

# CITY OF LONDON ARCHAEOLOGICAL TRUST ROSEMARY GREEN GRANT: The Impact of Industrialisation on London Health

Progress Report – November 2016 for CoLAT December meeting

## Radiographic Progress

### Overview

Radiography of the London Metropolitan and Non-metropolitan sites has continued since March and the current total for individuals radiographed is **1,103**.

With the current selection of elements, the rate of individuals radiographed overall per day is 29.6.

The number of individuals remaining to be radiographed with reference to the target of 2,500 is 1,397 – this total number of individuals may be slightly less dependent on the available individuals for selection and inclusion.

Access to the London material, with the opportunity for advance preparation in locating boxes and space, with additional help from student volunteer in 2016, has been very helpful. The radiography of individuals in locations outside of London has encountered some difficulties with access to the boxed material in the store areas: this has been more time consuming and space was limited for preparation.

The non-metropolitan collections at Durham University had been allocated 7 days with the use of the in house radiography kit, but due to a fault with their kit, arrangements had to be made for the portable kit to travel and be used in Durham. This took 5 days in total, and was achieved within the original budget allocation.

Radiographs are available for Wharram Percy, but these will need digitizing. Jelena will visit to assess how many radiographs are available and how digitizing can be carried out.

The costs for the additional expenditure of travel & accommodation for Mark Farmer to undertake the radiography were originally estimated when he was based in the south of England: as he is now based in York the costs will be different, but will be within the total allocated for this expenditure.

### Completed sites

#### Industrial London

OCU00 – Chelsea Old Church  
PAY05 & BBP07 – Bow Baptist  
FA090 – St Bride's Lower Churchyard  
PGV10 – Bethnal Green

#### Industrial non-metropolitan

P4442 - Holy Trinity, Stratford

WSM43246 - Upton-on-Severn  
SLF 09 - Fewston  
COL10 - Coach Lane

### **Pre-Industrial London**

LSS85 – Broadgate/Liverpool Street  
BIG82 – Billingsgate  
MIN86 – Royal Mint/St Mary Graces

### **Pre-Industrial Non-metropolitan**

P4442 - Holy Trinity, Stratford on Avon

## **Detailed report**

### **Durham University**

Access and permission was granted to include the two non-metropolitan post-medieval sites that were curated at Durham University – **Coach Lane and Fewston.**

Jelena visited the Archaeology Department to review the paper based records relating to the osteological analysis for the individuals, to be able to make a selection of those adults that could be included in the Impact Project. From this information excel sheets were created giving site codes and context numbers, with headings for recording which of the elements were present and possible to radiograph. Time was restricted to only gaining access during the student holidays for the room and the use of the radiographic kit that was in place in the department.

Dates and times were arranged for a period of days in the Easter holidays for Mark to be able to have access and to carry out the radiography on the sites. A PhD graduate with osteological experience assisted Mark in preparing the elements for each context to be radiographed. Unfortunately, during the first day it was apparent that the in-house radiographic kit was not functioning correctly and it was not going to be possible to attain the totals of individuals for the project within the time parameters.

Liaising with the department and Reveal Imaging Ltd, it was agreed to transport the portable kit to Durham and to reorganise the radiography of the individuals from Coach Lane and Fewston to take place at the end of July and a day in August, with the space then available as students again on holiday. Mark transported the kit to Durham, which was then in closer proximity for taking on to Barton on Humber. It was fortuitous as the Fewston assemblage was to be reburied but we were able with the dates in July and August to still be able to include them in the sample. All of this was achieved within the original costing framework.

### **Ongoing sites**

Radiography of the London pre-industrial individuals selected from **St Mary Spital (SRP98)**, with the site having dated phases identified as Period 14, 15, 16 and 17 – individuals selected from Periods 14 and 15 have been completed and individuals from Period 16 started. Total radiographed to date for SRP98 = **213.**

Started the radiography of the medieval non- metropolitan individuals from **Barton on Humber**. Total radiographed to date for = **85**.

