

From Beldibi to Bedfordshire - 11,000 Years of Tokens

Part 2. Pushing the Boundaries

Gary Oddie

Introduction

The first part of this Blog stayed firmly in the author's main areas of interest – coins and tokens typically to the value of one shilling, post 1504 and emanating from Britain and the British Empire.⁽¹⁾ It also covered other token series issued locally to the author's home and places of work over the past 30 years. Any specialisation, by definition, is a narrowing of the scope of interest and is usually determined by a recognition that it is not possible to do "everything". Limits are set by available resources: time, money and for very large series, storage space. The latter is especially the case if the "enthusiastic collecting" extends as far as relevant numismatic literature.

This Blog begins with a brief review of a conference held at Warwick University in 2017 - Tokens: Culture, Connections, Communities. Of the many talks, only two fell into the author's interests, the majority were from the Greek, Roman, classical and Mediterranean civilisations but also one that would unexpectedly lead the author to invert his view of the relationship between coins and tokens and allow all token series to be presented in a single and simple format. This latter talk would ultimately lead to these three blogs.

Returning To The Talk

In early 2017, electronic flyers appeared announcing a conference to be held at Warwick University - Tokens: Culture, Connections, Communities.⁽²⁾ Whilst the flyer did illustrate a 17thC token from Wimborne, the provisional programme was wholly classical and foreign. As the programme evolved a shilling token from the Worcester Porcelain Company was added to the illustrations along with a few talks on more parochial topics: 17thC British, an engraved coin and a series of ecclesiastical lead tokens from Holme Cultram Abbey. These were enough to tempt me to attend.



Following the usual introductions, the three days of talks began with Bridget Millmore on the story behind an engraved coin relating to a naval mutiny in 1797 and the harsh penalties meted out on some, but not all of the mutineers.

Extensive notes were taken of all of the talks and I tracked down representative illustrations and references for each talk in order to write a review of the whole conference.⁽³⁾ This includes where the programme order and speakers were changed.

This and the next two slides give the basic titles and a single illustration for most of the talks presented at the conference.

Tokens: Culture, Connections, Communities

Warwick University
An interdisciplinary conference at the University of Warwick, 8-10 June 2017
Classics & Ancient History Token Communities in the Ancient Mediterranean



15

Success to the seventeen united bright stars
England 1797

Byzantine pilgrim tokens
Syria 400-600AD

Christian Iconographies on Contorniates
Roman 306-394AD

Athenian Tokens
Greece 5th-4thC BC

The tokens and moulds from ancient Rome
Rome 1st-2ndC AD

Lead tokens in Roman Egypt
Egypt 300BC – 4thC AD



16

Along with the title there is a brief description of the topic covered. For full details of the authors and their affiliations see the conference review.⁽³⁾

It had been originally intended for a full conference proceedings to be published, but ultimately just sixteen of the twenty five presentations were included in a Special Publication of the Royal Numismatic Society.⁽⁴⁾

On the whole the published papers are representative of the talks as given. A review of the Special Publication has also been published in the Numismatic Chronicle.⁽⁵⁾

Three underlying themes stood out through all of the talks. (i) though usually collected, studied and catalogued parochially, the concept of tokens issued for local applications are ubiquitous (ii) tokens are only now being recognised for their importance as solid historical evidence of history from below, exemplified by the observation that the 10,000+ base metal and clay tokens in Athens Museum were only catalogued for the first time in 1910. Tokens aren't big, shiny, precious metal or pretty like most coins and (iii) contemporary documentary evidence is almost non-existent across almost all of the series presented, again exemplified by the observation that the word σύμβολον (symbolon) only appears a handful of times in the whole of the surviving classical Greek literature.

For me, the highlight of the conference was the second plenary lecture under the theme "Tokens, Authority and Government." Denise Schmandt-Besserat presented "The Invention of Tokens". This material was derived from her book *How writing came about*⁽⁶⁾ and her PhD Thesis, ultimately published in two volumes with the title *Before Writing*.⁽⁷⁾ The first book also appears on a list of "100 or so Books that shaped a Century of Science."⁽⁸⁾

Some time around 9000 BC small clay objects were first created to allow counting and recording of goods, materials and livestock. These simple three dimensional objects are tokens which are the precursor of writing. By 3300 BC 50 different shapes were in use and by 3200 BC the first writing appeared, deriving from many of these shapes.

