Introduction

It is important for a student of any field to gain experience in that field before they enter into that profession. That is why, as graduate students of forensic anthropology, we wanted to get an internship at one of the most highly touted forensic anthropology laboratories in the country. That lab is called the Joint POW/MIA Accounting Command (JPAC), and their main facility is located in Honolulu, Hawaii. The organization is based on Joint Base Pearl Harbor-Hickam and its primary objective is to identify the remains of unidentified US war dead from World War II, the Korean War, and the Vietnam War. Through joint efforts by the military and many civilian
anthropologists, archaeologists, historians and dentists, JPAC strives to find, recover, and identify the remains of US servicemen “Until They Are Home”.

As interns, we were able to not only learn about the organization’s structure and the various procedures involved in the identification process, but also participated in several different stages of the process. At the first stage, the historians at JPAC work in two different divisions to either locate remains abroad or narrow down the list of potential identities of unidentified remains buried on US soil. One of their internship tasks was entering historical information into databases that contribute to the historians’ efforts. Once remains are brought back to JPAC, the forensic anthropologists and odontologists are responsible for making an identification of the remains. The authors were able to assist the anthropologists with their assessments of the remains and learn more about how they complete their portion of the process. The following paper will briefly demonstrate the scope of the organization, the major projects going on at JPAC, as well as how we were able to participate in the various steps involved in identifying the remains of our fallen US soldiers.

**JPAC in Context**

In 1947, the United States military was developing an identification laboratory in response to the Repatriation Program instituted by the American Graves Registration Service. Charles Snow, one of the first forensic anthropologists responsible for establishing this laboratory, described what was then referred to as CIL-HI (Central Identification Laboratory - Hawaii), based out of Joint Base Pearl Harbor-Hickam in Honolulu, Hawaii. The purpose of this new organization was to identify and return the skeletal remains of long-lost US military service members to their loved ones. In his writing, Snow describes the laboratory:
Two large interconnected warehouses serve as mausoleums (nos. 1 and 2) where the flag-draped caskets from all over the Pacific are arranged in their original cemetery associations awaiting examination and identification. Honor guards are on duty at all times, night and day. The morgue (working laboratory), conveniently situated in one of the adjacent corners of Mausoleum no. 2, is a light, airy, sanitary, roomy laboratory. It is well equipped with metal-covered tables at comfortable working heights, fluorescent lights, washing and scrubbing sinks, sterilizers, white storage cabinets for supplies, personal lockers and clean "whites" (operating-room gowns and trousers) and showers.

-Snow 1947

Almost 70 years after Charles Snow’s description of the young department, CIL-HI has gone through few changes. Now called Joint POW/MIA Accounting Command - Central Identification Laboratory (JPAC - CIL), the organization is based out of the Joint Base in Hawaii and has a newly opened annex on Offutt Air Force Base in Nebraska. JPAC utilizes all the resources at its disposal to continue in their efforts to locate, identify, and return the remains of military servicemen that died abroad. These efforts take place both on US soil, where numerous sets of unidentified remains await identification, and abroad, where the remains of POW/MIA soldiers are still waiting to be discovered and brought back to the US for identification.

The overall mission of JPAC is to identify and repatriate the remains of US war dead, and in order to complete that mission, the organization functions in two broader sectors, the Command and the Central Identification Laboratory (CIL). On the Command side of the operation, more than 400 military personnel are responsible for organizing and supporting the recovery missions abroad, as well as working with US Military regulations surrounding the identification process of recovered remains. The CIL is made up of approximately 70 civilian personnel including forensic anthropologists, archaeologists, historians, and odontologists. The employees on this side are the ones responsible for locating, recovering, and identifying the remains of previously unidentified US war dead.
JPAC’s Hawaii facility is made up of two main buildings that are situated on opposite sides of the Joint Base. The main building houses the Command side of operations and the main laboratory of the CIL. The Command is primarily made up of offices for military personnel and meeting rooms. The CIL side holds several offices for anthropologists, odontologists, and historians, as well as general meeting rooms. The most important part of the CIL is the actual laboratory spaces. In one large open-floor laboratory sits several tables for laying out skeletons for examination, as well as an x-ray room and several computer workstations. There are also shelves in the main lab for storing artifacts and material evidence pertaining to each individual case, as well as case files and paperwork for each set of remains. Also key to the laboratory space is the autopsy suite, which is where DNA samples are taken and remains are processed (see explanation below). The second building of JPAC’s Hawaii facility primarily houses the workspace of the archaeologists and a small material evidence lab.

