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The genesis and development of deathscapes in America -- a story of how Chicago and Louisville cemeteries demonstrate the shifting rationale of cemetery placement during the 19th and 20th centuries.

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THE GENESIS AND DEVELOPMENT OF DEATHSCAPES IN AMERICA --

A STORY OF HOW CHICAGO AND LOUISVILLE CEMETERIES DEMONSTRATE THE SHIFTING RATIONALE OF CEMETERY PLACEMENT DURING THE 19TH AND 20th CENTURIES

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ABSTRACT

THE GENESIS AND DEVELOPMENT OF DEATHSCAPES IN AMERICA --

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Today, most construction projects require a systematic site qualification based on a suitability analysis utilizing parameters such as slope, soil type, elevation, distance to open water, and distance to transportation. The proper siting determines the success of a project in terms of project stability and longevity. However, has this suitability analysis exist for one of the most significant phases of humanity – death

Historically dead bodies seem to have been placed without suitable qualification being many cemeteries have created environmental problems for the living. Hence, with which placement rationale has been used comes to mind. With a varied array of rationale used in cemetery placement, this thesis aimed to focus on a simple question. Were cemeteries placed based on qualifying criteria mentioned above or not? If so, factors beyond a normal suitability analysis exist. If not, then these qualifying criteria should probably be employed going forward.

This question was investigated through a spatial analysis of cemeteries placed in two different geographical areas of the United States.

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INTRODUCTION

SIGNIFICANCE OF DEATHSCAPE GENESIS

Recently, while strolling through the winding paths of Cave Hill Cemetery, in Louisville, Kentucky, the smell of fall filled my lungs as the serene beauty teased my eyes that all was well. However, the statuary and tombstones whispered other words. They whisper that life's clock is ticking. Amongst the 150-year-old white oak (*Quercus alba*) and the 200-year-old American beech (*Fagus grandiflora*), the Grimm Reaper lurks. When and how he appears is unknown, but his footprints can be seen amongst the graves. His shadow dances amongst the trees. His voice echoes in the breeze. The picturesque vistas only pacify for the inevitable meeting with the Grimm Reaper will come for me and for all.

While the meeting with the Grimm Reaper is inevitable, our perception of death has changed over time (Davies, 2005). The way we treat the dead in terms of burial has changed as well. This treatment of dead (or burial practices) has been evaluated on burials going back thousands of years. Until recently, the first known hominin burials were believed to have occurred approximately 50,000 years ago by Neandertals (Wilford, 2013) and were believed to be intentional (Rendu, et al. 2014). However, the newly discovered skeletal material of *Homo naledi* changed when the first burials occurred. The multi-age *H. naledi* skeletons were found in the Rising Star Cave in South Africa (Berger and Hawks, et al, 2015) and were believed to be purposefully deposited

(Dirks, P, Berger, L R, et al, 2015) between 236,000 and 335,000 thousand years ago (Dirks, 2017) which supports a long-held practice of hominin burials to before the Neandertals entered La Chapelle-aux-Saints, (Pinhasi, et al, 2011; Higham, et al, 2014; McKie, 2013; Rendu et al, 2014).

While body deposition (burial) occurred for a long time, we cannot be certain of the reason for the burial. The intentional burials are thought to have been done for compassionate reasons (Bellah, 2011) or it might simply have been for symbolic (Cullota, 2009) or superstitious (supernatural) reasons (Barber, 1988; Puckle, 1926). According to Darwin (1896), kindness (or compassion) presented an evolutionary advantage as our species evolved. In fact, "compassion" has been observed in closely related species including chimpanzees and bonobos (Goetz, et al, 2010; Prüfer, et al, 2012; Gibbons, 2012) which have diverged from our latest common ancestor between 4 and 7 million years ago (Prüfer, et al, 2012).

Nonetheless, whether compassion motivated the burials, or they were done for some other reason, the fate of the decomposition products has not been suggested as a factor in where the bodies were placed. Or perhaps the hominins did not perceive the potential consequences of burial placement 335,000 years ago.

However, more recently during the 19th century, there was a concern for the increasing mass of urban dead which lead to reactive measures to relocate the dead to the city periphery (Rugg, 2013b; Meller and Parsons, 2011), to move dead out of churches (Puckle, 1926; Jenner, 2005; Anthony, 2016), or to place them in haphazard locations (Ucisik and Rushbrook, 1998; Pattison, 1955). Whether the burial site was in a cave at La Chapelle-aux-Saints (Rendu, et al, 2014), or on a picturesque hillside in

Massachusetts (Rotundo, 1984), the rationale for these deposition locales seem varied. But the deposition did not seem to be due to systematic siting rationale (Pattison, 1955). In fact, during the 19th century, many cemeteries were built for purposes of aggrandizement (Meller and Parsons, 2011), and built with a lack of systematic rationale leading to pollution events at more than a few cemeteries (Ucisik and Rushbrook, 1998; Environment Agency, 2004; Boyd, 2005; Graeber, 2012). Using a systematic rationale can mitigate the pollution effects from cemeteries, but to understand the pollution effects, one must understand how the pollution can come about.

THE IMPORTANCE OF THE DISSOLUTION OF THE DEAD

The potential pollution is important to briefly review because it creates the framework for understanding why cemetery placement is important. If this review were skipped with a statement "Pollution has occurred in more than a few cemeteries", the justification for the hypothesis would be undermined. This justification is equally as important as reviewing the sociocultural history for cemetery placement. Otherwise, a statement like the on above can be written to summarize the sociocultural history "Humanity's preoccupation with sociocultural practices thwarted sound judgement in cemetery placement for the past 335,000+ years". To be thorough, the review ensues below.

The potential pollution effects from cemeteries come about from embalming (Chan, et al 1992; Chiappelli and Chiappelli, 2008), casket and vault materials (Harker, 2012; Rumble, et al, 2014), materials within the body such as amalgam dental fillings (Batchelder, 2008; Nieschmidt and Kim, 1997), artificial joints (Harker, 2012), pharmaceuticals (Kümmerer, 2008; Carrara, 2008; Paiga and Delerue-Mayos, 2016), and

from the normal decomposition products. Aside from these, disease pathogens can pose a risk for the living if not handled with extra care such as with ebola virus (Nielson, et al, 2014) or Creutzfeldt-Jakob disease (CDC, 2019).

The decomposition products originate from the five decomposition stages (Powers, 2005) and result in volatile organic compounds (Rosier, et al, 2016; Stadler, 2015; Vass, 2002), biological macromolecules (proteins, nucleic acids, polysaccharides, and lipids (Vass, 2002), numerous cations and anions (Zychowski, 2012), countless microorganisms (Bucheli and Lynne, 2016; Hawksworth and Wiltshire, 2011), and various entomological creatures (Sanford, 2015). Even the population of multicellular organisms can be affected by cemeteries (Miller and Trigoboff, 2001).

For every kilogram of dry body mass, a human body decomposes into 32g of protein, 10g of phosphorus, 4g of potassium, 1g of magnesium, and numerous other byproducts (Costandi, 2015). Hence, to put this into perspective, one average weighted person in the United States (Fryar, et al, 2016) releases enough nitrogen for about 1,000 square feet of lawn for one year (MacLachlan, 2013) in the United States. This may not seem substantial, but evidence has been documented that decomposition by products have created pollution (Chiappelli and Chiappelli, 2008). This may not seem substantial, but evidence has been documented that the "non-living", prion diseases are infective to humans zoonotically (Priola and Priola, 2004). Hence, who is to say what amount of contaminants or what quantity of prions are safe to be exposed to?

Nonetheless, normally over half of the pollutant load from human decomposition dissipates within a year and half of the remaining dissipates with each year with 0.1 % of the original pollutant load remaining after 10 years (Environment Agency, 2004).

However, the decomposition process may take up to 100 years (Zychowski, 2011) or in excess of millions of years with which recognizable tissue can be identified (Hardy, et al, 2017). Prions are much smaller than recognizable tissue.

Microorganisms can persist 2 weeks (Meyer, 2013), 84 days (Duboise, et al, 1976), 120 days (Metcalf, et al, 2016), a year or more (Finley, et al, 2016), or several years (Zychowski and Bryndal, 2015) in soil according to the various studies. Microorganisms can be transported via rain into groundwater within weeks (Zychowski and Bryndal, 2015) and can be recovered from groundwater up to 70 days (Bitton et al, 1983). In fact, being prions are little more than non-living, naked strands of proteins, which can cause devastating diseases, the isolation of nucleic acids (proteins in the form of DNA) from skeletonized horse tissue from 700,000 years ago (Lee, 2017; Orlando et al, 2013) may suggest a corpse may have impacts long after the nitrogen has hypothetically fed your lawn for the summer.

As for other decomposition products, chemicals such as chloride, sulphate, and sodium have been found to migrate through unsaturated soil zone beneath a cemetery for up to 20 years (Zychowski, 2012). Volatile organic compounds (VOCs) are released within days of production, but Rosier, et al (2015) found 452 VOCs within 6 months of decomposing humans and various animals. Zychowski (2012), reported that cemeteries "adversely affected the quality of underground water" by discharging numerous chemicals up to 200 meters.

To briefly touch on mitigation of the above decomposition products, vaults are commonly used for burial in the United States which should prevent the release of decomposition products. The vaults of Wilbert Group who is the leader in burial vault

production in the United States are warranted to last 50 or 100 years (www.centurywilbert.com). However, the concrete will eventually crack. As the second law of thermodynamics can be paraphrased as "nature tends toward entropy". Likewise, nature will "uncreate" vaults as Boltzman demonstrated the reversibility of entropy (Woldram, 2002). The vault's contents will eventually be released. The decomposition products will eventually be released. And without a vault and without burial, even cremains can produce detrimental effects upon release (Batchelder, 2008).

Other mitigating factors which minimize release include the type and composition of soil in which the inhumation occurs. Humic acids and tannins found in soil can influence chemical (Vass, et al, 1992) and microbial (Bitton and Harvey, 1992; McCaulou et al, 1994) translocation. The percentage of clay (Gammack, et al, 1992), the bulk soil density (Gammack, et al, 1992), the amount of organic matter (Gammack, et al, 1992), the percentage of plant root volume (Mawdsley, et al, 1994), and the cation exchange capacity (Gammack, et al, 1992) can dramatically affect the movement of microbes and other byproducts.

Consequently, many variables can be utilized to mitigate potential cemetery effluvia through the siting process. John Claudius Loudon (1783 – 1843) who was a prominent designer in the garden cemetery movement in the United Kingdom, in Europe, and elsewhere (Curl, 1983) proposed a classic design strategy: "The main object of a burial-ground is, of course, the disposal of the remains of the dead in such a manner that their decomposition and return to the earth shall not prove injurious to the living, either by affecting health or by shocking feelings, opinions, or prejudices" (Curl, 1983).

Utilizing the mitigating factors above through systematic guidelines seems like a good place to start for being concerned about the fate of decomposition products.

In having reviewed the dissolution of the dead, next the sociocultural basis for cemetery placement genesis will be explored.

HISTORICAL DEVELOPMENT FOR CEMETERY PLACEMENT

As discussed earlier, the reason for burials, whether it be for reasons of compassion (Bellah, 2011), of symbolism (Cullota, 2009), or superstition (supernatural) (Barber, 1988; Puckle, 1926), a more conclusive analysis can be derived from looking at cemetery placement during historic times (within the last 10,000 years). The placement of cemeteries is rooted in each cemetery's history and the sociocultural attitudes toward death (Schuyler, 1984; Rotundo, 1984; Dethlefsen, 1981). These attitudes are translated through the siting and design of cemeteries (Francaviglia, 1971; Vidutis and Lowe, 1980; Rotundo, 1984; Worepole, 2003). For example, burial of bodies close to and within churches (Puckle, 1926; Jenner, 2005; Anthony, 2016) reflected the sociocultural rationale for religious belief compliance. Burial in plague cemeteries (Puckle, 1926; Maddicott, 1997; Hawkins, 1990; Association of Graveyard Rabbits, 2008) normally reflected reactionary, rationale. Many plague cemeteries were planned in the midst of heavy death tolls and short-term planning dominated the siting.

Historically, cemetery placement has been serpentine across time and through cultures. Nonetheless, within a more Western context, cemetery placement genesis can sometimes be revealed through a series of punctuating events (Marcucci, 2000). It is because of the punctuating events significant changes occurred. These punctuated events oftentimes shattered the socio-cultural (Curl, 1975; Welford, 1992) and supernatural

rituals practiced (Keyworth, 2010; Stetson, 1896). These punctuating events changed the trajectory of cemetery placements. They even changed due to environmental impacts at times, but the concern for these impacts were not maintained.

PUNCTUATING EVENTS

For this review, punctuating events span pre-modern (pre-10,000 B.C.) to modern eras (10,000 B.C. to present). The events will be discussed in brief.

Pre-Modern Era – Prior To 10,000 B.C.

In the Pre-Modern Era, nomadic life and sedentary life altered deathscape development (Renfrew, 2006; Rendu, 2014). Societal sophistication (maintaining organized groups or not) and agriculture (nomadic or sedentary) were two components that changed the dealings with death (Bar-Yosef and Belfer-Cohen, 2002).

For example, during the Middle Paleolithic, intentional burials were treated differently, depending upon the area examined and upon the group of Homo (*Homo sapiens* or the subspecies *H. s. neanderthalensis)* (Smirnov, 1989). Some corpses were concealed; some were buried intact; some were disarticulated; some were buried as whole bodies; some had only body parts buried (Smirnov, 1989). The bodies were buried alone or sometimes in groups, but not in the current sense of cemeteries of today. Also, inhumation was selectively practiced on only a small minority of the population with men being buried more often than women (Smirnov, 1989). In addition, patterns of burial seemed to be independent of technology (Smirnov, 1989). The *H. s. neanderthalensis* suggests a presence of a type of religious belief (Smirnov, 1989).

In general, however, the sacredness of body burial increased as hominin groups became more "organized" (Bar-Yosef and Belfer-Cohen, 2002). By the Late Paleolithic,

at the dawn of agriculture, groups were still largely nomadic, hunter-gatherers (Feynman and Ruzmaikin, 2007). The dead were deposited along the migratory routes like the Early Natufians did by the Mediterranean Sea (Bar-Yosef and Belfer-Cohen, 2002). As some of the Natufians became more sedentary in pursuing agriculture, the burials made along the seasonal travel routes were later exhumed and reburied at more sacred secondary sites (Bar-Yosef and Belfer-Cohen, 2002; Grosman and Munro, 2007). The data suggests, however, that the precise burial practices, and the adaptation to agriculture did vary between Natufian groups (Bar-Yosef and Belfer-Cohen, 2002).

