Enabling scientific research: the museum perspective

Gail Boyle FSA FMA

Senior Curator (Archaeology & World Cultures)

Bristol Museum & Art Gallery

Tapping the resource….

- Have you done your homework?
- Who did you consult before you framed your research programme?
- Are you asking questions we really want to know the answers to?
- What are the timescales involved?

Lost in translation – do we speak the same language?

Research questions – scientific terminology versus plain English

Analytical techniques – assumptions made about what we know or have experienced

What are the projected benefits – for the museum and for the public?

Lost in translation – do we speak the same language?

Details of method of analysis: fresh lead metal will be taken with a cleaned high-steel drill (1.5 mm) in the museum, maybe at the bottom of the ingot. In the laboratory, 100 mg will be dissolved in half-concentrated nitric acid and diluted up to 1000 mg/l.

Chemical analyses will be performed with an ICP-MS (inductively coupled plasma mass spectrometer) Thermo Scientific ELEMENT XR. Sample solution will be therefore diluted 1:10 with 5% HNO_3. Analysis will be carried out with FAST SC-system, ST 5532 PFA µ-FLOW nebulizer, Peltier-cooled Qtz spray chamber and 1.8 mm sapphire injector in triple detector mode at all three different mass resolutions ($m/\Delta m$) depending on the elements of interest.

For lead isotope analysis, sample solution will be diluted with 2% HNO3 to yield a concentration of 500 ppb Pb, and spiked with 100 ppb thallium (Tl)-standard NIST SRM-997. The analysis will be performed with an ICP-MS Thermo Scientific NEPTUNE.

Staff resource and expertise

Our surveys show on average

- c. 33% of museums with responsibility for the care of archaeological archives reported a fall in staff numbers since 2010.
- c. 48% employ a curator with specialist expertise.
- Most have fewer than 1.5 FTE staff dealing with archaeological material

Staff resource and expertise – South West

Half of the respondents in this region reported a reduction in staff numbers.

One reported that all its collections staff had been made part time, and this was not a unique story.

Of those staff retained, most were covering broader remits, including the management of other collections.

Three museums reported that they worked closely with retired museum archaeology professionals and/or with local archaeological societies, which appears to have slightly buffered staff losses and reductions in permanent staff, but these represent unique local responses to the situation and is wholly reliant on goodwill and strong community support.

Unrealistic expectations …..an exceptional resource

https://www.britishmuseum.org/research

The dream….

“The British Museum maintains world-class laboratory facilities for scientific research of the collection and employs a team of scientists..”

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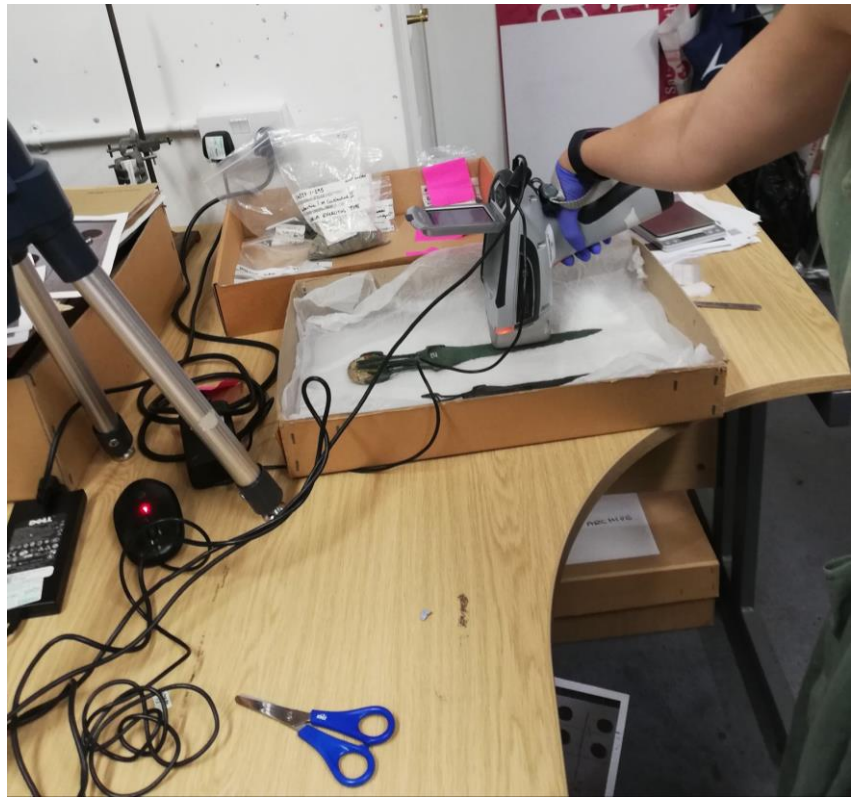


