelves or behind glass, and drawers of varying sizes to accommodate smaller objects of differing or comparable types, sizes, materials or use, the physical architecture of the furniture, its arrangement and form, was an integral and determining factor in the intellectual architectures of the catalogues.

From this brief first glimpse into the distribution of the Miscellanies in Sloane's cabinets, the categories by which he arranged them conform in part to all of the others discussed earlier: by material (like Worm), by use (such as Grew or Thoresby), by place of origin, by colour or chemical properties, or for convenience in showing the collection to others; a particularly large section was devoted to the intersection and transformations between art and nature. Delbourgo noted that Sloane aimed to arrange and display his things in sets corresponding to the categories he used in his catalogues, with catalogue numbers acting as location codes;[60] but as noted here, although this may work for some natural history catalogues, it was not the only guiding principle for the Miscellanies, and instead, as MacGregor reasonably concluded in relation to other catalogues of collections, a 'variety of classificatory programmes might co-exist alongside each other.'[61]

Apart from the enormous difference that the vast scale of Sloane's collection imposed on the number and arrangement of the cabinets, what emerges clearly from this analysis is that the arrangement was a fluid one, with objects often moving from one cabinet to another, and that the catalogue was the crucial central tool for keeping track of the changing taxonomies. When an object moved, the catalogue description of the object did not change, so the catalogue description was not a reflection of its place in Sloane's taxonomy. It remains difficult to decide how many of those shifts were due to new objects coming in and contents having to be moved to accommodate them, or how many were due to rearrangements and the addition of cabinets or sub-presses after a move (such as that from Bloomsbury to Chelsea in 1742), or how much was due to Sloane's changing perception of how objects should be arranged in relationship to each other in order to best convey the knowledge they contained.

Sloane was unable to exert much control over the order of the entries in the catalogue, for it did not describe a finished collection but was a working catalogue, in use for over seventy years. Consequently, the architectures of the catalogue were limited by the space on the page, the words used, and marginalia, as well as underlines and capitals, and the amount of information that could be recorded within the entries – cross-references, valuations, etc. – to enhance the integrated working of his natural and artificial collections and the library. In the cabinets, however, he was free to experiment with all the different systems and to move items around, to change his mind, reorder and experiment. The cabinets and catalogues together demonstrate Sloane's underlying guiding principles of Baconian experimentation: a physician's constant search for cures, a cyclical need to handle and connect objects and books, to contest, revise, reorder and re-examine the products of God's creation in order to demonstrate the wonder of the divinely created world.[62]

One of the aims of the project has been to establish whether Sloane's method of cataloguing reflected changes in classifications during his own lifetime. What we have discovered is that Sloane's catalogue of Miscellanies is not as directly related to his contemporaries' taxonomies as the question implies, but that the intellectual structures of his catalogues and cataloguing processes – their 'information architecture' – through their intimate relationship with researching and arranging the collections, helped to shape the origins and subsequent evolution of the specialisms and modern disciplines of the Enlightenment.

Conclusion

This paper has argued that Sloane's catalogues were not merely finding tools and their intellectual purpose went beyond mere listing, indexing or valuing. The cataloguing of his collection was part of the Enlightenment endeavour to understand the world through objects, text and image (once together under Sloane's roof and all now separated) and through the people who made, used and collected these objects throughout history. This paper has aimed to deepen current understandings of this, by presenting new insights on the writing of the Miscellanies catalogue itself and the descriptive terms used in it. It has also advanced current understanding of the arrangement of the cabinets and the question of whether they observed the same organizing principles as other cabinets of *artificialia*. This has enhanced understanding of how Sloane's 'information architecture' underpins his cataloguing process, how he employed the spaces on the page to reflect his cataloguing principles, and how the catalogues were used within the context of his entire collection; for example, the use of cross-references to other catalogues, other natural and artificial objects in the collection, and to books, correspondence and collections of images in his library. Remarkably, Sloane's research methods used in creating his catalogues closely parallel John Unsworth's 'scholarly primitives' of discovering, annotating, comparing, referring, sampling, illustrating and representing.