The main laboratory floor. Photo Courtesy of JPAC

The laboratory side of JPAC maintains extremely high standards of scientific rigor and, because of that, it is the holds the honor of being, not only the largest forensic anthropology lab
in the country, but also the only forensic anthropology laboratory in the world with certification from the American Society of Crime Laboratory Directors (ASCLAD), and the fourth federal laboratory in the US to get that level of certification. Unlike the earlier days, when a military coworker could accidentally find a crock pot used to clean bones and use it to make chili for the company picnic, the standards of security and sanitation have been vastly improved.

Not only do JPAC employees have to undergo the background checks to gain access to the military base, but they also have to undergo a separate process to get access to the JPAC facilities. Each laboratory is secured by swipe access that regulates entry through the use of ID cards. An ID card is programmed with your “ranking” within the organization (interns can only access the building’s main doors), but those with higher clearance levels can access the laboratory and evidence storage areas. ASCLAD certification requires JPAC to restrict access to any areas that contain skeletal remains or material evidence, and the swipe cards meet this requirement.

**Ongoing Project on US Soil**

The Punchbowl Project refers to the ongoing efforts to identify the remains of unknown soldiers interred at the National Memorial Cemetery of the Pacific, also known as Punchbowl Cemetery. This cemetery is located on the Hawaiian island of Oahu, where the main headquarters of JPAC are located. Remains of unidentified war dead - recovered from World War II, the Korean War, and the Vietnam War - are buried in the Punchbowl Cemetery until a positive identification (described below) can be made.
With living family members, a positive identification for an individual should be a fairly simple endeavor, thanks to DNA. However, the circumstances surrounding some of the individual cases are rather unique. For instance, before nations began exchanging fallen soldiers back to their countries of origin, many of the remains of US soldiers were processed and preserved internationally, especially in Japan. The processing that took place there involved placing a powder, similar to a form of powdered formaldehyde, on the bodies. Unfortunately, this powder eliminated the possibility of using DNA for identification because it damaged the integrity of the DNA beyond the ability to even collect a proper sample from the remains. Without DNA as a viable option for identification leaves the JPAC personnel to seek out other means of identifying the thousands of unidentified soldiers.
When DNA samples cannot be collected or compared to a living relative, historians are brought in to relieve some of the chaos surrounding the first steps in identifying Punchbowl remains. There are six historians working in the Central Identification Laboratory (CIL) disinterment division, who focus exclusively on identifying those remains held within the Punchbowl Cemetery. The identification process begins with combing through archives of documentation of missing soldiers’ records. Compiling items like crew member crash reports, last known alive accounts (LKA), incident reports, and deployment records is an exclusionary method that rules out potential individuals as a match. For instance, given a crash incident report, soldiers that are reported as survivors of the crash can be excluded as a possible future match in identity to any remains recovered from that particular site.

While this is already a tremendous task, the archival records are frequently scattered all over the United States. On many occasions throughout the year, historians working on the Punchbowl project have to travel to those archives and spend days or weeks attempting to locate helpful documents. This is of course only possible if records were, in fact, properly maintained.
The convenience of a cohesive database is still a fairly recent luxury that is distinctly different from the information retrieval and filing system of even a few decades ago.

This was especially problematic for World War II cases, where there are not complete lists of soldiers that died in action (and what mission they were on) or of those that survived. The CIL historians gave interns tasks that focused on expanding and revising these lists from multiple sources. Originally, soldiers’ names were added to the long list of plane crash survivors by going through each individual’s record, but now these lists are being digitized for cross-referencing when trying to narrow down the identity of a specific set of remains. Rachel and Amelia created data sheets, based on primary source archival records, with names of Air Force members that survived plane crashes in Europe during WWII, as a way to help continue to build these lists. Available information generally includes the individual’s name, rank, and ID number, and the date, time and location of the crash, and a MARC number referencing the crash report on file. This is especially useful information when narrowing down a list of potential victims from a plane crash, as confirmed survivors of that crash incident can be instantly ruled out.