The advent of agriculture is believed to have taken place around 10,000 years B.C. (Feynman and Ruzmaikin, 2007). It developed independently in at least four societies around the world: in the Levant, China, Meso-America, and Andean-Amazonian (Feynman and Ruzmaiki. 2007). Plants (wheat, barley, lentils, peas, bitter fetch, and chickpeas) were domesticated over a few centuries beginning nearly 12,000 years ago (Feynman and Ruzmaikin, 2007). Animals (sheep and goats) were domesticated beginning ~9,000 years ago (Feynman and Ruzmaikin, 2007). Some believe the advent of agriculture was related to long-term weather stability (Feynman and Ruzmaikin, 2007) and some suggest the reason was due to food deprivation or food surplus (Svizzero and Tisdell, 2014). The advent was a gradual process over 5,000 years, but the burial practices remain consistent (Feynman and Ruzmaikin, 2007) in these sedentary peoples. The burials were done in special (Grosman and Munro, 2007), sacred locations. As sedentariness increased, the burials became more central (Faull, 1976). These burials were some of the first “burial grounds” as we define the term today (Rugg, 2000b).

For the Late Natufians, in the Southern Levant, such a burial site was a cave (Grosman and Munro, 2007). Earlier burials which were more formally organized in the manner of a cemetery were in southeast Asia, however (Bar-Yosef and Belfer-Cohen, 2002). The center of civilization became the area for life and for deposition of the dead (Mumford, 1961). The Modern Era brought forth additional burial placement challenges.

As for specific burial placement within the civilization centers, some cultures buried their dead close to their family's home (Puckle, 1926). This was done for several reasons. It was done to better honor the deceased (Pearson, 1999; Etlin, 1982). It was done with the belief the deceased would protect the house and family (Puckle, 1926). It was done out of convenience (Puckle, 1926). Sometimes the deceased were buried beneath the house (Halliday, 2009; Pearson, 1999; Naumov, 2007). Sometimes burials were done near and in churches (Puckle, 1926; Keister, 2004; Jenner, 2005; Anthony, 2016).

Nevertheless, the deceased were buried in congregated areas as individuals, in family plots, as local village burial grounds, as church associated graveyards (Anthony, 2016; Pattison, 1955), or at burial places for larger geographical areas (Faull, 1976). The formal cemetery, as we know of them today, was born (Pardoe, 1988). However, the rationale for the siting of these concentrated burials is not as well understood as in the modern era.

Modern Era – 10,000 B.C. To Present

In the Modern Era, the most drastic changes occurred through a series of punctuating events including disease theories (pre-miasma and post-miasma (Jenner, 2005)), rise of modern religions (Jenner, 2005), wars (i.e., Civil War (Blankenship, 2012)

and World War I and World War II (Zychowski, 2011)), the industrial revolution (Rugg, et al, 2014), and individual conscientiousness.

Disease Theories

Throughout human history, disease has played a role in shaping humanity (Blaser, 2006). Up until the early 20th century, the bubonic plague (*Yersenia pestis*), influenza (H1N1 and H5N1 influenza viruses), cholera (*Vibrio cholerae*), small pox (Variola virus), and others were some of the diseases that changed the trajectory of human civilization in the Old World and in the New World (Nelson and Williams, 2014). They also impacted the treatment of the dead and the deposition of them.

Aside from the effects of significant human loss, the epidemics had terrifying effects on the psyche of the villagers (Hecker, 1832; Crawfurd, 1914; Rosen, 1972). The loss of up to 60% of a village during the plague epidemics through the centuries in Europe (Perry and Fetherston, 1997) pushed the villagers to seek answers for the plague from anywhere (Nelson and Williams, 2014). The answers people accepted were from what they knew (Barber, 1988; Tesh, 1995; Morgan, 1985). They tended to believe earlier, previous knowledge over new (Morgan, 1985). They did not know of etiologic agents for disease like we know today. Villagers did not comprehend the effects of bacteria, viruses, fungi, and protozoa which would become known as the Germ Theory of disease by 1900 (Moffett, 2010) even though the first inkling for a contagiousness or etiologic cause for disease was suggested by the Persian, self-taught, medical doctor Avicenna in 1025 (Moffett, 2010).

Pre-Miasma Theories

Nonetheless, prior to 1900, various pre-miasma theories existed to explain disease and illness (Moffett, 2010; Comrie, 1933). Some of these theories described below are ether, entelechy, hormesis, phlogiston, homeopathy, zymosis, humoral, spontaneous generation, miasma, and countless others (Moffett, 2010; Thagard, 1996; Karamanou et al, 2012; Magner, 2009; Holden and McDonald-Madden, 2018). These theories create a conglomeration of belief systems that instilled a more spiritual perception of death and burials as compared to the subsequent disease theories. Diseases and illnesses were not agents that people had control over.

The pre-miasma theories did not appear on a specific date and disappear on another; they were born from multiple disciplines. Some joined into new. Some were disjoined into separate. Many are subscribed to today. Nonetheless, the dates depicted, and the descriptions made are written from a point of earliest found documentation.

The humoral theory (7^{th} century B.C. to current times) explained that all life is a mixture of the four basic elementary powers: earth, air, water, and fire (Bujalkova, et al, 2001). These powers are in constant motion seeking balance. These opposing powers affect the four body fluids/ humors, namely blood, phlegm, yellow bile, and black bile (Bujalkova, et al, 2001). The four humors are furthermore bound together by the oppositional qualities in the body such as warm – cold, sweet – bitter, wet -- dry (Bujalkova, et al, 2001). Normal health was considered a balance between the body fluids (eukrasia) and the external environment (Bujalkova, et al, 2001; Nutton, 2013). If there is an imbalance, the result is dyskrasia. In order to achieve the body's harmony, the right diet must be taken in to balance the body fluids (Bujalkova, et al, 2001; Nutton, 2013). However, the balance also was construed to the body and spirit balance

(Bujalkova, et al, 2001; Bastien, 1989). The balance is largely out of the control of physicians and patients (Bujalkova, et al, 2001). Physicians and patients are "helpers" and not agents of disease. Physicians and patients are at the mercy of the natural caused disease (Bujalkova, et al, 2001). Patients are not the prime agents of their fate (Nutton, 2013).

The ether theory (4^{th} century B.C.) was delineated by the Indian Ayurvedic medicine, a 5th element, ether, evoked (in addition to earth, air, fire, water) which is space or "ether". Too much space in blood or bile causes illness (Moffett, 2010). Ayurvedic medicine is still taught today in India but is not normally learned by Western doctors. The ether theory releases agency to other worldly forces.

The spontaneous generation theory (3rd century B.C.) arises from Aristotle's claimed that living beings arose from one of three ways: sexual reproduction, asexual reproduction, or nonliving matter (Moffett, 2010). The Roman poet Virgil wrote in ~29 B.C. (*Georgics*, 2019) that for "making…bees, a practice known as bougonia, which involved beating a poor calf to death, blocking its nose and mouth, and leaving the carcass on a bed of thyme and cinnamon sticks". Additionally, "creatures fashioned wonderfully appear," he wrote, "first void of limbs, but soon awhir with wings" (Ball, 2016). Three hundred years later, Aristotle claimed in his book *On the Generation of Animals* that a fertile matrix of decaying matter spontaneously yielded insects and mice (Ball, 2016) from if the nonliving matter contained *pneuma* (vital heat) (OpenStax, no date). Even the bible mentions creation of living "out of clay" (von Holsten, 1936).

Spontaneous generation beliefs continued until 1668 when the Italian physician, Francesco Redi (1626 – 1697), demonstrated that maggots would not spontaneously

generate from rotten meat (OpenStax, no date). Redi's experiment involved setting up six containers of meat. Two were open to air, two were covered by gauze, and two were sealed. As he hypothesized, maggots appeared in the open jar, but not in the gauzed jar nor in the sealed jar (OpenStax, no date). Hence, maggots did not spontaneously generate from decaying meat. Up until Redi, the belief that life came from non-life helped justify aberrant burial practices such as those for revenants (Barber, 1988) and other supernatural forces. The belief in spontaneous generation mystified death and dissolved agency in treatment of the dead.

The entelechy theory (3rd century B.C.) conveys that organisms are composed of matter plus a vital force which creates life (Moffett, 2010). The vital force can be disrupted causing illness or be extinguished causing death. Aristotle described this vital force as entelecheia or ἐντελέχεια which is translated as entelechy or soul (Aristotle, 1908; Hicks, 1907; Gendin, 2012) whereby "…when the soul departs, what is left is no longer a living animal…" (Aristotle, 1908). The agency is held by non-worldly forces as are the burial practices.

The contagion theory (10^{th} century A.D.) had a dual meaning for many centuries. The word "contagion" originally had a religious medicine meaning whereby illness was an affliction from a god (Jouanna, 2012; Harvard University Library, 2018). For example, a person with epilepsy has seizures as a result of a god's possession of the person (Jouanna, 2012). Further to the east, the Persian doctor, Avicenna, suggested the conventional idea of contagion when he submitted that quarantining ill patients prevented the spread of disease (Moffett, 2010). However, in subsequent centuries, contagion theory became associated with the spread illness, in association with miasmata (Pelling,

1994; Harvard University Library, 2018). In the subsequent centuries, the spread of disease drew causation. The burial of the dead drew causation as well, as discussed in the Miasma section below.

The hormesis theory (16th century A.D.) arises from Paracelsus who claimed that there is a dose response to a substance exposure (Moffett, 2010). A high dose may kill while a small dose may be curative.

Consequently, applying a small amount of something that causes illness will protect one from that illness. This idea is applied in the pharmaceutical industry that evaluates the dose response of compounds. While a small amount of digitalis can be beneficial in heart disease, a large amount is lethal. Like contagion theory, hormesis linked causation. It linked control with consequences.

The phlogiston theory (17th century A.D.), according to Joachim Becher (1635-1682), claimed that all material is made of air, water, earth. Illness can be cured by adjusting these materials. Stahl in about 1700 submitted that "…when a substance burned or when a patient was fevered, an element to which he gave the name "phlogiston" escaped with the development of heat. The physician's duty…was to prevent the phlogiston from escaping and being lost to the body" (Comrie, 1933).

The homeopathy theory (18th and 19th century A.D.) began with Samuel Hahnemann (1755-1833) whose scintillating idea is paraphrased by the following from Schmidt (2010)

> *It is Hahnemann's basic idea of an art of healing that, on the one [hand], attempts to conform as closely as possible to the sick human and primary phenomena (disturbed well-being/feeling, detuned vitality, remedies as potencies*

to influence these states) and, on the other band, strives to find tools, rules and laws that make the highly demanding practice of medicine certain and reliable.

Putting it simply, one can say that similar cures similar (Schmidt, 2010). Hahnemann claimed, "substances which arouse a kind a fever extinguish the types of intermittent fever" (Schmidt, 2010).

However, Hagnemann's ideas stemming from the term "homeopathic" which he coined in 1807 involves more than the simplification of above (Schmidt, 2010). Consequently, Hagnemann encapsulated his ideas in six editions of Organon published between 1810 and 1842 (Schmidt, 2010). Interestingly, this theory is quite popular today, albeit in a different form.

The zymosis theory (19th century A.D.) is based upon what Antoine Béchamp claimed that tiny organisms called zymes are fundamental building blocks of life (Moffett, 2010). These morph into disease agents and have immortality.

Pre-Miasma Theories Effect

The above theories do not in and by themselves cause a change in rationale for cemetery placement. However, they do morph in part to influence the miasma theory. They do mirror the attitudes toward life and toward death. They demonstrate a supernatural perspective with subservience to the earth and to forces beyond human control. Consequently, burial practices were oftentimes meant to gain favor, to seek redemption, to pay penance, or to make an offering to spiritual or supernatural forces. These spiritual and supernatural forces dictated where and how burials were done rather than following any earthly rationale. Likewise, the fate of the decomposing body was thought to left to the forces out of human control.

Miasma Theory 1700 To 1900 A.D.

The miasma theory in its "non-morphed" form claims that disease "ferments" combine with noxious air to bring about disease. The disease "ferments" come from a disease, but are only "activated" through the noxious vapors of sewer gas, of a manure pile, of decomposing leaves, etc. The more noxious vapors a person is exposed to, the stronger the disease.

The miasma theory morphed over time (Halliday, 2001; Pannell, 2016) with each morphogenesis being difficult to pinpoint with any degree of certainty. Sometimes, a morphing of the theory arose by one influential person (Halliday, 2001). A Professor H Booth, from London, writing in the Builder in July 1844 claimed, "From inhaling the odour of beef the butcher's wife obtains her obesity" (Halliday, 2001). However, in general, the miasma theory involved a spiritual, ghostly, and supernatural component as well as the standard noxious vapor component. Because the essence of the miasma theory persisted for so long and was spread geographically through many people and cultures along the silk roads from Asia to Europe (Morelli et al, 2010; Perry and Fetherston, 1997), merging of other theories into miasmata occurred (Moffet, 2010; Pannell, 2016).

Miasma Theory Effect

The miasma had impact on the treatment of the dead and on the placement of cemeteries (Rugg, 2013b). Cemeteries were not welcome in the city largely due to petitions from those such as Dr. Rausch. The Chicago City Ordinance of 1881, section 1.439 (Jamieson and Adams)

The common council of the city of Chicago shall have the power, by ordinance:

First. To prevent the interment of the dead within the present or future limits of the city.

Second, To provide for the vacation of the several cemeteries in said city by the purchase and extinguishment of the titles of lot owners, or otherwise.

