Final Report for JISC

Transatlantic Archaeology Gateway (TAG),

Archaeology Data Service, University of York

JISC Project Director: Julian D. Richards, University of York

NEH Project Director: Keith W. Kintigh, Arizona State University

June 30, 2011

Final Report
TAG: Transatlantic Archaeology Gateway

Introduction. The goal of TAG, the Transatlantic Archaeology Gateway, is to enable cross searching between two repositories of digital archaeological data, the UK's Archaeology Data Service (ADS) at the University of York and the Digital Archaeological Record, tDAR, based at Arizona State University and managed by a multi-institutional organization, Digital Antiquity. The grant is awarded jointly by JISC to the University of York and by NEH to Arizona State University. Within this broader goal, we have two distinct work packages. The first is to establish a portal that enables a basic level of cross searching of metadata across the two repositories. The second is to prototype a higher level of interoperability so that transatlantic faunal database content may be searched, integrated, and filtered.

Team Meetings. Since the November 21, 2010 the last report, in addition to frequent email communication, the joint teams have had 3 videoconferences: on December 15, 2010, January 27, 2011, and March 3, 2011 (by which time the joint effort was essentially complete).

Personnel. No changes.

Project Activities. Below, we summarize the major activities under the grant.

Work Package 1. The development of Work Package 1 is now complete. The University of York's Archaeology Data Service (ADS) hosts the project page (Appendix 1; http://archaeologydataservice.ac.uk/research/tag), the TAG Portal Introduction (Appendix 2; http://archaeologydataservice.ac.uk/TAG/intro.jsf), and TAG Portal (Appendix 3; http://archaeologydataservice.ac.uk/TAG/www.jsf). As a result of Work Package 1, a user is able to search both ADS and tDAR with a single query executed at the project portal. The portal executes searches of project metadata that cover basic "what," "when," and "where" categories of archaeological information in both ADS and tDAR and returns records from both repositories that satisfy the search criteria. The "what" component of a search is executed using a controlled vocabulary for site type (monument type) plus arbitrary keywords. "When" is specified by a calendar date range or using a slider bar with a keyed set of timelines with archaeological period names. "Where" is indicated using a selection box in a Open Layers interface and is ultimately described by the longitude/latitude coordinates of diagonal corners of the rectangle. More technically, the portal executes a search by calling web service endpoints implemented by ADS and tDAR. The portal software has been developed by ADS as a part of their companion grant from JISC. tDAR has developed a web service to process the portal request (delivered in an agreed upon format using an agreed upon vocabulary). The tDAR web service transforms the request into a tDAR search, the results of which are reported back to the user via the portal interface.

The search for agriculture and subsistence or domestic sites dating from AD 1000 to 1500 in the UK or continental US is shown in Appendix 3 with sample results shown in Appendices 4-7.

A paper describing work package 1 was presented by Lei Xia of the ADS at the CAA 2011 conference in Beijing and a jointly authored ADS/tDAR paper has been submitted for publication in the conference proceedings (http://www.caa2011.org/).

Work Package 2. Work Package 2 was an ambitious effort to prototype a much deeper level of interoperability whereby transatlantic database content (prototyped with faunal data) may be searched, integrated, and filtered. Work Package 1 builds on ADS's success in establishing interoperability across European cultural heritage repositories, notably through ARENA (Archaeological Records of Europe - Networked Access). Work Package 2 builds upon tDAR's data integration features that have been funded by the National Science Foundation (06-24341) and continues to use faunal data (animal bones recovered from archaeological sites) as its use case.

In Work Package 2, the US and UK teams have worked together on three subtasks. First, we worked with US and UK communities of faunal analysts to agree on shared ontologies (hierarchically organized concept maps for a wide range of faunal variables) that permit data integration. Initially by the March 2010 workshop attended by 22 people including17 faunal remains experts from the HE sector, the museum sector, English Heritage and commercial archaeology. Second, we identified US and UK faunal datasets whose integration can yield substantively useful results and entered them into tDAR. Third, we enabled access to tDAR's data integration tools through the TAG portal. The TAG portal flags search results that include datasets eligible for data integration. Table columns within the dataset must be mapped to a common ontology in order to be eligible for data integration.

The first subtask of building shared ontologies is complete. We achieved substantial agreement across a considerable spectrum of faunal analysts. These ontologies (including a lengthy historic fauna taxon ontology) are included as Appendix 8.

The second subtask of selecting and entering datasets is complete but proved more difficult than expected, not because of incompatibilities in the recording schemes but due to differences in the time periods and research questions that are typically pursued in the US and the UK. For our pilot test, we selected and entered faunal datasets from historic household contexts in Alexandria, Virginia (http://core.tdar.org/project/3738) and post-medieval household contexts from Spitalfields Market in London (http://core.tdar.org/project/5803).

We have now completed the third subtask of enabling transatlantic data integration through the TAG portal. A TAG portal query flags search results eligible for data integration. The TAG portal search results displays (See Appendix 7) "Compare datasets within these results: Database". Clicking on the link sends the user to tDAR with an active search result of datasets with linked ontologies that fall within the scope defined by the TAG search parameters. From that point, one can follow the standard tDAR integration process: (1) selecting the specific datasets to be integrated, (2) selecting display and integration columns, and (3) deciding how to filter and aggregate the results based on selection criteria over the integrated variables. The user can download, for further analysis, the integrated and filtered data in which each component database is transformed to a unified view over the integrated columns using the shared ontologies and mappings of the individual datasets to these ontologies.

A paper by Spielmann and Kintigh, including discussion of project efforts on Work Package 2, was presented at the 2010 ICAZ (International Council for Archaeozoology) conference in Paris August 23-28 (at NSF expense) and in January 2011 that paper was published in the *SAA Archaeological Record* (http://digitaleditions.sheridan.com/publication/?i=58423&pre=1).

Urban Fauna Workshop. Associated with Work Package 2, the NEH grant sponsored a workshop led by co-PI Spielmann focused on the data integration challenges for our transatlantic pilot dealing with the integration of historic period fauna. The workshop was held April 30 and May 1 at Arizona State University's Washington, D.C. facility. Attendees from the UK included zooarchaeologist James Morris and data analyst Michael Charno from Archaeological Data Services, with zooarchaeologist Richard Thomas participating when possible via Skype. Attendees from the US included zooarchaeologists Teagan Schweitzer and Kate Spielmann, historic archaeologists Nan Rothschild and Pamela Cressey, archaeologist and project PI Keith Kintigh, and NEH program officer Charles Kolb. TAG data integration pilot research executed by Katherine Spielmann was presented to illustrate the challenges and potentials for data integration (Spielmann's report on this work is presented as Appendix 9.)

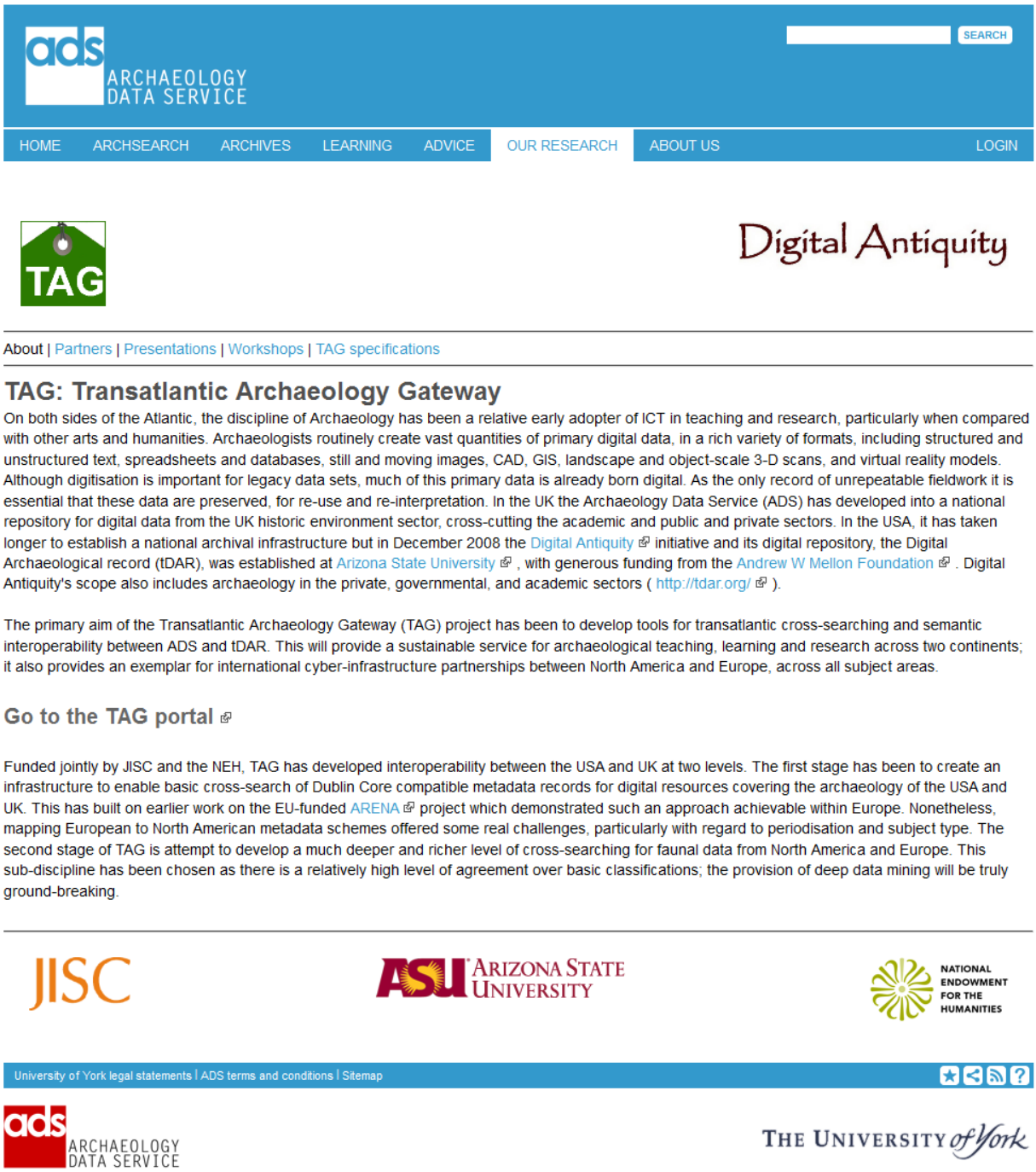
Separate notes detail the two-day discussion around issues of mutual interest concerning urban fauna (Appendix 10). As a direct result of the meeting, Morris and Thomas planned to convene a group of urban zooarchaeologists in Britain to identify ways in which to move this research forward; they identified the semi-annual zooarchaeology meeting as a good context in which to do that. Rothschild and Schweitzer planned to do the same with US zooarchaeologists and historic archaeologists, and identified the January 2012 Society for Historical Archaeology meeting in Baltimore as an appropriate venue to sponsor a session and/or organize an informal discussion. Kolb provided details of NEH grant opportunities that could help fund the uploading of datasets into tDAR and research on those data.

