

Cobb Research Lab News

A quarterly newsletter brought to you by the W. Montague Cobb Research Laboratory, Howard University

VOL. 3 ISSUE 1

EDITOR, Dr. Fatimah Jackson, ASSISTANT EDITOR, Ms. Jayla Harvey

FALL 2015

CRL team extracts ancient DNA from individual who died 85 years ago.

By Dr. Latifa Jackson

Over the past year, the Howard University W. Montague Cobb Research Lab (CRL) has been developing protocols and collaborations to analyze the ancient DNA present in the skeletal remains from those individuals in the collection. The collection contains individuals who were born between 1860 and 1959, with 699 individuals available for possible analysis. Our desire to attain sequence data for these individuals will help to increase our understandings of the genetics of individuals living in the late 19th and early 20th centuries. We began our work by forming a collaboration with the Centre for GeoGenetic at the University of Copenhagen. From this collaboration we learned their protocols in extracting ancient DNA and ways to address possible methodological issues associated with trying to capture human ancient DNA. While they worked on a subset of samples from another ancient DNA collection, the CRL took these technologies back to Howard University to run a pilot study to determine the ancient DNA yield in a sample individual (CC672) from the CRL collection. This individual lived 85 years ago. In order to have maximum preservation of the collection, we chose to extract DNA from the upper molars which were still imbedded in the skull. These were carefully removed, scraped and the remnants of tissue structures were scraped off. We used phenol chloroform, Qiagen and Oragene extraction methods. Quantification of the samples showed DNA was present in all of these methods; however the phenol chloroform delivered the highest DNA concentrations and will be the methodology used in the future to extract DNA from the skeletal collection. We are currently studying methods available to increase the capture of human specific DNA in these samples since the DNA was shown to still be quite degraded. DNA degradation is a common result of long term DNA presence. We will continue to work to bring ancient DNA sequencing to the CRL samples in order to gain insights into their genetics and associated genetic disease phenotype predispositions. We are excited by our preliminary findings and hope to start DNA extractions of these unique historical skeletal resources at Howard University. ****

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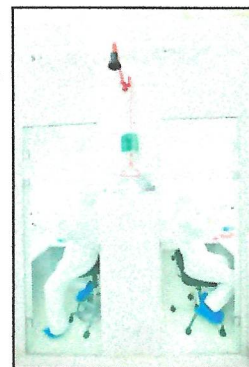
Recent visit to the University of Copenhagen yields insights on ancient genomic analysis methods

By Dr. Fatimah L.C. Jackson

During the last week of September, a team of researchers from Howard University spent four days visiting the Centre for GeoGenetics at the University of Copenhagen's National Museum of Natural History. On the team were Drs. Michael Campbell, Latifa Jackson, and Fatimah Jackson, all of Howard University.

This Centre is a world-class multidisciplinary center of excellence in ancient DNA research. Their facilities were opened in 2012, and they were built to comply or surpass the stringent requirements for working with ancient DNA. The labs are separated into several smaller rooms to facilitate cleaning and to allow several people to work at once. The Howard University team had several objectives for visiting colleagues at the Centre but foremost among these was to try to replicate the Centre's methods of ancient DNA extraction, library development, and sequencing and bring this technology to Howard University.

At the Centre there is a strict isolation of all work related to human DNA. In this area pictured, there are two separate extraction rooms with laminar airflow benches and two small PCR setup rooms form the core. Separate from these a similar setup exists for working with non-human material, mainly other mammals, soil and ice. At Howard University we are not only working on ancient DNA derived from human bone and teeth but from grave soil as well. Each of these labs at the Centre have a special room where researchers must put on full body suits and other protective clothing required prior to extracting the ancient DNA. A positive air-pressure gradient is applied with highest pressure in the extraction rooms. The Centre also hosts a suite of laboratories in which modern DNA can be extracted, and where DNA can be analyzed post-PCR. Their laboratories also contain standard molecular biology equipment for the sequencing of these ancient materials. We hope to replicate these facilities here at Howard University so that we can become one of the few institutions in the United States and the only HBCU with the capacity to reveal our ancestors' genetic history and biology. ****



(More pictures from the visit to the Centre on page 6)

Who is She?

By Keely Clinton

In late August of this year the W. Montague Cobb Research Lab received a letter of great significance from a man inquiring about one of the individuals in the New York African Burial Ground. The individual was a woman, age unknown, was compared to our modern day Sandra Bland by the mode in which she was murdered. She was described to have been laid to rest with a musket ball embedded in her shoulder blade and forearm twisted out of joint. With this information and a peaked interest in this woman I embarked on a literary journey to find her. Because there are no names associated with the archaeological archives I searched burial by burial looking for an individual fitting this description. It was only on the eve of the deadline of this article that I came across Burial No.25, I found her!