Nevertheless, this theory coincided with many epidemics (Hays, 2005; Rotundo, 1984; Szczygiel and Hewitt, 2000; Martensen, 2009), the development of large cities (Pregill and Volkman, 1999), and the over-filling of city graveyards (Rugg, 2013b). The miasma theory, in part, forced an abandonment of sociocultural norms in favor of cemeteries being placed in rural, non-secular areas. America's romantic era paralleled miasmata and favored the placement of cemeteries in picturesque (Bender, 1974), country vistas away from city centers (Bender, 1974; Rugg, 2013b; Meller and Parsons, 2011), away from putrid laden churchyards (Puckle, 1926; Jenner, 2005), away from crowded, layered burials (Curl, 1983) to open, space abundant, rolling hills of America (Bigelow, 1860). There was an overwhelming appeal in the 19th century to place the dead in rural, countryside locales which mediated the relationship between the dead and the bereaved (Tarlow, 2000; Meller and Parsons, 2011). Additionally, the cotyledons of the Landscape Architecture profession rooted itself into the romantic, rural cemetery movement (Pregill and Volkman, 1999). The profession reveled in creating beautiful, vista-ful, country landscapes (Curl, 1983).

Germ Theory 1900 To Current

The development of the germ theory took a serpenticious route with elements dating to before the Persian doctor, Avicenna suggested disease contagiousness in 1025 (Moffett, 2010).

Evidence for the existence of pathogens was not known until the light microscope was invented in approximately 1590 by either Hans and Zacharias Janssen or Hans Lippershey (Davidson, 2009; Cox, 2013). The microscope was further perfected by Antoni van Leeuwenhoek who used it to study nearly all his surroundings. He described "little animacules" in the 1600s which enabled the visualization of this “invisible” world (Fred, 1933; Dobell, 1932). Van Leeuwenhoek showed the world through his drawings that microorganisms existed. Despite this knowledge, the scientists of the day did not generally connect them as causative agents to disease. They could not believe that something so small caused disease. Consequently, the germ theory of disease was not well accepted until nearly 1900 (Kokayeff, 2012; Moffett, 2010; Harvard University Library, 2018; Thagard, 1996; Halliday, 2001). The preponderance of evidence for “germs” causing disease was overwhelming from the late 18th century and throughout the 19th century (Mcclary, 1980). While it took a while for the concepts to spread and gain popularity in the medical community, many contributed (Mcclary, 1980). Some of the pioneers who advanced the germ theory in the 19th century included John Snow, Louis Pasteur, and Joseph Lister.

In 1854, after repeated outbreaks of human cholera in London, John Snow (1813-1858) demonstrated statistically and epidemiologically that the cholera outbreaks in South London was caused by a contaminated well and not by miasmatic vapors (Moffett, 2010; Cameron and Jones, 1983). John Snow showed on a map that those Londoners that

contracted the disease primarily got their drinking water from the Broad Street Pump (Moffett, 2010; Cameron and Jones, 1983). After city officials removed the pump's handle, the residents had to get their water from other city wells which stopped the outbreak (Moffett, 2010; Cameron and Jones, 1983).

In 1865, Joseph Lister (1827 – 1912) provided more causative evidence when he successfully curbed post-operative infection by using carbolic acid as an antiseptic on surgery instruments and wounds (Pitt and Aubin, 2012). In the mid to late 1800s, Louis Pasteur (1822-1895) demonstrated that microbes caused alcohol, wine, beer, and milk to ferment (Bordenave, 2003). He later proved that vaccination confers protection to chickens against cholera (*Pasteurella multocida*) and he boldly vaccinated a 9-year-old boy (Joseph Meister) against rabies after the child was bitten by a rapid dog (Bordenave, 2003). The life of Joseph Meister was saved, and Pasteur gained great support for the role of microbes in disease.

The conclusions of the pioneers of the germ theory lead to its eventual acceptance. Dissemination of the germ knowledge was made through newspapers and magazines which led to a germ phobia and germ panic, but acceptance of the fact that microbes are everywhere settled the public (McClary, 1980).

Germ Theory Effect

The germ theory helped put things into perspective. The germ theory also enabled direct causation to be drawn between pathogen and death. The germ theory demonstrated that miasmatic vapors were not going to emanate from dead bodies in cemeteries within or without the city. As an effect of the germ theory came a sense of mastery of life and a mastery over death. Consequently, by 1905, the City of Chicago

ordinances did not restrict cemeteries from being placed within the city limits or the future city limits (Chicago, et al, 1905). In fact, the ordinances referred to "contagious or infectious disease" when referring to the handling of dead bodies which reflects the acceptance of disease pathogens (Chicago, et al, 1905). The city did control the manner within the city a body could be carried, however (Chicago, et al, 1905).

Rise Of Modern Religions

While a deep discussion of religion is beyond the scope of this thesis, suffice it to say that religion has long been tethered to the origination of life and of the dissolution of life. Religion has also created practices, rituals, and edicts of what is done with the deceased (Rugg, 2013b). These practices were rooted in a vacillation of what the dissolution of life meant. Nevertheless, the practices were rooted in an absentic awareness of the fate of decomposition and of the long-term consequences of burials (and of cremation).

As far as 100,000 years ago, some believe a religious belief system began (Culotta, 2009). Smirnov (1989) indicated evidence that Neandertals are some of the first hominin to practice religious-like burial practices. However, the better-known religions fostered by ancient Israel, classical Greece, Confucian China, and Buddhist India flourished in the 500 years before Christ (Bellah, 2001; Wolfe, 2011). Between the 13th and 20th century, a religious fervor created a different view on death. As the germ theory of disease provided a systematic, pathogen causation to disease, the rise of Christianity can be viewed by some to reverse the gains in disease understanding to one focusing on spirituality (Withington, 1892). Christianity also re-introduced a spiritual element to death and burials that was diminishing with an emboldened discipline of science and

medicine. For example, Christianity expected good Christians to be buried near the church in church yards (Geake, 1992). Christianity banned cremation until 1966 after which it was allowed (Puckle, 1926).

Nevertheless, the rise of modern religions morphed our perception of death from one of acceptance, to one of fear, to one of an afterlife, and to one of an overcoming of death. Each religion codified the treatment of the dead and directly impacted where and how bodies were buried regardless of other factors.

Wars

The Civil War and the two world wars were traumatic on society's perception of death and the treatment of it. The development of cemeteries shifted as a result of these societal traumas.

The Civil War, WWI, and WWII, overwhelmed humanity's emotions, our ability to adhere to religious and traditional burial practices, brought about a few technological changes in dealing with death, have transitioned burial grounds into perpetual honorariums (Budreau, 2010, p. 13), and have covertly brought forth humanity's concern for crimes against humanity.

Civil War

Amidst the revelation of the germ theory, the Civil War in the United States broke out in xxx. Between April 12, 1861 and May 9, 1865, between 828,000 and 1,000,000 people died directly from combat, shortly thereafter due to wounds incurred during combat, accidents, and collateral deaths. The United States had never suffered such war mortality. There was no adequate system in place to deal with the wounded nor with the dead. Dorothea Lynde Dix (Burns, 2019) was one of the first to treat wounded soldiers

and was appointed on June 10, 1861, to the position of Superintendent of Female Nurses of the Union Army by Secretary of War Simon Cameron to treat soldiers on or near the battlefield. Clarissa "Clara" Harlow Barton (1821 – 1912), Mary Ann Ball (1817 – 1901), Louisa May Alcott (1832 – 1888) were other well documented nurses that worked under Dorothea or on their own (Burns, 2019). Barton worked to establish the American Red Cross. Ball worked with the Sanitary Commission serving in 19 battles, often under fire, and was known to walk the battlefields at night hoping to find anyone alive (Burns, 2019).

Aside from treating the wounded, the deaths were beyond what anyone imagined. The ritualistic mourning a loved one graveside and burial nearby could not happen. The cultural belief systems of religious- and non-religious-prescribed practices of burial in a specific direction, burial in a homemade coffin, processionally following the body to the grave, placing a substantial marker at the grave, and countless other practices could not take place. Instead, after blow flies, countless microbes, and the sweltering heat caused corpses to swell into monstrous-looking gooey blobs, the bodies were hastily buried or had dirt kicked over them. Most were unidentified, haphazardly placed (if moved at all), and rest in silence to this day. In silence, most never were mourned in a manner traditional for the day. Because of these deaths en mass, the government set up National Military Cemeteries. In these, union soldiers who fought in the Civil War, and soldiers that fought in other earlier wars had the option to be buried in newly formed National Cemeteries. Many of these cemeteries were formed at sites "after the fact". That is soldiers were already buried at a site and the designation of a National Cemetery was added later. Consequently, many of the sites were placed based on being at the near

proximity to the battle site. The bodies from the Civil War that were recovered were removed in the years following the Civil War to these National Military Cemeteries or at a cemetery of the family's request. In a way, many of these sites may have been situated as places of military strategic significance or as places of chance.

The Civil War created several new challenges to American's dealings with death. It was the first time that families were forced to deal with the death of family members at a distance. It was the first time, large numbers of people died, and the United States government was grossly ill prepared for the mass deaths. Battle treatments, embalming, corpse identification, and transportation methods for corpses were new to the union. Furthermore, National Cemeteries were declared by Lincoln which began a memorialization of those that died in the service of the country.

Generations of grave maltreatment were begun as a result of the war. And death became a fact of life for all Americans. It became a source of great sorrow for prematurely dying family members as compared to old-age attritional causes of death.

World War I (WWI) & World War II (WWII)

Subsequent to the Civil War, WWI and WWII created additional shifts in cemetery placement. Being both wars were battled abroad, the dead never received the mourning rituals of the day. Although during the Civil War, some of dead were brought to their home area for mourning rituals, during WWI and WWII, the dead were often buried in the country in which they died. They never had the mourning rituals by loved ones (Budreau, 2010), but were buried by strangers at or near the battlefields of their death. These Military Cemeteries were created near the battle for logistical and cultural purposes (Harke, 1990; ?Robertson, 1983?) and not because the site was best for burials.

Burials in the proximity of the battle made logistical sense. However, a long held cultural belief bestowed great honor by being buried at the place of death. In these situations, the cultural belief systems weighed more heavily than the cultural implications (Budreau, 2010) and more heavily than the long-term strategy addressing the fate of decomposition.

Following WWII, a heightened national confidence arose in the United States as in any national achievement (Smith, 1998). The nation had overcome the Great Depression. The nation had "won" two world wars. The nation had advanced technologically and industrially through these times. In converting countless factories to war time products and weapons brought an awareness that American's can do anything. The WWII also brought forth a sense of righteousness. The United States and its allies remedied a moral injustice in the world. It brought an end to the extermination of millions of Jews. WWII had brought an enwrapment of moral superiority to the United States. Consequently, the Military Cemeteries that were placed abroad became nexi for the symbolism of honor (Harkle, 1990; Roberston, 1983; Budreau, 2010) and purpose for dying. These cemeteries brought forth the idea that death with honor is better than death without. These cemeteries brought forth the idea that while the individual tombstones were alike, the monumentation of the mass graves gave a resurgence to the purpose of cemeteries – death can be honorable and cemeteries can reflect this (Roberston, 1983).

Both World Wars resulted in great masses of deaths. However, these deaths were on foreign territory. The United States' war department concluded that transporting the war dead back to the United States was an impractical use of war resources (Budreau, 2010). Consequently, far-away deaths removed "the closure" for many of having a grave

to visit. The nexical sacredness of having a grave to communicate to the dead was prevented from being possible (Walter, 2005). Great honor was bestowed upon the military cemeteries unlike previous burial grounds (Budreau, 2010), particularly WWII. Military Cemeteries became places of memorialization, national pride (Budreau, 2010), and tourism.

Mass graves, the barbarity of humanity, and the effects of mass burials transformed death into the realm of honorarium and into the realm of evidences against humanity.

Industrialization

In the early 1900s, people became emotionally detached from death during the beginnings of urbanity (Anthony, 2016); the putrescence and the ills associated with death and the overcrowded churchyards (Curl, 1983) were "forgotten". The industrial revolution in America brought a "can do" attitude (National Day Calendar, 2019) for mechanization, automation, and overcoming all. Americans believed they can conquer hunger, overcome "unjust" political regimes, accelerate technological innovations, and advance beyond disease and death. A distancing from death became more pervasive. The cemetery was not as important. The minimalist design and the pristine, lawn, flat-markered cemeteries became commonplace. Function above form was the norm.

Religion's hold on death practices were eroded during the 2nd half of the 19th century (Walter, 2005). Concerns for public health, advances in the medical field (citation), and an increased emphasis of defining death through medical terms rather than religious faith (Anthony, 2016) lead to a rationalization for cemeteries into the countryside away from churches (Jenner, 2005).

Through the sense of honor and the surge in the United States' industrialization era, cemeteries were placed with greater prominence. New cemeteries were placed with more conspicuousness and existing ones became more conscious of their presentation to the world. Sections of the existing cemeteries were modified to highlight fallen soldiers of not only WWI and WWII, but also the subsequent wars. Korean War monuments, Vietnam War monuments, and monuments of all wars became almost expected across the country in cemeteries in which military personnel were buried. However, the placement of the new cemeteries and the adaptations of existing cemeteries were done so for sociocultural reasons and not for reasons of long-term fate consideration.

Individual Conscientiousness

Beginning during the United States' industrialization era, people started individualizing their burial plots. While individualization occurred greatly in Victorian-Styled Cemeteries of the late 18th and throughout the 19th century in terms of demonstrating greatness, power, money, and status, the individualization that slowly emerged during the industrial era was buried in a humble consciousness. With the great strides of the earlier wars and those of the industrial era, some looked introspectively at their own impact on the world. These effects are mostly evident today with societal concern for the climate, pollution, income and food inequality, and other causes, but I contend these sentiments began in the 1940s and 1950s. The saving of millions from extermination by the Nazi was a bold and necessary move toward a humble, self-aware individualism. Individualism is written because these ideas are rooted in an individual's mind. Most of the "causes" depicted above only could be achieved through the involvement of thousands and millions, but the individual mind and body was changed.

The individual mind and body were changed or more accurately directed to a higher purpose. The higher purpose was not necessarily in reference to religion, but a higher purpose for humanity.

In the 1940s, the YMCA was a pioneer in blazing a trail toward non-profit societies. The labor laws in the United States to protect worker's rights and safety originated in 1938 and 1893, respectively (https://en.wikipedia.org/wiki/United_States_labor_law; https://en.wikipedia.org/wiki/Occupational_Safety_and_Health_Act_(United_States)). The Civil Rights movement culminated in the 1960s. The anti-war movemen1880st culminated in the late 1960s. The Clean Air Act and Clean Water Act were passed nationally in and 1972 and (1963/) 1970, respectively (https://www.epa.gov/laws-regulations/history-clean-water-act).