This is the primary objective for the historians working within CIL: finding documentation that will associate potential individuals with a specific set of remains. After the list of possible individuals is narrowed down to a manageable number of individuals, which usually does not exceed 8, those sets of remains are exhumed and brought to the autopsy suite in JPAC for processing and analysis. These cases are placed in the care of the forensic anthropologists, who move forward in making an identification of the remains (see below).

Projects Abroad

Aside from the Punchbowl project, JPAC also operates internationally to recover the remains of soldiers who died abroad. These operations are different from Punchbowl, in that
there are two stages involved in the recovery process before the remains are brought to the CIL for identification. Unfortunately, interns are not involved in any of the projects abroad, so the authors can only discuss the typical procedures. The two stages in the recoveries abroad are undertaken first by the Investigation Teams, and then by the Recovery Teams. Both groups are highly active, with multiple teams being regularly deployed at any given time throughout the year.

*Investigation Teams*

The other branch of historians, referred to as the Research and Analysis section, are responsible for the research necessary to locate sites around the world where the remains of US service members are suspected to be buried. While they do not work within the CIL, they are a part of the larger mission at JPAC. Their role takes place before forensic anthropologists are involved in a case, and they are responsible for discovering where to excavate for human remains next.

Similar to the early steps taken by the historians working on Punchbowl Project, the historians working in Research and Analysis begin the process of locating remains by analyzing the historical records. Unlike the CIL historians however, they are also involved in the first round of fieldwork. They frequently have to travel to the areas that are thought to be the site of a plane crash, as a part of the Investigation Team. The investigation teams usually contain between 3 and 6 individuals, working as analysts, linguists, and historians, trying to locate and confirm the relevance of a site. Interviewing locals is often a key part of the process, as old maps were usually created from approximations, if they are available at all. The memory of locals is sometimes the best resource when trying to locate the initial site.
Once the possible crash site is found the team conducts noninvasive survey methods. This is important to protect the integrity of the site, as invasive methods are destructive in nature versus noninvasive methods which do not compromise unrecorded site data or materials (Dupras et al. 2006). Due to the amount of metal debris associated with plane crashes, one noninvasive method frequently used is metal detection. This, however, can prove problematic at times when a crash area has been extensively salvaged of the debris, or when other natural (e.g. mudslide) or cultural (e.g. farming) processes have taken place. Only when the investigation team is able to confirm that their findings in the field are consistent with a crash site can the next phase of recovery begin.

Recovery Teams

The team that returns to the site after an investigation team is called the recovery team. This team is made up of approximately 12 individuals, including a forensic anthropologist/archaeologist as the only civilian member, and JPAC military members with positions such as team leader, photographer, medic, explosive ordnance disposal (EOD) specialist, linguist, and various other roles. Teams are generally deployed to sites within Europe and Southeast Asia, since the majority of conflicts occurred in these regions.

While a recovery team’s mission is fairly obvious, as the name of the team suggests, it is often much more difficult in practice. The entire recovery is reminiscent of a typical archaeological survey but with extras. The steps leading to excavation consist of hiking out to the site which can be very remote while carrying several thousands of pounds of equipment and resources that are to last the duration of the mission (usually 6-8 weeks). Additional time constraints are sometimes put forth by a particular country, adding another factor
to consider. After arriving at the site, setting up camp and clearing the site areas are necessary before putting a trowel to the ground.

Delineating a site or grave, meaning to uncover the boundaries, is a very important step in the recovery and recording of a crash scene. These sites are held to standard archaeological excavation procedures. This includes documenting pertinent features, proper field photography, creating site maps, logging daily activities, etcetera. Depending upon the size and time allowance, locals are sometimes hired to aid in the excavation process. When remains and associated artifacts are successfully excavated, they are then shipped back to a JPAC laboratory so that the biological profile can be created by forensic anthropologists and further analysis can be completed.
The Lab Side of JPAC: Analyzing the Remains

When skeletal remains are brought to the lab, whether from Punchbowl or from a foreign site, an entirely new phase of analysis begins to meet the goal identifying the remains. Biological anthropologists specializing in forensic anthropology are responsible for analyzing skeletal remains and using scientific methods to determine the identity of the remains. The goal of the forensic anthropologists working at CIL is to make a match between any unique portion of a missing soldier’s records and the recovered skeletal remains, which is referred to as making a positive identification of the remains. A positive identification means there is no doubt whatsoever that the remains belong to a specific individual, and in the context of JPAC’s mission, the remains can then be returned to family members or be given a more final burial rite.