Just as was described in the letter she was buried with a lead musket ball lodged beneath her fourth rib with an oblique fracture of her lower right arm that had been caused by twisting. In addition to these lesions she had a large hole at the center of

her left scapula more than likely the entry point of the bullet along with bone fractures to the face suggesting blunt-force trauma occurred. Our mystery woman was approximately 20- 24 years old when she died more than likely from the injuries ensued. Unfortunately, evidence states she survived a few days after the attack, presumably in tormenting agony. What the evidence doesn't tell us is WHY she was murdered. It is well known that slaves were not killed very often since they were seen as property and no slave owner wanted to lose a profit. So was this woman the Rosa Parks of her day? Was she standing up for something? Or was she the subject of a brutal beating without just cause just as our sister Sandra Bland?

We know that this woman endured ongoing physical labor, as was the principal purpose of slaves in New York. This is proven by the scarring shown on each ulna (one of the lower arm bones) very common in the skeletal remains of slaves suggesting habitual activity using these muscles. An interesting fact about this this burial is that it lies directly above Burial No.32, a man 50-60 years of age, allowing one to conclude the interment of this body was purposely placed with the other. Excavation notes the distance between the two individuals is only 0.12' in elevation. Curiosity leads me to the next piece of the puzzle, who was HE?! Why did they share a grave? Did they die for the same reasons/ causes? What can the DNA of the grave soil tell us that archaeological records cannot?

Hopefully more research will lead us to answers, but until then we should bask in the essence of the known. We found HER and are looking to multiply the numbers of identified individuals of the NYABG. As reportedly mentioned by Bernard L. Richardson, dean of the chapel at Howard University, "Even though we can't call their names, we know them. We give thanks for the opportunity to connect with our past and our future. Oh God, you have made these bones live again [New York Historical Society]." *****

COBB RESEARCH LAB GROWS TO 40 ACTIVE MEMBERS – A NEW HIGH

This September, Nicholas Guthrie and the Cobb Lab team conducted a very successful round of recruiting to the CRL. After placing targeted flyers around campus, students and faculty responded to the call. In the Biology, Chemistry, and Physics buildings, flyers which targeted future STEM professionals garnered traction for the CRL's research committees relating to Infectious Diseases, Chronic Diseases, Mental Disorders, Dentistry, and Genomics. In Locke and Douglass Halls, advertisements targeting writers and historians were so successful that the CRL created a brand new Social Science research committee. Flyers posted in Childers Hall peaked interest from fine art faculty and students to use the Cobb Collection as a subject for many different works across the department. After weeks of orientations, paperwork, and CITI certifications (a requirement for all CRL members), the core team at the lab grew from a dozen to over 40 researchers, spanning undergraduate, graduate and outside affiliates. The buzz around the CRL is high and we hope to see great outcomes from our new, larger research unit! *****

Organization of the Cobb Research Lab for the academic 2015-2016 year

Research Groups:

- Infectious Disease Biomarkers
- Mental Disorders
- Advanced Dentistry
- Digitization and Bioinformatics
- Imaging (Radiographic and 3D)
- aDNA and Genomics

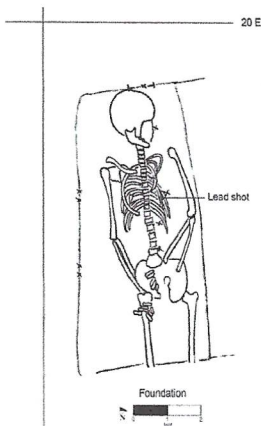
Committees within the Lab:

- Publications
- Publicity and outreach
- Fundraising
- Research and grants

Open Hours for Research Groups(Fall 2015)

- ⇒ J'Aron Heard (jaron.heard@bison.howard.edu) will open the doors from 3-6 on Mondays and 1-4 on Tuesdays
- ⇒ Nick Guthrie (gutt333@gmail.com) will open the doors from 1-4 on Thursdays and Fridays.

