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## DIGITIZING LATE ANTIQUE AND EARLY MEDIEVAL COIN FINDS: CONNECTING THE MEDITERRANEAN, BLACK SEA, AND UKRAINE

### INTRODUCTION

This paper provides a brief introduction to the work of FLAME (*Framing the Late Antique and Medieval Economy*), a digital humanities project headquartered at Princeton University. In particular, it focuses on FLAME's potential as a research tool for ancient and medieval historians of the Black Sea area and eastern Europe, specifically through the case-study of Ukraine. Begun in 2014, FLAME was undertaken on the premise that numismatics must be a critical element in the economic history of the transition from Late Antiquity into the Early Medieval period (325–750 CE). While reasonable on its face, in practice – primarily due to the enormity of the evidence, divided by disciplinary and linguistic barriers – this supposition is not applied systematically in large-scale histories of this period. This is true, for instance, of the most influential current account of the period – Chris Wickham's *Framing the Early Middle Ages: Europe and the Mediterranean, 400 – 800* – which makes minimal use of coin evidence to reconstruct the economic picture of the Late-Antique to Medieval transition.[18] Wickham, basing his history of the Late-Antique to Medieval transition primarily on ceramic, archaeological, and literary sources, argued for a Mediterranean whose macro-economic disintegration (or continued integrity) was highly variable, manifesting primarily at the regional level, and thus complicating any generalized approach. While this is a reasonable and sane approach to the topic, further coin evidence would nuance and extend this analysis.

Since 2014, FLAME has completed two projects (or Modules) that aim to bring together and make accessible the relevant numismatic evidence for this period (roughly 325–750 CE). The first Module, focused on minting, was published in 2016 and has appropriately been named the "Minting Module." This paper, however, focuses on the more recent Circulation Module, which is now available on FLAME's website (https://flame.princeton.edu). The Circulation Module focuses on the

[18] In an extended footnote, Wickham justifies the avoidance of a heavier emphasis on coin evidence (702, n. 16): "I have relied on it less than on ceramics, in part to avoid an over-complex exposition; in part because it is often unclear how much coin distributions tell us about economics as opposed to the structures of public administration and of diplomatic gift exchange… in part because only copper coins, which were not minted in the post-Roman West, are much of a guide to non-luxury exchange in our period… It must be further observed that several moments of considerable economic prosperity show striking shortages of coin in excavations, such as the fifth century in Palestine, and the ninth century in both Rome and Iraq… All the same, coinage is a crucial indicator, and I would hope that future comparative studies give it proper weight."

movement of coins, from mint to find-spot, and aims to provide access to available coin-find data from across west Afro-Eurasia.

In what follows, we lay out our methodology, some preliminary results, and finally look at a case-study—circulation on the territory of modern Ukraine—and what FLAME has done to integrate the Black Sea-area into accounts of this period. While avoiding conclusions, this paper should demonstrate that the material has value to historians of this period, both to those specializing in the region and those with interests outside of it.

**Method**

FLAME is a collaborative digital humanities project that brings together dozens of international scholars, each contributing according to their regional specialization. The primary role of most contributors is to digitize existing, published reports of coin finds (e.g., excavation reports, hoard reports, etc.). Contributors do so using a standardized reporting system built by FLAME, which ensures consistent terminology and concepts. This forms the basis for FLAME's Core Dataset. The results are stored on a MySQL database and are visualized using ESRI's ArcGIS platform.

Another source of data comes from external datasets, which FLAME integrates into its database (while providing full credit and, where possible, linking back to the original). We currently rely on four major external datasets, though we anticipate more to come. These include the online *Coin Hoards of the Roman Empire* (CHRE); the British *Portable Antiquities Scheme* (PAS); Andrei Gandila's dataset of Thessalonikan coins; and, Peter Philps' database of Early Islamic coinage.[19] We aim to add additional external datasets in the coming year.

**Preliminary Results**

As of June 2021, FLAME stores nearly 700,000 coins from approximately 6,000 coin finds, originating from 721 individual mints. From as far west as Portugal, these finds range as far east as India (though, in principle, they might eventually extend as far east as China). From as far south as Ethiopia, finds stretch to northern Poland and England. Thus, FLAME can claim to cover a considerable portion of west Afro-Eurasia, well beyond the borders of the eastern and western Roman empire.