The remains are first cleaned by removing any soft tissue, dirt, or other substances (e.g. formaldehyde powder) to leave only clean bones for the forensic anthropologists to analyze. For instance, the Punchbowl cases that were received from Japan were covered in some sort of
substance similar to a formaldehyde powder that had to be rinsed from the remains before analysis. Once the remains are clean enough to be examined thoroughly, the set of remains associated with a single individual is inventoried. This inventory is used to both make sure the bones do not belong to more than one individual and to see if recovering more remains from that individual is at all possible.

The next step of analyzing the remains involves developing what is known as the biological profile. The biological profile is made up of estimations of age, sex, ancestry, stature, and trauma. These characteristics act as puzzle pieces that should fit together to identify the individual represented by the remains. This is the main function of the anthropologist within the laboratory setting.

Interns, like the authors, are often involved in these first stages of laboratory work. Rachel and Amelia both worked to clean the remains from several Punchbowl cases, and were able to practice different methods for estimating the features of the biological profile. Rachel spent a good deal of time working with Dr. Nicolette Parr, who was given responsibility for one of the Punchbowl cases and allowed Rachel to practice her techniques. Amelia worked with Ashley Burch briefly, mostly reviewing the techniques most commonly used to create the biological profile.

The Biological Profile

There are many studies published that present methods attempting to accurately estimate various aspects of the biological profile. Not all methods are appropriate or consistently reliable enough in all cases. The JPAC laboratory having ASCLAD certification directly ties to these issues as Standard Operating Procedures (SOPs) are required for uniformity among case reports. The SOPs dictate what methods are acceptable and appropriate to use in the cases specific to
JPAC. While other methods may be looked at alongside the standards, they are not all accepted as a means of identification. All the methods used at JPAC are specifically chosen for their applicability to the population(s) in question and for their ability to stand up to scientific rigor.

Sex

Estimating the sex of an individual means to evaluate the sex they were born biologically, hence is usually referred to as biological sex. This is different from the gender of an individual which has a personal and cultural meaning which is outside the binary ‘male’ or ‘female’. Overall, the skeleton shows different levels of sexual dimorphism, which is the general size and shape difference between males and females (males typically being larger), depending on the bone(s) being observed. In the case of JPAC remains, most of the individuals were a part of the military, so the remains more than likely represent a male.

There are multiple methods used to estimate the sex of skeletal remains, including both postcranial and cranial assessment. The skeletal element with the highest degree of sexual dimorphism, and therefore the ideal element to utilize when estimating sex, is the pelvis. The female pelvis has evolved to a size and shape more appropriate for the function of giving birth, in comparison to a male, and therefore displays features highly correlated with females only (Phenice 1969). The cranium and other postcranial elements are also frequently used in estimating sex. Crania are scored accordingly to specific traits and again overall size and shape (Buikstra and Ubelaker 1994). However care needs to be used when relying on the crania. Depending on the population cranial scores can be misleading, as seen in Asian and Hispanic groups where there is less sexual dimorphism between the sexes.
Age

The most reliable indicator of age in younger individuals is to look at the developmental stage of the teeth. At JPAC odontologists are available to study dental radiographs (x-rays) to estimate age from tooth root and crown development (Mincer et al. 1992). With most of the remains examined at JPAC, the age of most individuals ranges from late teens to late twenties, given the most common ages of individuals enlisted or drafted into the military at the time of these conflicts. Beyond analyzing the teeth, several other skeletal features are quite useful in estimating age in younger people. For instance, patterns of bone growth and fusion are often useful in estimating the age of younger individuals. Similarly, certain changes occur on specific bony surfaces, in relatively predictable patterns, that make it easier to estimate age in individuals older than their twenties (Lovejoy et al. 1985, Brooks and Suchey 1990).