Additionally, regarding cemeteries, individuals have become concerned about their carbon footprint. Individuals want to have their ashes incorporated into concrete blocks, to be sank into the ocean, and to provide a home for ocean coral (https://www.eternalreefs.com/). Individuals want to be buried more naturally without embalming, without a casket, without a vault (Harker, 2012; Holden and McDonald-Madden, 2018). Individuals want to be cremated instead of having a whole-body burial to save land. Individuals want to be cremated to have their ashes scattered over flower gardens as a fertilizer. In ground cemeteries are becoming less of an impact for the 65% that are choosing cremation. However, even cremation can have deleterious effects. Toxic chemicals, air pollution, disease, and crematory energy demand also need assessment. These other modes of dissolution of the dead are not harmless. As a species,

we tend to jump ahead before knowing the consequences. In fact, as a biological precept, most species destroy their environment in favorment of the next successional species. Perhaps this is a destinal course we must take. Perhaps humanity does not have the patience to look toward impacts before proceeding.

Even Native American Indians have been lauded as an epitomal symbol of respect for their environment (Lewis and Anderson, 2002; Callicott, 1982) and for foreseeing consequences. However, the Native American Indians in the United States have in the past dramatically altered their surroundings (Lewis and Anderson, 2002; Williams, 2002; Raish, et al, 2007) and in fact can be said to have destroyed the existing natural flora to suit their own needs (Raish, et al, 2007). They started fires along the tree tension zone to push back and to limit the advancement of the forest in favor of open prairie (Lewis and Anderson, 2002). It was in open prairie that buffalo, elk, and various gallinaceous birds thrived. While lightning also created such fires, the Native American Indians far surpassed lightning fires in their affect. In addition to pushing back the tree line, the new, vigorous growth occurring after the fire dramatically improved the habitat for white-tailed deer, rabbits, and other r-strategists.

Consequently, if the epitomous society of modern civilization also destroyed their natural habitat, will we do any different? The rationale for cemetery placement is the purpose of this thesis.

HYPOTHESIS

Historically, cemetery placement has followed sociocultural rationale without regard to eventual effects on the environment (Ucisik and Rushbrook, 1998). The rationale has shifted through a series of punctuating events over time but has nonetheless resulted in more than a few pollutive cemetery placements (Graeber, 2012; Eastern Cemetery, 2017; Associated Press, 1989; Bannos, 2019; Chadwick, 1843). Cemeteries in Jefferson County and Cook County will be used as proxies for cemetery placement. Some cemeteries in Jefferson County (Eastern Cemetery) and Cook County (Fleig, 2018) have been placed without foresight.

ANALYSIS OBJECTIVE

The above introduction delineates the genesis of cemeteries in brief. It delineates the genesis as sourced from literature and historical documents. It delineates a lot of complexities and confounding rationale to the placement of the deathscapes. However, is there objective evidence that gives concrete evidence to the deathscape genesis and to the placement of them. And more to the point, has the vacillating cemetery placement rationale been done to foreword planning, reactive planning, or chaos theory.

In order to determine this, cemeteries in two counties have been selected from which cemeteries were analyzed. The method to discover the placement rationale is through a spatial analysis of variables that may have been rooted in or have been reflective of the logic of cemetery placement. These variables include cemetery name, cemetery size, slope of terrain, elevation, distance to railroads, and distance to open water.

Overall, the goal of this thesis was to evaluate and to draw conclusions about the following.

- To identify and understand the sociocultural and physical factors influencing the development of deathscapes in Cook County, Illinois and Jefferson County, Kentucky primarily during the 19th century.
- Determine if the rationale for cemetery placement has been for sociocultural reasons or with planning rationale with foresight on consequences.

MATERIALS AND METHODS

LITERATURE REVIEW

The literature reviewed were gathered from various sources including PubMed, Google Scholar, and other peer-reviewed databases available such as the University of Louisville, Library System, the University of Chicago, Library System, and the Filson Historical Society. Further data were gathered from non-peer reviewed sources available through both Library Systems and public access.

SPATIAL DATA

The data were collected from historical documents; land deeds; USDA Natural Resource Conservation Service geographical, soil, slope, and hydrology data Web Soil Survey (2019); Google Earth Pro (Google Earth), 2018 and Google Maps; historical maps; religious centers; peer reviewed literature; newspapers and magazines; and other sources.

Some of the spatial data was gathered and analyzed with specific terminology and assumptions. These are described below.

COUNTY SELECTION

In evaluating the counties to choose, Jefferson County, Kentucky and Cook County, Illinois are the two chosen for the spatial analysis.

Jefferson County, Kentucky

Jefferson County, Kentucky was selected as a study area for several reasons. First, the University of Louisville is located within Jefferson County, so research from this thesis may have direct relevance to the University and to those associated with it. Second, Kentucky sits at a nexical location through which a lot of cultural changes, stressors, and transitions occurred. These included the split loyalties over the Civil War, the racial tensions stemming over 200 years, the prominence of grave robbing during the 19th and early 20th century, the strong southern religious influence, and the mountainous terrain. Kentucky offered a complex mix of interactions which provided a great test for the variables of interest.

Cook County, Illinois

Cook County was selected as a direct contrast to the characteristics of Jefferson County. Cook County is relatively flat. It was significantly impacted by the miasma theory and the transition between it and the germ theory (Loerzel, 2019). These theories shaped cemeteries during the 19th century. Slavery and racial tensions were not a significant impactor in the deathscape development. Immigrants dramatically impacted the City of Chicago's growth and deathscapes. The county reflects the surveying, plotting, and development of the Public Planning Survey System (PLSS) following the development of the 13 original colonies. The City of Chicago and its environs was heavily impacted by the industrial era and experienced rapid growth. Lastly, Cook County seems to reflect a demeanor and philosophy created by farmers and immigrants which has been translated into deathscape development.

LOCATION

The location of each cemetery was determined based on its center point (centroid) in terms of latitude and longitude in decimal degrees, except for the data sources that had GPS coordinates complete.

The reason for using the centroid of each cemetery was because each cemetery has different dimensions. In analyzing the distance to a stream is confounded by using a point along a boundary other than the centroid. The boundary of each cemetery could be used to measure distance, but the specific point on the boundary would need to be detailed. Standardizing a point to use on each cemetery to be consistent is next to impossible with triangle shaped, square shaped, 6-sided polygonal, 8-sided polygonal shaped, and all the other shapes. Additionally, some cemeteries have no defined boundary.

The distance measurements used in this analysis were conducted based on what appeared to be the centroid of each cemetery based on the visual representation of each cemetery in Google Earth and/ or Google Maps. The "tilt while zooming" was disabled in Google Earth to more accurately view each site perpendicularly. Also, a satellite image was used for determining centroids to better visualize the ground plane.

CEMETERY DESIGNATION

Each cemetery was considered a separate cemetery if any of the following was true.

- The GIS file considered a site as unique.
- One of the sources for data as described above considered a cemetery as unique.
- Different sources for data considered a cemetery as unique.

- The synonymy between cemeteries was questionable for any reason.

NUMBER OF CEMETERIES

According to the lists the author compiled, Jefferson County has in excess of 648 and Cook County has about 718 cemeteries. The uncertainty in the number of cemeteries is due to the imprecision in every knowing the precise number. The number of cemeteries were gathered primarily from GIS files, findagrave.com, the Filson Historical Society, and the cemetery's website (where applicable), but no cemetery list can be complete. Countless family cemeteries exist that are not listed online, primarily in Jefferson County. Cook County does not appear to have as many backyard, family burial grounds, but it cannot be known with absolute certainty. Many cemeteries have become overgrown, forgotten, or destroyed. Many cemeteries have had bodies moved elsewhere with a weak paper trail to know if all bodies have been removed. Many cemeteries have joined others, have had name changes, are un-named, or are known by two or more different names which greatly confounded a list of cemeteries. In Jefferson County, there are likely quite a few family and slave cemeteries that have never been designated as such and have long been forgotten. While Cook County may have many family cemeteries, the land development was largely done at a later time. Cook County has also been plotted, in part, through the initial Public Land Survey System (PLSS) which designated original man-made elements. And subsequent surveying documented subsequent elements. All land transfers would have documented changes to the surveying through deed transfers and sales. Consequently, documentation of the existence of cemeteries can be more assured in Cook County than in Jefferson County.

Additionally, there appears to be no central repository from which comparisons can be made to eliminate duplicate entries or other errors. As it exists, numerous

databases/ lists exist duplicity and in parallel by various city, county, state, and national organizations. To illustrate some of the complexity below are some examples.

- In Jefferson County, there are 14 entries for the Portland Cemetery. The GIS file information indeed shows 14 separate parcels of land. This cemetery was separate at one time, but over the years had been joined.
- There are very similar names for two different parcels of land.
    - Oxmoor Lodge and another is known as Oxmoor Lodge, Adjacent.
    - Oldham Cemetery and at a separate location one named Oldham Family Cemetery.
    - Murray Family Cemetery and a Murray – Young Cemetery.
    - Moore Heafer Road Cemetery, a Moore Family Cemetery, a Moore – Fishpool Cemetery, a Moore Slack Cemetery [defunct].
    - Hikes Family Cemetery, Hikes Family Burying Ground, Hikes – Jones Cemetery by John E's Restaurant.
    - Saint Michael Cemetery and another named Saint Michaels Cemetery

The only way to reconcile the disparities pointed out is to physically go to each and document them. While many volunteers have been doing this, it is a monumental task and beyond the scope of this thesis.

Also, infant mortality was high which were transformed into small family cemeteries, but many dead infants never were represented in the cemetery numbers because the infant deaths originated when a family was young. As the family got older,

they may have moved away or were buried elsewhere. Not all infants were buried in a formalized cemetery nor were they the seed of new cemeteries.

Nevertheless, the cemeteries that were selected had at least two variables collected for which to compare, except for the name analysis which only required a name.

ESTABLISHMENT YEAR VARIABLE

The date of establishment was determined through one of several means. If the GIS files that were gathered had the date, the GIS date was used. Some cemeteries had website with establishment dates. Other dates were determined through mining the online tombstone inscriptions on a genealogy website, such as findagrave.com. If dates between these differed, the order of acceptance priority was in order of priority GIS – cemetery's website – tombstone data. If dates were in doubt beyond that, the earliest of the dates was used. Furthermore, a date reflecting when burials occurred was considered the establishment date rather than official ceremonial dates. For example, some cemeteries had burials, but were not chartered or did not have an official opening until a later date. Some cemeteries were opened on a given date but were under construction for several years before which the first burial occurred.

SIZE VARIABLE

The cemetery size was ascertained from the GIS files, the cemetery's website, other websites that refer to a cemetery's size (e.g. findagrave.com), Google Earth measuring tools, or calculations based on the number of graves.

When calculations were made, the number of published graves was used. These were multiplied by a grave size of 32 square feet (8' long x 4' wide). The total area was multiplied by 2.5 to account for border areas around each grave and around the cemetery.

SLOPE VARIABLE.

Slope is an elemental design factor in many cemeteries during the 19th century (Francaviglia, 1971), especially when creating picturesque cemeteries (French, 1974; Bigelow, 1860). The slope of cemeteries has also demonstrated environmental issues (Jackson, 2006).

The slope was gathered from the Soil Web Survey (2019). The slope can be gathered from other sources including contours, but the Soil Web Survey has the most complete data set. Also, the slope can be evaluated based on percentage or based on degrees. Percentage was used in this analysis because it is more familiar by most and is more easily analyzed statistically than degrees. The limitation of using slope from the Soil Web Survey is that some generalities are made. Cemetery sites may have changed slope because of excavation or because of natural events which will not be reflected in the Soil Web Survey. Lastly, the slope data is what is indicated in the latest Soil Web Survey data which is from 2017. However, reliable data is not available on slope from the 19th century. Systematic elevation measurements were not for construction until machinery was available to change it on a scale basis. This equipment was not available readily until World War II. Nonetheless, the data still reflects general changes in terrain. Generally, elevational changes of several feet were not changed to build a cemetery in the 19th century. Today, this can be done, but the current slopes should reflect that of the 19th century being that most cemeteries analyzed have been in existence and operational since the 19th century.

ELEVATION VARIABLE

The elevational data were gathered from Jefferson County (https://www.lojic.org/) and Cook County (https://datacatalog.cookcountyil.gov/) GIS data. In order to compare Jefferson to Cook County, the elevation from each county was normalized. While the elevation across the country is normalized to sea level, this does not reflect local specificities. Consequently, as a means of reflecting local nuances, the elevations for each county were deducted from the minimum elevation for each county. In this way, local floodplains, and other variations can be considered. For example, if the minimum elevation of Cook County is 300, and a cemetery is at 340 feet, a calculation was done to subtract 340 from the minimum of 300. The analysis was done on 40 feet.

At these sites, contour data and spot elevation data are available. The contour data files are very large and complex when trying to analyze so many cemeteries. For example, each township in Cook County, Illinois has a separate contour layer file. Each township has slightly different benchmarks and GPS correction datum. Consequently, to analyze across these townships would entail merging the files together and to adjust each to a central datum. ArcGIS had issues in merging these files and it became an issue beyond the scope of this thesis. As a result, the spot elevations were used. These spot elevations were created on a county wide basis for both Jefferson County and for Cook County. This avoided the need to adjust for different township datum.

In using the spot elevations, several methods could be used for representation of each cemetery. Several spot elevations could be averaged to gain a wider perspective on a given cemetery. However, some cemeteries are very small. Consequently, the nearest spot elevation was chosen as representative of each cemetery. While this single elevation does not represent a 500-acre site in completion, it indicates whether further analysis is

warranted. If such a deeper look is deemed appropriate, an actual survey of each site would be needed.

DISTANCE TO RAILROADS VARIABLE

Railroads were used as a variable because they were used as a means of transport of dead during the 19th century, especially during the Civil War (Habenstein, 1962), and during an era of many cemetery beginnings.

The railroads used for the analysis were from 1910 for Cook County (University of Chicago, 1910), and 1891 for Jefferson County (Hoeing, 1891). These maps were used for analysis because they represent the cemeteries from the 19th century and the 20th century.