We have discussed here the ways in which Enlightenment Architectures digitized and made machine readable Sloane's catalogues so that they could be transformed, manipulated and interrogated to address research questions that are difficult to answer with conventional methods. As has been shown, the ability to identify word occurrences in the manuscript catalogue, and to rearrange and group object entries, allows us to study objects and people scattered across the analogue catalogue. This work saw us recombine extant (though disjointed) information in new ways, paralleling what Sloane was doing with the information in his catalogues, and the information contained in and represented by the objects themselves. Crucial to this was our growing awareness of the interdependence of the information at hand: to make best use of the catalogues the next step should involve interweaving them more closely with the other elements of Sloane's collections – the correspondence, the books, albums of drawings, natural history and *artificialia* – with awareness of how they too were interdependent upon the spaces containing them. In this way, Sloane's catalogues can be seen as a rich and complex testing ground, not only for digitally augmented approaches to the history of collections and early modern studies, but also for the wide potential transferability of the results of this work to the many present-day fields that aim to find patterns in, and make sense of, large, complex and often disjointed datasets. Present-day digital humanities, science and humanities are also interdependent, and it is only by working together that we may better understand the way Sloane and his contemporaries made knowledge and understood the world through objects and collections.

Supplementary information

An online Appendix at *Journal of the History of Collections online* presents, in Part A, a summary list of contents of cabinets containing Miscellanies objects and, in Part B, Sloane's collection of Miscellanies sorted in cabinet number order.

Addresses for correspondence

Kim Sloan, Department of Prints and Drawings, British Museum, London WC1B 3DG.
ksloan@britishmuseum.org
Julianne Nyhan, UCL Centre for Digital Humanities, Department of Information Studies University College London, Gower Street, London WC1E 6BT.
j.nyhan@ucl.ac.uk

Acknowledgements

We are grateful to the Leverhulme Trust, which provided the research project grant (RPG-2016-239) for Enlightenment Architectures, and to our colleagues at the Natural History Museum, British Library and British Museum who generously provided digital images of their catalogues and much useful advice. The deep knowledge, skills and support of Marjorie Caygill, James Delbourgo, Sachiko Kusukawa, Deborah Leem, Arthur MacGregor, Edwin Rose, Andreas Vlachidis and Alison Walker contributed greatly to the project and to this article. We would especially like to thank Xinyun (Sigrid) Liu, who produced the table in the Appendix and our colleagues on the Enlightenment Architectures project, Martha Fleming, Alexandra Ortolja-Baird and Victoria Pickering.

Notes and references

1 Proceedings published in A. Walker, A. MacGregor and M. Hunter (eds.), *From Books to Bezoars: Sir Hans Sloane and his collections* (London, 2012).

2 All databases are incomplete and still ongoing: NHM beta data portal, http://data.nhm.ac.uk/dataset/sloane-herbarium; BL Sloane Printed Books, http://www.bl.uk/catalogues/sloane/Home.aspx; and BM COL, https://www.britishmuseum.org/research/collection_online/search.aspx. Two newer online database resources are now available: Royal Society Minute Books by Hans Sloane, 1686–1711, https://royalsociety.org/collections/turning-pages/; and abstracts of Lisa Smith's database of abstracts from Sloane's medical correspondence, http://sloaneletters.com

3 An AHRC Science in Culture Exploratory Award: see the Projects pages on the Reconstructing Sloane website at https://reconstructingsloane.org, which includes links to podcasts of these workshops and to an innovative AHRC Group Collaborative Doctoral Award, Reconnecting Sloane: Texts, Images, Objects, with curators from the three nationals co-supervising three PhD students with two universities, King's College London and Queen Mary University of London.

