THE CATACOMBS OF PARIS; AS SEEN THROUGH AN ANTHROPOLOGICAL LENS

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by
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I took all of the photographs in this document myself.
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Chapter 1

Introduction

Summary of the History and Relevance of the Catacombs:

Under Paris lies a network of tunnels spanning 11,000 square meters of surface area (Schomburg, 2005). The beginnings of this tunnel system date back to around the 12th century, created unintentionally by people quarrying limestone. Limestone was used to build many of the structures in Paris at this time (Fronteau et al., 2010). The limestone was formed over a period of many years due to the variety of organisms that lived and died during the environmental changes that took place in Paris roughly 40 million years ago (Huyghe et al., 2012). The tunnels that had been created with the extraction of the limestone were then largely forgotten about until they became unstable. After a series of cave-ins in the 1700s the tunnels were reinforced and repurposed. Despite the reinforcement, the tunnel system cannot support tall buildings even to this day, and as such is a major factor in the current city-scape (Fronteau et al., 2010).

During the 14th century the popularity of being buried on consecrated ground, coupled with the astounding number of deaths attributed to the bubonic plague was causing a second structural issue in Paris. Les Innocentes became a well-known burial ground in the city, however it was ill equipped to handle the demand for burial space (Harding, 2002). The large number of bodies placed in the cemetery originally fostered an immense population of decomposition bacteria, which contributed to rapid decomposition, however the bones could not be removed fast.
enough to accommodate the growing need for burial space (Harding, 2002). After a series of mass burials the cemetery also collapsed into an adjacent basement, signaling a need for more burial space outside the city (Harding, 2000).

To combat the issue of the collapsing tunnels and later the overflowing cemetery, King Louis XVI created the General Inspectorate of Paris Quarries (IGC) in 1777 (Archer, 2013). Originally, the IGC’s task was to stabilize and monitor the underground tunnels, but as the cemeteries filled up faster and faster they were also ordered to move skeletal remains down to the tunnels (Archer, 2013). In 1786 a portion of the tunnels became consecrated, and over time more remains were interred there. The General Inspectorate of Paris Quarries is largely responsible for the structures still visible in the Catacombs today (Archer, 2013).

A comprehensive understanding of the Paris Catacombs is enriched by cultural and biological anthropology perspectives and knowledge from the fields of epidemiology, osteology, and geology. Looking through all these lenses allows us to see the catacombs’ broader context. When examining this broader context, not only are the catacombs more interesting, they are also much more useful academically. As such, the Catacombs of Paris demonstrate an epidemiological, geological, and historical relevance to the field of anthropology.
Environmental Changes in Paris:

The layers of rock from street level to the bottom of the tunnel systems span nearly 45 million years (Holms, Little, Sayre, 1986). At the deepest layer there is a unit of limestone, dating between 48 and 40 million years ago to the age known as the “Lutetian” (Holms, Little, Sayre, 1986). Lutetia is an ancient name for Paris, and as an age it accounts for a roughly 6 million years, a relatively short amount of time. The Lutetian is an age within the Eocene epoch (Huyghe et al., 2012). The Lutetian can be split into three sub-ages, the Lower, Middle, and Upper Lutetian (Huyghe et al., 2012). During each of these sub-ages the deposition of sediments and organisms varied greatly, and influenced the formation of the subsequent layers.

During the Lutetian age the geography of France was different than present day. Fifty three million years ago Paris was a marshy plain with numerous rivers and tropical vegetation (Huyghe et al., 2012). While the Pyrenees existed at the time, the Alps had not yet appeared and the islands currently known as Corsica and Sardinia were not where they are today (Kenyona, 2002). Fifty million years ago the compression associated with the expansion of the Pyrenees mountain chain caused geological layers to fracture and fold (Kenyona, 2002). Closer to 47 million years ago, the sea was advancing toward Paris from the northern part of Europe (Huyghe et al., 2012). The area had a tropical climate and as such the sea in the Paris Basin was both warm and shallow, supporting diverse life including the sea snail, which,
being over two feet in size, was one of the largest marine gastropods mollusks, (Vermeij, 2001).