The distance to railroads was done through ArcGIS computation in U.S. feet. The cemetery centroid and the railroad layers were transformed by ArcGIS's transformation tool to be the same. Assumptions were made that ArcGIS was correctly transforming the layers and no quality control was conducted to verify these measurements.

The ArcGIS tool used for determining distance was it "near" and "near to" tools. These determined the distance from each centroid to the nearest point of the nearest railroad which was represented as a polyline. No adjustments were made for the near distance in terms of if it was near through a perpendicular axis or an angular axis. Assumptions were made that ArcGIS was measuring accurately and ArcGIS's tools employ methods that are well accepted.

DISTANCE TO OPEN WATER VARIABLE

A cemetery's proximity to water is a concern because of the ease of distribution of contaminants through it (da Costa Silva and Malagutti Filho, 2012) and because it is a source of drinking water (Diakonidze, 2013).

The distance to open water was done through ArcGIS computation in U.S. feet. The cemetery centroid and the open water layers were transformed by ArcGIS's transformation tool to be the same. Assumptions were made that ArcGIS was correctly transforming the layers and no quality control was conducted to verify these measurements.

The ArcGIS tool used for determining distance was it "near" and "near to" tools. These determined the distance from each centroid to the nearest point of the nearest open water boundary which was represented as a polyline with streams and lake edges. No adjustments were made for the near distance in terms of if it was *near* through a perpendicular axis or an angular axis. Assumptions were made that ArcGIS was measuring accurately and ArcGIS's tools employ methods that are well accepted.

The open water comprised any water identified as such in the GIS layers that were collected from Jefferson County and Cook County. Each county identified streams and lakes which were both relabeled as "open water". No distinction was made to whether water was of a natural source, a drainage ditch, or other classification.

SOIL TEXTURE

The soil type was assessed because decomposition can leave a mark on the soil (Charzyński, 2010) and the soil type can mitigate these effects. The types of soil refer to the texture with clay being the smallest particle at less than 0,002 mm, with silt being

0.05 mm to 0.002 mm, with sand being 0.05 to 2.00 mm, and a loam being a mixture of these 3 textures (Burt, 2011). These texture sizes are reflective of the physiochemical properties of a soil and of a soil's suitability for a given purpose. The soil textures were collected from the Soil Web Survey (2019). For statistical computation reasons, these textures were simplified and numerically categorized. The core texture was used. For example, if a soil was labelled a clay loam, the loam was the texture used. Furthermore, each soil category was assigned a number with 1 being clay, 2 being silt, 3 being sand, and 4 being the "other" soil type.

CEMETERY NAME VARIABLE

The names used were liberal interpretation in nature. If multiple names were used for a given cemetery from multiple sources, they all were included in the datasheet. Hence, if one website had a name with a "also known as" listed while another source has two more, but different names listed, the cemetery was listed to have four names. While official land deeds and business records reflect official names of more current cemeteries, many did not have such formality. And if different data sources referred to a cemetery by different names, that tells something about the nature of the cemetery. The multiple names are reflective of the culture surrounding such cemeteries.

Many cemeteries have no noun in their name. Some only had a family name with no reference to "cemetery" or "burial ground" or "graveyard" (e.g. Immanuel Lutheran Church, Wilcott). With these, the most generic, unbiased term for subsequent analysis was "cemetery". In reviewing the other names, it seemed that those that were specifically a "memorial park" or a "graveyard" were designated as such. Consequently, "cemetery" was added to the adjectives.

Furthermore, to eliminate duplicates, a few criteria were used from which one of the terms was used for analysis.

The perceived intended purpose was used as the selected term for analysis. For example, if a family burial ground had the word *cemetery* in its name, the term *family* was used over *cemetery* because it was believed that the burial ground was originally started as a family burial ground. For example, the term *cemetery* was not evaluated against the term *religious* because most religious burial grounds were considered cemeteries.

Lastly, the terms selected were those that appeared to dominate the list of names. The names evaluated were those of the entire list of cemeteries whether any variable data was present or not. The terms selected were combined into categorical terms. It is these categorical terms which were analyzed. These terms as they were categorized are in the following table.

STATISTICS

The data was analyzed with the statistical packages within SigmaPlot v11.0, Excel 2010, and SPSS v25. Independent t-tests between means with unequal variance were used to compare establishment date to size, to slope, to distance to railroads, and to distance to open water. Pearson Correlations (non-parametric) were performed to examine the relationship between establishment date to size, to slope, to distance to railroads, and to distance to open water. Frequencies for Slope, Elevation, Soil Texture, and distance to open water and distance to railroads over time between Jefferson County, Kentucky and Cook County, Illinois were compared using Chi Square tests. Specific frequencies observed between the states and between time groupings were compared

using Binomial Proportion Tests. The binomial proportion test evaluated for a difference between 2 proportions based on p values for 2-tailed tests (Siegel and Castellan Jr, 1988). Assumptions for this test were: 1) variables are dichotomous, assuming an equal chance of either occurrence, such as 50-50 for Yes or No; 2) checked whether a correction is needed for proportions that have a small *n* or the proportions are too extreme (too small or too large); 3) Z scores from 1.65-1.95 are significant at the .05 with a 1-tailed test.

Principal Component Analysis (PCA, Varimax rotation) was performed separately for Jefferson County, Kentucky and Cook County, Illinois to determine which outcome measures (Soil Texture, Slope, Elevation, Cemetery Size, Distance to Open Water, and Distance to Railroads) show interrelatedness for which to know which further statistical test to perform.

The r is considered significant above 0.9. The t-test and Chi-square test were considered significant at P <.001, <.05, or <.01. The principal component analysis shows the relatedness between the primary variables with values greater than 0.8 have important relatedness.

RESULTS

COUNTY SELETION COMPARISONS

These two counties have several characteristic differences (see Figure 3 and Table 2). Jefferson County has 380 square miles of land and 17 square miles of water (https://en.wikipedia.org/wiki/Jefferson_County,_Kentucky). Cook County has 11,819 square miles of land and 690 square miles of water. While Kentucky and Illinois became states in 1792 and 1818, respectively, the cumulative population censuses through 2010 for Kentucky and Illinois were 46,942,436

(https://en.wikipedia.org/wiki/Jefferson_County,_Kentucky) and 123,198,784 (https://en.wikipedia.org/wiki/List_of_U.S._states_and_territories_by_historical_population) people over a total area of 40,408 (https://en.wikipedia.org/wiki/Kentucky) and 57,914 (https://en.wikipedia.org/wiki/Illinois) square miles, respectively. It is readily apparent that Illinois has had a greater cumulative number of people per square mile over time (Kentucky = 1,162; Illinois = 2,127). If the census data from above is taken in combination with data from Haines (2001) for the 19th century and Bastian, et al (2019) data for the 20th century a projected cumulative mortality number is 7,398,295 and 17,927,695 for Kentucky and Illinois, respectively (see Figure 2 and Table 1). This is crude data, but it reflects the number of cemeteries and the size of cemeteries expected. Chicago appeared to contain more cemeteries than the population would call for (Pattison, 1955). However, based on the data, Jefferson County has 296 and Cook County has 259.

NUMBER OF CEMETERIES

The year of establishment shows a peak at between 1826 and 1900 with Jefferson County increasing and decreasing earlier and Cook County lagging in the increase and decrease (Figuren2 and Table 3). When comparing these dates to population increases and mortality, there appears to be a general decrease in cemetery establishment with a decreasing mortality.

ESTABLISHMENT YEAR VARIABLE

The cemeteries studied varied in establishment year between1759 and 2014 for Jefferson County and between 1781 and 2005 for Cook County (Figure 2 and Table 3). Cemeteries appear to have been established by 50 years earlier in Jefferson County.

SIZE VARIABLE

The size summary data can be found in Figure 4 and Table 4**Error! Reference source not found.**. The cemetery sizes in Cook County varied between 500 square feet and over 37,000,000 square feet. Those in Jefferson County varied between 25 and over 12,000,000 square feet. The median and average size for Cook County cemeteries is 807,400 and 3,337,273 square feet. The median and average size for Jefferson County cemeteries is 5,200 and 238,859 square feet.

Overall the size of the cemeteries between Jefferson and Cook Counties show a statistical difference with a P value of < 0.001. The size across the years of analysis also showed significance ($P \leq 0.001$) within Jefferson County and within Cook County as well as each showing a positive linear trend.

SLOPE VARIABLE

The size summary data can be found in Table 5 and the statistical data can be found in Figure 5. The slopes in Jefferson County are generally greater than Cook County because of the proximity to the Appalachian Mountains. Cook County is next to Lake Michigan and much is in a flood plain. As a result, the minimum, maximum, average, and median slope for Jefferson County is 0%, 31%, 6.51%, and 6%, respectively. The same for Cook County is 1%, 25%, 3.04%, and 3%, respectively.

The slope between Jefferson County and Cook County shows significance through ANOVA ($P \leq 0.001$). The slopes also show significance over the timeline within Jefferson and within Cook Counties ($P \leq 0.001$) with a negative trend in Jefferson County and a positive trend in Cook County.

ELEVATION VARIABLE

The elevation summary data can be found in Figure 7, 8, and Table 6. The actual elevation of cemeteries in Jefferson County is generally greater than Cook County because of the proximity to the Appalachian Mountains. Consequently, the minimum, maximum, average, and median elevation for Jefferson County are 425.90, 771.20, 613.16, and 673.10, respectively. The same for Cook County is 583.20, 827.20, 643.96, and 628.20, respectively.

The elevation shows significance between Jefferson County and Cook County ($P \leq 0.001$) and over the timeline within Jefferson County and within Cook County at $P \leq 0.001$. Jefferson County shows a decreasing trend while Cook County shows an increasing trend.

DISTANCE TO RAILROADS VARIABLE

The distance to railroads summary data can be found in Figure 9, 10, and Table 7. The minimum, maximum, average, and median distance to railroads for Jefferson County is 89.79, 29948.40, 5010.35, and 3840.74 feet, respectively. The minimum, maximum, average, and median distance for Cook County are 5.06, 14038.97, 3346.93, 2295.27 feet, respectively.

The ANOVA between Jefferson and Cook County do not show a significance correlation ($P = 0.092$). However, the difference in distance to railroads is not significant over the timeline in Cook County ($P \leq 0.381$), but it is in Jefferson County ($P \leq 0.001$). Both Jefferson and Cook Counties show a positive trend over time.

DISTANCE TO OPEN WATER VARIABLE

The distance to open water summary data can be found in Figure 11, 12, and Table 8. The minimum, maximum, average, and median distance to open water for Jefferson County are 89.03, 6420.34, 1192.21, and 818.21 feet, respectively. The minimum, maximum, average, and median distance for Cook County are 53.58, 7287.22, 1291.29, and 1009.44 feet, respectively.

The distance to open water approaches significance between Jefferson and Cook County, but not quite at $P = 0.0757$. The distance over time within Jefferson County shows significance as does that within Cook County with P values ≤ 0.001. Also, both Jefferson and Cook County show in increasing distance trend over time.

SOIL TEXTURE VARIABLE

The soil texture summary data can be found in Figure 13 and Table 9. The soil texture changes over time shows significance within Jefferson County and within Cook County with P values ≤ 0.001.

CEMETERY NAME VARIABLE

The cemetery names are informative. The name statistics are summarized in Figure 14, Table 10, 11, and 12. Aside from the data below, it is intriguing that no cemeteries in Jefferson County named to reference Native American Indians like there are in Cook County. In Cook County, there are 23 cemeteries referencing Native American Indians which is a striking difference.

STATISTICAL RESULTS AND TRENDS

The overall statistical results are in the Table 11, 12, and 13.

DISCUSSION

CEMETERY LOCATION

In 1859, the prominent medical physician, John Rauch, who would become Chicago's Sanitary Superintendent and president of the Illinois State Board of Health (Loerzel, 2019), petitioned for the City Cemetery to be closed because he feared that corpses were oozing disease into Lake Michigan and contaminating the air (Loerzel, 2019). The cemetery was established only in 1837 (Maggio, 2004) and had a large Potter's Field at the northern side, but through Rauch's petitioning, those of other city officials (Loerzel, 2019), and city residents, a city ordinance from 1864 ordered burials in the City Cemetery to cease (Maggio, 2004). Residents complained that the burial conditions were inadequate and lead to water contamination and disease, such as cholera (Maggio, 2004). Despite resistance to the cemetery's closure, it was eventually closed in 1870 (Maggio, 2004). Bodies were hastily relocated from the City Cemetery to Rosehill and Calvary Cemeteries (Maggio, 2004). However, in 2000, human remains were found during a construction project of a housing development (Maggio, 2004).

The location of the cemeteries within each county was not specifically evaluated because it was beyond the scope of this thesis. However, in reviewing the figures, there appear to be clustering along railroads (or other means of transportation), along specific elevations, and near other possible geographic features (e.g. historical suburban town centers).

NUMBER OF CEMETERIES BY ESTABLISHMENT YEAR

The number of cemeteries by year of establishment largely reflected the growth in the population and the mortality. Prior to the germ theory that gained acceptance in the late 19th century, mortality from Old World diseases (cholera, small pox, tuberculosis, yellow fever, etc.) were common place. Having a place to bury such dead was at the forefront of people's mind.

As the Romantic Movement ensued and as new towns were established in the 19th century, new town development involved building a church, establishing a blacksmith, creating a cemetery, and establishing other necessities. Many of these small, pioneer cemeteries later were abandoned, but they were part of town establishment as the populations moved westward.

After the turn of the 20th century, the field of city planning came into being (Pregill and Volkman, 1999). Developing sewage systems, indoor plumbing, and the flourishment of sanitary commissions (Pregill and Volkman, 1999) changed the consciousness of death into one of denial. The germ theory and the control people felt over their lives led to a lessening of the perceived need for cemeteries.

SIZE VARIABLE

The size of cemeteries generally increased over time. The increase seemed to be the result of a greater need and due to merging of adjacent cemeteries (Pattison, 1955). Instead of planning for one's family or for one's church, planning was done to accommodate an entire town or city (Pattison, 1955). Also, as church graveyards became overfilled, the putrescence and the fear of miasma led to larger, more expansive, countryside secular cemeteries were constructed (Water, 2005).