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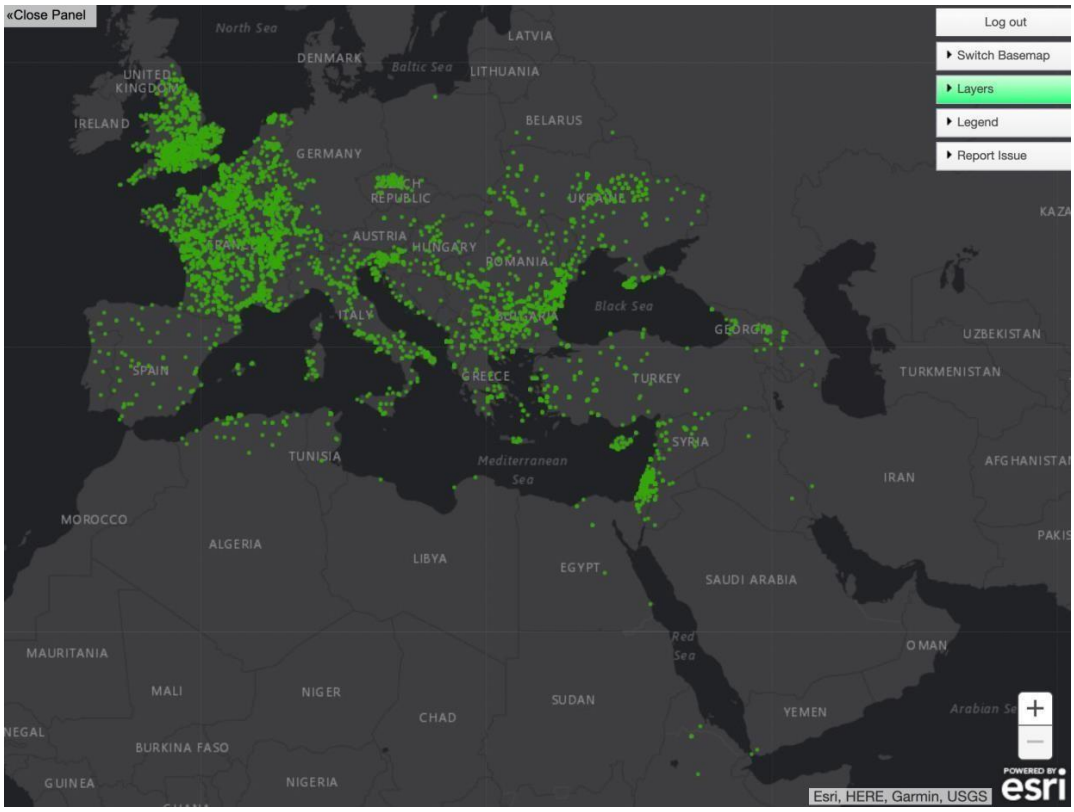


*Figure 1: Individual coin finds in FLAME database (Not pictured: finds in Central Siberia and Southern India).*

The reader can see significant lacunae among the existing finds, even in relatively well-covered areas such as North Africa or Germany (both priority areas).[20] Moreover, while the longterm goal of the project is to contribute descriptively to the overall economic picture of the Late Antique to Medieval transition (as stated above), we believe that before this can happen, more work must be done to clarify a series of methodological and historiographical problems identified in the course of data-gathering.

This can be demonstrated clearly simply by looking at Britain, which is massively overrepresented on the FLAME map (Fig. 2). The reason for this is that Britain has, since the late 1990s, operated under the Portable Antiquities Scheme (PAS). Run by the British Museum, it coordinates a significant number of "find liaison officers" whose job is to communicate with members of the public who make archaeological finds. These individuals are incentivized to report their finds through a series of laws that regulate and reward reporting of archaeological objects. The results can be seen on the *PAS* website (https://finds.org.uk/), which as of January 2021, contained approximately 1.5 million entries, of which about 5,000 were early medieval coin finds, and 279,000 Roman.

[20] Germany is better covered by existing, publicly available databases of coin finds. This includes the *Antike Fundmünzen in Europa* (AFE-RGK) of the Deutschen Archäologischen Instituts (DAI), which is the largest single database that is open and publicly available.