Project Assessment. Although we received a no-cost extension, for the final workshop that served to disseminate project results to a new user community, the project was essentially complete by the initial end date. We have refined our ideas, particularly in terms of conceptualizing Work Package 2 but have not made any substantial changes to the project objectives, work plan, or methodology.

Cyberinfrastructure automation and careful implementation of open source technologies has been central to this project and allows a small team of experienced staff to continue to build on a substantial tDAR code base developed with NSF funding. We have not encountered any significant hardware, software, or personnel problems.

As a final note, in addition to achieving the immediate project objectives, the intensive collaboration between the ADS and tDAR fostered by this grant has been beneficial, more broadly, for the development of tDAR, ADS and our respective user communities.

Appendix 1. TAG Project Page



Appendix 2. TAG Introduction

TAG

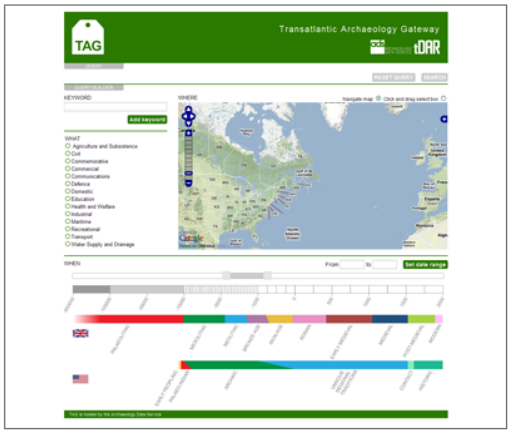
Transatlantic Archaeology Gateway

Searching digital archives in the UK and the USA

ads ARCHAEOLOGY DATA SERVICE tDAR

Welcome to the TAG portal

The primary aim of the TAG project is to develop tools for transatlantic cross-searching between the UK's Archaeology Data Service (ADS) digital archive and tDAR based at Arizona State University in the USA. This portal provides a sustainable resource discovery service for archaeological teaching, learning and research across two continents; furthermore it provides an exemplar for international cyber-infrastructure partnerships between North America and Europe.



Visit the TAG Portal

Funded jointly by JISC and the NEH, TAG is developing interoperability between the USA and UK at two levels. The first stage has been to create the infrastructure and portal to enable basic cross-search of MIDAS based Dublin Core compatible metadata records for digital resources covering the archaeology of the USA and UK. This project builds on the EU-funded ARENA project which has demonstrated cross-searching within Europe. The second stage, which is currently under development, is an attempt to develop a much deeper and richer level of cross-searching for faunal data from North America and Europe.

TAG searches can be carried out using keywords and three key concepts 'Where', 'What' and 'When':

WHERE

the search interface uses an open layers based geospatial selection interface and the Latitude and Longitude WGS84 coordinate system. This allows a search box to be drawn inside a country or across borders to specify the area of interest.

WHAT

each record is mapped to the 18 'top-level' terms in the English Heritage Thesaurus of Monument Types (TMT) a poly-hierarchical thesaurus.

WHEN

the interface allows searching by date range, either by direct input or by using a slider bar.

Visit the TAG project page

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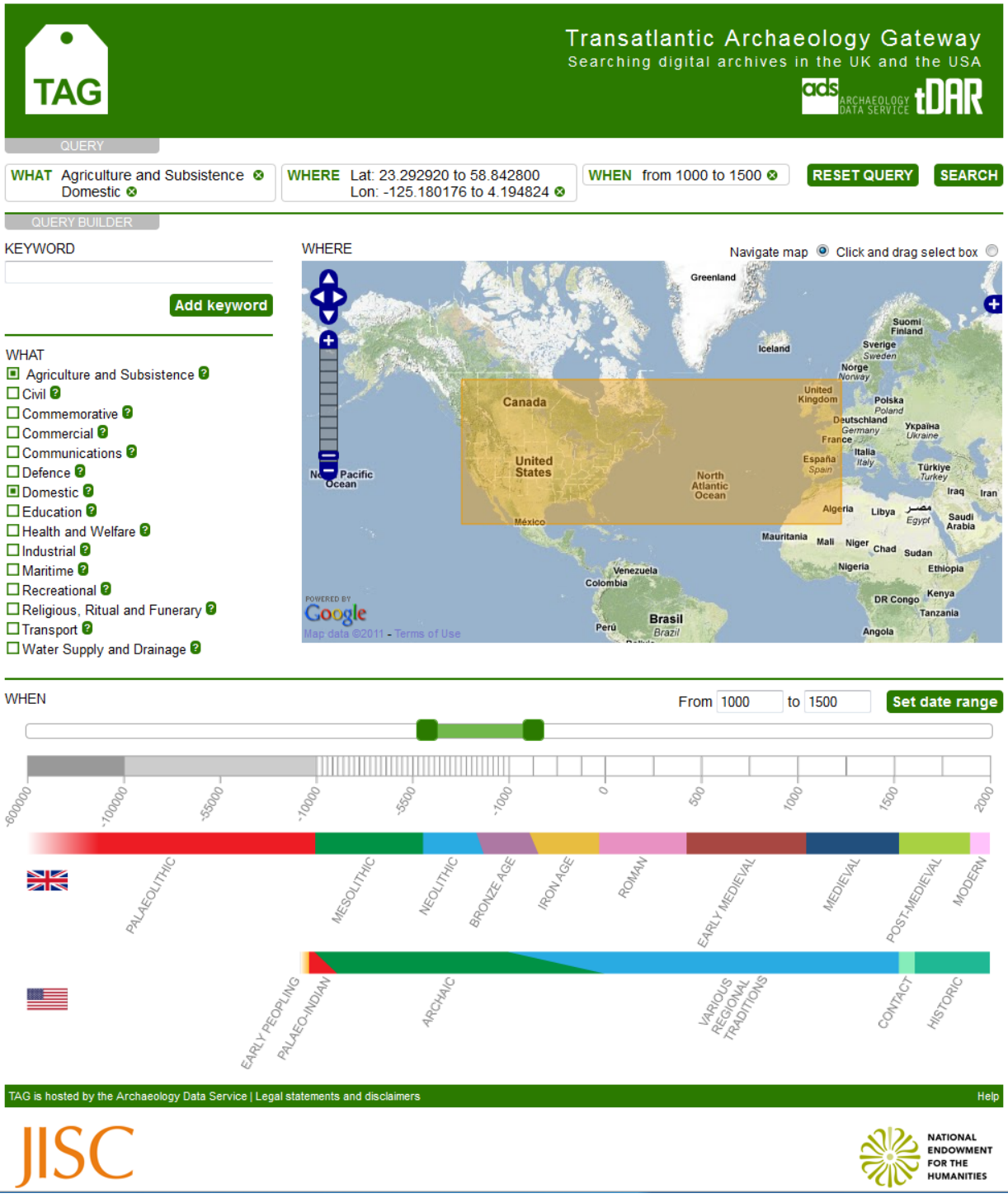
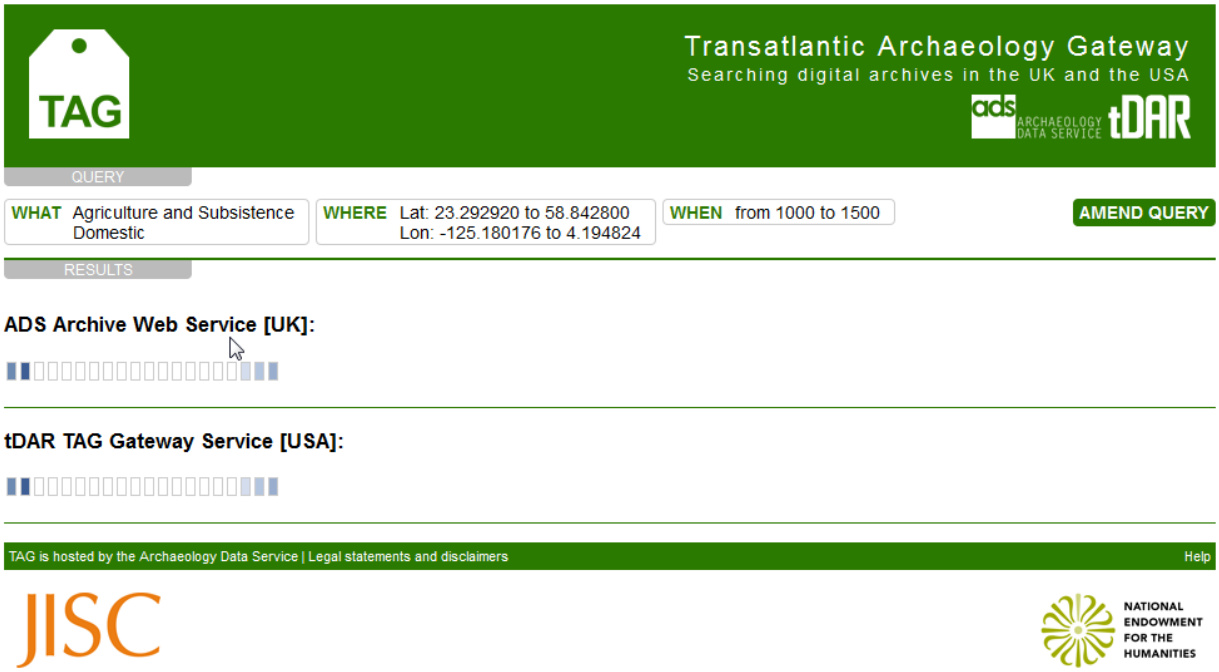
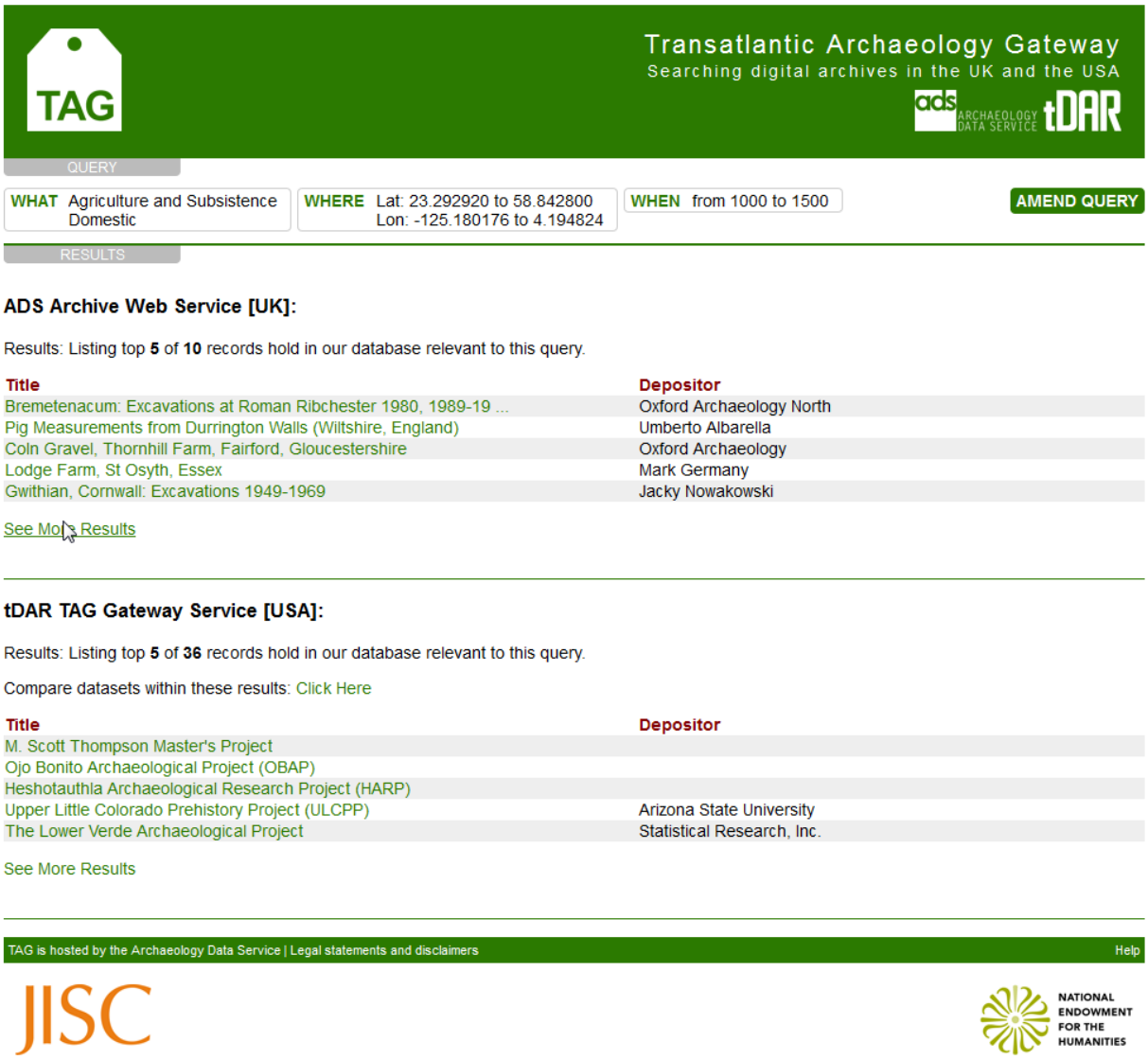
Appendix 3. TAG Portal