Exercising x-rays of teeth. Photo Courtesy of JPAC

Before working on the Punchbowl case, Dr. Parr assigned Rachel a worksheet that contained multiple radiographs of different individuals. The objective was to select an
appropriate dental formation method and to correctly classify the developmental phases displayed by the x-rays. After completion, these techniques were applied to the Punchbowl case.

Ancestry

Estimating ancestry is possibly one of the more complex pieces of the biological profile. The most common tool of most forensic anthropologists for estimating ancestry in the US is the statistical program Fordisc 3.0 (Ousley and Jantz 2005), which calculates the likelihood that skeletal remains belong to a certain population group. Several morphological (shape) features of the skull are often used to estimate ancestral origins of an individual when statistical programs are unavailable (Rhine 1990, Bass 2005, Hefner 2009). Some postcranial elements are also useful when the cranium is not present, but are not as heavily relied on as the metric measurements of the skull.

At JPAC, given the population of US soldiers in the wars they are focused on, ancestry estimation is generally simplified to determining whether an individual was an American White or American Black. The Punchbowl case, for example, had a cranium that was incomplete and fragmented beyond reconstruction, exhibiting warping. This made metric analysis impossible. However, many traits on the cranium could still be visually assessed and were used by the authors to estimate ancestry.

Stature

Osteometric measurements, which are simply measurements taken on bones focusing on defining the size and shape of the particular element, are used in the first step of estimating height. Long bone lengths are some of the most frequently used measurements that can be plugged into established formulae for regression (Wilson et al. 2010), or put into Fordisc 3.0. There are also methods that require most of the weight-bearing skeletal elements to be present, as
well as the cranium (Fully 1956, Raxter et al. 2006). Serious fragmentation of remains can negatively impact an anthropologist’s ability to estimate stature and continues to be a confounding factor. Stature of an individual should always be in the form of an interval, as point estimates are usually inaccurate and very unhelpful as they exclude the possibility that an individual is outside of that very specific height.

Rachel and Amelia were able to practice taking osteometric measurements on several specimens from the CIL’s anatomical collection as well as the Punchbowl cases. The stature interval derived after inputting the measurements into Fordisc is especially useful at JPAC. Since there are military records for all missing servicemen that contain health information and other quantifiable data (e.g. height), stature can be used to support a circumstantial identification.

**Trauma**

Trauma assessment is a very detail-oriented subfield and often has compounding elements within a single case. When describing trauma on the skeleton, one of the first things to consider is when the injury may have occurred. There are three categories: antemortem trauma, injury occurred before death; perimortem trauma, when an injury may be simultaneous with the time of death; and postmortem trauma, damage done to remains after the individual is deceased. Describing and identifying the type of trauma seen on remains is key to this section of the biological profile. The different types of trauma, such as sharp force, blunt force, projectile and blast trauma, are all distinguishable with training and practice (Tersigni-Tarrant and Shirley 2012).

JPAC’s unique population of remains from soldiers killed at war often show extensive signs of perimortem trauma. Radiographs are commonly used when remains are fragmentary to search for metal debris that may still be inside the bone. This was the instance in one Punchbowl
case where metal was not visible to the eye, but after taking radiographs was found to be present in several skeletal elements. Mass trauma resulting from the plane crashes can also often be cross-referenced to the documentation collected by historians, and used to determine if the recorded events match the physical evidence from the remains.

**Positive Identification**

The goal of constructing the biological profile is to work towards making a positive identification of a particular set of remains. There are many methods that are acceptable (according to the SOPs) means of confirming a positive ID at JPAC, such as DNA and dental record comparison. Typically, multiple lines of evidence that are in agreement are sought after. For instance, personnel records, the workup of the biological profile, personal artifacts, and dental records would ideally all match up with each other.

DNA analysis is regularly performed on the remains recovered. The standard bone used at JPAC for that sample is the tibia. The sample is taken in the autopsy suite and is then shipped out for the actual DNA testing. All employees that may have contact with remains, including interns, are subjected to a swab test that will create a record of their DNA in case a possible contamination of the original sample occurs. Mitochondrial DNA is used for analysis purposes, primarily because it is more easily extracted from older remains and is thus a more viable for analysis than nuclear DNA. To avoid contamination, gloves are always worn when examining and handling the remains and are replaced when changing cases.