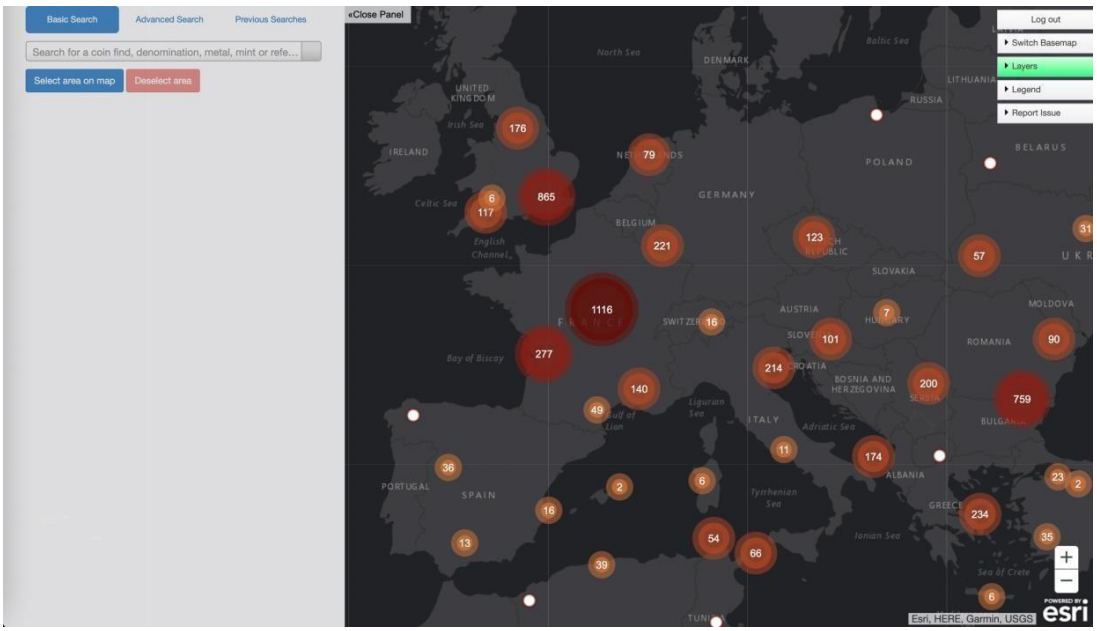


*Figure 2: Clusters of coin finds in FLAME database. Notice the comparatively large number in Britain (upper left of map).*

The result is that British finds number about 1,000 in FLAME, compared to about 230 in Italy, 172 in Greece, or 193 in Turkey. This does not reflect British economic centrality in antiquity. Britain was not a larger component of the Atlantic-Mediterranean macro-economy than any of the previously mentioned countries (indeed, it was likely peripheral, by comparison). Rather, the numbers reflect modern differences in disciplinary, political, and cultural history.

Dealing with such systematic biases – or rather, accounting for and communicating them to users – has become a priority for FLAME. This has implications for how other regions must be interpreted, as well as how Britain itself should be. One strategy that FLAME has adopted for dealing with this is structure its map tool in such a way that it highlights systematic bias in the map interface itself. Another is to commission regional essays that explain why excavation, preservation, and reporting of coin finds looks different in those areas (these are forthcoming and will be freely available on FLAME's website).

**Ukraine as case study**

Nevertheless, bias aside, FLAME's data will help to expand and deepen historical accounts of this period. This is particularly true of areas – for instance, the northern Black Sea region or the territories of modern Ukraine, Russia, or Georgia – which are not covered in many western European and North American economic histories (here too, in ignoring eastern Europe, Wickham is emblematic). FLAME has filled some of these gaps largely through its international and collaborative nature. In

what follows, we consider the case of Ukraine – the composition of FLAME's Ukrainian research team, its early results, and the possibility such data holds for better integrated histories of this region (especially vis-a-vis the Mediterranean-Black Sea macro-region). This will be no detailed analysis, but rather a bare description of finds. We hope, however, to publish such detailed analyses over the next few years.

Starting in February of 2021, FLAME began to work with a group of scholars in Ukraine to digitize available coin finds on the territory of modern Ukraine.[21] This team was led by Prof. Vasyl Orlyk of Central Ukrainian National Technical University, as well as Dr. Andrii Boiko-Haharin, Senior Curator of the Monetary Museum of the Central Bank of Ukraine, and Olena Petrauskas, a researcher at the Institute of History of Ukraine at the National Academy of Sciences. This team began with the most recent comprehensive catalogues of Roman and Byzantine coin finds,[22] with ambitions to record at least some unpublished finds (though the situation here, as in many other countries, is difficult under normal circumstance, but especially in the wake of the COVID pandemic).

As of June of 2021, this research unit had digitized 313 coin finds, totalling 3,016 coins from 22 separate mints. Of these, 34 finds were coin hoards, 45 were from archaeological excavations, and the rest were single finds, discovered and reported either by civilians in the course of daily life or found during infrastructure repair or building activity. Among these finds, there were 399 gold coins,[23] as well as 241 silver,[24] and 2,366 bronze.[25]

As the following image shows, these covered the whole country, to a greater or lesser extent, but were concentrated in particular areas. Crimea formed single largest coin cluster (n=78),[26] but in particular the immediate region around Sevastopol (n=54). The areas in and around Kyiv (n=23) contained a high concentration of coin finds, with the wider region around the city doubling this number (n=46). The Poltava Oblast, in the center of the country, likewise shows a thick concentration of finds

[21] It did so with considerable financial support from the Canadian Institute of Ukrainian Studies (CIUS) at the University of Alberta. We extend our gratitude to CIUS for this support, without which work on Ukraine could not proceed.