Appendix 4. TAG Search Progress



Appendix 5. TAG Search Result



TAG

Transatlantic Archaeology Gateway

Searching digital archives in the UK and the USA

ads ARCHAEOLOGY DATA SERVICE tDAR

QUERY

WHAT Agriculture and Subsistence
Domestic

WHERE Lat: 23.292920 to 58.842800
Lon: -125.180176 to 4.194824

WHEN from 1000 to 1500

AMEND QUERY

RESULTS

ADS Archive Web Service [UK]:

Results: Listing top **5** of **10** records hold in our database relevant to this query.

Title	Depositor
Bremetenacum: Excavations at Roman Ribchester 1980, 1989-19 ...	Oxford Archaeology North
Pig Measurements from Durrington Walls (Wiltshire, England)	Umberto Albarella
Coln Gravel, Thornhill Farm, Fairford, Gloucestershire	Oxford Archaeology
Lodge Farm, St Osyth, Essex	Mark Germany
Gwithian, Cornwall: Excavations 1949-1969	Jacky Nowakowski

See More Results

tDAR TAG Gateway Service [USA]:

Results: Listing top **5** of **36** records hold in our database relevant to this query.

Compare datasets within these results: Click Here

Title	Depositor
M. Scott Thompson Master's Project	
Ojo Bonito Archaeological Project (OBAP)	
Heshotauthla Archaeological Research Project (HARP)	
Upper Little Colorado Prehistory Project (ULCPP)	Arizona State University
The Lower Verde Archaeological Project	Statistical Research, Inc.

See More Results

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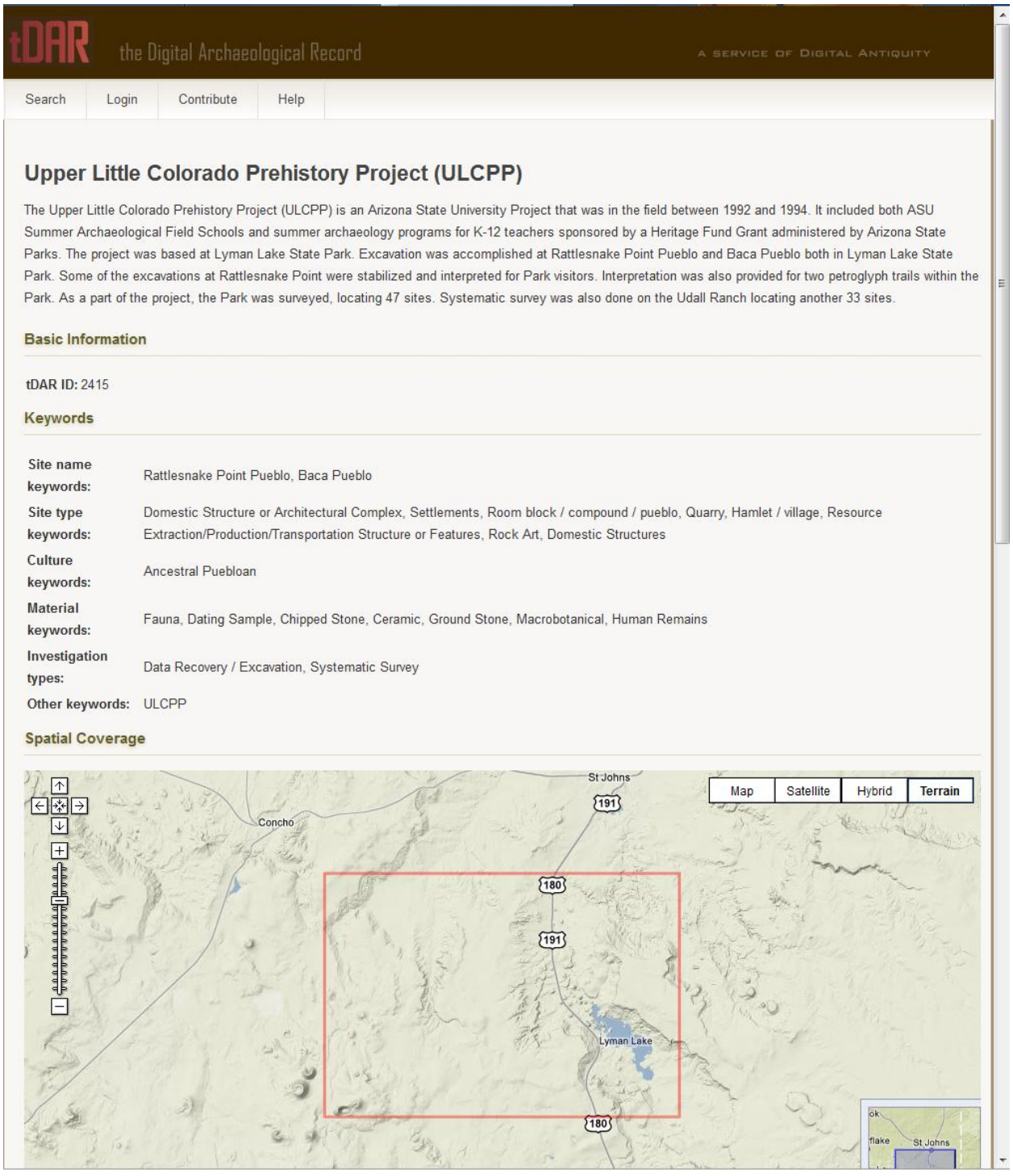
Appendix 6. Individual tDAR Result Record (Partial).



tDAR the Digital Archaeological Record — A service of Digital Antiquity

Search | Login | Contribute | Help

Upper Little Colorado Prehistory Project (ULCPP)

The Upper Little Colorado Prehistory Project (ULCPP) is an Arizona State University Project that was in the field between 1992 and 1994. It included both ASU Summer Archaeological Field Schools and summer archaeology programs for K-12 teachers sponsored by a Heritage Fund Grant administered by Arizona State Parks. The project was based at Lyman Lake State Park. Excavation was accomplished at Rattlesnake Point Pueblo and Baca Pueblo both in Lyman Lake State Park. Some of the excavations at Rattlesnake Point were stabilized and interpreted for Park visitors. Interpretation was also provided for two petroglyph trails within the Park. As a part of the project, the Park was surveyed, locating 47 sites. Systematic survey was also done on the Udall Ranch locating another 33 sites.