As far as Jefferson and Cook County, specifically, the size overall in Jefferson County were much smaller than those in Cook County. This seems mostly due to efforts at accommodating larger communities rather than families as the name analysis suggests. Another factor that is hidden is that many cemeteries in Cook County were abandoned or were moved due to the flooding in Cook County. Much of Cook County was built on marsh land, so after the small cemeteries flooded, they were moved, or they got buried deep in flooding sediment. Nonetheless, the relocated cemeteries were not counted and the bodies were oftentimes added to other cemeteries which made them bigger.

SLOPE VARIABLE

The slope should be a good indicator for the advance during the genesis of cemeteries. However, that does not seem to be the case in Jefferson and Cook Counties. Creating cemeteries on sites with less slope would seem to make the cemetery functions easier. The pursuit of picturesque, vista-ful sites may negate the ease with which a cemetery functions. Many graves at the time were dug by hand being excavators such as the bulldozer were not invented until 1904 (Bellis, 2019). Mowing cemeteries was not commonplace until after the lawn mower was invented and popularized (Shukitis, 2012).

Nevertheless, a confounding factor in Cook County is that the County is much flatter than Jefferson County. No slope correction was made in each county. Nevertheless, the slight increase in slope in Cook County may have been related to moving cemeteries out of the flat floodplains, moving cemeteries to more beautiful vistas as influenced by the Romantic Movement, and moving cemeteries away from prime farmland (former swamp land).

In Jefferson County, the decreasing trend in slope seems to reflect a greater comfort with building at lower elevations. In Louisville, flooding was common for over a hundred years (Louisville/ Jefferson County Metropolitan Sewer District (MSD), 2019; Moseley, 1939; United Department of the Interior, 1938). However, they were particularly devastating in 1883 and 1884 (MSD, 2019), 1907 (MSD, 2019), 1913 (Shockley, 2015 -- https://www.onlyinyourstate.com/kentucky/8-of-the-most-horrific-disasters-in-ky-history/), 1945 (MSD, 2019), and 1937 (Moseley, 1939; United Department of the Interior, 1938). The 1884 flood was the largest on record (MSD, 2019). The 1937 flood covered 60% of the City of Louisville and 65 square miles of Jefferson County (MSD, 2019 -- http://louisvillemsd.org/programs/programs-and-projects/floodplain-management/flooding-history-louisville). However, flood waters were stopped through river embankments, backfilling marshland, and redirecting the Ohio River. Siting construction projects on highlands was no longer a necessity for houses nor for burials. Slope as a building qualification was becoming less of a factor.

ELEVATION VARIABLE

The elevation is linked to slope. The positivity and negativity of the elevation are like the slope for both Jefferson and Cook County. The "meaning" behind the decreasing elevation in Jefferson County is tempered by the sameness in elevation. This seems to be due to a plateau effect amongst the hills (see Figure 6). In viewing the contours of Jefferson County, a few cemeteries appear along plateaus in the terrain (see Figure 6). Basically, the cemeteries cannot be built at the peak of a hill due to logistics but cannot be built in a valley either. Consequently, cemeteries may have been forced to be built in "benches" along the hills.

In Cook County, the cemeteries have been built at progressively higher elevations as time progressed. The reasons may be due to the same reasons for the slope. Hence, there is no significant difference in much of the terrain. For the terrain that existed, cemetery construction was being done away from floodplains (Fleig, 2018).

As Fleig (2018) noted, the City of Chicago was built on what was a lake bottom 12,500 years ago. Consequently, early burials in the 1800s were at a person's home (Fleig, 2018). People lived near the water of Lake Michigan and the Chicago River, so that is where they were buried upon death. In fact, all along both sides of the Chicago River, "…bodies of early Chicagoans are thickly laid" (Fleig, 2018). As well, "…early cemeteries in the low lakefront sand fared poorly" (Fleig, 2018). Coffins were seen floating down the river according to the 1897 edition of the Daily Democrat (Fleig, 2018). In fact, Rosehill and Graceland Cemeteries in the eastern edge of Cook County were built on "spits", which were ridges amongst low areas (Fleig, 2018). As the Chicago population grew western, the cemeteries were built on "…spits, islands, and moraines, once the western shore of 12,500 year-old Lake Chicago" (Fleig, 2018). Therefore, cemeteries carried the names Blue Island, Ridgeland, Mount Forest, and Ridge Road.

DISTANCE TO RAILROADS VARIABLE

The distance to railroads seemed to represent a pattern based on the initial maps. Afterall, railroads were an important means of transportation in the 19th century. Nineteenth century trails and roads followed moraines, ridges, and spits (Fleig, 2018) as did railroads. The first railroad appeared in Chicago in 1849 (Clogher, 1849) and in Louisville in 1853 (Castner, 2019). Dead soldiers during the Civil War were returned to

loved ones by means of railroads (PBS, 2015; Lee, 2014) as in other times (Meller and Parsons, 2011). Additionally, towns had a major railroad element in their planning. Or more accurately, railroads were built where they were needed by burgeoning populations (Clogher, 1849). Consequently, placing cemeteries near these routes of culture seemed to make sense.

However, the apparent seeming link between railroads and cemetery was demonstrated only in Jefferson County. The link there may be simply due to the terrain. Due to the hills, railroads were forced to be built on the "bench" elevations. There was a limited number of flat areas. Cemeteries may have been forced to be build along these same flat areas.

DISTANCE TO OPEN WATER VARIABLE

Water contamination due to humans goes back to way before John Snow. Historically, water has been found to be contaminated based on several sources (Diakonidze, 2013; Braz, 2000; da Costa Silva and Malagutti Filho, 2012). Consequently, distance to water would have seemed to be a qualification criterion for cemetery placement.

In fact, in this thesis, the distance to open water increased over time. However, the statistics do not support this. Consequently, the increased distance for Jefferson County seems more related to redirecting streams and backfilling. The analysis did not specifically focus on swamps because they are much harder to track over time.

The 19th century and before was a battleground across the globe between civilization and nature. For centuries, nature was viewed as a dark creature that needed to be conquered, fought against, and beat back (Nash, 1963). The dark forest represented

a struggle between nature and light, between nature and good, between nature and mankind's mission to "Be fruitful, and multiply, and replenish the earth, and subdue it: and have dominion over…every living thing that moveth upon the earth" [Genesis 1:28, King James Version] (Nash, 1963). Filling in of swamp lands and controlling rivers was part of this battle under the guise of preventing flooding. Cemetery placement seemed to be more of a reaction to the battle with nature than to a long-term suitability analysis.

SOIL TEXTURE VARIABLE

According to Lawson (1910), the ideal land for cemetery purposes is "…that which has well cultivated top soil with sandy loam subsoil to a depth of at least six feet" (p. 308). However, this specification is for having soil that is good for plant growth rather than soil that is good for remediating decomposition byproducts. Furthermore, Lawson (1910) continues that cemeteries that are composed of heavy clay need to be drained with drain tile (p. 309). These specifications are also not for consideration of remediating decomposition byproducts, but for ease of burial and for access to the sites. Consequently, even in the field of landscape architecture the fate of decomposition byproducts was not of concern.

As for concern, the soil texture is a point of concern in terms of suitability. The soil texture translates to the physiochemical suitability for construction of buildings and for remediation of decomposition byproducts as described in the introduction of this thesis.

As for the data, the soil texture analysis provides some interesting revelations. The data mirrors the bell-shaped curve of the number of cemeteries over the years of

establishment. Hence, the significance within each county seems to be related to a "false positive" rather than to a significant planning qualification criterion.

Nonetheless, the number of cemeteries where there is loam is greater in Kentucky, but most of Cook County has a clay loam. It is interesting why a lesser number of cemeteries have loam in Cook County. The sand in Cook County is logical, but much of Louisville is a sandy loam, which makes the absence of it in cemeteries odd. However, many of the cemeteries are in higher ground where the sand will have washed away over the millennia.

Another interesting data value is the high number of complex soils in Kentucky. Many of these classifications are termed "cemetery soils" and "urban soils". Consequently, these classifications appear to be of more recent designation than of a site's parent soil. This biases the data significantly.

Additionally, while quite a few large and small cemeteries are represented, the data is not weighted by size. Each cemetery has one value regardless of the cemetery's size. Consequently, had the soil texture of each cemetery been weighted, the soil texture may have provided a more meaningful result for discussion.

CEMETERY NAME VARIABLE

The cemetery names appear to reflect the purpose of the cemeteries analyzed on a macro scale. In Jefferson County, a strong focus on family burials is reflected in the prevalence of family name for a cemetery label. There are quite a few cemeteries with names such as Stillwell-Wilcox Cemetery, Hewitt Family Cemetery, Blankenbaker Family, etc. in Jefferson County. Not as many such cemeteries exist in Cook County. Part of this may be related to the earlier settlements of Kentucky where connections to

family pioneers were more prominent. For example, establishment of one's name in a community was most important. Some land in Kentucky was deeded as payment for service in the Revolutionary War, the War of 1812, and other deeds for national service. In fact, the cemetery was a means of continued notoriety and was a continuation of the first burials being of family members. As the cemetery grew, the name continued.

Cook County, however, was established later and its people were involved in farming or manufacturing. The county had many immigrants where the focus was on working hard, getting established, and earning a better life than in their homeland. The people's identity was comprised of their country of origin and to their religion. Hence, cemeteries reflected these two essences of their life with the terms of reference *religious, ethnic (German, Italian, Polish), sacred, Catholic, inspirational, Jewish, etc*.

The names referencing *memorial* were greater in Cook County than Jefferson County which may simply reflect later establishment dates during which America's romantic movement was occurring.

The terms referencing nature (*ecosystem* and *tree*) may reflect a nature due to the romantic movement during time of establishment of the cemeteries in Cook County. However, the significance of the term referencing *water* in Jefferson County contradicts this rationale. Jefferson County has 4.47% water and Cook County has 5.84%, so it does not seem likely due to prominence.

The terms by date within each county are not surprising. *Cemetery* dominated over *graveyard* as did *cemetery* over *memorial*. As cemeteries increased in size and merged, the names were likely changed to reflect them as cemeteries which was a term more commonly used as the 19th century progressed. The term *family* was significant in

Jefferson County and not Cook which also supports the idea of family's importance. Lastly, the *religious* term is more significant due to the close association with death and religion over an institution being responsible for the dead.

CONCLUSION

In reviewing the summary table, the some of the normal variables used in landscape planning today (distance to floodplain (/water), soil type, slope, and distance to transportation do not appear to have been used as criteria for cemetery placement. While there was significance, the principal component analysis (Figure 15 and 16) strongly indicates another undetermined variable is responsible for the cemetery placement during the 19th and 20th centuries. In addition, being the variable explored are not convincing rationale statistically, it is assumed that sociocultural rationale was used for cemetery placement during the 19th and 20th century.

The correlations observed are likely due to reactionary measures such as the desire to not have loved ones wash down the river when a stream-side cemetery flooded. The correlations observed are likely due to not having loved ones get in the way of farming, manufacturing, or housing projects. The placement rationale has not addressed the critical issues which have harkened centuries ago from John Snow, from the putrid church graveyards, or from common sense. An accumulation of people's waste and cemeteries have caused pollution in the past. Hence, we should have placed cemeteries with consideration to the potential pollutiveness of them.

With our understanding soil chemistry, human decomposition processes, landscape architecture, and urban planning, we have an opportunity to create cemetery placement criteria. We have a responsibility to today's earth and that of tomorrow to create limits on what we do. We have a responsibility to not be simplistic planners that only react when a loved one's body floats by in the flooded river or when we get sick from the sweat taste of well water (Graeber, 2012).

Annese (1983) suggests a few cemetery placement standards to include placement above the water table, installing a base course below crypts, and to install drainage lines. Loudon proposed that cemeteries be sited according to elevation, the nature of the soil, and the proximity to drinking water (Curl, 1983).

Washington Irving believed the 'grave should be surrounded by everything that might inspire tenderness and veneration for the dead, or that might win the living to virtue. It is the place, not of disgust and dismay, but of sorrow and meditation' (Curl, 1983). In fact, Loudon believed that advance planning should be done whereby when a cemetery is filled, it should be closed as burial grounds and turned into public walks or gardens while maintaining the gravestones, architectural or sculptural monuments (Curl, 1983).

The conclusion from this thesis is that cemeteries have not been planned well and we can do better.

FUTURE DIRECTIONS

This thesis has revealed several future angles of which further research can explore. For example, analyzing the apparent clustering observed can get at the root of sociocultural and/ or planning factors used in establishing cemeteries.

As noted above, there was a tendency prior to the germ theory to locate cemeteries at the periphery of cities. And even after the germ theory, city planning did not look at cemeteries as a resource and positioned them at the periphery. Conducting an analysis of the city limits over time or evaluating the distance from the city center may reveal interesting factors not revealed in this thesis.

Researching city ordinances, town meeting notes, and local historical documentation over time may reflect the positioning of cemeteries. While this is a difficult task, many cities have such ordinances available. Chicago has them published and stored in various libraries as an example.

Expanding the analysis to other cities across the country can provide support or not for the variables explored. In fact, in looking at other cities, new variables may become apparent.

Investigating the reason for death for the people at cemeteries can reveal multitude of rationale for cemetery placement.

Developing a series of sociocultural rationale for cemetery placement may prove fruitful in statistically assessing the rationale for cemetery placement.

Analyzing the cemetery name in more detail, with more parsing, and with more historical documentation support can be interesting as a project of its own.

Lastly, creating a compiled diary of a given cemetery can get at the root of why a cemetery was placed where it was.