[22] These were derived primarily from Vladislav Kropotkin's monumental catalogues of Soviet coin finds, covering the territorial boundaries of the former Soviet Union. See: Kropotkin 1961, 1962. This was supplemented by smaller works of Kropotkin (1965, 1966, 2000), along with a variety of other works. A current bibliography of the region, which includes approximately thirty sources but is growing, can be found on FLAME's website (https://coinage.princeton.edu/resources/bibliography/#Ukraine).

[23] These either came from the mints of Thessalonike or Constantinople, or could not be attributed to a mint.

[24] These came from a larger range of mints: Arelato; Constantinople, Nikomedia, and Sirmius. There were likewise many that could not be attributed.

[25] These came from the widest range of mints: Antioch, Aquileia, Arelato, Chersonesus, Colonia Augusta Treverorum, Constantinople, Decrinos, Heraclea, Kyzikos, Leione, Londinium, Lugdunum, Nikomedia, Sirmium, Siscia, Thessalonika, and Treveris. Of course, as before, some mints could not be attributed.

[26] Readers should note that the following totals are not reflected, one-to-one, on the map in Figure 3. This is because map clusters are generated automatically by ArcGIS, and tend to collapse geographic locations together in ways that can be deceptive. Thus, while the cluster centered around Sevastopol (southern Crimea) appears to contain 64 finds, many of these lie a considerable distance from the city. The cluster map should be used to make very broad insights into distribution. Those wishing to draw more nuanced insights should use the FLAME tool itself.

(n=59) – more or less evenly distributed across the district. Some areas in western Ukraine are well represented—for instance, the Ivano-Frankivsk Oblast (n=19), though upon closer inspection, finds from this region are scattered across a series of rural locations, not concentrated in any one location.

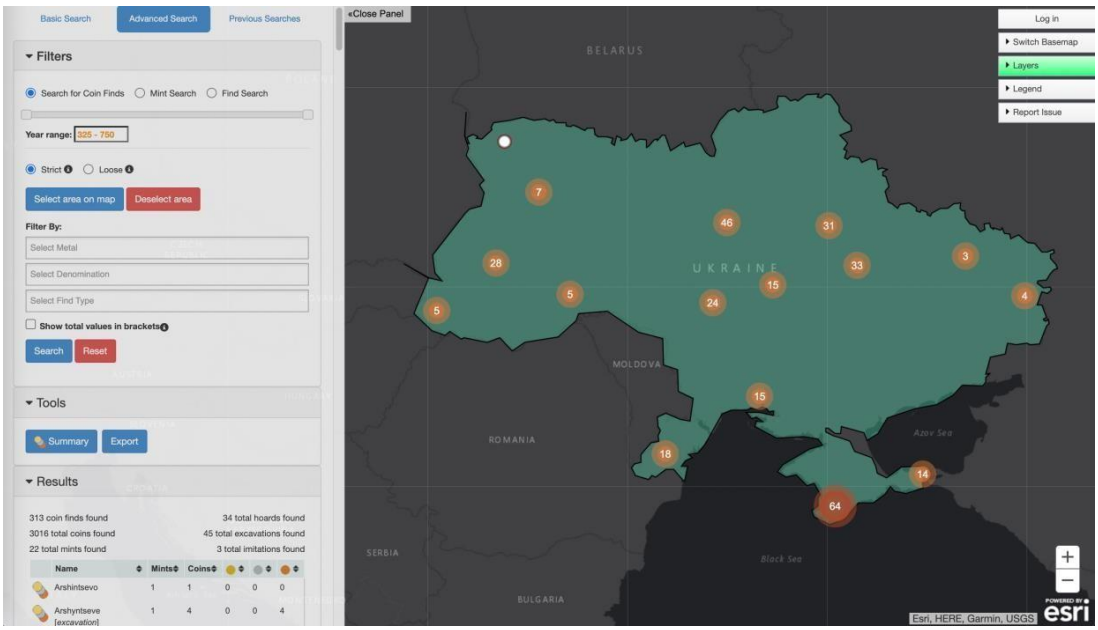


*Figure 3: Map of Ukrainian coin finds in FLAME database.*

Further analysis is required to show how these finds relate to other regions in the Black Sea and Mediterranean. For the moment, the Ukrainian team has laid the foundation for this work, and it is our hope that in the coming months and years, new and significant insights will be made into the place of this region in the Late Antique and Early Medieval economy.

**Conclusion**

FLAME was inaugurated in order to inject coinage back into debates over large-scale economic change in the Late Antique and Early Medieval periods in western Afro-Eurasia. Such materials are relevant to phenomena as widespread and important as the fall of the western Roman Empire, the consolidation of the Byzantine East, and the rise of Islam. They will also touch on regions that, in the past, have received less attention – whether through disciplinary, linguistic, or other barriers. Transitively, of course, the role of these previously neglected regions in the big economic processes of this period (e.g., the place of the Ukraine-region in the early Byzantine economy) ought to become clearer.

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