Basic Information

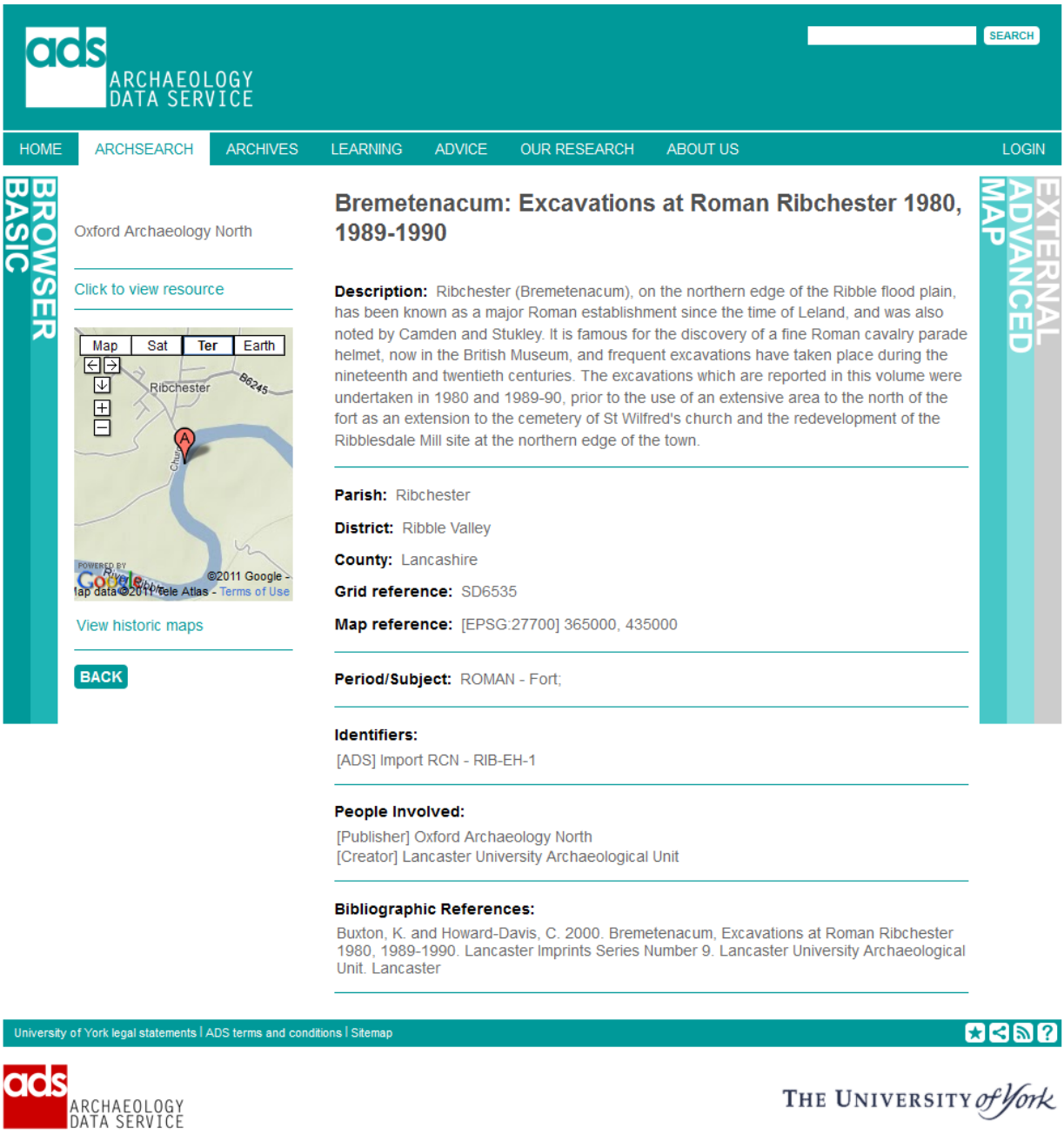
tDAR ID: 2415

Keywords

Site name keywords:	Rattlesnake Point Pueblo, Baca Pueblo
Site type keywords:	Domestic Structure or Architectural Complex, Settlements, Room block / compound / pueblo, Quarry, Hamlet / village, Resource Extraction/Production/Transportation Structure or Features, Rock Art, Domestic Structures
Culture keywords:	Ancestral Puebloan
Material keywords:	Fauna, Dating Sample, Chipped Stone, Ceramic, Ground Stone, Macrobotanical, Human Remains
Investigation types:	Data Recovery / Excavation, Systematic Survey
Other keywords:	ULCPP

Spatial Coverage

Appendix 7. Individual ADS Result Record (Initial Screen)



Report on Data Integration for TAG Workpackage 2

Katherine A. Spielmann

May 2011

Introduction

The original JISC-NEH proposal for the TAG project proposed to make both archives jointly searchable within faunal datasets through the TAG interface (workpackage 2). As the project developed, however, we felt that it would be important to demonstrate the research utility of being able to discover and allow integrated analyses of faunal datasets from both sides of the Atlantic.

I thus undertook a pilot integrated analysis of two roughly contemporaneous zooarchaeological datasets, a legacy dataset from Alexandria, Virginia provided by Dr. Pamela Cressey, and a newly generated dataset from the Spitalfields project in London provided by Dr. James Morris. Both datasets and associated metadata were uploaded into tDAR so that both could be mapped to the same general faunal ontologies, and to use the tDAR data integration tool. Other datasets found through a search of ADS could similarly be uploaded into tDAR for integrated analysis.

This report discusses the process of integrating the two datasets and the outcomes of that integration. Briefly, this exercise highlighted challenges facing integrated analyses of UK and US faunal datasets, but more importantly set the stage for a very productive workshop in Washington, D.C. that brought together zooarchaeologists from the UK and US who work with urban post-Medieval [UK]/historic [US] fauna. The workshop took place April 30-May 1, 2011. The comparative analysis of the Alexandria and Spitalfields datasets is continuing and is likely to produce substantive results as well.

Dataset selection

One of the initial challenges to selecting datasets to integrate was the fact that while roughly 95% of North American faunal data pertain to wild animals, over 95% of British faunal data pertain to domestic fauna. Moreover, North American faunal datasets that contain significant quantities of European domestic animals post-date 1700, a period of time that has not been the focus of much faunal research in Britain (Thomas 2009). The Alexandria and Spitalfields datasets were those most readily accessible that made substantive sense to jointly analyze and compare.

The integrated analysis of these datasets is not without intellectual merit, however. Both datasets come from low-income household contexts on the outskirts of a large urban area. Alexandria is across the Potomac from Washington, D.C., and at the time of the post-Medieval occupation, Spitalfields was just outside the London city wall. The Alexandria households (sites 1 and 30 in the dataset) were comprised of free African-Americans and date to the nineteenth century. The Spitalfields households (post AD 1680 cases in the dataset) were Huguenot weavers and date to the eighteenth and nineteenth centuries. Both datasets contained a combination of domestic animals and fish. Thus the intended focus of the analysis was to compare how low-income households in two peri-urban areas provisioned themselves with meat and fish. Historical documents were relied upon for understanding the relative costs and availability of different

animals in Alexandria and London (Cressey 1985; Dodd 1856; Mayhew 1861; Schulz and Gust 1983; Lyman 1987).

Obstacles to integrated analysis of datasets

The two datasets are incommensurate in terms of recovery method: the material from Alexandria was all recovered through screening (1/4-inch mesh); Spitalfields was recovered through a combination of hand collecting and targeted flotation of select contexts. As UK archaeologists do not usually screen sediments and US ones do, this difference in recovery methods will be an issue that will need to be addressed in any transatlantic comparative analyses. Hand collecting biases against small fauna and smaller elements of larger fauna; robust patterns of representation across domestic stock are likely real, but analysis of the fish remains will be most accurate if it focuses on within-assemblage patterns rather than between dataset patterns.

It was also discovered that ribs and vertebrae had not been coded for the Spitalfields mammals due to time constraints. Their absence in the Spitalifields dataset prompted me to check with James Morris who discussed this with the faunal analyst who verified that they had not been coded. Their absence makes inferences concerning cuts of meat in the Spitalifields dataset challenging.

In the Alexandria dataset, although "age" was coded as a variable, direct information on fusion is not present in the dataset. Comparing patterns of fusion rather than interpretations of age would have been preferable, but since both datasets included an "age" variable, it was possible to include it in the comparative analysis.

In the Spitalifields database, variables such as butchering, burning and gnawing are contained in a table separate from the main table containing such variables as taxon and element. In tDAR it is currently not possible to join tables within a single database during the integration process. This pilot analysis thus did not compare butchering, burning, or gnawing across the two cases.

Finally, because no contextual data (beyond feature number) were present in the Alexandria dataset, there is no control for context. Both datasets, however, are comprised of materials recovered from household yards.

Analysis

The pilot comparative analysis focused on patterns in % NISP (number of identified specimens), age, and bone element/body part frequencies. Time constraints prevented me from first undertaking a thorough analysis of taphonomy-related variables such as fragmentation, weathering, and burning. Such an analysis is necessary to make sure that the datasets have not been subject to dramatically different taphonomic histories, which could produce patterning in the data that is not due to food consumption per se.

The taxon, element, and age variables in each dataset were mapped to the same general ontologies for these variables in tDAR. At the completion of each integration, the datasets were downloaded into an excel spreadsheet, and then uploaded into SPSS Statistics 19 where the cross-tab function was used to create tables for further analysis. All data are in NISP (number of identifiable specimens).

For taxon, the initial integration included all taxa coded in each dataset to determine which taxa dominated the datasets. The remainder of the analysis then focused only on the most abundant taxa, which were cattle, sheep, pig, cat, and chicken. The analysis of the fish was conducted separately from these taxa due to their recovery via flotation in the Spitalfields project. The integration of elements by taxon provided the raw data from which further tables were constructed based on body part (axial, appendicular, autopodial) and meat cut. Statistical analyses were not conducted on these data given the lack of attention to taphonomy in this pilot study and the differences in recovery mentioned above.

The initial integration of age by taxon identified an unusually adult-dominated Alexandria fauna. Review of pertinent sections in Cressey's (1985) dissertation, however, revealed that the analyst coded unfused elements as "young adult" rather than juvenile, juvenile being reserved for what others code as neonate. A remapping of the Alexandria age categories such that "young adult" was mapped to the general ontology as "juvenile" created a more realistic age profile. The integrated analysis continued to show some behaviorally significant differences in some domestic animal age profiles between Alexandria and Spitalfields.

Results

The differences in mammal distributions in Table 1 and Figure 1 are expectable given the information in Cressey's (1985) dissertation on the affordability and heavy marketing of pig in Alexandria, and Mayhew's (1861) and Dodd's (1856) discussions of the prominence of beef in London (although Dodd's data indicate that weight-wise, sheep seem to be a close rival to beef in London markets). Frequency and element-wise, it looks like chickens may have been kept in the house yards in Alexandria, but perhaps not in Spitalfields. Appendicular portions of chicken are over-represented in the Spitalifields dataset, but it will be important to check and make sure axial elements were recorded for chicken.

Table 1. % NISP of most abundant taxa in datasets.

Taxon	**Alexandria**	**Spitalfields**
Bos taurus (Cattle)	14.9%	**48.0%**
Canis familiaris (Dog)	.2%	4.6%
Felis catus (Cat)	10.2%	8.0%
Gallus gallus (Chicken)	**33.0%**	12.2%
Ovis aries (Sheep)	5.9%	**14.9%**
Sus domesticus (Pig)	**31.3%**	9.2%
Large mammal (vertebra and ribs) (cattle horse red deer-sized)	3.5%	3.2%
Small mammal (sheep goat dog roe deer-sized)	.9%	.0%
Total NISP	3066	1582

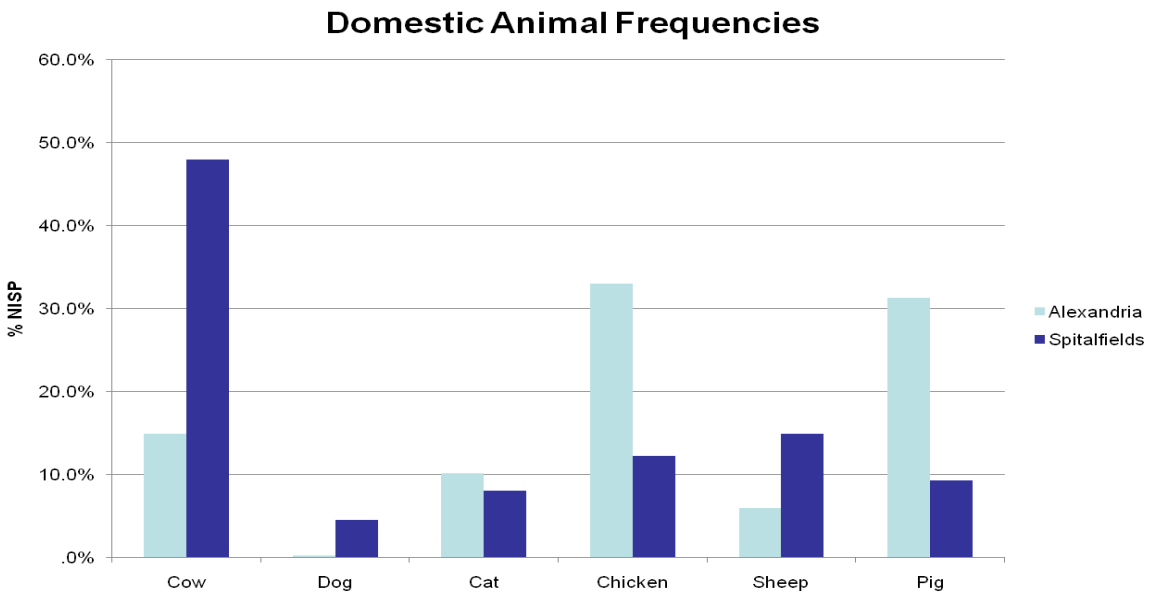


Figure 1. Domestic animal frequencies by dataset.