4 For previous discussions of the original and surviving catalogues, see P. Murray Jones, 'A preliminary check-list of Sir Hans Sloane's catalogues', *British Library Journal* 14 no. 1 (1988), pp. 38–51; A. MacGregor (ed.), *Sir Hans Sloane: Collector, scientist, antiquary* (London, 1994), pp. 28–9, 291–4; M. Caygill 'Sloane's catalogues and the arrangement of his collections', in Walker, MacGregor and Hunter, op. cit. (note 1), pp. 120–36; and most recently J. Delbourgo, *Collecting the World: The life and curiosity of Hans Sloane* (London, 2017), ch. 6 'Putting the world in order', pp. 258–74; for the library catalogues, see Amy Blakeway, 'The library catalogues of Sir Hans Sloane: their authors, organization, and functions', *Electronic British Library Journal*, article 16 (2011) http://www.bl.uk/eblj/2011articles/article16.html; and for Sloane's cataloguing of his collection of prints, see A. Griffiths, 'Sir Hans Sloane (1660–1753)', in *Landmarks in Print Collecting: Connoisseurs and donors at the British Museum since 1753*, ed. A. Griffiths (London, 1996), pp. 21–42, and Appendices A–C, pp. 257–73.

5 The five catalogues are: Miscellanea (BM), Fossils I and V (NHM), MS 3972B and MS 3972C vol. VI (BL). At the end of 2019, the results were made available in the form of a searchable online transcription with corresponding page images at https://reconstructingsloane.org/enlightenmentarchitectures/2020/01/02/digitised-catalogues-2/. The first of a series of articles explains the process used to transcribe and markup the catalogues and explores initial discoveries made during the process: A. Ortolja-Baird, V. Pickering, J. Nyhan, K. Sloan and M. Fleming, 'Digital humanities in the memory institution: the challenges of encoding Sir Hans Sloane's early modern catalogues of his collections', *Open Library of Humanities* 5 no. 1 (2019), pp. 1–40. Further articles will focus on the use of catalogues as part of a collections-management process, Sloane's approach to cataloguing his library in comparison with his contemporaries, his use of bibliographic cross-references in his natural history catalogues, and the digital ethics raised by issues of 'absence' in the catalogues – their blank spaces, other information that is not there and what these absences tell us. Links to all these articles as they appear and to other useful Sloane material will be found at https://reconstructingsloane.org/enlightenmentarchitectures/ .

6 The link to the catalogues is given in note 5. The freely downloadable datasets, including the colour and material terms that were searched to make Figs. 3 and 4, as well as the TEI-conformant schema used for the project and the XML datasets for each catalogue, are being made available through the UCL Research Data Repository under 'Enlightenment Architectures' at https://rdr.ucl.ac.uk.

7 Caygill, op. cit. (note 4), p. 131.

8 H. Sloane, *A Voyage to the Islands Madera, Barbados, Nieves, S. Christophers and Jamaica, with the natural history of the Herbs and Trees, Four-Footed Beasts, Fishes, Birds, Insects, Reptiles, &c. of the last of those islands*, vol. II (London, 1725), p. i.

9 Sloane to Abbé Bignon, n.d., cited in J. Clarke, 'Sir Hans Sloane and Abbé Bignon: notes on collection building in the eighteenth century', *Library Quarterly* 50 (1980), p. 478; our italics.

10 The manuscript volume titled 'Miscellanea' in the BM, which includes the sub-catalogue on which this article focuses, 'Miscellanies', is number 28 in the list of Sloane catalogues in MacGregor, op. cit. (note 4); the volumes of Intaglios and Islamic amulets are numbers 2 and 6 and the volume of indices, which were created later, often by amanuenses, and refer to catalogue numbers (the pages were never numbered by Sloane), is number 3.

11 The bindings on the four volumes are modern, with some other later lists incorporated into the backs of them by curators for ease of reference, but basically the categories and grouping of the catalogues into four volumes is as Empson recorded them in 1754; Caygill, op. cit. (note 4), p. 136.

12 The coins and medals catalogues were apparently destroyed in the Second World War: see Caygill, op. cit. (note 4), p. 122.