General Research Group Meetings are every other Thursday from 10:00 am to 12:00 noon, 232 Douglass Hall, Howard University



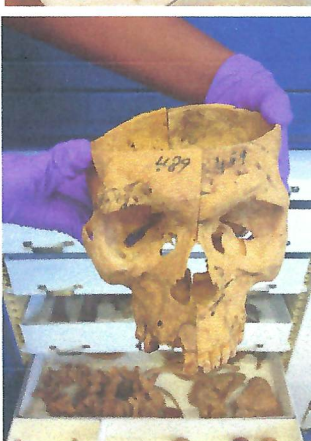
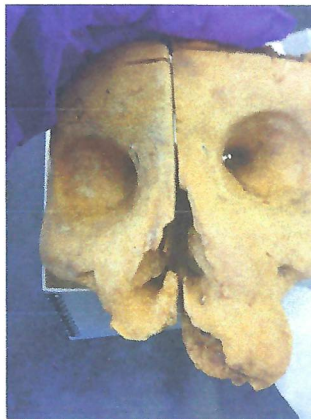
Burial No. 25 (drawn by L. Romanczyk on 10/19/97; Drawing No. 1129).

Skeletal Disease in the Cobb Collection

By Christopher Cross

The Cobb Research Laboratory (CRL) is a treasure chest full of secrets waiting to be discovered. With over 600 individuals' skeletal remains that have never been buried, essentially we have a small township of human capital in our possession. Due to the unique nature of the collection it is irreplaceable and we are optimizing safe techniques and lobbying for new storage and lab facilities to preserve its integrity and longevity. The CRL is an example of using the past to not only predict the future but also change the present. Using next generation scientific techniques and interdisciplinary collaborations internally, domestically, and internationally we are contributing novel information on African Americans and their health disparities using these unique remains. The model we are establishing will help create a new path for science that is translational and clinically relevant. Currently, we have ongoing studies linking the anatomical abnormalities/signatures from trauma, syphilis, tuberculosis, Paget's disease, to periodontal disease just to name a few. There is so much information contained in these skeletons. We have the rare capability to further investigate the causation and development of these individuals' skeletal disease using their own clinical records. If a picture is truly worth a thousand words, please take note of the depictions presented on this page to the right. We hope they are research-inspiring! ****

PHOTOS: (Upper left) Skull of an 81 year old woman with advanced osteological disease. (Upper right) Various long bones with rickets. (Middle right) Male skull. (Middle left) Inside of cranium stained by hemoglobin. (Lower right) Damaged femur head. (Lower left) Skull missing upper crania.



Science Editors are Coming to Howard University!

Who: Various editors from Science

What: Deciding where to submit your manuscript, the peer review process, compliance with funder mandates, and the new open access journal, Science Advances.

When: October 22, 2015 from 2-3:30pm

Where: Seeley G. Mudd Building (Red Room – 3019)

Registration: https://howard.az1.qualtrics.com/SE/?SID=SV_eJKe81MgR2iFLtH

If these bones could talk...

By Dr. Carlina De la Cova

The human skeleton can tell us much about a person's past. Whilst serving as the framework of our bodies, the skeleton also records important events in our life histories, including periods of poor health, disease, and malnutrition. Understanding how to read these events, and the subsequent pathologies they produce in human bones, allows us to better comprehend health and the relationship between health, race, and social status. As a skeletal biologist and paleopathologist, my work does this. Since 2006, my research program has focused on skeletal health disparities amongst African Americans and Euro-Americans who were born during the Antebellum, Civil War (1861-1865), and Reconstruction (1866-1877) eras and lived into the early 20th century to determine the impact enslavement, liberation, industrialization, migration, and urbanization had on African American salubrity. This summer myself (University of South Carolina) and my research team, comprised of Dr. Antonio de la Cova (University of South Carolina) and Jessica Tompkins, MA (Indiana University, Bloomington) spent the month of June and most of July studying the impact of these events on individuals in the William Montague Cobb Anatomical Collection.

The Cobb Collection was started by Dr. William Montague Cobb in 1932 and originally included the skeletal remains of 978 mostly unclaimed African American individuals that died in public hospitals, almshouses, charity clinics, and mental institutions in Washington, D.C., between 1932 and 1969. The Cobb Collection is the first, and only anatomical collection, established by an African American scientist for the purpose of researching the Black past and refuting the popular and controversial scientific beliefs about African Americans during Dr. Cobb's lifetime.