By the end of the Lower Lutetian the sea had reached present day Paris (Huyghe et al., 2012). The deeper areas of the Parisian gulf contained many unicellular marine creatures. These creatures have no modern day equivalent and lived 130-260 feet below sea level (Vermeij, 2001). During the Middle Lutetian the sea was still moving toward the south of Paris, getting shallower in the Paris Gulf (Huyghe et al., 2012). At this point the rivers were moving less clay to the coast, and the marine sludge made up of crushed shells was becoming more calcareous (Huyghe et al., 2012). During this time sea-worms, crustaceans, and giant gastropods were living at 100-130 feet below sea level (Vermeij, 2001). Eventually this sludge hardened into the limestone commonly used for building stones (Huyghe et al., 2012). By the end of this sub-age the sea was no longer spreading, having already reached south of Paris and into Normandy (Huyghe et al., 2012). The calcareous sludge formed dunes under the water. These dunes were fixed by aquatic plants, many of which provided shelter for various single celled organisms (Guiter et al., 2005). During the Upper Lutetian the sea became shallow and turned into a bay, separated from the North European Sea by what is now known as the strait between the English Channel and the North Sea (Huyghe et al., 2012). In the bay the drastic variations in salinity and temperature limited the number of organisms that could survive (Guiter et al., 2005).
**Fossil and Limestone Formation and Usage:**

The marine sludge of the Lutetian period coupled with the climate of Paris at the time created an ideal environment for fossil formation (Fontesa et al., 1993). With increasing pressure the marine sludge hardened in horizontal layers beneath younger layers, perfectly preserving many fossils (Fontesa et al., 1993). Many of the organisms mentioned above were preserved in this way, creating a diverse fossil record from that time period. Figure 1 shows a plaster cast of one such fossil, *Campanile giganteum*. These fossils were a great contribution to the beginnings of modern paleontology during the 18th and 19th centuries (Brown, 1843). Jean-Baptiste Lamarck made detailed descriptions and classifications of the marine fossil shells, and outlined one of the early hypotheses of evolution in 1809 (Brown, 1843). Cuvier, a French naturalist who is often referred to as the father of paleontology, was also interested in these fossils. Cuvier had men bring him fossils they found in the tunnels. He was one of the first to discover the differences in the fossils of different strata, an important discovery at the time (Rudwick, 2000).

The same processes that contributed to the formation of fossils during this period of time were also responsible for the limestone under the city. The marine sludge of the Lutetian period and all of the now fossilized remains that existed therein hardened into limestone (Dagalliera et al., 2000). Limestone is a hard sedimentary rock, often composed of the skeletal remains of marine organisms (French, 1994). Limestone can take on a multitude of appearances depending on the clay or organic material present during its formation (French, 1994). A slab of
limestone displayed in the Catacombs is pictured in Figure 2. As the Earth continued to change the limestone broke and bent in large part due to the formation of the Alps and the continued formation of the Pyrenees (Huyghe et al., 2012). In some parts of Paris there are outcrops known as “anticlinal folds” due to the sloped sides and common crest of the limestone (Dagalliera, 2000).