The other common avenue for positive identification is the comparison of dental records to radiographs taken of the remains. There are actually multiple forensic odontologists working within JPAC who work alongside the forensic anthropologists. Dental x-rays serve a two-fold purpose; as a way of looking at dental anomalies (e.g. dental work, genetic conditions, etc.) that
would make identification possible, and as mentioned above, looking at tooth formation processes for estimating age. If the radiographs can lead to a positive identification and the profile supports this, the case is made much stronger for the correct identification of the remains.

A bone with a section cut for a DNA sample.  

JPAC is only concerned with identifying the remains of fallen soldiers from World War II, the Korean War, and the Vietnam War. The issues, a lack of DNA or radiographic records for identification, which are prevalent in these historical wars, are very different from what occurs with the war dead from current wars. DNA samples are regularly taken from soldiers now, and there are easily updateable databases that summarizes soldiers’ information, such as deployment dates, location, missions. As such JPAC is not generally responsible for cases from modern wars.

**Side Research**

When working at JPAC, the physical anthropologists are not only encouraged, but expected to perform their own research separate from JPAC’s primary objective. This is to
encourage both their continued participation in the field of anthropology as a whole and their advancement of the field of forensic anthropology.

One example of this kind of research is a project by Hugh Tuller attempting to interpret the findings of a mass grave that resulted from a human rights violation in Serbia. He is using the data collected from a 2002 human rights investigation of one of the mass graves found in Batanjica, Serbia. By examining the data, Tuller is attempting to reconstruct the order of events surrounding the 12 deposits of remains found in this particular grave feature, as to help further the identification process of the remains found. With this information, he will be able to make a solid argument for the use of archaeological methods in mass graves with the commingled remains in order to increase the rate of successful identifications of remains in similar circumstances. These methods include technology that is now commonly used in archaeological settings, for example, spatial mapping of a site by total stations and geographic information systems (GIS) (Tuller et al. 2008) than is beginning to permeate the field of bioarchaeology.

During the internship, Amelia was able to work with Tuller on the breakdown and reconstruction portions of this project. By reviewing the case report containing specific descriptions of the 12 deposits within the grave, she was able to analyze the order in which the remains were deposited. This information was given to Tuller, who then compared the stratigraphic estimate to the 3D mapping data of the remains (taken in situ at the time of excavation) in order to observe any patterns. Later, Amelia assisted with entering information about the evidence logged from the grave and the identifications made since the case report was completed.

Another example of an ongoing project, that has ramifications for ancestry estimation, is the effort undertaken by Dr. Joseph Hefner. Dr. Hefner and many others have been working on
the development of a free software called Osteoware. The focus of the Osteoware program is to aid the user in properly identifying and scoring morphoscopic cranial traits (visual shape features), one area of Dr. Hefner’s expertise. Rachel had the opportunity to be involved with the re-illustration of E.A. Hooten’s original cranial trait drawings, which may eventually be uploaded to the software program. Hooten was one of the original anthropologists involved in developing non-metric (not measured) cranial traits that can lead to ancestry estimation.

Nonmetric traits are assessed visually without measurement by calipers or a 3D digitizer.

An example of Hooten’s archival drawings. Photo Courtesy of JPAC
While metric evaluations of the skull are readily available by means of digitizing, geometric morphometric analysis and inputting data into Fordisc for analysis- this does not invalidate non-measured characteristics. Digitizing is not always an option, for instance, especially when dealing with war dead. This is because the skull is often recovered in such a fragmented state that even if it is possible to piece it back together, damage from blast trauma or postmortem events that cause damage to the remains, permanently warp the bone beyond the utility of measurements. These are instances when non-metric traits are utilized to estimate ancestry and continue building the biological profile for the individual. Osteoware is akin to a user guide for scoring these traits that can be used in conjunction with articles, such as Hefner (2009) which measures the frequencies of traits in ancestral groups. This can be a great aid for estimating ancestry when craniometrics cannot be used on the fragmentary skulls often analyzed at JPAC.