Figure 1 – GOOGLE NGRAM VIEWER, TERMS

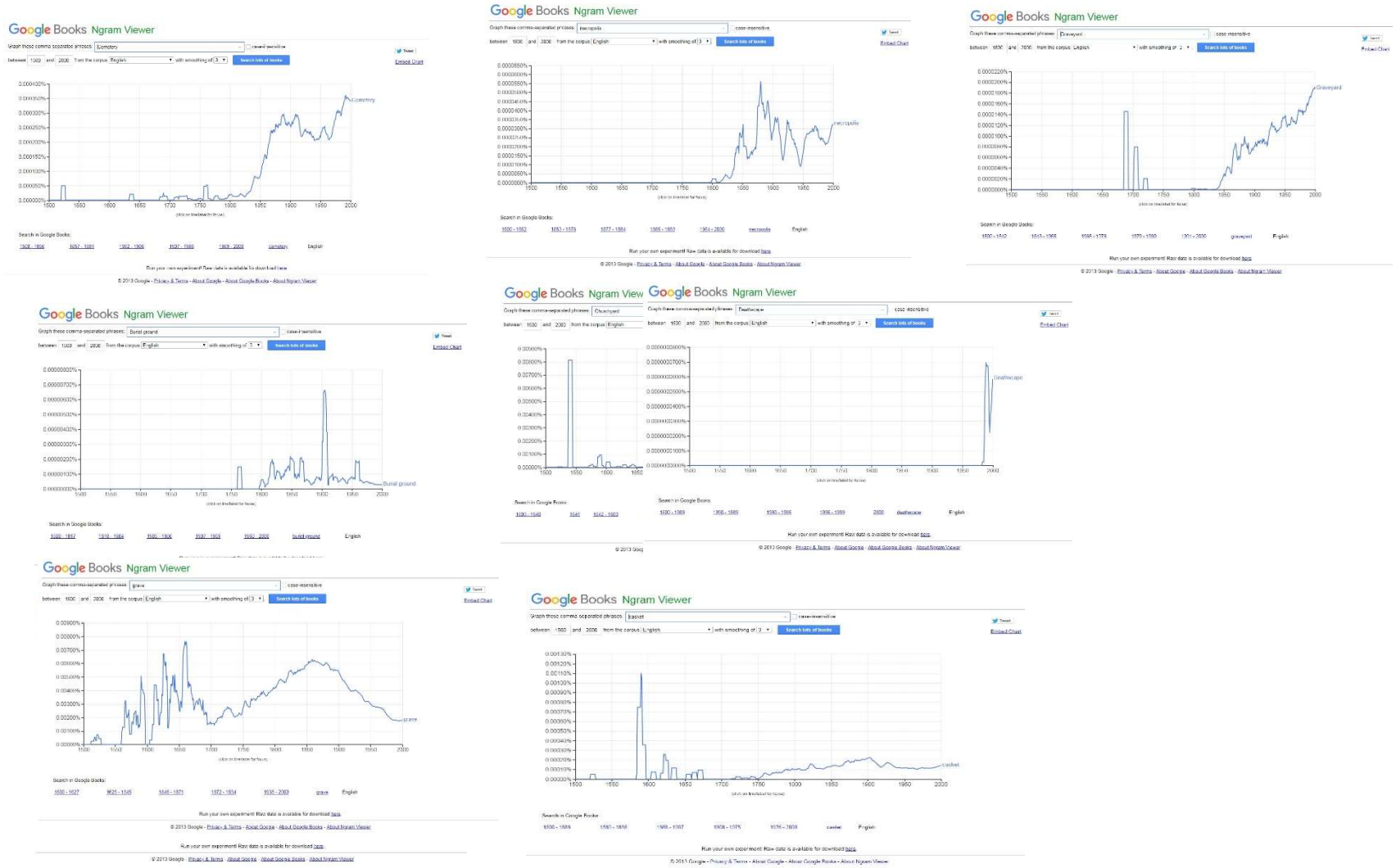
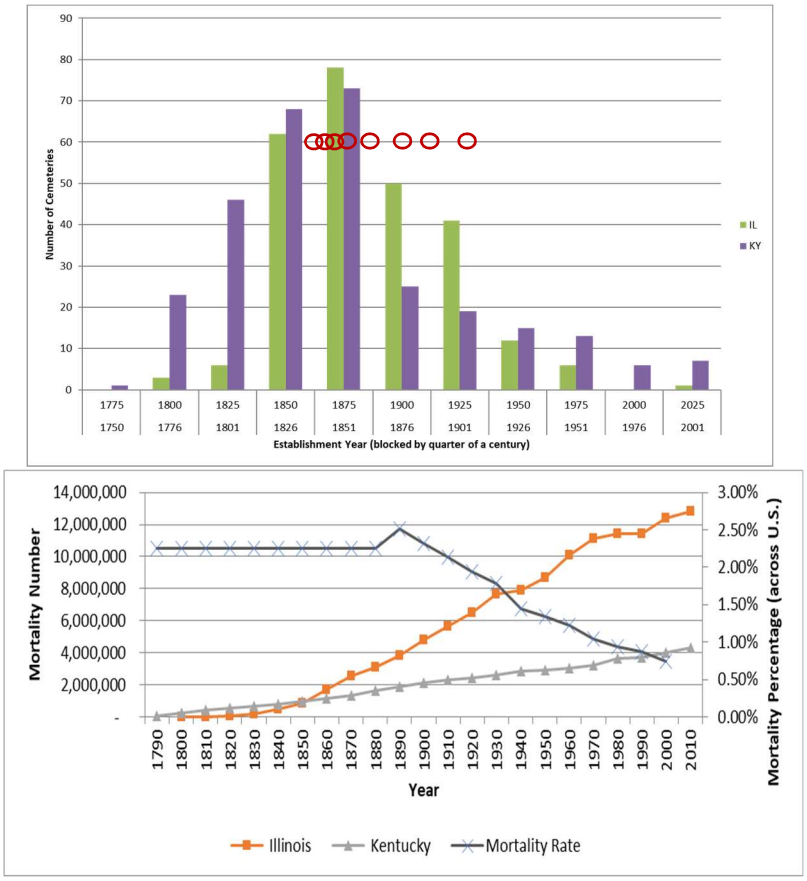


Figure 2 – NUMBER OF CEMETERIES AND MORTALITY



Red circles correspond to mortality peaks derived from:

Prudential Insurance Company. ~1920. Mortality of Chicago, 1844-1920. Accessed 1 September, 2019. http://www.encyclopedia.chicagohistory.org/pages/3608.html.

Mortality rates compiled from:

Bastian B, Tejada Vera B, Arias E, et al. Mortality trends in the United States, 1900–2017. National Center for Health Statistics. 2019.

Haines, Michael R. 2001. The urban mortality transition in the United States, 1800 – 1940. National Bureau of Economic Research, Historical Paper 134. NBER Working Paper Series on Historical Factors in Long Run Growth. 39 pgs

Figure 3 -- CEMETERY LOCATIONS

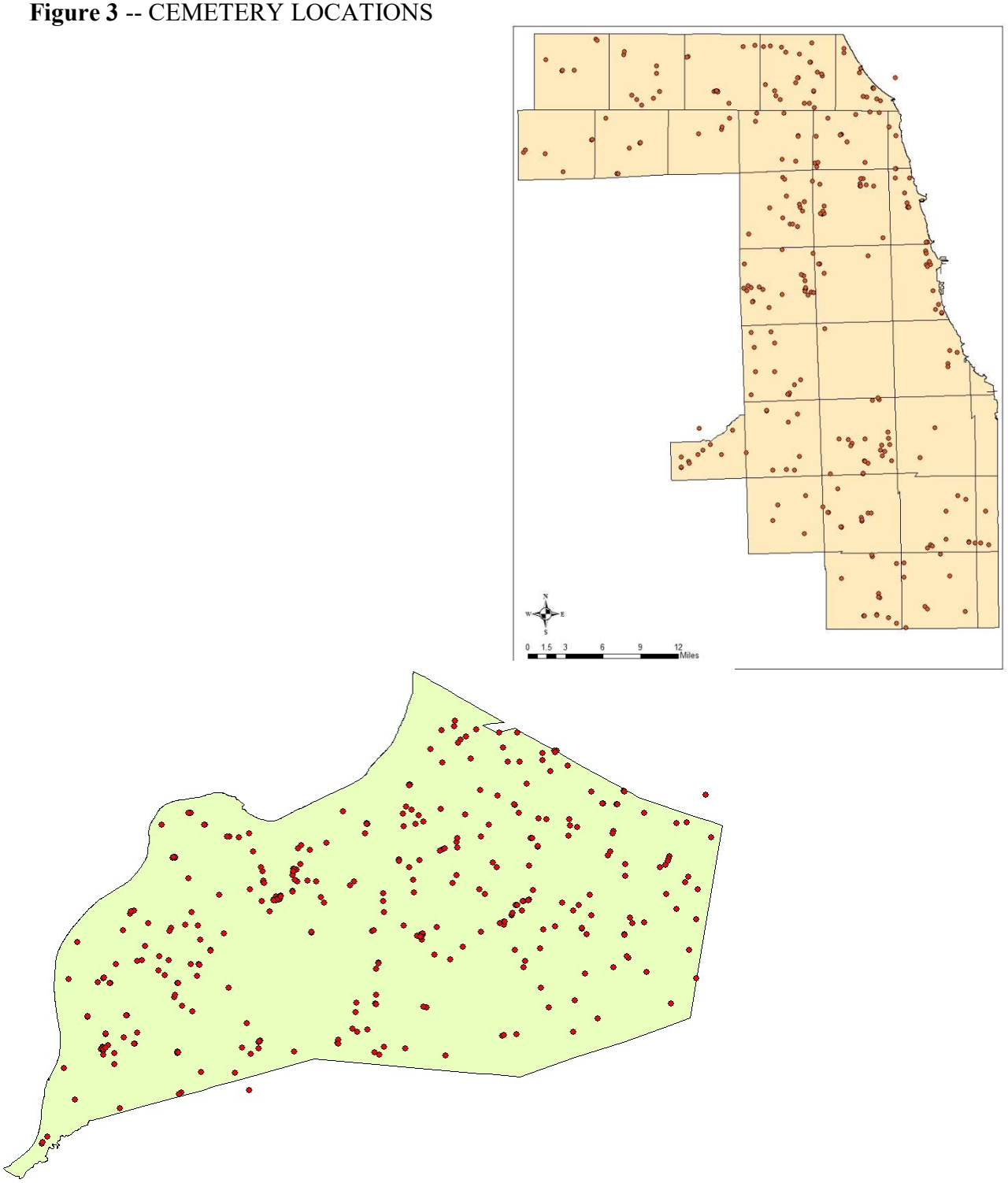


Figure 4 -- CEMETERY SIZE

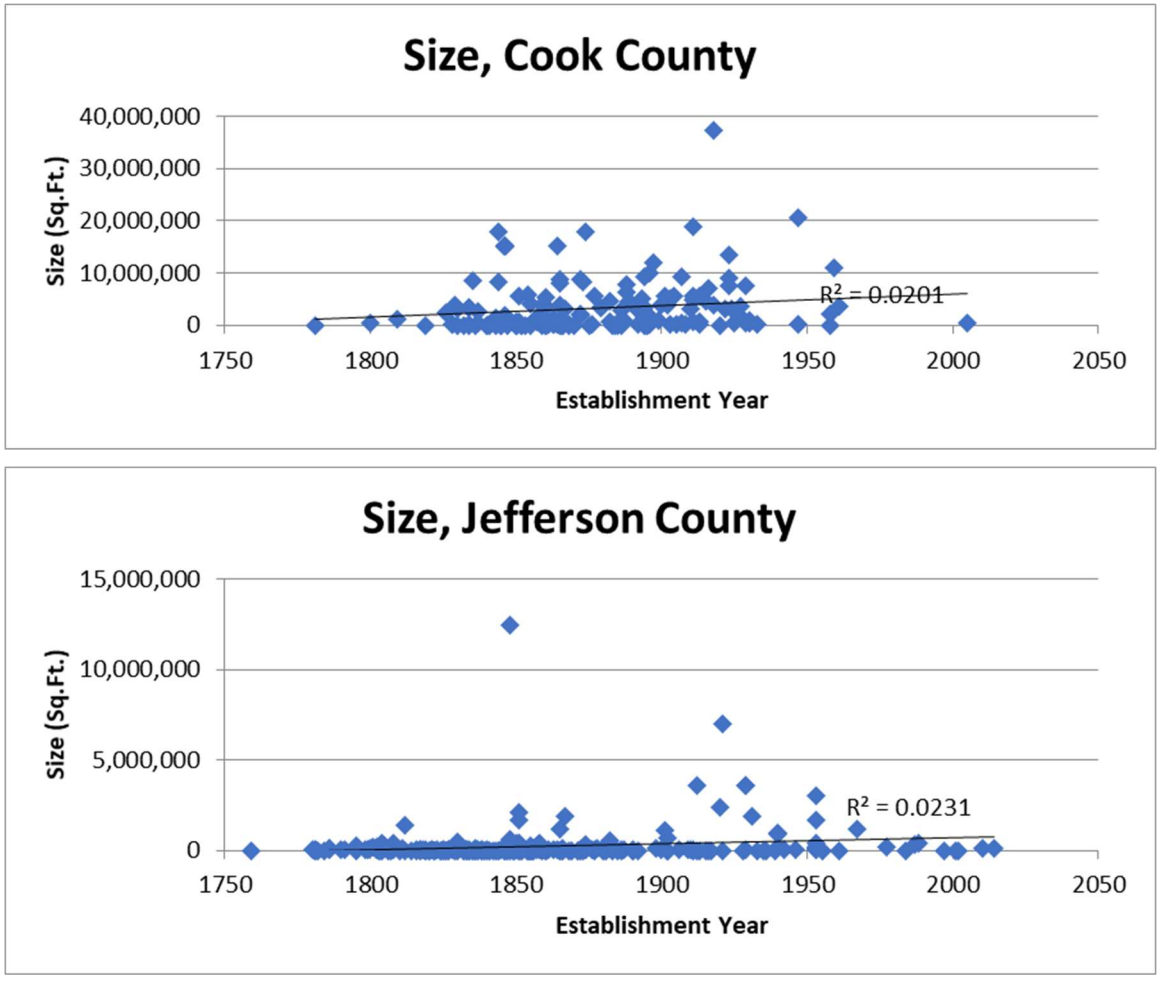
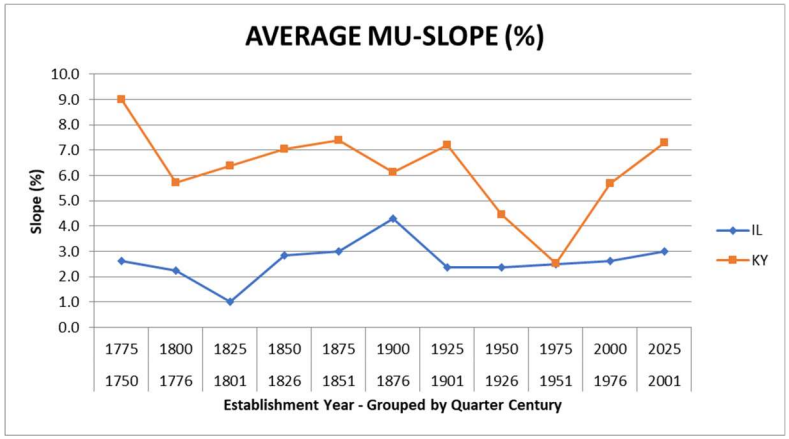
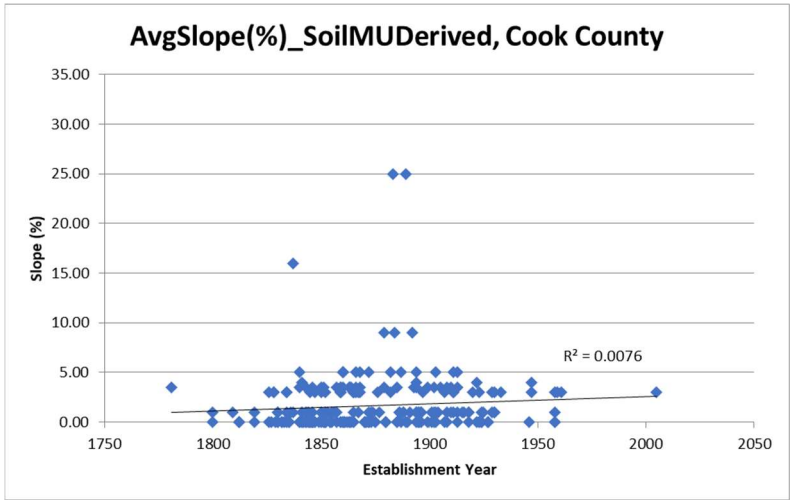