The non-metropolitan individuals from the Barton on Humber assemblage are both medieval (pre-industrial) and post medieval (industrial): they are currently retained on site in the church in Barton. English Heritage (EH) kindly gave permission for access to them to be included in the project, with the acceptance of the application form, but there is a restriction in terms of access with the church with regards to the timings of opening. Initially only a limited period of access was possible at the end of August and beginning of September. A start was made on the medieval individuals, but as the project requires a large sample size, of several hundred overall, it was not going to be possible or feasible to attain this if trying to work within the current time constraints for access to the church site.

Fortunately, Kevin Booth from English Heritage, kindly suggested that in order for us to be able to continue to radiograph the individuals with better timing access, he would arrange for the appropriate boxes to be transported by EH to a facility they have in Helmsley, Yorkshire. This site is manned for longer hours in the day and has better space facilities for the kit and preparation of the elements to be radiographed. Kevin said that the earliest he would be able to carry out the transfer would be in November and are liaising with him, providing a list of the contexts we want to radiograph.

As the Helmsley site is near to York this is convenient for Mark and in advance of the transfer he will meet Kevin at the site to check the layout and space for setting up the kit. He has also offered to assist Kevin and his team with the movement of the boxes from the church to the EH vehicle.

## Future Sites

**Brentford** – London Industrial Metropolitan site that was not possible to access in the summer as had been hoped with restricted physical access, it is hoped that it will be more accessible later in the year and this will be liaised with through MoLA

**English Heritage: Wharram Percy** - Jelena will be liaising with Dr Simon Mays to arrange a date for visiting him in Portsmouth to go through the radiographs that he currently holds of the individuals from Wharram Percy to see if any can be digitised and used in association with those taken for the Impact Project. An application form will be completed requesting access to the Wharram collection for inclusion in the project.

## Summary tables

Summary of totals of individuals radiographed for Metropolitan and Non Metropolitan Sites

	<b>YMA</b>	<b>MMA</b>	<b>OMA</b>	<b>YFA</b>	<b>MFA</b>	<b>OFA</b>	<b>Total</b>	
<b>London Industrial</b>								
<b>Bethnal Green</b>	20	30	35	41	26	48	200	
<b>Bow Baptists</b>	18	21	17	33	23	15	127	
<b>Chelsea Old Church</b>	2	4	14	5	3	7	35	
<b>Lower St Brides</b>	10	25	37	14	17	33	136	

<b>Total</b>	<b>50</b>	<b>80</b>	<b>103</b>	<b>93</b>	<b>69</b>	<b>103</b>	<b>498</b>	49.80%
<b>London Pre-Industrial</b>								
<b>Billingsgate</b>	7	9	4	4	5	0	29	
<b>Spitalfields</b>	61	48	14	58	21	11	213	
<b>Royal Mint</b>	3	4	2	2	1	0	12	
<b>Broadgate</b>	12	15	2	15	10	7	61	
<b>Total</b>	<b>83</b>	<b>76</b>	<b>22</b>	<b>79</b>	<b>37</b>	<b>18</b>	<b>315</b>	63.00%
<b>Not-Met Industrial</b>								
<b>Holy Trinity, Stratford</b>	8	13	12	13	8	8	62	
<b>Upton-on-Severn</b>	0	5	3	1	0	0	9	
<b>Fewston</b>	1	3	10	5	1	6	26	
<b>Coach Lane</b>	13	28	9	18	18	3	89	
<b>Total</b>	<b>22</b>	<b>49</b>	<b>34</b>	<b>37</b>	<b>27</b>	<b>17</b>	<b>186</b>	37.20%
<b>Non-Met Pre-Industrial</b>								
<b>Barton on Humber</b>	27	16	4	24	13	1	85	
<b>Holy Trinity Stratford</b>	4	4	1	3	3	4	19	
<b>Total</b>	<b>31</b>	<b>20</b>	<b>5</b>	<b>27</b>	<b>16</b>	<b>5</b>	<b>104</b>	20.80%
<b>TOTAL</b>	<b>186</b>	<b>225</b>	<b>164</b>	<b>236</b>	<b>149</b>	<b>143</b>	<b>1103</b>	

Key:

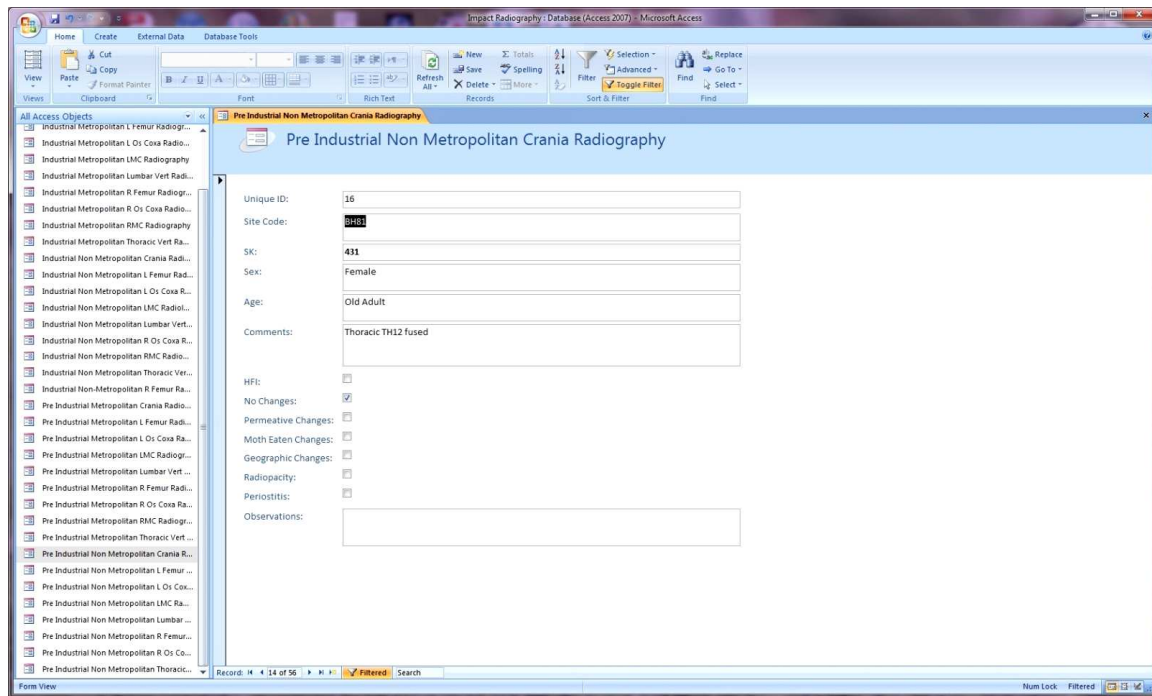
YMA	Young Male Adult
MMA	Middle Male Adult
OMA	Old Male Adult
YFA	Young Female Adult
MFA	Middle Female Adult
OFA	Old Female Adult

Summary table of elements radiographed for Metropolitan and Non-Metropolitan Sites

	Crania	Thoracic Vert	Lumbar Vert	LMC	RMC	L Femur	R Femur	L Os Coxa	R Os Coxa	Total
<b>London Industrial</b>										
Bethnal Green	194	0	197	186	187	176	2	194	193	1329
Bow Baptists	126	57	122	111	116	127	57	123	126	965
Chelsea Old Church	34	34	34	31	31	34	34	35	35	302
Lower St Brides	135	11	132	99	97	117	8	131	130	860
<b>Total</b>	<b>489</b>	<b>102</b>	<b>485</b>	<b>427</b>	<b>431</b>	<b>454</b>	<b>101</b>	<b>483</b>	<b>484</b>	<b>3456</b>
<b>London Pre-Industrial</b>										
Billingsgate	8	1	22	18	19	25	1	24	24	142
Spitalfields	212	0	212	192	169	211	2	212	212	1422
Royal Mint	12	0	9	9	5	2	0	9	9	55
Broadgate	38	4	57	40	50	59	1	57	59	365
<b>Total</b>	<b>270</b>	<b>5</b>	<b>300</b>	<b>259</b>	<b>243</b>	<b>297</b>	<b>4</b>	<b>302</b>	<b>304</b>	<b>1984</b>
<b>Not-Met Industrial</b>										
Holy Trinity, Stratford	8	24	23	22	15	44	34	37	32	239
Upton-on-Severn	4	6	7	7	6	6	8	7	7	58
Fewston	22	4	21	15	17	25	0	22	22	148
Coach Lane	43	1	66	63	67	85	3	73	73	474
<b>Total</b>	<b>77</b>	<b>35</b>	<b>117</b>	<b>107</b>	<b>105</b>	<b>160</b>	<b>45</b>	<b>139</b>	<b>134</b>	<b>919</b>
<b>Non-Met Per-Industrial</b>										
Barton on Humber	56	0	78	67	69	76	9	83	83	521
Holy Trinity Stratford	2	6	9	5	6	11	19	14	10	82
<b>Total</b>	<b>58</b>	<b>6</b>	<b>87</b>	<b>72</b>	<b>75</b>	<b>87</b>	<b>28</b>	<b>97</b>	<b>93</b>	<b>603</b>
<b>TOTAL</b>	<b>894</b>	<b>148</b>	<b>989</b>	<b>865</b>	<b>854</b>	<b>998</b>	<b>178</b>	<b>1021</b>	<b>1015</b>	<b>6962</b>
No of Radiographs	1788	296	1978	865	854	1996	356	1021	1015	10169