Because of its abundance in the area, limestone is sometimes referred to as “Paris stone”. It is useful as a building stone, and as such has been quarried extensively (French, 1994). Hundreds of miles of tunnels exist below Paris due to the mining of limestone and gypsum that began around the 12th century (Daniel, 2007). Limestone was first quarried in open quarries in the first century of the Common Era, supplying the building material for sites from the Roman era of Paris such as the Arenes de Lutece and the Theme de Cluny (Fronteau et al., 2010). These sites include an amphitheater that was able to seat 15,000 people. During the Middle Ages, around the beginning of the 13th century, people began to quarry the limestone underground (Daniel, 2007). This limestone was used to build well-known sites such as Notre-Dame Cathedral, pictured in Figure 3, and all of the Gothic monuments in the city (Fronteau et al., 2010). This stone was used to build the city, but the empty space the miners left became problematic. The mines were often illegal and uncharted, and the haphazard tunnels led to a series of cave-ins in the 1700s (Daniel, 2007). The underground quarrying continued through the 19th and early 20th century (French, 1994). The area that is currently open to the public
is one of the old underground quarries and was dug out in the 15th century (Daniel, 2007). The underground tunnels were largely forgotten about until December of 1774 when the first in a series of cave-ins caused panic among the residents of Paris (Daniel, 2007).
Figure 1: plaster cast of fossil, Campanile giganteum.
Figure 2: A slab of limestone displayed in the Catacombs.
Figure 3: Notre-Dame Cathedral, made out of Paris limestone.
Chapter 3

Disease Components

Plague:

The plague, sometimes referred to as the Black Death, first struck Europe in the 13th century (Gottfried, 2010). Thought to have spread from Asia, the plague killed as much as 30-60 percent of Europe’s total population (Parkhill, 2001). The plague is thought to have hit Paris for the first time in the 14th century (Schomburg, 2005). Yersinia pestis are the Gram-negative bacteria responsible for the disease (Parkhill, 2001). Due to frequent recombination, many Yersinia pestis strains are now resistant to drugs (Parkhill, 2001). This, coupled with the potential for the plague to be used as a biological weapon, makes the plague a modern day threat as well (Parkhill, 2001). The plague can be spread pneumatically or through the bites of infected fleas or rats (Kelly, 2005). This was not understood at the time, and the combination of poor sanitation and ignorance fueled the epidemic (Gottfried, 2010). With the greatly inflated rate of deaths, cemeteries were filling up rapidly.

There are several types of plague; the bubonic plague, the septicemic plague, and the pneumonic plague (Kelly, 2005). The bubonic plague is the most common form of the disease, affecting the lymph system (Kelly, 2005). It is contracted through the bites of infected fleas or rodents, or in some cases through the opening in the skin if it comes in contact with a material used by an infected person (Kelly, 2005). The bubonic plague is rarely spread from person to person. If contracted, symptoms appear quickly, within two to six days. Symptoms included fever,
headache, chills, weakness, hemorrhages under the skin causing blackish
discoloration of the skin, and tender lymph glands, or buboes, the origin of the name
(Kelly, 2005). Contraction of the bubonic plague increases the chances of developing
other diseases such as pneumonia, sepsis, or meningitis (Kelly, 2005).

The septicemic plague occurs when the *Yersinia pestis* enters the
bloodstream (Parkhill, 2001). This can happen in much the same way as it does in
the case of the bubonic plague, or it can occur when the bubonic or pneumonic
plague go untreated (Kelly, 2005) The symptoms of the bubonic plague may rapidly
progress to the septicemic symptoms, or they may occur without the bubonic plague
symptoms appearing at all. These symptoms include chills, fever, rapid heart rate,
severe headaches, nausea, vomiting, delirium, and death (Kelly, 2005).

The pneumonic plague is the third form of the disease (Kelly, 2005). This
version can be spread from person to person through the air. The pneumonic plague
can also occur in the case of a person with the bubonic or septicemic plague not
getting treatment if the bacteria spread to the lungs (Kelly, 2005). The bacteria
multiply quickly once in the lungs, taking only one to three days to become
symptomatic. Symptoms include fever, weakness, headache, pneumonia, chest pain,
cough, and potentially respiratory failure and death (Kelly, 2005). Death from
pneumonic plague generally occurs within two to six days after the symptoms first
appear. Due to the rapid multiplication and the exponential increase in the severity
of the symptoms over an incredibly short period of time, early diagnosis and
treatment are critical to survival (Kelly, 2005).
Understanding the interactions between the types of plague is crucial to understanding the epidemic that occurred in Europe during the 14th century. While the bubonic plague is not generally spread from person to person, treatments such as antibiotics were not developed yet, and as such the bubonic plague could easily move into the lungs and become pneumonic (Gottfried, 2010). Even today treatments such as antibiotics must be administered very quickly to be effective. The survival rate during the early outbreaks was very low, due to the fact that there were no antibiotics. Despite the high mortality rate there were survivors of the plague.