The foreign bronze coins as Athenian token money
Greece 4thC BC

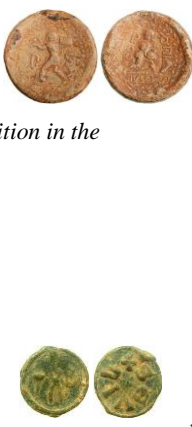
Iberian tokens
Iberia 1stC BC

Tokens, Honor, Tribute, Tith: Rank and Recognition in the Making of Money
World 6000 BC – 2000 AD

Tokens from Athens Museum
Athens 4th – 2ndC BC

Tokens from a Roman house in Athens
Athens 253-268 AD

The Holme Cultram Abbey tokens 1200-1530
England 1200-1530 AD



17

Royal tokens
France 17thC AD

Seventeenth Century Tokens and their Issuers
England Mid 17thC AD

Ephesian Tesseræ
Asia Minor 300 AD

Owls Depicted on Lead Tokens/Symbola
Greece 5th – 1stC BC

The armour tokens from the Athenian Agora
Athens 4thC BC


How a (material) token becomes a (conceptual) one
Near East 6000 BC



18

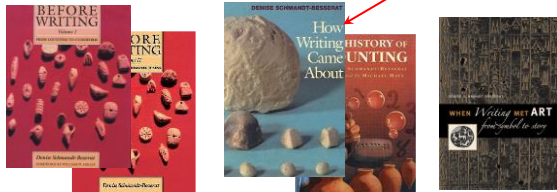
The Invention of Tokens
Denise Schmandt-Besserat

Near East 9000-3000 BC



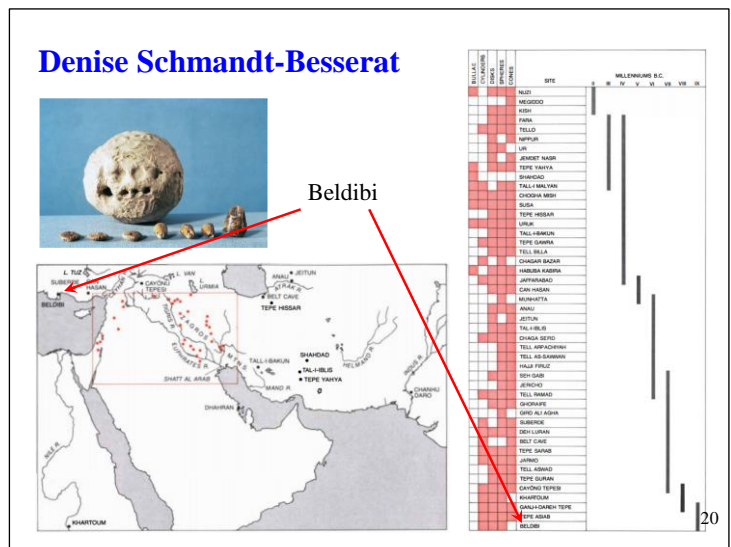
The Earliest Precursor of Writing, Scientific American, June 1977, Vol. 238, No. 6, pp. 50-58
Before Writing (2 vols), University of Texas Press 1992;
How Writing Came About, University of Texas Press 1996;
The History of Counting, Morrow Jr. 1999 (a children's book);
When Writing Met Art (University of Texas Press, 2007)