## Radiographic Analysis: Access database

To provide a structured and uniform method for the recording of the analysis of the radiographic images of elements from across different sites, Gaynor constructed an Access database for recording radiographic observations. The database will provide a record for each analysed element. Each record will contain systematically recorded information on the presence or absence of pathology, and the classification, nature and diagnosis of pathology where present. This will enable the retired radiologist David Allan, who has kindly agreed to assist with the interpretation of the radiographic images, to share and add information to the database records during the project. It will be an invaluable tool to aid in the interrogation of the radiographic data and at the end of the project will also provide a means of readily sharing the data.



## Documentary Research

The desk based assessment for the sites (21 days) has been completed by Gaynor, producing site summaries, including the inventory of parity and biographical details of known females from Bethnal Green.

Site summaries from online historical documents:

- Barton-upon-Humber
- Bethnal Green
- Billingsgate
- Bow
- Brentford
- Chelsea
- Fewston
- North Shields
- Spitalfields
- St Brides/Farringdon without
- St Mary Graces/East Smithfield
- Stratford-upon-Avon
- Upton-on-Severn
- Wharram Percy

## Documentary Research: Archaeological, cartographic & environmental research

Archaeological research for the metropolitan and non-metropolitan sites has been completed by Gaynor. This involved the collation of data and information for the post medieval sites with reference to *Vision of Britain census data: 1801-1911* (see below), mortality data from the *Office for National Statistics 1910-2011* (see below) and *Public Health England*, disease

incidence rates and lifestyle factors 2011-2014, for each of the post-medieval metropolitan and non-metropolitan sites.

*Vision of Britain census data: 1801-1911.* Each post-medieval metropolitan and non-metropolitan site - corresponding parish/registration area, as available. Also for London and England

- Population numbers
- Male v Female demographic
- Total Number of Births
- Total Number of Deaths
- Total Number of Infant Deaths
- Occupation/Industry
- Social Structure
- Cause of Death in 5 yearly age groups for 1851 and 1881/1911
- Housing
- Some areas up to 1961

*Office for National Statistics 1910-2011:* mortality data, at the UK level, including age, sex and cause of death annually.

*Public Health England, disease incidence rates and lifestyle factors 2011-2014:* Incidence rates per 100,000 population or %. Each post-medieval metropolitan and non-metropolitan site, including National Averages.

- Cancer: overall rates plus individual rates for lung, breast, bowel, prostate, cervical, oesophageal, ovarian, stomach.
- Diabetes
- Osteoporosis (defined by PHE as incidence of femoral neck fractures)
- COPD (Chronic obstructive pulmonary disease)
- Mortality attributable to particulate air pollution
- Cardiovascular disease
- RTA's and injuries leading to mortality
- Smoking
- 5 a day diet
- Hypertension
- Overweight/Obesity
- Tuberculosis
- Infant mortality
- Overall mortality ratings

There are nine days remaining from the assigned 36 days, to continue data collection and cartographic investigation.