The relatively high frequency of cats in both assemblages is interesting. James Morris (personal communication) notes that evidence of cat and dog consumption is not common in Britain, but that skinning butchery marks are, suggesting that their fur/skin was often utilized. I have not analyzed butchery marks for the Spitalifields data; butchering is not coded for Alexandria.

Differences in age data for Alexandria and Spitalfields pigs (Table 2 and Figure 2) would seem to indicate house yard pig-raising in Spitalfields due to the very high proportion of young. James Morris (personal communication) noted that suckling pig was popular in England at the time. Dodd (1856:222) mentions that pig-raising was common in the Kensington area of London.

Table 2. Age distributions of primary domestic taxa.

Alexandria	Alexandria Adult	Spitalfields Adult	Alexandria Juvenile	Alexandria Juvenile
Cattle	76%	74%	24%	26%
Pig	64%	12%	36%	88%
Sheep	51%	69%	49%	31%
Cat	25%	45%	75%	55%

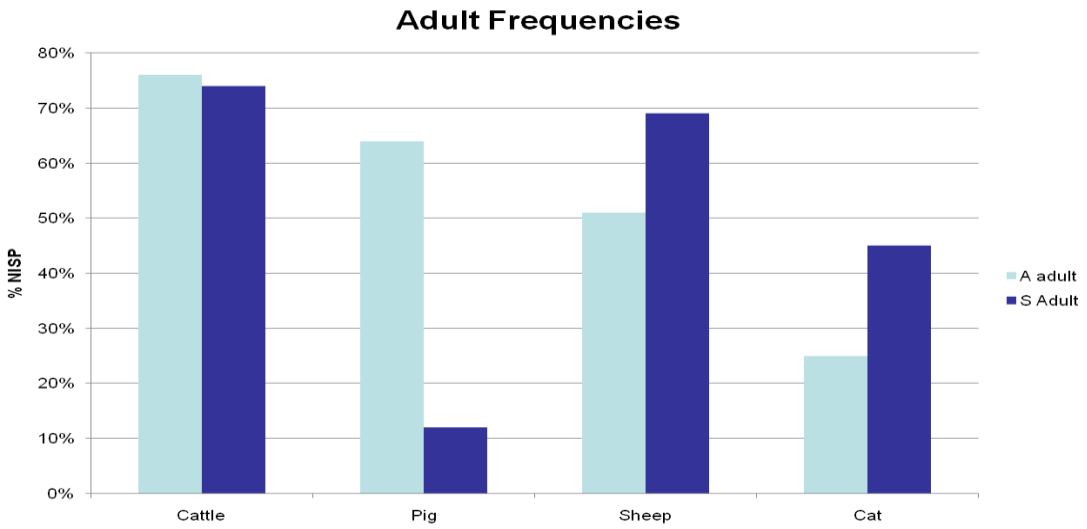


Figure 2. Adult frequencies of primary domestic taxa.

In Alexandria, the fish remains are dominated by a taxonomic category that includes herring and shad, which were the primary taxa caught in commercial fisheries along the Potomac (Cressey 1985:311; see Table 3). Perch, the other common fish type in the Alexandria dataset, were available in abundance seasonally and also commercially fished. For Spitalfields, the data diverge from the information available in Mayhew and Dodd, who both note the overwhelming dominance of herring, especially in low income neighborhoods. Sole is mentioned as available year-round and very prominent in fish markets and among fish mongers. The greater frequency of Gadidae (cod, whiting, haddock) in terms of % NISP is unexpected. Although the Spitalfields sample size borders on being too small to do much with; the context of the Gadidae should be examined to clarify this unexpected abundance.

Table 3. Fish NISP frequencies by dataset.

Taxon	Alexandria	Spitalfields
Elopomorpha (eels)	.0%	10.1%
Gadidae (true cods)	.0%	**32.5%**
Neopterygii (neopterygians)--Herrings	**62.1%**	**28.3%**
Ostariophysi--carp/chub	13.1%	3.8%
Perciformes (perch-like fishes)	**24.2%**	.0%
Pleuronectiformes (flatfishes flounders soles)	.0%	**20.3%**
Total NISP	2605	237

To address the relationship between low socio-economic status and meat consumption, I endeavored to ascertain the types of meat cuts that were present in each dataset. Because there are very few butchering data in the Alexandria dataset, I only worked with bone element data. I began by using information from Schulz and Gust (1983) and Lyman (1987) to tabulate cuts of meat for cattle and pig. These publications link specific faunal elements to specific cuts of meat, and rank those cuts of meat in terms of quality. Their approach, however, requires information on which specific vertebrae and ribs are present in a collection (e.g., thoracic vertebrae 6-13, ventral rib 1-3). Given that neither the Spitalifields nor the Alexandria dataset (and probably not many others) has particular vertebrae numbers or rib types coded, that no ribs were coded for Spitalifields and pelvic portions are not identified, and that proximal/distal was generally not recorded for the Alexandria fauna, I gave up on this approach, though attach the table (Table 4).

Table 4. Cattle meat cuts and associated bone (after Schulz and Gust 1983 and Lyman 1987).

Meat Cut	Elements	Meat Cut	Elements
short loin	lumbar vertebrae	arm	prox humerus and diaphysis
rib	dorsal ribs/thoracic vert 6-13	cross/short rib	ventral rib 1-3
sirloin	ilium/sacrum	brisket	sternabrae, costal cartilege
round	distal femur and diaphysis	neck	axis, cervical vert
rump	acetab, pubis, ischium, prox femur	foreshank	distal humerus, radius-ulna
chuck	thoracic vert 1-5, dorsal rib 1-5, scapula	hindshank	tibia, astragalus, calcaneus, distal fibula, naviculo cuboid

I then turned to an analysis of anatomical units. Without controlling for degree of fragmentation, portion of bone, and numbers of bone types in the body, this is only a first pass. There do seem to be interesting differences, however, between Alexandria and Spitalfields (Table 5). Those elements with an NISP 10% or more of the total taxon NISP are highlighted. For beef, the hindquarters and axial portions of the skeleton are most frequent in Alexandria; in Spitalfields the metatarsals dominate; subtracting the metatarsals from the total NISP leaves metacarpals, scapulae, and vertebrae at above 10% NISP (recall that ribs were not coded for Spitalfields). For pig, there is a reasonable representation of the whole carcass in Alexandria, with some emphasis on the hind limb in Spitalfields. Because pig are more rare in Spitalfields than are sheep, I also included sheep in the table; as with pig, limbs are more emphasized than the axial portion, but without rib information we don't know if that pattern is accurate. James Morris (personal communication) agrees that the anatomical unit data may represent differences in butchering styles and cuts of meat. He notes that the high proportion of cattle metapodials in the Spitalfields assemblage suggests poor cuts of beef were being used, but could also suggest some bone working activity is taking place. He plans to look at the archive and see if there are any concentrations of metapodials from specific areas/features.

Table 5. Anatomical units in Alexandria and Spitalfields datasets (NISP)*

		A cow	S cow	A pig	S pig	S sheep
Head	Skull	31	55	29	35	85
	Teeth	9	8	197	2	1
Forelimb	Scapula	13	53	40	6	
	Humerus	12	20	25	9	37
	Radius	6	22	22	8	27
	Ulna	9	12	24	7	1
Hindlimb	Pelvis	71	35	28	13	2
	Femur	57	40	62	17	26
	Patella	4	2	7	0	
	Tibia	31	36	21	23	
	Fibula	5	0	29	3	
Axial	Sternum	9		1		
	Vertebrae	125	69	154	1	
	Ribs	146	n/a	148	n/a	n/a
	Sacrum	8	5	6	1	
Foot	Carpals	8	2	10	0	
	Metacarpal	2	71	27	1	27
	Tarsals	34	16	39	6	1
	Metatarsal	3	341	16	16	52
	Metapodial	8	2	26	2	
	Phalanges	6	34	92	4	3
Total		597	823	1003	154	262

*Highlighted areas represent >10% NISP for the taxon.

Concluding thoughts and future plans

The integrated analysis of fauna from Spitalfields and Alexandria has had two immediate benefits with a potential third in the planning stages. First, it highlighted the richness of information that can be gained from a comparative analysis of post-Medieval/historical urban fauna and thus prompted the organization of an urban faunal working group meeting in Washington, D.C. in late April, 2011. Second, the presentation and discussion of this case study at the meeting made clear some of the challenges as well as potentials of integrating datasets across the Atlantic. Third, there appears to be intellectual merit in pursuing a more thorough comparative analysis of these particular datasets.

Urban Faunal Working Group Meeting

As noted in the introduction to this report, the integrated analysis of transatlantic faunal datasets was added to workpackage 2 in order to move beyond simply being able to locate faunal datasets meeting a set of search criteria from both sides of the Atlantic. Similarly, we decided that the most effective use of the remaining travel funds in the NEH portion of the joint grant would be for a workshop that not only provided a venue for the dissemination of relevant project results but that also brought together urban faunal analysts from both countries in a way that allowed us to end the grant with a substantive contribution and a potential plan for future transatlantic collaboration. The faunal working group meeting was very successful and appears to have launched a transatlantic dialog around urban animalscapes in the 18th and 19th centuries.