There are many hypotheses as to why some people caught the plague and survived, or were exposed and never caught it at all. Parisians at the time employed a variety of techniques to avoid contracting the plague. They did not understand the origins of the disease; even the educated Parisians attributed the disease and subsequent deaths to the wrath of God, or a number of superstitious reasons (Aggarwai, 2011). Their outlooks on cures were similarly put together. Even after the plague was better understood, many people were grasping for an explanation for why some survived when most did not. One hypothesis was that the poorer population ate moldy bread, effectively eating the antibiotic that could save them, however there is little to no proof that this was the case (Aggarwai, 2011).

It is now known that there is a genetic reason that some people did not contract the plague, despite being exposed to it. A genetic mutation, CCR5-delta 32 seems to cause a resistance to the plague (Aggarwai, 2011). People who are
homozygous “normal” had no resistance to the plague and died. People who were
heterozygous got sick but lived through the plague, while people who were
homozygous “delta 32” did not get sick at all. The plague, as well as HIV, uses CCR5
to enter and infect host cells. The mutation prevents this attachment from occurring.
The medieval population in the isolated town of Eyam, England most likely had high
frequencies of this allele and many survived the plague (Aggarwai, 2011). This
mutation was not incredibly common, however, and as such the death toll caused by
the plague was extensive.

Les Innocentes:

The earliest Christian burial ground in Paris, Les Innocents, dates back to the
4th century (Schomburg, 2005). Parishes were basic social units, and early on each
parish took care of its own dead (Harding, 2000). Traditionally wealthy Parisians
were buried in crypts under their churches, but for a much smaller fee the common
people were buried in outdoor consecrated clergy property such as Les Innocents
(Harding, 2002). By the 6th century these burials were common and legal. The rise of
Christianity during the 13th century caused the number of burials on consecrated
ground to grow exponentially (Harding, 2000). Consecration of an area involves
solemnly dedicating that area for a religious purpose, and is directly associated with
the sacred. Bodies from eighteen separate parishes were all placed here, something
that was fairly uncommon (Harding, 2002). In the 14th century two hospitals and the
city morgue began adding their dead to the cemetery as well (Harding, 2002). Pits
were dug to hold 1,500 dead at a time and were closed only when they were full
(Schomburg, 2005). By this point the cemetery was walled, and each wall had a long hollow space where the contents of the oldest pits were placed to make room for more dead (Schomburg, 2005). The plague of 1418 placed 50,000 dead into the cemetery over a 5-week period (Schomburg, 2005). The burial rituals became unceremonious. According to one account, a coffin was hung over such pits, and a trap door in the bottom released the human remains providing a rapid funeral process (Harding, 2000). The dead remained in the pit for a short period of time until the decomposition process was complete and the bones could be moved to the wall (Harding, 2000). By the 18th century many of the corpses saponified, their fatty tissue becoming adipocere, or nearly soap-like (Weigelt, 2009). At this point the circumstances were no longer conducive to a rapid decomposition process, instead bodies failed to completely decompose. Putrefied bodies produced a rotting odor, which led to quickly deteriorating sanitation conditions (Weigelt, 2009). In 1780 the weight of the burial ground collapsed a wall in a nearby basement. In the same year King Louis XVI banned all further burials in Les Innocents (Schomburg, 2005).
Chapter 4
The Solution