My research with the collection began in 2006, when I examined 90 males. For this return visit, 72 females were analyzed. Numerous pathologies were observed. Some individuals had broken bones and evidence of poorly healed fractures that had not been properly set. One person also had a fracture that got infected but later healed, as evidenced by osteomyelitis. Many women had benign hyperostosis frontalis interna, or thickening of the interior skull. There were also infectious diseases present, including tuberculosis and tertiary syphilis. Tuberculosis was so severe in some persons that the disease destroyed part of the spinal column and resulted in severe spinal deformities consistent with Pott's Disease. Individuals with syphilis had limb disfigurements associated with expansion of the lower leg bones. Padgett's disease, a metabolic disorder, was also present and resulted in thickening and expansion of the facial, limb, and hip bones. One individual died from uterine cancer, which had metastasized to the pelvis and vertebrae. Septic, osteo, and rheumatoid arthritis were also observed. Perhaps most telling were bowed bone malformations associated with childhood rickets or vitamin D deficiency.

The disorders and diseases present suggest that the individuals in the Cobb Collection lived challenging lives. Examination of census and morgue records indicated that most were from Blue Plains, or the Home for the Aged and Infirm, a long-term care facility for the indigent elderly. Most of the individuals studied died impoverished and thus truly represent the poorest denizens of the District at the time period, as other researchers have pointed out. Improperly healed fractures suggest accidental injuries or evidence of interpersonal violence. That these broken bones were not properly set implies limited access to health care or a cultural mistrust of doctors. The presence of healed rickets indicates poor childhood nutrition, which may have been the result of the stresses associated with enslavement or Reconstruction.

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The infections and communicable diseases observed illustrate the impact of an urban environment, especially for those marginalized to poor housing with limited access to health care. It is interesting to note that African Americans in the present day still suffer from higher rates of tuberculosis when compared to their white counterparts. The Cobb Collection has the potential to shed further light on this persistent health disparity.

Historical research is being performed on each individual examined in this study so that more can be learned about the Cobb Collection, who the people were that comprise it, and the impact the collection, and the people within it, will have in better understanding the Black past through the lens of health, social marginalization, and biology. ****

Cobb's Corner :

Research Assistant Sierra Williams

Cobb's Corner is a reoccurring feature of the CRL Newsletter featuring a brief interview about the lab experience of a current researcher. In addition to learning more about their research, we learn how Dr. Cobb's vision and mission is carried on through our efforts in the CRL today.

Our researcher is Ms. Sierra Williams, who graduated in May 2015 from Howard University with a B.S. in Sports Medicine, Originally from Philadelphia, Pennsylvania, Ms. Williams was interviewed by Nicholas Guthrie, a two year veteran of the CRL.

Nicholas Guthrie (NG): So how did you hear about the CRL? Sierra Williams (SW): My friend Alexis Payne is also a research assistant at the CRL. She told me about the amazing work that you guys were doing at the lab and she invited me to check it out. I started working on the CRL in June and spent most of my summer doing research there.

NG: I know that some of the records on our patients are very scarce. Did you find that aspect difficult?

SW: At first it was a little difficult! We have some records here on most of the patients and following their research, we went to the Moorland-Springard Research Center where they had boxes of Dr. Cobb's records and documents that we were able to look through.

NG: I know how expansive the amount of material that the library housed relating to Dr. Cobb (because I was with you on the first trip over!), but can you share with us how much there was and the types of information housed?

SW: There were over 70 boxes, so it took a while on to go through them all. I only had the opportunity go through around 10 of them, and the topics ranged from Dr. Cobb's involvement with the American Association for the Advancement of Science, to his membership with Omega Phi Phi Fraternity Incorporated. Additionally, there were anatomical board cadaver documents from various hospitals. He also had correspondence from the NAACP, as he was the president at the time. There are also personal documents photos and publications in the collection.

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New Research Associates join CRL

Dr. Michael Campbell, Research Associate



Dr. Michael Campbell (michael.campbell1@howard.edu) obtained his Bachelor of Science degree in Physical Anthropology at the University of Toronto and then earned a Master of Science degree in Human Biology at Oxford University. Dr. Campbell went on to obtain his PhD in Biological Anthropology at Columbia University in New York City and completed post-doctoral training at the University of Pennsylvania where he studied the evolution of genetic and

phenotypic variation in diverse African populations. Dr. Campbell then applied his knowledge of African populations to study the genetic basis of ethnic disparities in cancer susceptibility in African Americans as research faculty in the Department of Biostatistics at Yale University. Dr. Campbell has recently joined the Department of Biology as an Assistant Professor at Howard University where he will continue his research on the genetics underlying health disparities and other complex traits in populations of African descent. ****