13 L. Daston and K. Park, *Wonders and the Order of Nature 1150–1750* (New York, 1998), pp. 265–73.

14 Ibid., p. 272.

15 N. Kenny, 'The metaphorical collecting of curiosities in early modern France and Germany', in *Curiosity and Wonder from the Renaissance to the Enlightenment*, ed. R.J.W. Evans and A. Marr (Aldershot, 2006), pp. 53–8.

16 O. Worm, *Museum Wormianum* (Leiden, 1655), 'Historiae de artificiosis, liber quartus', pp. 346–89.

17 G. Moss (trans.) and A. MacGregor (ed.), 'Liber procuratoris junioris: the book of the junior proctor, Ashmolean AMS 18 [1685B], c.1685', in *Ashmolean Museum Oxford: Manuscript Catalogues of the Early Museum Collections 1683–1886*, pt 1, ed. A MacGregor British Archaeological Reports, International Series 907 (Oxford, 2000), pp. 15–31: the additions in square brackets here are the authors', and are not in the original.

18 Nehemiah Grew, *Musæum Regalis Societatis. Or A catalogue and description of the natural and artificial rarities belonging to the Royal Society and preserved at Gresham College* (London, 1681), pp. 351–84.

19 A. MacGregor, *Curiosity and Enlightenment: Collectors and collections from the sixteenth to the nineteenth century* (New Haven and London, 2007), p. 62; see M. Hunter, 'Grew, Nehemiah (bap. 1641, d. 1712), botanist and physician', *Oxford Dictionary of National Biography*, http://www.oxforddnb.com/view/10.1093/ref:odnb/9780198614128.001.0001/odnb-9780198614128-e-11521 (accessed 26 January 2018).

20 B. Nelson (ed.), Ralph Thoresby, *Musaeum Thoresbyanum*, in *Ducatus Leodiensis* (London, 1715), 'The Digital Ark', http://drc.usask.ca/projects/ark/public/catalog.php?catalog=ThorMus .

21 MacGregor, op. cit. (note 19), pp. 49–50.

22 Delbourgo, op. cit. (note 4), p. 274.

23 Ibid., p. 259.

24 V. Pickering, 'Putting Nature in a Box: Hans Sloane's 'Vegetable Substances' collection', PhD dissertation, Queen Mary University of London (2016), pp. 51ff.; see also J. Rudoe, 'Engraved gems: the lost art of antiquity', in *Enlightenment: The discovery of the world in the eighteenth century*, ed. K. Sloan and A. Burnett (London, 2003), pp. 135–6.

25 N. B. Thylstrup, *The Politics of Mass Digitization* (Cambridge, MA, and London, 2018), p. 3.

26 Questions addressed by the research project but not explored in this article include from whom and where did Sloane acquire objects? What bibliographic cross-references did he make? Some of these can be addressed through the Enlightenment Architectures searchable database, https://reconstructingsloane.org/enlightenmentarchitectures/2020/01/02/digitised-catalogues-2/ .

27 D. Cohen and R. Rosenzweig, *Digital History: A guide to gathering, preserving, and presenting the past on the web* (Pennsylvania, 2005), pp 3–11. Note also their five problem areas, pp. 11–13.

28 J. Unsworth, 'Scholarly primitives: what methods do humanities researchers have in common, and how might our tools reflect this?' Paper presented at the symposium Humanities Computing: Formal Methods, Experimental Practice, King's College, London, 13 May 2000. http://www.people.virginia.edu/~jmu2m/Kings.5-00/primitives.html (accessed 16 December 2019).

29 TEI Consortium, *Guidelines for Electronic Text Encoding and Interchange: TEI P5*, https://www.tei-c.org/release/doc/tei-p5-doc/en/html/SG.html (accessed 16 December 2019).

30 See, for example, K. de Smedt, 'Some reflections on studies in humanities computing', *Literary and Linguistic Computing* 17 no. 1 (2002), pp. 89–101, at p. 95; S. Hockey, *Electronic Texts in the Humanities* (Oxford, 2000), p. 24; E. Vanhoutte and R. Van den Branden, 'Text Encoding Initiative (TEI)', *Encyclopedia of Library and Information Sciences*, 3rd edn., 7 vols. (Baton Rouge, FL, and London, 2010), vol. 1, pp. 15, 172–81: and D. Schmidt, 'The inadequacy of embedded markup for cultural heritage texts', *Literary and Linguistic Computing* 25 no. 33 (2010), pp. 337–56, at pp. 338–9.