**The Creation of the General Inspectorate of Paris Quarries (IGC):**

During the mid-18th century when many of the underground tunnels began collapsing there was a general state of panic among the people of Paris (Archer, 2013). To remedy the issue, King Louis XVI created a General Inspectorate of Paris Quarries on April 4th, 1777 (Schomburg, 2012). The IGC was a government department solely dedicated to underground risks and the monitoring and shoring up of the tunnels in an effort to keep the people and the property above safe from collapse (Archer, 2013). More tunnels were dug under the streets in an effort to explore the area and determine which tunnels needed to be filled in and which should be reinforced (Archer, 2013). The tunnels that were left intact were supported by thick walls and pillars, which were numbered by the engineers who erected them. The engineers’ initials and the date were carved into these pillars (Gowing, 2012). An example of such an inscription is shown in Figure 4. The designation 5.J.1847 indicates that the pillar was the fifth in a series built in 1847 under the command of Juncher. Juncher was a Quarry Inspector from 1842 until 1851 (Gowing, 2012). Despite the work of the Inspectorate, small collapses still occur fairly frequently. The most notable recent collapse occurred in 1961 and killed 21 people (Shea, 2011).
Figure 4 The pillar that is inscribed with its sequential number, the Quarry Inspector at the time it was built, and the year it was built.
Creation of the Ossuary:

The Paris authorities began to turn the multitude of underground tunnels into an Ossuary not long after the IGC was created (Gowing, 2012). In 1785 both the issue of the crowded cemetery and the collapsing mining tunnels began to be remedied with the removal of the bodies from Les Innocents and the insertion of the same bodies into the tunnels (Davenport Adams, 2009). Antoine Francois de Fourcory was appointed to the commission that made recommendations on the method of exhuming the bodies in the cemetery (Sourkes, 1992). He was educated in both medicine and chemistry. Fourcory was especially interested in the preserved state of the brain. Fourcory described the preserved brains he found as being wax or soap like, or “adipo-cire” (Sourkes, 2004). Fourcory, Vaquelin, and some of their contemporaries used chromatography, a collective term for a set of laboratory practices that separates mixtures, to identify some of the key components of the brain (Sourkes, 2004). This exhumation coupled with Fourcory and Vaquelin’s interest began some of the early roots of neurochemistry and biochemistry (Sourkes, 1992).

Fourcory and Vaquelin were not the only scholars interested in the contents of the cemetery. Many years later, after the bones were moved to their current position in the Catacombs, Moller-Christensen and Jopling began their examination of the bones in an effort to learn more about the history of leprosy and syphilis (Moller-Christensen & Jopling, 1964). They examined over 5,000 skulls looking for atrophy of the anterior nasal spine as well as atrophy of the maxillary alveolar
process (Moller-Christensen & Jopling, 1964). These anomalies are seen in advanced cases of leprosy. They also searched for pathological changes indicative of syphilis. The results were inconclusive, no signs of leprosy were found and an insignificant percentage showed signs of syphilitic changes (Moller-Christensen & Jopling, 1964). Prior to this study Dr. Broca conducted a similar study, removing all of the syphilitic skulls he could find and placing them in various medical museums (Thomas, 2011). Many of these skulls showed signs of tooth loss during life. An examination of the skulls in the museums did not yield any significant findings either (Moller-Christensen & Jopling, 1964).

The first bones moved into the tunnels were from Les Innocents on the 9th of November 1785 by decree of the King’s State Council (Reid, 1993). The Catacombs were consecrated on April 7th, 1786 (Reid, 1993). The bones were moved to a now abandoned section of the tunnels. The current location of the Catacombs belonged to the town of Montrouge until 1860 (Broadwell, 2007). Bones from deconsecrated cemeteries of Paris were transferred to the catacombs until January of 1788 then again between 1842 and 1860 (Reid, 1993). Figure 5 shows an engraved plaque stating that the origins of those particular bones was Les Innocentes, and that they were moved there in 1787. Originally the bones were placed in the tunnels haphazardly, but in 1810 renovations began that transformed it into a place that could be visited (Davenport Adams, 2009). The Catacombs of Paris are the largest underground necropolis in the world, unlike any other known burial ground, with
over 6 million skeletons, however they cover no more than 1/800th of the area of the underground quarries of Paris (Pike, 2011).
Figure 5: An engraved plaque stating that these bones were moved to this location from the cemetery of Les Innocents.
**Structural and Intriguing Components:**