100 books that changed science in the 20th century



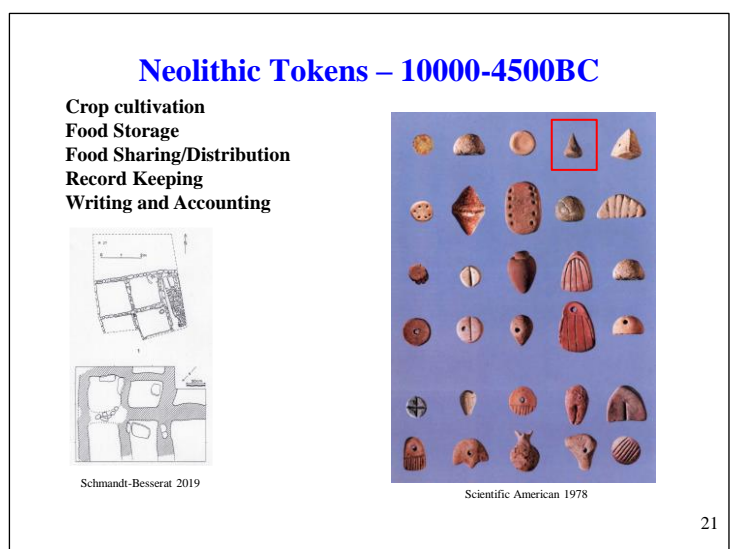
19

The next two slides derive from Denise Schmandt-Besserat's first article on this subject that appeared in 1977.⁽⁹⁾ When Neolithic man first started to settle and grow crops that could be stored, mechanisms were required to keep records of deposits and allow future withdrawals equitably. Throughout the fertile crescent archaeological digs have been finding small clay objects for many decades and sometimes hollow clay bulla or envelopes that contained these tokens. When enough material is brought together with sound location and other dating material it is possible to see an evolution in the use and complexity of the tokens. In many cases the indentations in the surface of the bulla are impressions of the tokens inside. One of the earliest datable locations was at Beldibi on the Mediterranean coast of Turkey, around 9000BC.



The find locations have generally been in locations with known early cereal cultivation and more specifically where in-situ structures have been found (pits) that are associated with grain storage.

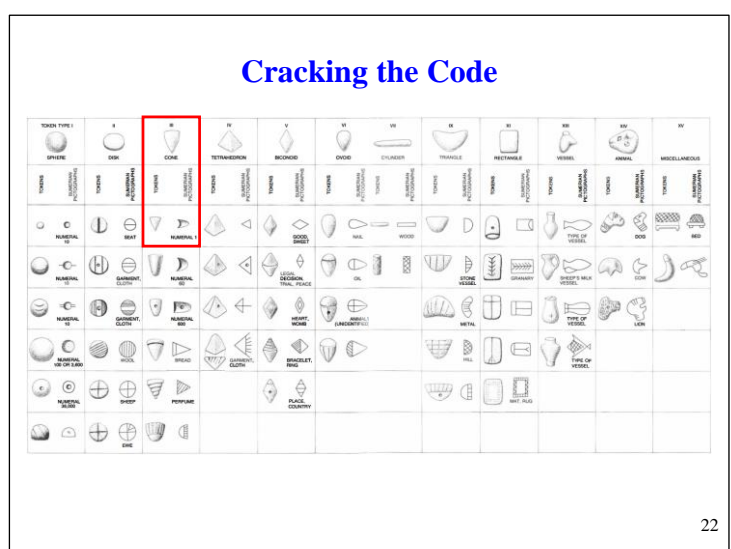
It is important to note that these clay tokens are abstract in shape, not being simple pictograms, and are thus the first conceptual step towards writing and counting. When impressed into soft clay and allowed to dry, the result is the earliest writing and record keeping. This also allows the storage of much more complex messages and information than the simple notched tally sticks of this early period of civilisation.



Many different clay token designs are known, some simple: spheres, cones, discs etc, some slightly more complex, but none are shaped like the things they represent and are thus abstract tokens. Other, typically later, clay tokens also have extra marks: lines, dots, curves impressed into their surface.

Thus there is a written code to be cracked, but there is no Rosetta Stone to help.

However, there are many thousands of clay tablets with early forms of writing, (Cuneiform etc), that allow many of the tokens to be interpreted.



This last sentence is a really sweeping statement, especially as the meanings may not be unique by location or time period. The general concept has met some opposition since first proposed but is standing the test of time.

This image is from a display at the Oriental Institute Museum, University of Chicago. It shows the evolution from clay tokens inside clay envelopes with impressed marks on the outside, to various examples of evolving cuneiform writing on clay tablets.

With just a few dozen intact bulla existing in museums around the world, there was little more to do than to fill in the gaps in the literature study and think about how these tokens fit into the scheme of my own token interests.

Then in 2020 one of my weekly searches for “token” on the-saleroom.com turned up the item shown here.