The workshop was held April 30 and May 1 at ASU's Washington, D.C. facility. Attendees from the UK included zooarchaeologist James Morris and data analyst Michael Charno from Archaeological Data Services, with zooarchaeologist Richard Thomas participating when possible via Skype. Attendees from the US included zooarchaeologists Teagan Schweitzer and Kate Spielmann, historic archaeologists Nan Rothschild and Pamela Cressey, archaeologist and project PI Keith Kintigh, and NEH program officer Charles Kolb. Separate notes detail the two-day discussion around issues of mutual interest concerning urban fauna. At the end of the meeting, Morris and Thomas planned to convene a group of urban zooarchaeologists in Britain to identify ways in which to move this research forward; they identified the semi-annual zooarchaeology meeting as a good context in which to do that. Rothschild and Schweitzer planned to do the same with US zooarchaeologists and historic archaeologists, and identified the January 2012 Society for Historical Archaeology meeting in Baltimore as an appropriate venue to sponsor a session and/or organize an informal discussion. Kolb provided details of NEH grant opportunities that could help fund the uploading of datasets into tDAR and research on those data.

Challenges and Potentials

Having a case study to dissect and discuss made the Spitalifields-Alexandria pilot very useful to the discussion at the workshop. Points that were particularly salient include:

- The UK and US differ in recovery techniques, something that all integrated analyses will need to take into account.
- Metadata on how an assemblage was sampled (if sampling occurred) are critical for understanding any missing elements or taxa
- Metadata on how variable values were applied are crucial for data integration (e.g., as mentioned above, how "juvenile" and "adult" were coded for the age variable).
- Different approaches to coding elements affect the specificity with which cuts of meat can be identified

Substantive Analysis

If the Spitalfields-Alexandria comparative analysis only served to launch and inform a transatlantic dialog on urban zooarchaeology, it will have contributed to the goal of the TAG project to provide an exemplar for international cyber-infrastructure partnerships and to promote research between North America and Europe. Morris noted, however, that the substantive outcomes of the analysis were likely to be of interest to the zooarchaeological community. Publishing this analysis as a substantive contribution to urban zooarchaeology will require that differences in recovery techniques and taphonomic issues be addressed, that contextual information be incorporated, and that each case be placed more firmly in its historical context.

Morris and Cressey expressed interest in pursuing the case study for publication, and I will be working with them to see what their schedule looks like for moving the analysis forward.

In conclusion, while fauna have constituted the test bed for the TAG project, the addition of many other kinds of data from ADS and tDAR digital archives in integrated analysis is expected to follow. In fact, in the course of discussing urban foodways, the need for additional lines of evidence such as ceramic and botanical datasets was mentioned. It may thus be that this project launches a productive "migration stream" of non-faunal datasets into ADS and tDAR.

References Cited

Cressey, Pamela
1985 *The Alexandria, Virginia City-Site: Archaeology in an Afro-American Neighborhood, 1830-1910.* Unpublished Ph.D. dissertation, Department of Anthropology, University of Iowa, Iowa City.

Dodd, George
1856 [1976] *The Food of London.* Arno Press, New York. Reprint of the 1856 edition published by Longman, Brown, Green, and Longmans, London.

Lyman, Lee
1987 On zooarchaeological methods of socioeconomic position and cost-efficient meat purchases. *Historical Archaeology* 21(1): 58-66.

Mayhew, Henry
1861 [1968] *London Labour and the London Poor, Volume 1, The London Street-Folk.* Dover Press, New York. Reprint of the 1861 edition published by Griffin, Bohn, and Company.

Schulz, Peter D., and Sherri M. Gust
1983 Faunal remains and social status in 19th century Sacramento. *Historical Archaeology* 17(1): 44-53.

Thomas, R.
2009 Bones of contention: why later post-medieval assemblages of animal bones matter. In *Crossing Paths or Sharing Tracks: Future Directions in the Archaeological Study of Post-1550 Britain and Ireland,* edited by A. Horning and M. Palmer, pp. 133-148. Boydell and Brewer Ltd., Woodbridge.

Appendix 10. Notes from Urban Faunal Working Group Meeting

Notes from Urban Faunal Working Group Meeting
ASU-Washington D.C.
Kate Spielmann, 4/29/11-5/1/11

I. Introductions

Nan Rothschild: 1980s directed 3 blocks of excavation in New York City; 1990 publication on fauna, deposition type and time period (control for taphonomy) with focus on how does emerging city feed itself (processes of food acquisition, markets; loss of wild animals and fish species [loss of habitat]); had specific deposits that could associate with individuals; found no clear correlation between socio-economic status and food ways—diversity within socio-economic classes. More recently historical focus has been on 2 projects involving colonial interactions: Dutch in the Mohawk Valley and Spanish in SW US; explored acquisition of one another's food species. Used presence/absence data and analyzed change over time; now her research focuses on the archaeology of modern American cities. Noted that large contract projects that investigate socio-economic status, ethnicity and foodways are too often simplifying complex relationships (e.g., is not an "African American" diet).

Teagan Schweitzer: Is standing zooarchaeologist for URS contract firm; working in NE Philadelphia, urban households. Research has focused on food in Philadelphia 1750-1850: PhD last year on zooarchaeology at Constitution Center: brought data together from contract firms and the National Park Service. Contexts included gentlemen's farmsteads to compare with urban deposits; 8 Park Service sites excavated since 1980s: looking at food landscape in Philadelphia, change over time, urban/rural relations, socio-economic status/ethnicity (not clear-cut in zooarchaeological record); interested in food as it moves through the system of the city of Philadelphia: production, distribution, consumption; strong focus on butchers and butchering; explored new ways to look at butchering using recipes in contemporaneous cookbooks, which allowed her to relate her zooarchaeological remains to cuts of meat. Interested in comparing her data with other large urban centers.

Michael Charno: Curatorial officer for Archaeological Data Services; focus is informatics at ADS but has experience with faunal datasets: Knowth, Spitalfields; data sharing; has worked on ARENA project which involves sharing data across different European projects for purposes of resource discovery.

James Morris: Zooarchaeologist since 2009 for Museum of London Archaeology (CRM wing of the Museum); MoLA is unique for a CRM entity in its attachment to a museum; 2008 PhD focused on how to interpret animal burials; used faunal reports from over 2000 sites and managed those datasets; date from 4000 B.C.-Late Medieval [ca. 1550]. The Museum of London holds the archive of any excavation that has taken place in greater London. Museum began as the department of urban archaeology run by London City Council; in 1990 when CRM came into UK through legislation, became the Museum of London. MoLA uses an Oracle database that includes records on just under half million faunal remains from 228 sites. James interested in using this wealth of legacy data. Interested in comparing London remains with other large urban centers; interested in links across former British empire.

Post-medieval: a few individual projects and practitioners. Terry O'Connor: research in York with focus on Roman and Medieval; working on Viking material at Hungate; he would have access to early historical remains as well. Umberto Albarella at Sheffield University has an interest in this area and had anaylsed the remains from castles such as Launceston and Oakhampton and cities such as Norwich. Could draw people from other CRM companies (such as Wessex Archaeology and Oxford Archaeology) in other urban centers; anticipates interest.

Professional UK zooarchaeology group meets semi-annually.

Richard Thomas: Interested in how food is used actively in community identity in a period of marked social change; worked with faunal material from Worcester Cathedral, well-stratified animal bone deposits and excellent historical documents that illustrate dietary change in the post-Medieval period; materials come from the Chapter House and just outside it; documents illustrate items purchased for dinners at cathedral; marked difference in cathedral diet compared with rest of town (e.g., greater diversity in cathedral diet). Other primary research interest: "improvement" of domestic animals; increased

productivity in agriculture to feed increasingly urban population. Narrative of "agricultural revolution" in response to urbanism has been challenged (less rapid, more gradual); zooarchaeological record of early post-Medieval period suggests that the timing of increase in size of domestic livestock is gradual; but additional attributes (e.g., reduction of bone contribution to body weight) appear to have been the focus of stock breeding in 18th and 19th centuries, though little is known about domestic stock in this period. Breadth of post-Medieval issues that zooarchaeology can illuminate is vast but potential not yet realized due to lack of link between research designs and zooarchaeological analyses for post-Medieval sites (e.g., projects that address process and impact of industrialization do not tend to include faunal materials in the analysis).

Kate Spielmann: North American archaeologist; has worked with wild fauna on a variety of issues (hunter-farmer interactions; resource depression and dietary change; Pueblo responses to Spanish colonization); has led the faunal analysis portion of tDAR projects, organized tDAR faunal working groups and workshops; interested in the prospects and challenges of faunal data integration to address regional and pan-regional scale issues.

Keith Kintigh: discussed tDAR history; 1999 first grant proposal; 1999-2000 SW archaeology faculty and graduate student informal seminar highlights both difficulty and desirability of doing regional-scale synthesis, to address research questions at scale of entire Southwest. Leads to discussion of how to build infrastructure for archaeology to find data that facilitates synthetic research. Planning grant in 2004 included Julian Richards, so ADS has been a partner in this endeavor from very beginning. One of tDAR's goals is to empower integrative analysis. Its business model focuses on projects going forward, with a plan to charge at ingest, but keep use of resources free.

Pam Cressey: Alexandria City Archaeologist. Attended city archaeology conference in Manchester several years ago and was struck by the fact that in the UK community-oriented archaeology is much stronger than in the US. She is one of few city archaeologists in US. She became City Archaeologist in 1977; oversaw excavation of last urban renewal block; focus of her work has been on change over time.

Alexandria history: annexed to DC in 18th century; southern city with northern influence. Size has been stable. Archaeology is well-preserved, colonial period to modern with adjacent rural area of plantations. Research has focused particularly on African-American population. 20-25% of Alexandria population is African American. In 1810/one-third households held at least 1 slave including tavern keepers, ship builders, doctors, upper class, plantation. Her focus is on free black populations; worked with urban geographers and urban historians. Like Nan has used tax collector detailed records. Examined a 20-year stratified sample of tax documents study starting in 1790, from which the existence of free black neighborhoods emerged. Marked increase in free blacks in Alexandria 1790-1810.

Dissertation: Pre and post-Civil War comparison of data from yard-focused excavation with NEH funds, elites, non-elites, black households. Quantity of material recovered varied with economic status (less material in elite yards). Coleman site: 3 households; 2 in a duplex; one in separate building. Hay-ti is neighborhood name. Richness of documentary record on slaves and free-blacks. Black neighborhoods encircle Alexandria after war.

Charlie Kolb: Senior Program Office in Division of Preservation and Access, TAG NEH-JISC project funded under this division; preservation includes databases, GIS, GPS, aerial photos. As an archaeologist his research has focused on material science, especially with regard to ceramics; has worked in Mesoamerica (Teotihuacan); Afghanistan since 1965: Middle Paleolithic-present (last archaeologist remaining from this project), East Africa, Peru, US Great Lakes Basin (Paleo to contemporary) in CRM context, Forest Service, and DOE.

Mentioned Jillian Galle at Monticello, part of DAACS project. DAACS has two zooarchaeologists: Joanne Bowen (Curator of Zooarchaeology, Colonial Williamsburg Foundation) and Steve Atkins (Associate Curator of Zooarchaeology, Colonial Williamsburg Foundation). Recommended that US members of the workshop familiarize themselves with this repository as well as an on-going project at the Hermitage. Emory U: transatlantic slave database from ship data; ship data stop at sales records; Jillian's archival data allow her to pick up these same people on plantations.