….the reality.

Location and facilitation

- Museums store material onsite and offsite
- Documentation standards vary
- Time and staff resource are in short supply
- Transport and logistics - vehicles
- Administration – object movement, loans, insurance, security

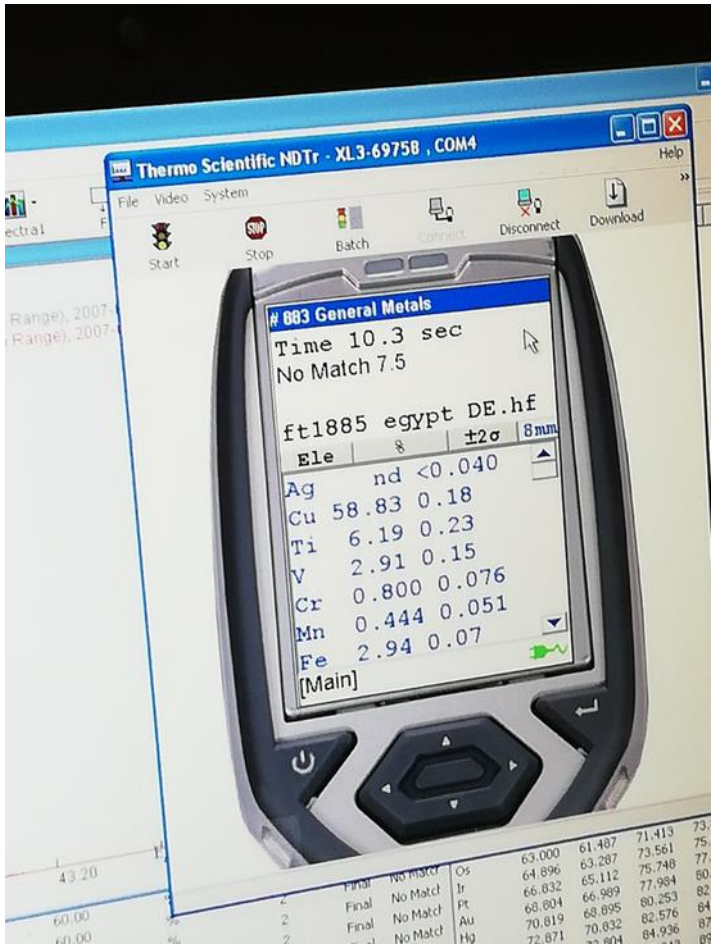
Hidden costs – the reality

- 1 x enquiry relative to cat, fox, hawk and pigeon bones
- 9 separate pre- 1990s archived sites held in an external store
- 290 boxes to manually sort and retrieve
- The logistics and cost to the Service to provide access to these archives was calculated to be:

£1,193

With thanks to Angie Bolton, Oxfordshire Museums

Destructive versus Non-Destructive



- Curators default position will be to do ‘no harm’.
- Need to be convinced as to worth of the knowledge gained.
- Need reassurance that the techniques are ‘state of the art’

Size matters…. as do records

Example from Bristol Museum:

- Request for sample of lead pig (Antoninus Pius), sample sent to J. Newton Friend, Birmingham Technical College for analysis; June 1928
- Analysis of lead pigs in BCM and a fragment of jug from Brislington well by J. A. Smythe at Durham Univ.; Jun-Oct 1935.
- Request and sampling for a Corpus of Roman Lead Ingots – Historic-archaeological and Scientific Investigations on the Production of Lead in the Roman Empire. University of Cologne. 2012.
  As of September 2023, publication not due until 2024

Results – interpretation and access

Cu	Sn	Pb	Zn	As	Sb	Ag	Ni	Fe	Mn	Bi	Co	Recon Total	CS Minor Element pattern
62.3	33.7	2.4	0.1	0.7	0.1	0.1	0.0	0.3	0.0	0.0	0.0	99.756	2
79.7	17.3	0.5	0.2	0.8	0.0	0.0	0.2	0.9	0.0	0.0	0.0	99.6773	11
60.8	22.7	12.5	0.2	1.8	0.2	0.1	0.0	1.1	0.0	0.1	0.0	99.6275	6
72.3	23.5	1.3	0.2	1.6	0.1	0.3	0.0	0.4	0.0	0.0	0.0	99.7106	9
84.5	13.5	0.1	0.2	0.8	0.0	0.0	0.1	0.6	0.0	0.0	0.0	99.8175	2
95.2	3.2	0.1	0.1	0.1	0.0	0.1	0.1	0.4	0.0	0.0	0.0	99.2566	1
97.4	0.1	0.2	0.1	0.4	0.1	0.1	0.3	0.5	0.0	0.0	0.0	99.3361	11
85.4	11.4	0.3	0.2	0.9	0.1	0.0	0.9	0.3	0.0	0.0	0.1	99.6406	11
86.4	12.3	0.1	0.1	0.1	0.0	0.4	0.0	0.1	0.0	0.0	0.0	99.5344	4
96.0	2.5	0.3	0.2	0.4	0.1	0.1	0.0	0.3	0.0	0.0	0.0	99.9163	2
98.9	0.5	0.0	0.1	0.0	0.0	0.2	0.0	0.1	0.0	0.0	0.0	99.9145	1
73.8	24.7	0.5	0.3	0.5	0.0	0.1	0.0	0.1	0.0	0.0	0.0	99.9593	2
92.2	6.1	0.5	0.1	0.6	0.1	0.1	0.0	0.3	0.0	0.0	0.0	99.9333	2
84.6	14.1	0.1	0.1	0.5	0.0	0.0	0.1	0.2	0.0	0.0	0.1	99.7629	2
94.7	0.0	0.1	0.0	3.0	0.1	0.0	0.3	1.6	0.0	0.0	0.0	99.6746	11
77.2	14.5	0.8	0.4	2.8	0.1	0.1	0.5	1.9	0.0	0.0	0.1	98.5102	11
93.0	2.9	0.1	0.0	1.4	0.1	0.1	0.0	2.0	0.0	0.0	0.0	99.5915	2
83.7	10.6	0.2	0.0	3.9	0.1	0.1	0.0	0.7	0.0	0.0	0.0	99.3288	2
79.3	16.4	1.2	0.1	2.1	0.1	0.1	0.1	0.2	0.0	0.1	0.0	99.6144	2
87.4	10.0	0.2	0.0	1.8	0.1	0.0	0.0	0.4	0.0	0.0	0.0	99.8564	2
88.6	5.3	2.1	0.2	1.8	0.1	0.1	0.1	0.5	0.0	0.1	0.0	98.8991	2
63.2	15.8	16.7	0.5	2.5	0.2	0.1	0.0	0.3	0.0	0.0	0.0	99.335	2
53.5	44.5	0.2	0.1	0.7	0.0	0.1	0.1	0.8	0.0	0.0	0.0	99.9509	2
93.0	6.4	0.2	0.1	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	99.9793	1