31 Ortolja-Baird *et al.*, op. cit. (note 5), #case-study-2-the-object-problem.

32 They are: bak'd earth, porphyry, emeralds, Earthen, Bronze, Sulphere, Mulberry bark, Plaister of paris, silk grase, brass, earthenware, Electrum Britannicum, African-grasse?, earthen glased ware, amalgama of tin & Mercury, terra cotta, turchoises, Electrum Britanicum, Tea-root, lapis Lazuli, parian-marble, Elephants-tooth, glassed-earth, chrystal, sulphurous or pyriticall substance, cinder, terracotta, asphaltum, ebbany, kennel coal, palm-tree-wood, clay-stone, serpentine-stone. Note that we have not normalized spelling across the catalogues when doing this analysis, and thus 'turchoises' (Antiquities) is treated as a distinct term from 'turcoises' (Miscellanies).

33 Note that we have excluded the numbers 245, 199, 216, 244 which are in the top 5 most frequently occurring tokens in Miscellanies. The word-frequency list in Table 2 was extracted from Voyant on 11 November 2019 and is based on a plain-text version of Miscellanies from which we stripped all markup.

34 Daston and Park, op. cit. (note 13), pp. 327–8; Kenny, op. cit. (note 15), p. 55.

35 For this other type of list – an inventory – see J. Keating and L. Markey, 'Introduction: captured objects: inventories of early modern collections', *Journal of the History of Collections* 23 (2011), pp. 209–13. Keating and Markey use the words 'cataloguing objects' to describe the creation of an 'inventory', which is a conflation of two different processes, cataloguing and creating an inventory, possibly because there were few examples from the eighteenth century in their study so the differences were less apparent.

36 MacGregor, op. cit. (note 19), p. 64.

37 Caygill, op. cit. (note 4), p. 47.

38 A. M. Blair, *Too Much to Know* (New Haven, CT, 2003, pp. 13–14, citing B. Vickers (ed.), *Francis Bacon: The major works* (Oxford, 1996), p. 439; see also Kenny, op. cit. (note. 15). 'Baconian' is used here in the sense that, in his catalogues, Sloane used a multitude of observed facts to build up a large and complex body of knowledge.

39 BM Central Archives, Original Papers CE4/1, 39–45, 27 August 1756, cited in M. Caygill, 'From private collection to public museum', in *Enlightening the British: Knowledge, discovery and the museum in the eighteenth century*, ed. R.G.W. Anderson, M. L. Caygill, A. G. MacGregor and L. Syson (London, 2003), p. 18.

40 See, for example, E. D. Rose, 'Specimens, slips and systems: Daniel Solander and the classification of nature at the world's first public museum, 1753–1768', *British Journal of the History of Science* 51 (2018), pp. 205–37.

41 E. Powlett, *The General Contents of the British Museum with Remarks: Serving as a directory in viewing that noble cabinet* (London, 1761; rev. edn 1762)

42 Caygill, op. cit. (note 39), pp. 18–25; Caygill, op. cit. (note 4).

43 Caygill, op. cit. (note 4), pp. 126–31; see also Delbourgo, op. cit. (note 4), pp. 265–6.

44 Caygill, op. cit. (note 4), pp. 124–6.

45 Ibid., pp. 127–131: this is a very brief summary of Caygill's findings and she noted that around 1,800 of the objects in Miscellanies had codes; the lowest number was 8, the highest 324, but most (56 per cent) were clustered around four cabinets: 245 (393 entries), 199 (327 entries), 216 (293) and 226 (106).

46 The XML file, and corresponding schema, will be made available through the UCL Research Data Repository https://rdr.ucl.ac.uk (see note 6).