Annapolis later mentioned as another context of relevant historical US zooarchaeological information.

II. Background leading to Urban Faunal Working Group Meeting

Development and activities of tDAR faunal working groups, development of general ontologies (Kate)

- When tDAR was funded 2005, established a faunal working group that met in 2004 and 2005 to think about a large-scale research question we could tackle with digital data integration; group focused on resource depression, discussed what variables (faunal and non) would be needed to address it, also discussed with computer scientists what digital data integration would look like.
- Then a hiatus as we brought programmers, etc. into the project to create the kind of tool we were imagining
- Once the integration tool was moving along then reconvened the FWG to discuss how disparate coding schemes could be integrated for analyses. Decided that the approach of other archives focused on integration like Neotoma and DAACS (Digital Archaeological Archives of Comparative Slavery), which impose a set scheme on data ingestion, would not work for the disparate ways that fauna is coded across the profession. Did not want to appear to be imposing analytical standards on the profession.
- Decided that best approach would be through the development of general ontologies for faunal variables to which individual datasets could be mapped. Ideally, these general ontologies might be adopted as the profession moves forward so that data coding becomes more uniform
- In March 2010, as part of the Transatlantic Gateway Project (see below) met with a group of British faunal analysts about tDAR. A significant portion of that discussion focused on their reviewing and editing the draft general ontologies, and developing a taxon ontology appropriate to the taxa found on British sites, particularly domestic taxa. These ontologies are all publically available for use on tDAR.
- Fall 2010 the North American faunal working developed an NSF proposal for research on prehistoric changes in faunal resource procurement using tDAR.
- The TAG project introduced the possibility that a faunal working group organized around historic, urban fauna might be another direction that could be taken, hence the current meeting

Transatlantic Gateway (TAG) project

The TAG project, started in October 2010, is a joint project with the UK's Archaeology Data Service (ADS). It was funded jointly by NEH and JISC (the Joint Information Systems Committee) in the UK. The TAG project has two components:

- The first is to allow cross searching of archaeological projects held in the respective archives based on the site (monument) type, the time period, location (using a Google Maps interface), and keywords. Kintigh provided a demo of this component that can be accessed at the TAG Portal http://archaeologydataservice.ac.uk/TAG/www.jsf . The result is a list of *projects* in each digital archive that match the search criteria. (As demonstrated)
- The second, and more challenging component was to enable integration of datasets across the archives. As with our NSF funded project, we chose archaeological fauna as our test case. If a TAG search includes projects that include databases that have sufficient metadata to be integrated, with the search results the user is given an option to integrate them. When this option is selected, the user is routed to tDAR and presented with a search result for all of the *datasets* (or spreadsheets) eligible for integration.

III. Integration in tDAR

- Can use TAG (or tDAR) search function to find datasets of interest. The search result can also be refined.
- Prior to integration, the variables of interest in datasets of interest must be mapped to the same shared ontologies.
- Bookmarking a dataset puts it in your workspace
    - For integration datasets must be in workspace
- Select datasets in your workspace to integrate (can integrate several at once)
- Select display columns and integration columns

    - Display columns are dataset specific, e.g., site or period, info you will need in analysis
    - If you have a count variable that essentially indicates multiple cases with the same value you will want to include it for most statistical analyses
    - Integration columns must be associated with the same ontology
- Filter the integration so that only those variable values of interest are included in the integration
    - Hierarchical ontologies allow analyst to aggregate values to a higher level in a classification for analysis (e.g., for taxon at family rather than species level, if desired)
- Display in tDAR after integration
    - Displays a few cases to show results of integration
    - Includes dataset name, display variables, original dataset value and output (filtered) value
    - Allows you to download file to Excel
        - each dataset is on a different Excel page

IV. Spitalfields/Alexandria pilot integration

- Site background
    - Alexandria: Coleman site
        - 19th century
        - Freed slave households
        - Low income
        - Detached houses
    - London: Spitalfields
        - 18th-19th centuries
        - Huguenot weavers
        - Low income
        - Detached houses in some areas
- Differences in recovery methods
    - Alexandria:
        - Screened, ¼-inch mesh
    - Spitalfields
        - Hand collected (most)
        - Wet-sieving (5 to 15 litre samples from chosen contexts only)
- Missing data relevant to meat cuts
    - Both:
        - Number of vertebra and rib
        - Dorsal/ventral rib information
    - Alexandria:
        - Proximal-distal information
    - Spitalfields:
        - Ribs (and vertebrae?)
        - Pelvis portion information
- Results
    - Differences in taxonomic frequencies match expectations from historical literature
        - Affordability and prominence of advertising for pigs/pork in Alexandria
        - Prominence of beef in London markets and diet
    - Relatively high frequency of cats in both assemblages is noteworthy
        - James: Skinning of cats a common practice historically in low income neighborhoods, London
    - Chicken element data suggest access to whole animal (raising in yard?) in Alexandria, purchase of legs in Spitalfields
    - Relatively high frequency of Gadidae in Spitalfields fish dataset (followed by herrings and soles) unexpected given affordability of herring, emphasis on herring consumption among lower income populations historically in London and year-round availability of sole
    - Age differences (adult/juvenile) are very similar with regard to beef; differ with pig (many more juveniles in Spitalfields dataset)
        - James: suckling pig likely

- Conclusions
    - Marked differences in assemblages likely reflect real differences in diet, however:
    - Need metadata for how variables coded for each dataset:
        - E.g. Alexandria unfused elements coded as young adult, initially mapped to tDAR general age ontology as "adult"
    - Need to control for recovery methods
        - Focus on appropriate taxa/elements
    - Archaeological contextual and taphonomic issues still to address
    - Should place more firmly in historical context

V. Animalscapes

- Agreement that US and UK urban archaeologists/zooarchaeologists are interested in similar questions involving animal/person interaction
- Urban centers as networks of food importation/raising, processing, distribution, consumption
    - nature of the social links across these stages.

- Tracking spread of animal materials/pets/vermin across the city
    - how this changes in the 18th and 19th centuries.
- Forms of transport of "meat" to urban center
    - Driven, Railroad, Truck, Hunt/fished
        - source of stock—drovers vs. railway—get meat instead of cows.
        - Habitat change for local fauna (e.g., fish in New York)
    - What arteries are most important for food
    - What is catchment of food coming into city
        - Social connections between rural and urban areas—flow of food
        - Growth of urban center (loss of immediate food production locales)
- Urban animal husbandry
    - Chickens, cattle, rabbit, pigs
        - Household or industrial scale
- Form and location of processing
    - Isolated from city
    - Within city (nature of distribution)
    - Arrives already butchered
- Other businesses associated with animal processing (e.g., tannery, leatherworkers, cobblers, harness makers).
- Changes in the importance of markets in the economic system
- Informal distribution of food
- Cuisine: how food is prepared (e.g., roasted, broiled; stewed); condiments, spices
- Locations of consumption and relationship to status
    - Households, taverns
- Specific networks
    - Philadelphia: demands of city impacted farming, truck farming around city.
    - Suburbs added to Alexandria in 18th century
        - Turnpike extended through it, brought food into Alexandria port. Cattle held at intersection of town and suburb where butchers are also
        - Meat shipped from there into main port of Alexandria.
- People's perceptions of animals
    - How moving into an urban environment changes that perception
        - separate the live animals from the consumers
- How much do immigrants' foodways change? Colonial period. Creolization.
- Practical issue: linking bones to food; culinary and historical records vs. faunal data

Potential Research Foci

- Follow a specific resource and social networks that link across production/distribution/consumption (along lines of above network discussion)
- Roman-medieval-post-medieval—trajectory of foodways. Changes in the nature of the city with London, Philadelphia, and New York being case studies.
    - Irish 9th-10th century; plus early medieval.
- Foodways of a specific household
    - Richness of household-level data
        - link with what is known about occupants
        - Archaeology of everyday London life: household level; have a humanities grant.
- Changes in diet and foodways with immigration
    - Engages transatlantic nature of collaboration directly
    - Notion of colonial America becoming separate, and how that plays out in diet, 1750-1850
        - Dietary change partly depends on what is available, partly as aspect of choice
        - Cases could include Jamestown, St Mary's: Maryland immigrants, Old Plymouth
            - Jamestown a good "hook" for general interest in project
            - Richard has a PhD student who will be working with Jamestown data.
            - Julia King has pulled together data in Virginia and Maryland—need to contact her.
            - Other early colonial period researchers: Bill Kelso, Henry Miller
    - Post-medieval London also has immigrants: Dutch, Huguenots, Jews.
    - Need information from home countries for immigrants: what are diets there?
        - DANS: Dutch ADS: ADS has good relations with them; French person in project with ADS. Michael Charno willing to follow up on these connections should this topic be pursued.
        - Anick Coudart: source of information on French historical archaeology
        - Audrey Horning: looking at relations between Ireland and America
        - Jon Finch, (jonathan.finch@york.ac.uk), historical archaeology; comparison between Yorkshire and Caribbean; interested in research on trans-Atlantic comparisons; although he's not a faunal person he does potentially have datasets/access that might be useful.
        - Michael Barton: potential source on historical archaeology in Spain.
        - DAACS: source of information on African slave foodways
            - how much bringing in African archaeology and foodways?
            - U Syracuse group.
    - Diet-driven immigration
        - Irish; changes in Ireland with regard to pig, leading to proliferation of potatoes and then the famine.
    - Need to track degree of change in diet in home countries over same time period as a control on dietary/foodway change in immigrant populations
        - Post 1750 data will be scarce in Britain
            - Dating in UK pre and post civil war (pre and post 1640).
        - Regional scale of analysis will be important in understanding immigrant "home" diet (i.e., isn't a "British" diet per se)
            - British county councils portal: Heritagegateway.org.uk
            - Councils will have records of research at the local scale, but not likely to have the actual datasets.
    - Reciprocal dietary change: impact on home country diet of foods from immigrant locations
        - Post 1541, turkeys have significant impact on British diet.
    - Topic of immigration and foodways would be interesting to NEH. Immigration is a key area of interest in the humanities.
    - Practical issues: American faunal datasets: which colonies have datasets?
        - Dates; need to lump 50-100 years.
        - Sample size
        - Need to control for class, gender, purpose of colony