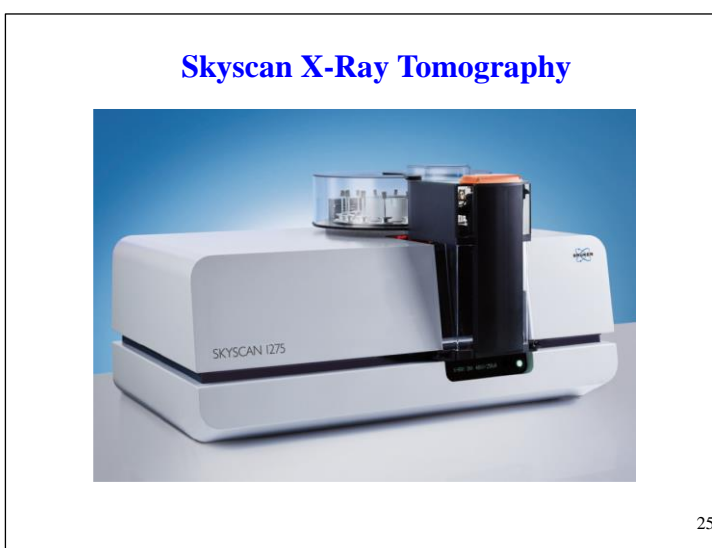
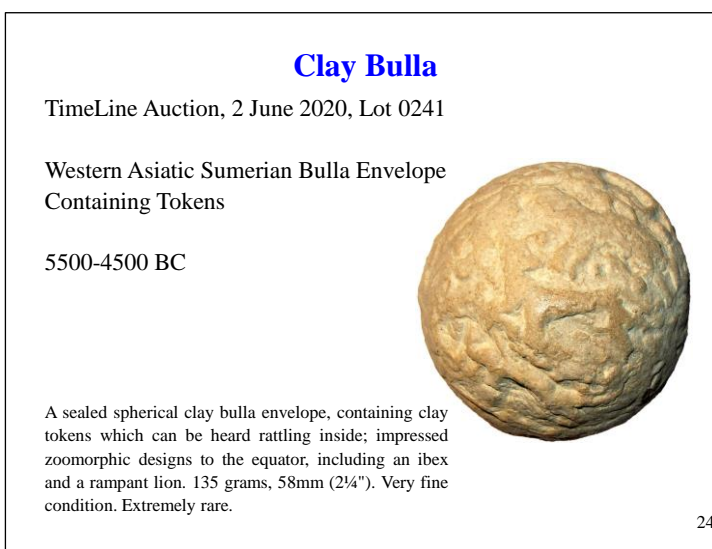
Though not the earliest of bulla, this item comfortably predates the earliest ditches and post holes of Stonehenge in Wiltshire (c.3100 BC) and the stones visible today (c.2600 BC).

The auction was on the day following my exit interview from my job of 24½ years in Cambridge, and though not a shilling and not a local token it was still special enough to tempt me to bid.

This was one of those occasions where the books had been bought and read long before the item was acquired. As with all collecting, more should be involved than mere possession and accumulation, and an item should always lead to an opportunity (or excuse) to find out more.

My career had been in fluid mechanics relating to the oil industry, working in a laboratory with state-of-the-art analytical and experimental equipment. The science ranged in length scales from microns (10^{-6} m - flow in porous media - rocks) to flow in pipes cm to m (10^{-2} to 1 m) to flow in hydrocarbon reservoirs (10m to 100km).

One of the pieces of equipment used in another department was the SKYSCAN 1275 Fully Automated High-Speed X-ray Microtomograph manufactured by Bruker.⁽¹⁰⁾ This was originally designed for clinical and medical applications. This equipment allows 3-D X-ray imaging of porous media, such as rocks, and the movement of fluids (oil, water, gas, chemicals etc) through the pores or settling processes within complex fluids. As I had now left the company, favours were asked of old colleagues (Dr Claire Wilshaw and Dr Leo Steenson) to carry out X-ray imaging of the bulla to identify the tokens that could be heard rattling inside.