The portions of the tunnels that house the skeletal remains contain many unique and easily identifiable structures. Some of these structures are functional and many are commemorative. Each structure has its own explanation and backstory, many of which speak to the cultural relevance of certain people or beliefs at that point in history. The structures listed below are all easily identifiable when traveling through the Catacombs on a tour.

One such structurally relevant feature are the hagues present throughout the galleries, or tunnels. Hagues are stonewalls made without mortar that hold back packed earth and prevent it from collapsing into the galleries (Hemeda, 2012). Hagues are generally paired with pillars. There are two main types of pillars in the tunnels, turned pillars and armed pillars (Daniel, 2007). Turned pillars are the most common, and they are characterized by stones left in place by the quarries (Hemeda, 2012). Armed pillars are made of piled blocks wedged to the ceiling of the quarry. Figure 6 shows a hague wall with armed pillars (Hemeda, 2012). Tooothing stones are another structure with an express purpose. Tooothing stones have the appearance of a zipper and are used as a source of natural ventilation throughout the galleries (Ellis, 1871). This can be observed in Figure 7.

When venturing through the tunnels one might observe long black marks on the ceiling, such as the mark in Figure 8. These are old tool marks, left on the ceilings intentionally (Ellis, 1871). These marks were left when the ossuary first opened to
the public, and the black marks allowed visitors to get their bearings in the galleries (Ellis, 1871).

Not all of the structures in the Catacombs are purely functional. A memorial structure exists for one of the first workers in the Quarry Inspections, Décure (Hall, 2007). Décure recreated the fortress of Port-Mahon, which was located on the Balearic Islands in the form of models he made from memory. He carved the statue in the catacombs after his shifts. He was imprisoned in a fort opposite this palace for many years prior to working with the Quarry Inspections (Hall, 2007). He later died from a cave-in while trying to build an access stairway (Hall, 2007). His model as it stands in the Catacombs can be observed in Figure 9.

Wells known as “quarry footbaths” were constructed by workers during the reinforcement (Ellis, 1871). These wells served as a way to reach the ground water level, and are now decorative and educational additions to the Catacombs (Maxwell, 1992). Such a well can be observed in Figure 10. The Crypt of the Sepulchral Lamp, pictured in Figure 11 was the first monument built in the catacombs (Broadwell, 2007). The bones in this area are from the Saint-Laurent Cemetery (Broadwell, 2007). The lamp consists of a block of stone with a bowl on it. Quarry workers kept a fire burning in this bowl for light and to encourage the circulation of air in the galleries (Broadwell, 2007). De Thury kept it as a centerpiece in the chamber. Despite its name, the cenotaph of poet Nicolas Gilbert (1751-1780) does not contain his remains, but is a reinforcement structure shaped like a sarcophagus (Maxwell, 1992). The verses etched on the structure were written by Gilbert, and
can be viewed in Figure 12. According to one source the line translates to “At the banquet of life, unfortunate guest I appeared one day and I die; and on my grave when I come slowly, No one will shed tears” (Maxwell, 1992).
Figure 6: An example of a hague wall with armed pillars
Figure 7: An example of a tooothing stone, which is used for ventilation.
Figure 8: Old tool marks used to help navigate the galleries.
Figure 9: Décure’s recreation of the fortress of Port-Mahon
Figure 10: The quarry footbaths are wells made to reach the ground water level.
Figure 11: The Sepulchral Lamp, the first monument built in the catacombs.
Figure 12: The cenotaph of poet Nicolas Gilbert, a decorative memorial in honor of the poet Nicolas Gilbert.
Chapter 5

History of the Usage of the Catacombs and Tunnel Systems

Early to Present Day Tourism:

The catacombs were reorganized in 1809 by Louis-Etienne-Francois Hericart de Thury (Picon, 2003). Napoleon authorized the IGC to complete this renovation. De Thury had the workers build artistic facades using the skulls and long bones, hiding the remaining bones in piles behind it (Picon, 2003). The catacombs were finished in the early 1860s (Schomburg, 2005). At this point visitors were allowed in the area. The bones were stacked in an aesthetically pleasing manner, and columns, altars, fountains and engraved plaques were added at this time (Picon, 2003). The Rotonde des Tibias is one example of a decorative column added during the renovation (Maxwell, 1992). It is a huge column made of lower limb bones and skulls. It is located at the end of the tour, and is pictured in Figure 13. We see the distal ends of the femurs in the middle row. While there are many examples of engravings, one of the most famous is the one above the entrance to the ossuary; “Stop, this is the empire of the dead” (Berthet, 1900). This is pictured in Figure 14. There are numerous examples of the elaborate facades highlighting the decorative use of long bones and skulls. Figures 15 and 16 are just two such examples. In both images the skulls are used to create an image amongst the long bones. Since the completion of the later renovations the catacombs have been visited by a considerable number of tourists. Some bodies were added to the catacombs at a later date, for both practical and ceremonial reasons (Picon, 2003). Since its
beginning the catacombs have attracted many visitors including well known
political figures such as Emperor Francis I of Austria who visited in 1814 and
Napoleon III who visited in 1860 (Picon, 2003). Today tours of the catacombs are a
regular occurrence. Entrance lines may even wrap around the park outside of the
main entrance, and it could take hours to get to the ticket booth itself.
Figure 13: Rotonde des Tibias, a large column made up of lower limb bones and skulls.
Figure 14: The entrance to the ossuary, which reads, “Stop! Here is the empire of the dead”.
Figure 15: An example of one of the decorative piles of bones. This is made up of skulls and long bones.
Figure 16: Another example of one of the aesthetically arranged skull and long bone stacks. The skulls in this image are arranged in the shape of a heart.
Educational and Militaristic Purposes:

The catacombs serve many purposes, one of which is to educate its visitors on the history of Paris. Shortly after the tunnels were opened to the public, mineralogical cabinets displayed samples of rock to educate the public on the geology of the region (French, 1994). Today there are samples of limestone and fossil molds as well as signage on the climate changes and geological processes occurring in Paris throughout history. All along the visitor path signs explain the various structures and parts of the catacomb’s history. Various plaques such as the one in Figure 5 explain the original resting place and the date that the bones were moved. While the catacombs are intriguing and visited for touristic and spiritual purposes, there are numerous educational opportunities along the way.

There is evidence that throughout its history the tunnels under Paris have been lived in. Some graffiti and debris suggest that there were families living in the tunnels during the 19th century (Hungus, 2008). The tunnels were also used in military matters, including as a tunnel system for members of the French Resistance during World War II, as well as being used as a bunker by German soldiers (Hungus, 2008). The members of the French Resistance had the advantage of having detailed maps of the tunnel system, while the Germans did not. There is no evidence suggesting that any battles took place underground, however, and it is likely the two sides did not cross paths below ground (Ashford, 2006). It is also known that food and supplies were smuggled through the tunnel system during World War II.
(Hungus, 2008). The tunnel system was extensive and spacious enough to be very useful, particularly to the French, during the war.

**Illegal Usage:**

Not all of the uses of the catacombs have been completely legal or good for the overall maintenance of the tunnels and bones that lie therein. For a time local farmers raised mushrooms in the catacombs, producing hundreds of tons a year at their peak (Archer, 2013). The tunnels are also known for cataphiles, people who hang out in the catacombs, or more broadly, who love the underground (Duncan, 2010). Cataphiles are typically pictured as the rebellious teenagers from the 1970s and 1980s who explored the catacombs and threw parties there. Some cataphiles are filmmakers, artists, and writers, however some are destructive. There are over 200 entrances to the catacombs, too many to secure, so people can easily sneak in (Schomburg 2005). Police patrol the tunnels, and there is a 60-euro fine for anyone found in the tunnels who are not authorized to be there (Garrett, 2011).