47 The table in the Appendix Part B was produced by Xinyun (Sigrid) Liu, a UCL MA Digital Humanities student placement, in Enlightenment Architectures in May 2019, building on work that had been done by Andreas Vlachidis (Assistant Professor, UCL) and Deborah Leem (MPhil / PhD candidate, UCL).

48 Caygill, op. cit. (note 4), pp. 125, 130–31.

49 Approximately 300 of the *c.*2,000 objects listed in Sloane's Miscellanies catalogue have been identified in the museum database, with their Sloane catalogue numbers and his original ownership recorded for them (they can be found by searching the BM COL (see note 2). The survival rate for the objects from the Antiquities, Cameos and Seals catalogues is much higher.

50 MacGregor, op. cit. (note 19), p. 63.

51 These items were probably well known to many of Sloane's visitors familiar with Petiver's illustrated catalogues of his own collections, as the reference Sloane provides is to an illustration in his *Gazophylacii naturæ et artis* (London, 1702–9), in the volume of plates, where it is listed under Tab. 74 as image no. 7: 'Tobacco Pipe *used by the Kings of Carolina*' cat. no. 608; this was its number in Petiver's catalogue of his collection, where the plates (Tabula) each had several numbered images within them.

52 The China ink was Miscellanies no. 1453: 'China *ink*. ib. 77.4.5' (in other words Tab. 77, images 4 and 5) and Miscellanies no. 1454 was: 'A Small Indian *Hatchet* graved by Mr. Petiver Pt. Am. 20.21 from Mr *Walduck*. Pet.' Pt. Am. was *Pteri-Graphia Americana* (London, 1712).

53 S. Kusukawa, 'William Courten's lists of 'Things Bought' from the late seventeenth century', *Journal of the History of Collections* 29 (2017), pp. 1–17, esp. supplementary material (appendix), p. 15.

54 Miscellanies catalogue, fol. 206, see Caygill, op. cit. (note 4), pp. 124–45; see esp. p. 125, Fig. 2.

55 Caygill, op. cit. (note 4), pp. 133–4.

56 E. D. Rose, 'Natural history collections and the book: Hans Sloane's *A Voyage to Jamaica* (1707–1725) and his Jamaican plants', *Journal of the History of Collections* 30 (2018), pp. 15–33, at pp. 16–19, figs. 1–3. See also K. Arnold, *Cabinets for the Curious: Looking back at early English museums* (Aldershot, 2006), pp. 226–7. A George II bookcase cabinet by William Hallett, from Langley Park in Norfolk, recently appeared with Apter-Fredericks; see https://apter-fredericks.com/product/an-important-george-ii-mahogany-bookcase-from-langley-park-norfolk/ . It is probably very close in appearance and structure to those in Chelsea.

57 Now in the Minerology and Botany departments of the Natural History Museum; three are on display in the Enlightenment Gallery in the British Museum; for images, see figs. 63 and 85 in Sloan and Burnett, op. cit. (note 24).

58 For images of the cabinets and their drawers, see https://www.queens.cam.ac.uk/life-at-queens/about-the-college/college-facts/the-buildings/viganis-cabinet, https://blog.geolsoc.org.uk/2014/02/21/dr-woodwards-fossils/ and http://scilla.sedgwickmuseum.org.gridhosted.co.uk/ .

59 G. Adamson 'The labour of division: cabinetmaking and the production of knowledge', in *Ways of Making and Knowing: The material culture of empirical knowledge*, ed. P. H. Smith, A. R. W. Meyers, and H. J. Cook (Chicago, 2017), pp. 257–60, fig. 10; see also Arnold, op. cit. (note 56), ch. 10, for the development of taxonomy as the intellectual underpinning of museum practice.

60 Delbourgo, op. cit. (note 4), p. 259.

61 MacGregor, op. cit. (note 19), p. 64.

62 Arnold, op. cit. (note 56), p. 144; A. Marr, 'Introduction', in Evans and Marr, op. cit. (note 15), pp. 14–15.