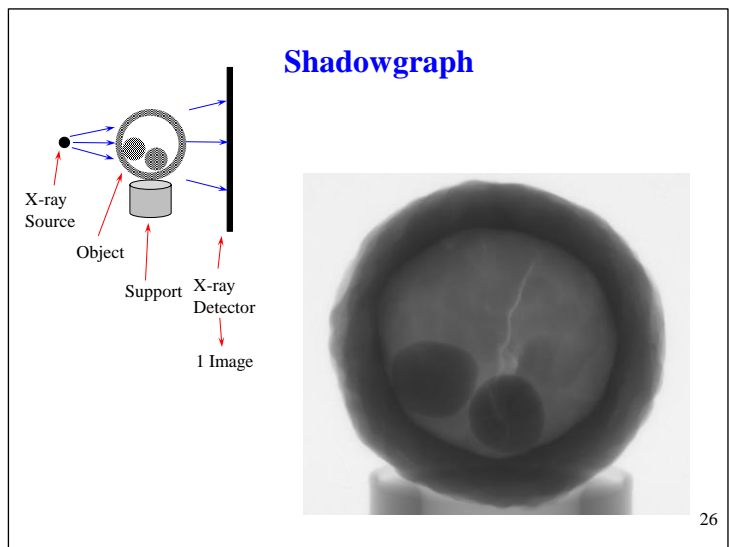


Simple X-ray imaging, also known as shadowgraphy involves sending X-rays through an object and then collecting the X-rays on an X-ray detector. Historically this was a wet film process, just like pre-digital photography. Today the X-ray detectors are electronic, in much the same way as digital cameras.

The denser the material the more the X-rays are absorbed and scattered and don't reach the detector. Thus the result is a shadowgraph representing a 2-D projection of the density distribution in the object.

On a small scale this is the process used by dentists to "see" teeth, bone and fillings.

A few shadowgraphs of bulla and their tokens can be found in the literature.⁽⁷⁾ If, however, instead of taking a single X-ray shadowgraph, a series of images is taken and after each image, the object is rotated slightly to create a slightly different image. The Skyskan does this automatically to take 720 X-ray images. Each of these is a digital 2-D greyscale image that can be seen on a screen. However a mathematical transformation (inversion) can be applied to all of the data which allows a 3-D image to be created. This 3-D image can be manipulated (rotated, sliced etc) to allow everything to be viewed more clearly (on a 2-D screen).

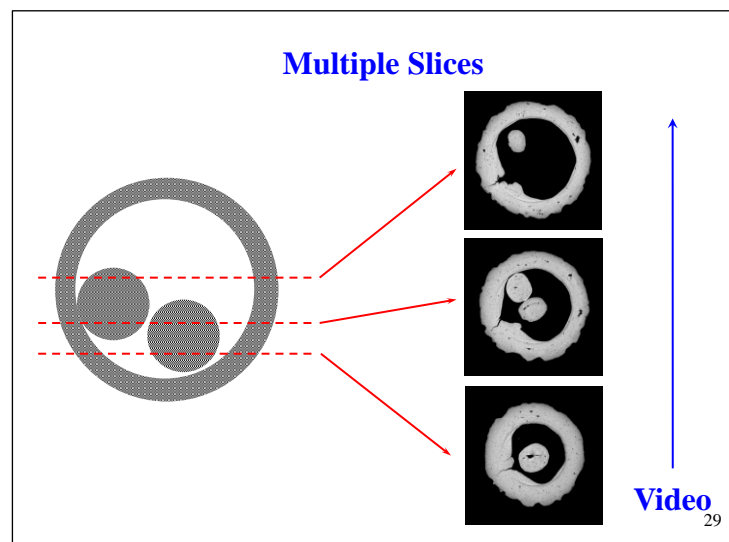
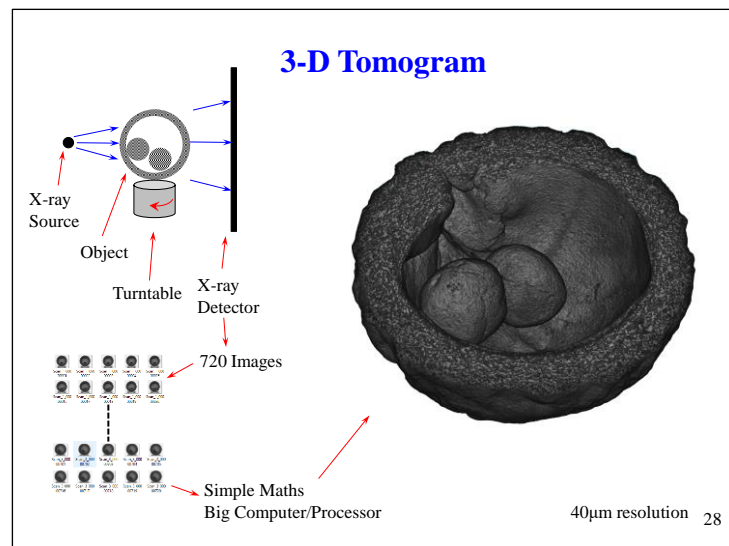