Despite the laws and subsequent fines, there are plenty of examples of cataphile activity in the tunnel system. In 2004 Paris police found a large cinema and restaurant in the tunnel system under the 16\textsuperscript{th} arrondissment (Henely, 2004). The restaurant had a stocked bar, and the cinema had a wide variety of films, from 50s classics to modern thrillers (Henely, 2004). None of the movies were banned or controversial. Three days after its discovery the power was cut to this underground entertainment complex and a note allegedly reading, “Do not try to find us” was left
behind (Henely, 2004). One group, the Mexican Consolidated Drilling Authority, has claimed responsibility for this complex (Henely, 2004).

The Mexican Consolidated Drilling Authority is a subgroup of the UX, or the Urban eXperiment group. The UX claims to improve Paris by restoring and reenacting its history. Its members are largely kept a secret, but the group has been known to be vocal and take credit for various actions ("Underground ‘terrorists’ with a mission to save city’s neglected heritage", 2007). This is only one of many such stories. While many cataphile activities are documented, the tunnel system is extensive and there is no way to know what all goes on within them. For every documented story there could be a great number of other undocumented cataphile activities. The numerous points of entry, including drains and ventilation shafts, make monitoring the catacombs difficult, and getting into them fairly easy (Garrett, 2011).
Chapter 6

Conclusion

The underground network of tunnels beneath Paris has a complex and unique history that is of interest and insight to many in the field of biological anthropology. While looking at all of the elements involved in the history of the formation of the tunnels and the catacombs, as well as the present day usage of the tunnels this becomes clear. While there is relevance for many individual fields, such as paleontology, epidemiology, geology, neurology, cartography, and many more, there is also a broader context that is holistically much more intriguing.

The change in climate in Western Europe starting 53 million years ago set in motion a serious of changes that led to the unique geological makeup of what is now the limestone under Paris (Huyghe et al., 2012). These changes included a large change in life forms in this area, and some of these are preserved today as fossils (Fontesa et al., 1993). These fossils have been incredibly useful to the field of paleontology. The limestone itself was used to build many famous and important structures around the city, and because of the holes it left under the city, tall buildings cannot be supported (Fronteau et al., 2010). As such these tunnels still mold the image of the city to this day.

The uncharted tunnels made during the extraction of limestone were not stable. Soon after they began being reinforced, the number of deaths caused by the plague became too much for the cemeteries of that time to hold. The portion of the tunnels known today as the Catacombs became consecrated and bodies were moved
down into them (Reid, 1993). Over time the catacombs have been rearranged and set up to accommodate visitors (Davenport Adams, 2009). Some of these visitors are welcome, paying customers, arriving to learn about the history of the tunnels, the bones, and the city itself. Other visitors have included military units, and cataphiles who sneak in and use the tunnel system for a variety of purposes (Duncan, 2010).

The catacombs have such a diverse meaning and use to everyone who visits or researches it. Some people go to learn about the history, some go to honor the dead, and some go out of curiosity. Today the Catacombs are one of the biggest tourist attractions in Paris, like the Eiffel Tour, figure 17, or the Palace of Versailles. The cataphiles who enter the tunnels illegally have an even wider variety of reasons for being down there. Many of these reasons are recreational, however much of what goes on in the catacombs today is secretive, due to the legal ramifications and monetary fines. This leaves cataphile activities, and the tunnels themselves, in a shroud of mystery. Ultimately there is no denying that the catacombs hold an astounding amount of history, and its relevance to the people of Paris exists maybe even more so today than it did during the tunnels’ beginnings.
Figure 17: The Eiffel Tower, one of the most well known tourist attractions in Paris today.
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