Dr. Bradford Wilson, Research Associate



Dr. Bradford Wilson (bradford.wilson@howard.edu) received his Ph.D., M.S., and B.S. from Howard University. His doctoral dissertation research was on The Characterization of Variation in the Vitamin D Receptor Promoter and Association of Ancestral Haplotype with Prostate Cancer in African Americans. He is interested in the genetics underlying the biology of health disparity conditions and diseases including common cancers (breast, and prostate),

hypertension and its sequelae and pharmacogenomics. Dr. Wilson is also a Senior Research Associate at the National Human Genome Center (NHGC) at Howard University where he is conducting his NIH-funded pharmacogenomics research. Dr. Wilson has lectured on cancer genetics and modes of inheritance in the Graduate and Medical Schools at Howard University, respectively. ****

Ms. Sherese Taylor, Research Associate



Ms. Sherese Taylor (sherese.taylor@howard.edu), a first year graduate student in sociology has joined the Cobb Research Lab team as a Research Associate. Ms. Taylor received her B.A. in Global studies with a concentration in culture, power, and place, and a focus in Latin American Studies at the University of Minnesota. She not only completed her degree, but also completed her certificate in International Development. With

her degree, she was able to establish a program at the University of Minnesota that promoted and gave tools on cross cultural communication. Since then, She has been involved with many international communities, most notably Ecuador where she was able to investigate the lack of African- Ecuadorian teachers within predominately African regions.

Most recently, Ms. Taylor has been working on the sociological implications of artificial intelligence and robotics and has presented a paper entitled: "Shifting the Technological Gaze: African American Perspectives and Insight on Artificial Intelligence and Robotics" at a national conference. Ms. Taylor was previously Administrative Assistant for the CRL before her administrative promotion to Biology. ****

NG: This sounds like a good segue into your work here at the CRL! Can you tell me about that?

SW: When I started working on the lab, I got the opportunity to work with Dr. Carolina and Antonio De la Cova from the University of South Carolina. They were conducting research on African Americans in the Cobb Collection and looking at trauma and disease and the bones. I was able to learn a lot about how these traumas were analyzed and reported

NG: Wow this sounds like a lot of useful information! How do you think it is going to be utilized back in the lab?

SW: All the information being gathered is going to give us a better understanding of who Dr. Cobb was as a professional and individual. It will also help us with funding, as we can use some of the information to fuel our grant proposals and support solicitation. The information that we find specifically on the Cobb Collection will tell us more about the individuals in the collection.

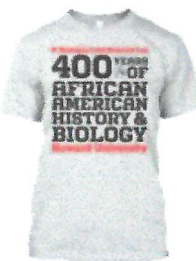
NG: How does working with the CRL align with your future goals? I don't see very many sports medicine graduates in bioanthropology labs!

SW: I have always had an interest in anthropology and, since I was a kid, I used to go to the anthropology museums and archaeology camps at the University of Pennsylvania Museum of Archeology and Anthropology. I've always wanted to be in the medical field, so this was a great opportunity to get research experience along with something that aligned with my career path. Working with the CC each day and looking at all of the different pathologies has allowed me to get a better understanding of some diseases and how they manifest in bone.

NG: That sounds really interesting! Well, thank you for taking the time to talk with us!

SW: Thank you very much, Nick! ****

Support student researchers in the Cobb Research Lab with your purchase of a stylish teeshirt!



<https://teespring.com/cobbresearchlabspring2015>

<https://teespring.com/Cobbresearchlab2>





Centre for GeoGenetics
Natural History Museum of Denmark



Professor Tom Gilbert



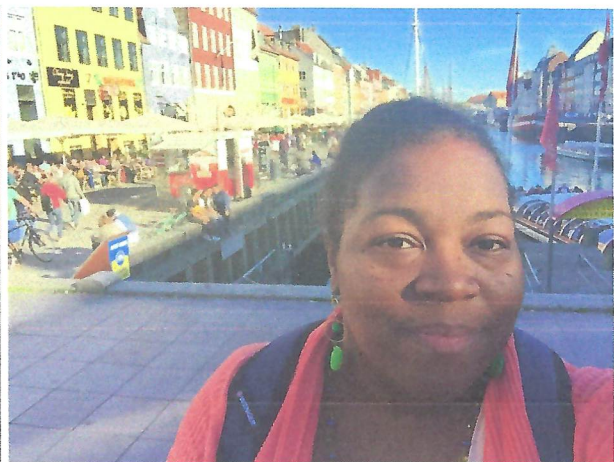
Assistant Professor Hannes Schroeder



Professors Fatimah Jackson, Hannes Schroeder, and Michael Campbell in one of the labs of the Centre.



Downtown Copenhagen



Dr. Latifa Jackson near the Waterfront in Copenhagen



Centre for GeoGenetics, National Museum of Natural History, University of Copenhagen, Denmark