Some side research projects eventually become frequently used methods at JPAC. For instance, the CRX method, which began as a side project, involves comparing chest radiographs of skeletal remains to chest radiographs of living individuals that could potentially match an individual to a set of remains. The clavicles are clearly visible in the living chest radiographs, and since they are in a very specific position and display uniquely identifiable characteristics, they can be used to make a positive identification when compared to a radiograph of the skeletal clavicles. Chest radiographs were commonly taken of soldiers before the Korean War to screen for diseases affecting the lungs, such as tuberculosis, so at JPAC this method is highly valuable for making positive identifications of skeletal remains. While working on remains from the Punchbowl Cemetery, one of the first cases the authors became involved with was positively identified by the CRX method within approximately one week.
Consultations

JPAC also works on a consultation basis for forensic cases that are submitted by local law enforcement, as well as outside academics, and on other related professional projects. Sometimes local investigators require assistance from the highly trained forensic anthropologists at JPAC, but most importantly having ASCLAD certification makes JPAC a highly esteemed laboratory to use for forensic cases. Chain of custody, a log of who and when is in contact with the remains and any personal artifacts, which is maintained and monitored by the high security for all the facilities is one example of how this benefits a forensic setting. While outside casework does not occur with any regularity, JPAC anthropologists are still familiar with the procedure of working with outside cases. However, consultation work does not take priority over the main mission of JPAC.

During this past summer the authors were asked to assist forensic anthropologists that took on outside forensic casework from colleagues, involving a large number of unidentified human remains. With these consult cases, a biological profile was formed based on very similar analyses used in typical JPAC cases. The only difference in methodology stemmed from methods that were more appropriate for the context of those remains, such as those tested on different population groups.

When consultation cases have forensic components, photographs of the remains are taken as part of the intake process to document what state they were in when they were received. DNA samples are also an important component of making an identification in these cases. DNA samples are taken before the remains are cleaned to avoid degradation of the sample.

While the historical remains of war dead typically have very little, if no, soft tissue present, forensic cases range from skeletonized to a majority of soft tissue (usually decomposing)
still present. In the cases where the remains still have soft tissue present, anthropologists must prepare the bones for analysis by processing the remains. This was so in the cases we were assigned to, with the remains requiring maceration, or the heating of remains in water and detergent to separate soft tissue from bone. Various tools were then used to clean the bones after soaking. At JPAC, wooden tongue depressors, scalpels, hemostats, and tweezers are the primary tools used to remove excess tissue. After the bones are in a satisfactory condition, they were ready to be analyzed in much the same way as all other JPAC cases. A biological profile is established for consult cases in the same way as JPAC cases, but instead of trying to make a positive identification, a forensic report is written up with all the analyses and estimations so that hopefully a DNA or missing persons report will match the remains with an individual. The anthropologists at JPAC are primarily responsible for developing the biological profile so that identifications can (hopefully) be made later.

Conclusion

During our internship at JPAC we had the opportunity to participate in multiple stages of the identification process. We both became involved in parts of the historical data compilation project and the analyses of the Punchbowl cases, as well as getting to work on some of the consult cases being worked on at the time. Rachel was able to get involved in a side project with Dr. Hefner, as well as spend a bit more time refining her skills with certain methods of assessing the biological profile. Amelia was also able to assist Hugh Tuller in his side research.

We were able to experience working within two of the different sectors of JPAC, working towards the goal of identifying remains. Working with the historians allowed us to develop a more complete understanding of the overall operations of JPAC and see what takes place before the bones are even examined by the anthropologists. Our time spent with the
forensic anthropologists was also very valuable as we learned how non-academic practitioners work, which is rather different from academic practitioners. Working with multiple individuals gave us insight into the different approaches that can be taken while working on cases.

Reflecting on our internship, we now understand how multifaceted these projects are, with employees from many different fields of expertise working together. This moves away from the more isolated academic forensic anthropologist, who would not necessarily have the benefit of so many resources on hand.

Seventy years after the birth of this organization, JPAC has stayed true to its original mission to reunite the remains of missing soldiers with their identities and their loved ones. The incorporation of many different professionals, interns, and volunteers is what gives hope to the families that JPAC will work diligently “Until They Are Home”. To be a part of that mission, even in the small capacity of an intern, is a great honor, not only to serve the mission, but to work alongside some of the field’s leading forensic anthropologists.

A military funeral honoring a fallen US soldier identified by JPAC. Photo Courtesy of JPAC
Bibliography