In this image it is possible to see the two spherical tokens inside the clay bulla, along with the coarse granules that make up the composition of the clay. The spatial resolution of the imaging is 40 microns, which means that the lines and ridges on the inner curved surface are likely the thumb-print of whoever made the bulla.

One way of viewing the 3-D data is to take a series of slices and then view the slices as a sequence of images of a video.

The whole of this processing is essentially the same as is now used medically for CT, MRI and PET scans. The main difference is that the patient stays still and all of the hardware moves around.

Three typical slices are shown here and the whole video can be downloaded using this link.



<https://britnumsoc.files.wordpress.com/2023/11/11000-years-tokens-oddie-blog-video.avi>

Conclusion to Part 2.

Following on from Part 1 – What is a Token? this blog has briefly described some of the talks that were given at a conference at Warwick University in 2017. The conference was reviewed by the present author.⁽³⁾ and some of the papers were published in an RNS Special Publication⁽⁴⁾ and reviewed in the Numismatic Chronicle.⁽⁵⁾

This has extended the definition of a token as “something that represents something else” back into the neolithic at 9000 BC, and the beginning of record keeping and counting. The clay tokens and their impressed bulla have a continuous history to 3100 BC and afterwards and the beginnings of cuneiform writing.

An early example of an intact clay bulla with its tokens has been presented and analysed using 3-D X-ray tomography. A trivial X-ray shadowgraph shows the two enclosed tokens without much detail. However the full 3-D imaging allows the fine detail to be seen on the surface of the tokens, in the structure of the clay and a likely neolithic thumbprint on the inside surface of the clay. A final video shows the capabilities of 3-D X-ray tomographic imaging.

The third and final part of the blog will bring all of the topics mentioned so far into a single picture that allows a unified description of all coins and tokens for the past 11000 years.

References, Links and Acknowledgements

- (1) G. Oddie. From Beldibi to Bedfordshire - 11,000 Years of Tokens Part 1. What is a Token? BNS Blog 5 December 2023.
<https://britnumsoc.files.wordpress.com/2023/12/414-11000-years-tokens-oddie-blog-001.pdf>
- (2) https://warwick.ac.uk/fac/arts/classics/research/dept_projects/tcam/events/tccc/
- (3) G. Oddie. Tokens: Culture, Connections, Communities – Conference Review. *TCSB* v12n6 Page 229-239, March 2018. https://thetokensociety.org.uk/wp-content/uploads/2022/12/Volume_twelve-1.pdf
- (4) A. Crisà, M. Gkikaki and C. Rowan (eds.). *Tokens; Culture, Connections, Communities*. RNS Special Publication 57, 2019.
https://numismatics.org.uk/wp-content/uploads/2020/01/Tokens_ed_crisa_gkikaki_rowan.pdf
- (5) J.H. Kroll. Book Review: *Tokens; Culture, Connections, Communities*, A. Crisà, M. Gkikaki and C. Rowan (eds.). *Num Chron* v181 pp506-508, 2021.
- (6) D Schmandt-Besserat. *How Writing Came About*. University of Texas Press, 1996.
- (7) D Schmandt-Besserat. *Before Writing*. University of Texas Press 1992
- (8) P. Morrison. 100 or so Books that shaped a Century of Science. *American Scientist*, v87n6, November-December 1999.
<https://www.americanscientist.org/article/100-or-so-books-that-shaped-a-century-of-science>.
- (9) D Schmandt-Besserat. The Earliest Precursor of Writing. *Scientific American*, v238n6, pp.50-58, June 1977.

Thanks to Denise Schmandt-Besserat for the presentation and publications that inspired this work. Also to Claire Wilshaw and Leo Steenson, at Schlumberger Cambridge Research, for carrying out the X-ray tomography and creating of the images and video.