### **JPEG radiography Images**

We have been working out a nomenclature for naming jpeg images in relation to the site, context, element and orientation of the element, to aid in searching and use in analysis and interpretation, as well as for the deposition with the CHB website and ADS, for future access by other research users.

## Methodology

Finalising writing up project methodology document.

## Outputs

### Publications

We were invited to submit a Short Communication Article to the *Radiology Open Journal*, which has been accepted, after peer review, and published on line - Ref. No. ROJ-16-SC102.

Research related to the Impact project based on the investigation of Hyperostosis Frontalis Interna (HFI) is in the process of being peer viewed by the *American Journal of Physical Anthropology* (AJPA). This research, although not directly funded by the Impact project, is directly related research that will be collated with the data achieved from the project. It will be a beneficial indicator of the Impact Project, raising awareness of the future work and outcomes from the project.

We will be liaising with *London Archaeologist* for the submission of an article discussing the aims and objectives project and the processes involved with the radiography,

### Presentations

- Presented a paper at *Radiographic perspectives on the history of our health*, as part of the session London Bodies: Some Recent Advances, at the 53<sup>rd</sup> LAMAS conference in March held at the Museum of London.
- Gave a talk in April about the Impact Project for the Wandsworth Archaeological and Historical Society *Using x-ray vision to investigate the impacts of Industrialisation on London Health*.
- As an invited speaker presented as part of the two day course in Oxford about curation and research of collections '*Post-medieval cemeteries: best practice in excavation and research*': included the research of the Impact project as a key element of the presentation.
- Abstract accepted and poster presented *The Impact of Industrialisation on London Health* at the Paleopathology Association (PPA), 43rd annual North American Meeting, Atlanta, April 2016.
- Abstract accepted and poster presented *The Impact of Industrialisation on London Health* at the 18<sup>th</sup> annual meeting of the British Association for Biological Anthropology and Osteoarchaeology (BABAO), September 2016. The poster presentations gave an overview of the project, outlining the aims and objectives, the elements targeted for radiography and the selected diseases for investigation. Good feedback and interest from participants when talking about the project.
- Spoke in June as part of the Southampton Seminar Series for student researchers –and discussed the Impact Project and use of radiography for research.
- Invited to give a talk for the Royal Society of Medicine in June for the event **A close look at our ancestors** with part of the presentation focusing around the Impact Project and the radiography being another means of getting a closer look at our ancestor's and adding to our knowledge.



- Gave a talk for the Grantham Historical Group in July and spoke about the Impact Project as part of an overview of research undertaken using the skeletal remains curated at the Museum of London.

### Forthcoming presentations

- Talk for the Berkhamsted Local History Society – Wednesday 9<sup>th</sup> November
- Call for abstracts just released for the North American annual Paleopathology (PPA) meeting in 2017 – hopefully Jelena will be attending as an invited presenter for a session at the American Association of Physical Anthropologists (AAPA) which follows on from the PPA with both organisations sharing the same venue.

### Website

The team working on updating and renewing the MoL website have been able now to create a page for the Impact Project on the website accessed through the Centre for Human Bioarchaeology. A meeting is being organised with the social media coordinator for working out Facebook presence for the project in light of the new configurations and how that works within the social media policy of the museum.

### Media

Interviewed by Amanda Ruggeri, BBC On Line, about the project and the work on the radiography of the individuals (<http://www.bbc.com/future/story/20160923-the-lab-that-contains-20000-skeletons>). Amanda is interested in doing another piece at a later stage in the project.

Nicola Twilley, a journalist from the New Yorker, contacted the museum press team when the announcement was first made about the project and the award from CoLAT. They were very interested in the aims and objectives of the project and Nicola is coming to the museum on the 11<sup>th</sup> October to talk about the project and the progress with the radiography.

We have been in communication with Caravan Productions who are in the early stages of planning a program to put forward to the BBC that could include the work of the project. Having spoken with a producer and director they are very interested in the content of the project. They will be in contact in the future, if the program is commissioned and if the project is to be a minor or major component feature of it.

Article about the project published and accessed on the Forbes site:

<http://www.forbes.com/sites/kristinakilgove/2015/05/20/industrial-revolution-caused-rise-cancer-obesity-arthritis/#3bf9da30180e>