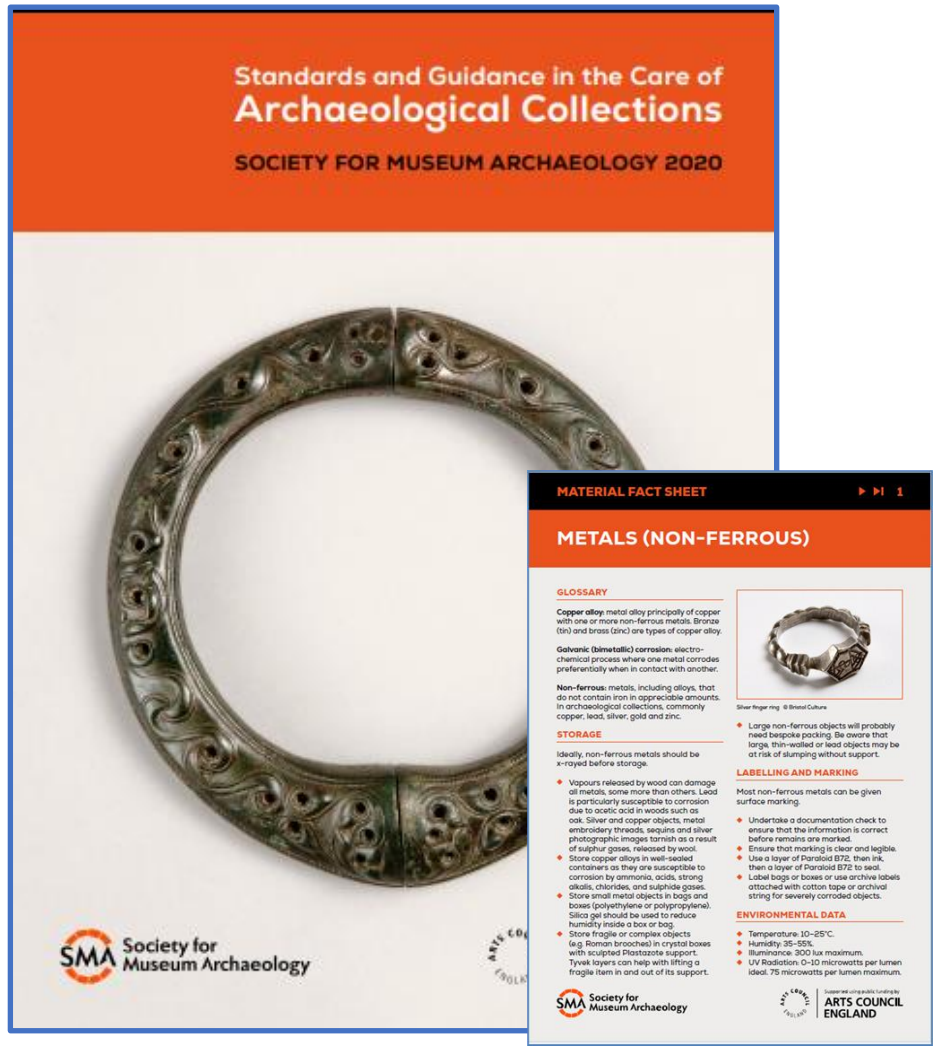
Partial results from pXRF analysis of copper alloy objects in an antiquarian collection at Bristol Museum – Dr Peter Bray

- Not public audience friendly
- Many institutions producing data
- key messages require distillation
- Dissemination of results – many platforms
- Need for open access – no paywalls

Research Charters – unlocking potential

"Apart from information about collection holdings it is good practice to produce a Research Charter and make this publicly available, ideally online. A Research Charter should be transparent about your organisational capacity to process and facilitate research requests and highlight any policies that are pertinent to it."

www.socmusarch.org.uk



Networks and guidance

"The largest collections specialist support organisation in the UK. We are the first consortium of support for specialist knowledge, advocacy, skills and research in the UK."

https://www.subjectspecialistnetworks.org.uk/