    - Larger issue: Under what circumstances do foodways change rapidly, are kept.
        - How/why do people change the way that they eat?
        - Changes in labor patterns will also change foodways (e.g., women in the workforce)
    - Challenges with this topic
        - Identification of immigrants involves ethnic markers, which are difficult to see in the archaeological record.
        - Not a topic that any of the participants in the meeting is working on or has datasets that directly address
            - Who would lead this endeavor—for whom is it compelling enough to devote time to?
- Discussion returned to urban animalscapes due to greater data availability on that topic among meeting participants
    - "Agricultural revolution" in UK, massive change in industrialization; rural-urban migration
        - nothing parallel in US, but is a gradual change in emphasis on farming
        - what is the impact of the industrial revolution on agriculture on foodways?
        - US has large land base
        - UK people who had been farmers put out of business due to new technology; majority of people were tenant farmers, forced off land when agriculture is mechanized, move into urban areas where factories are developing
            - diet declines dramatically in slum areas.
        - Affect on animal production: cattle are a sign of wealth; "improvement" means making bigger, can look at this metrically.
        - Organization changes: feeding cities; animal keeping in urban environment.
    - Process of urbanization and its impact on food production, distribution and access (consumption).
- Mapping out of what urban animal system was at one period of time and how it changed and why. Develop a map based on historical information regarding animal transportation, production, processing, distribution, and consumer social status; this map provides a model of the urban animalscape that can be addressed with faunal data.
- Industrial revolution: as period of time that group could focus on—where in the process of urbanization is each of the 3 cities at the time of industrialization, what is the impact on faunal-related food ways/animalscapes.
    - Timing: US: 1830s/40s; UK: late 1700s
    - Identify sites, assemblages before and after Industrial Revolution in London, New York, Philadelphia
        - Animal husbandry itself becomes industrialized to satisfy burgeoning urban populations. Livestock conformation and slaughter patterns are key parameters to investigate
        - Industrialized foodways create challenges for zooarchaeologists:
            - How can we identify imported meat (obviously an issue for 19th century fauna after invention of refrigerated transport)
            - or the effect of electric lighting, which disrupted natural seasonal rhythms (e.g. With milk production).
- Transport and trade as particularly important food system factors impacted by industrialization:
    - Where are urban supplies coming from?
    - Does this network change? If so, how and why?
- Need to delve further into the historical data to determine whether we should expect significant differences in use of animals in each city after the Industrial Revolution, or whether industrialization leads to commonalities in faunal resource use due to common conditions of labor.
- Compile list of available faunal datasets for the 3 cities
    - then need to assess the data in each of these dataset
        - Assessment requires significant time investment.
        - Assessment:
            - Context
                - Temporal

        - Archaeological
        - Socio-economic
    - Recovery methods and association of recovery methods with specific faunal data
    - Identifiability/preservation
    - Sample size
    - Availability of associated ceramics and botanical materials together.
- Would help to have people who have the data to upload it into tDAR. With datasets thus centralized, can more easily assess their suitability for addressing larger-scale questions.

VI. General Issues

- Getting more people to put data into tDAR
- Using tDAR for a collaborative project
    - Ability to tag which sites are appropriate for what questions
    - Tagging for specific categories (e.g., household-focused queries; socio-economic status; urban/rural investigations).
- Important sources of information
    - GIS: examples of:
        - Old Bailey online: can link a crime with location.
    - 16^{th}-18^{th} maps of London; geosinking to contemporary map.
        - Have similar capabilities for Alexandria 18^{th} century.

- Documents
    - Possibility of uploading documents into tDAR under headings (or with appropriate metadata) for resource discovery
    - Natural language processing: resource discovery metadata out of unstructured text.
        - Use urban animalscape related documents as test bed for new tDAR grant?
    - Cookbooks: how to cook different cuts of meat; doesn't seem to play out at the butchery level—degree of uniformity not there.
    - Guilds in Britain, e.g., butcher's guild records
- Crowd sourcing tools for compilation of data on topics of interest to the group
- Comparison of sizes of European livestock and colonizing livestock—use metric data.
    - Anglea Von den Driesch used on both sides of Atlantic, so already comparable.
- Generally British don't collect weight data.

VII. Viewing and discussion of participant database structure and content

- James: challenge of working in tDAR from a relational database and creating flat file from it that can then be used in integration
    - Can now upload Access databases into tDAR
    - In James' Access database could use the context variable to connect botanical, faunal, and ceramic data, and Bone ID variable to connect bone variables to create an enormous flat file.
    - Better to select just those variables that are desired in an integration to create the flat file
        - tDAR needs to work on how to do this
    - Large portion of London dataset is post Medieval
    - Structure zooarchaeological data in Britain through interconnected datasets and lookup tables
    - Some variables (e.g., zonal data, bone modification) have a one to many relationship
    - Tooth wear: mainly use Grant toothwear categories (as do zooarchs in US)
        - Multiple codes for toothwear in MoLA dataset.
    - Butchery methodologies: data string too complex for tDAR; not easy to map
        - Record butchery as a coded string based on punch card entries from 1980s. Mark Maltby (Bournemouth University) is currently do a survey for the PZG to see how UK zooarchaeologists record butchery and will be making recommendations.
- Teagan: NPS database from downtown Philadelphia site

- uses their structure
- uses Excel, not relational dataset
- Single case in dataset may have multiple items that may have multiple states.
- Measurements not individual, may have several different bone measurements in single line of data
    - In metadata should indicate that individual lines may contain multiple NISP and number of measured bones in the metadata when have multiple measurements in a single line.

VIII. Potential Grant opportunities at NEH

- Topics we discussed that are of interest to NEH: Food as material culture, relationship to zooarchaeology: foodways, other uses of fauna, biogeography. Use of animal products for purposes other than food.
- No problem dealing with disparate datasets.
- Collaborative grants program: appropriate if focus is on data collecting before put into tDAR
    - If still need to do analysis of faunal material itself, is then considered a research project
- If are working with existing datasets then is appropriate for the Preservation and Access program: Humanities Collections and Reference Resources, http://www.neh.gov/grants/guidelines/HCRR.html (up to $350,000 in NEH outright funds, expected cost sharing: consortial 30%, individual applicant 50%)
- Cost share can be in time (salary, benefits on salary, indirect costs; student tuition). Consultant time that aren't paying.
- Digital Humanities program: may not survive budget cuts; digital start-up grants for something innovative ($25,000). Implementation only $50,000. A collaborative project of the scale we are contemplating would require a grant the size of those available through Preservation and Access.
- Good to have an advisory group from the field; some subset of the British and North American faunal working groups would be appropriate.
    - Communicate largely through Skype, email to control costs
- Presentations at professional meetings covered only if essential to project (e.g., SHA, ICAZ) and only for key people to give a paper, disseminate results in workshops, etc.
- Subcontracts to UK are ok.
- NEH will provide pre-review and feedback on proposal
    - Success rate is much higher if do this
    - Need 6 weeks lead time if possible
- Think about who is evaluating the application
    - Collaborative Grants program: 5 evaluators, all scholars (not technical experts) on panel but not necessarily knowledgeable about datasets, GIS.
    - Preservation and Access program: panels are scholars (5) but also have some database background (panel will have an IT expert, an archivist, library collections or repurposing something already done), global coverage
- Topics the group discussed that Charlie Kolb found particularly relevant to NEH:
    - Searchability, cross-searching
    - Terminology (e.g., "mapping" term may need to be changed)
    - Non-food uses of animals (cats, dogs—this will be interesting to an audience reading the grant proposal)
    - "From food to bones."
    - Associated/related industries (e.g., tanneries)
    - Integrating information from sherds and flora with faunal material.
    - Queries across multi-table databases; can address in the context of putting databases together
    - Regardless of what topic choose, paint big picture
- Have a letter from institutions/persons whose datasets are using confirming that materials can be accessed.
- Mid-July deadline for Preservation and Access program too soon—wait until next year.

IX. Moving Forward

- Develop historical /post-Medieval urban faunal working groups in US and UK, see where people are interested in going in terms of urban faunal questions and transatlantic collaboration
    - Teagan and Nan in US, James and Richard in UK
    - include people who have relevant data but may not be faunal analysts
- At town scale of Alexandria, Pam will use the resources available to her (interns, volunteer archivists) to undertake finer-grained research on production, distribution, and consumption of food in Alexandria through archival materials.
- SHA is in Baltimore in January 2012; potential place to convene working group(s). In that context could:
    - Develop paper topics by deadline for abstract submission in June
    - Reserve a room and invite people to bring urban faunal data and upload to tDAR
    - Organize a workshop

- What need to do to move forward on collaborative project

    - Decide what data and metadata would need to be available in faunal databases of interest for them to be useable in a collaborative research project:
        - total NISP; % measureable, variables…
        - Contextual information.
        - Number of components.
        - Would be useful to tag datasets with regard to this information
    - Do an assessment of each dataset of interest—what variables coded, how coded, what lines are. What data are in notes
        - In Britain rare fauna often in notes. Would need to put into dataset itself.
        - This will be time-consuming
            - Need funds to support a focused effort
            - Might distribute effort across members of faunal working groups organized around the project
    - Practical issues:
        - Accessing data
            - NYC: 1980s many block sites excavated; no longer active, Nan needs assistance with uploading datasets.
                - Could apply for tDAR small grant
            - Readability of data: Punch card and tape readers.
                - Punch card reader in San Francisco; may have one at York.
        - Funding
            - Intermediate steps: conference grants (Wenner-Gren, AHRC research network proposals)
                - Invitees commit to bringing specific datasets to workshop that organizers identify for urban faunal analysis to upload into tDAR and discuss with respect to research topic (e.g., animalscapes)
        - Research project
            - NEH
            - NSF-AHRC: http://www.ahrc.ac.uk/FundingOpportunities/Pages/USCollaborativeFundingOpportunity.aspx
        - Working with colleagues on integration
            - Kate will be in UK August-December can lead workshop/information session on faunal integration in tDAR if interest is there
                - York
                - Cambridge (work with Preston Miracle)
- Kate will continue conversation with Pam and James on developing a substantive comparative analysis of Alexandria and Spitalfields for publication.

X. tDAR Issues & Improvements

- Multitable databases
    - We've talked about doing a query to select cases
    - More important is to be able to generate a query on a multitable database that will turn it into a flat file with the desired observations
    - Do we save that (as a different resource), at least allow this

- Allow mapping of a variable to more than one ontology
    - One case because variable encodes more than one independent variable
    - Another for alternate mapping to the same ontology
    - Another for alternate mapping to a different ontology with the same basic concepts

- Database Content Searching
    - Need to do this with translated and mapped ontology values, including in comments
    - Find the rare species only in notes

- Mapping is a confusing term
    - Recoding implies a permanent change

- Do we need to devise a way to add metadata to columns values even if there is no coding sheet (e.g., full text values)
    - Can we do this with coding sheets

- General ontologies need internal values, labels, synonyms, and descriptions (what do we mean by that term, e.g., “adult,” “juvenile”)

- Revisit Usage (views, downloads, show users?)

- User (not contributor) Tagging
    - Good use - relevance to research questions
    - good for digging into data - a form of crowd sourcing information gathering that is not as directly dealt with by our metadata
    - Historic documents, organized around topic <<tagging>>
    - Historic documents might also use keywords for, e.g. ethnicity, but could be added by others later with tagging
    - after a big search someone could tag resources relevant to an issue that others can use
    - good for student projects