Figure 5 -- AVERAGE SLOPE





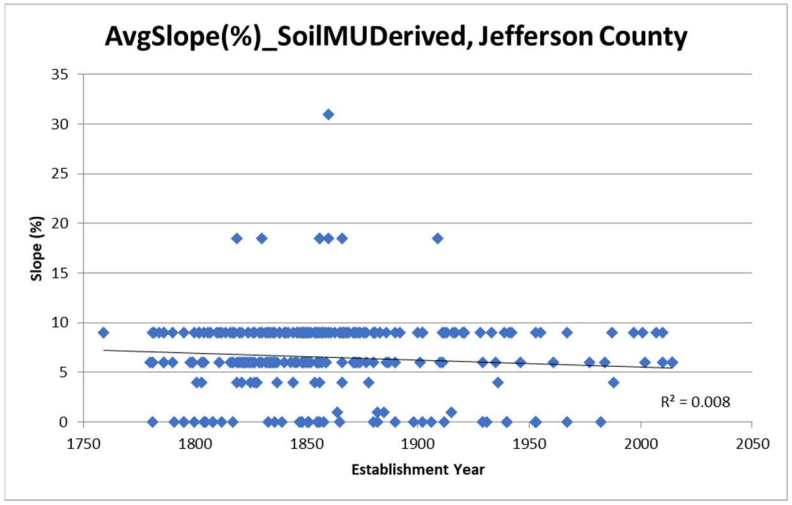
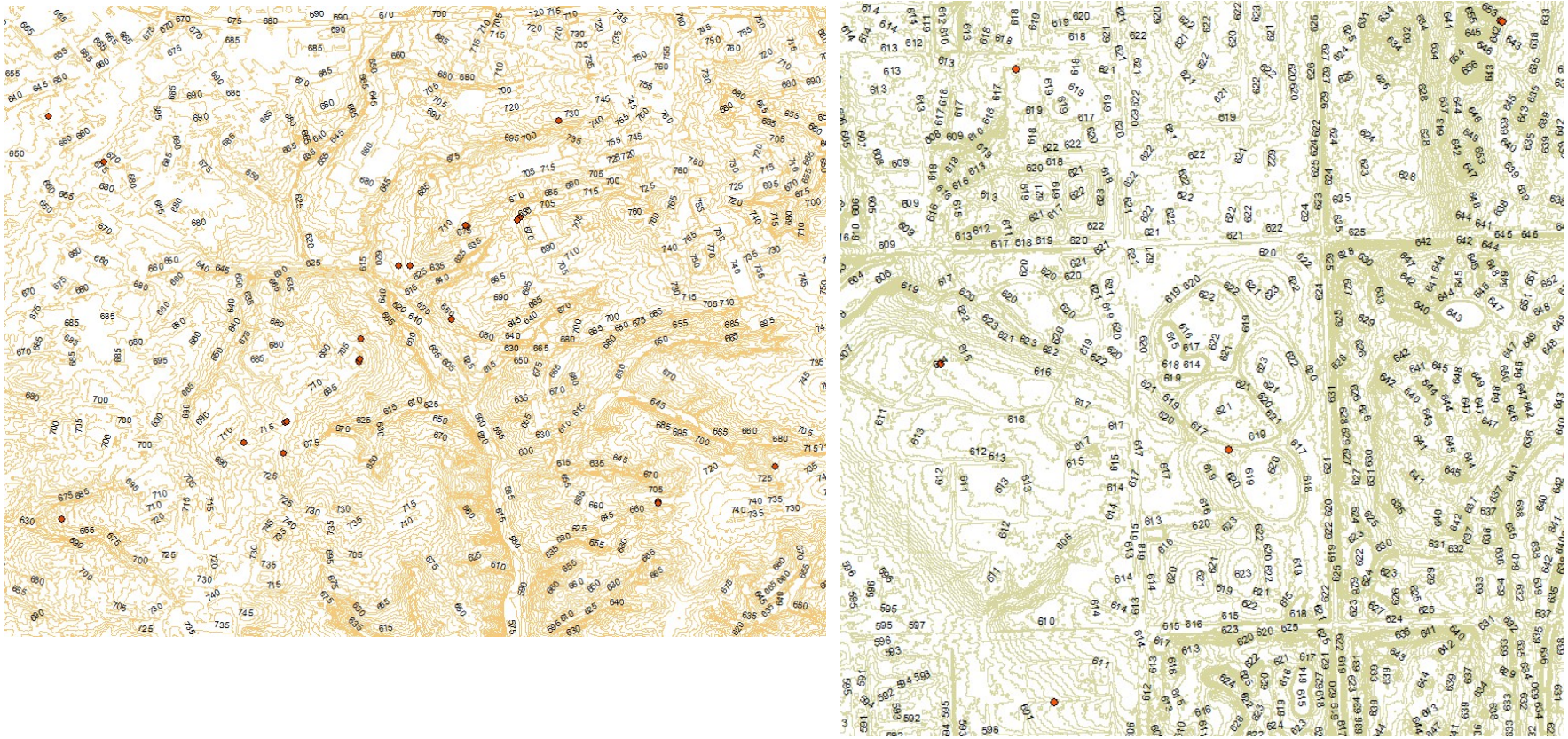


Figure 6 -- SPOT ELEVATION DISTANCE



Kentucky to left and Illinois to right

Figure 7 -- SPOT ELEVATION DISTANCE - continued

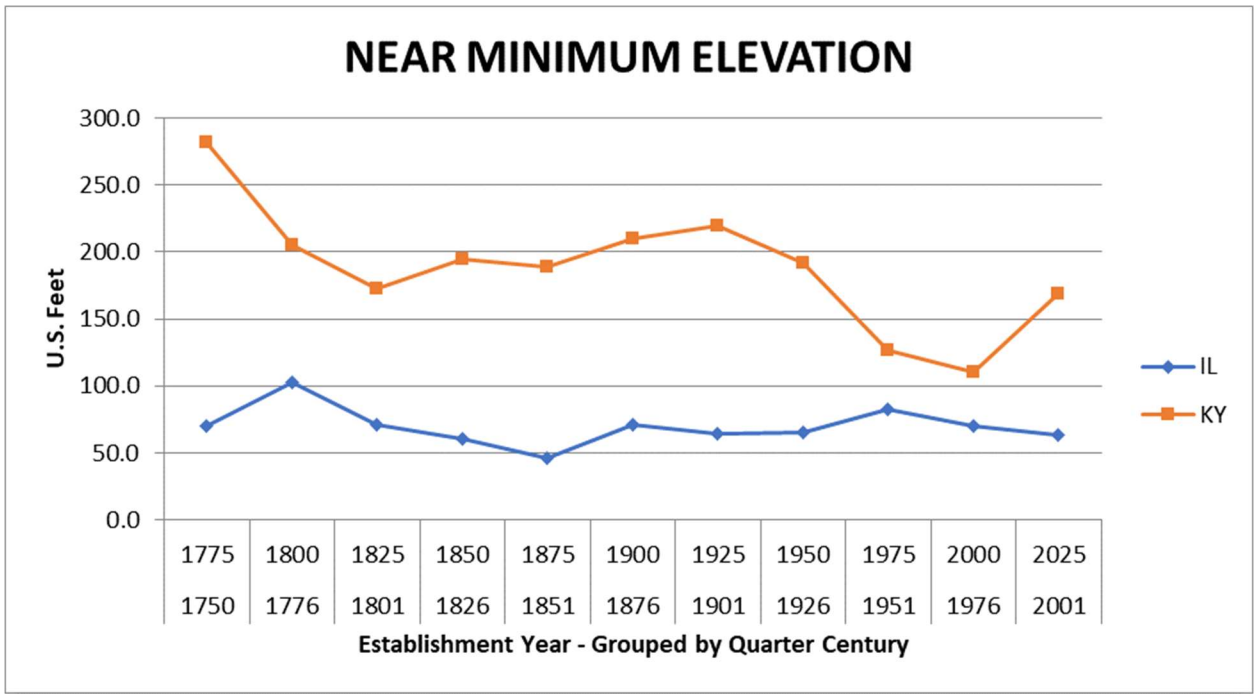
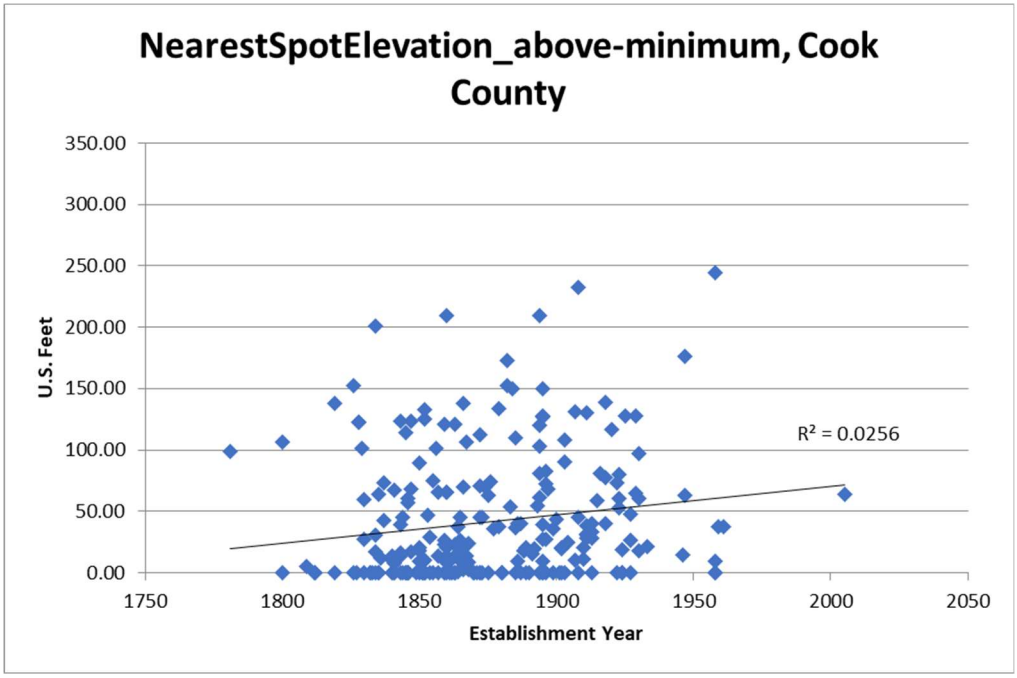


Figure 8 -- SPOT ELEVATION DISTANCE - continued



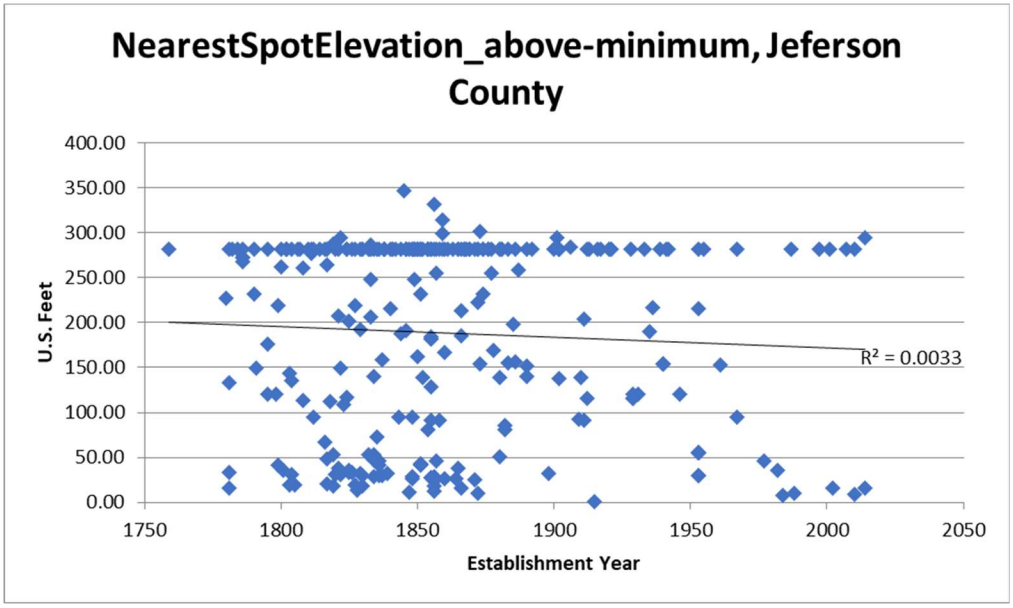


Figure 9 -- RAILROAD DISTANCE

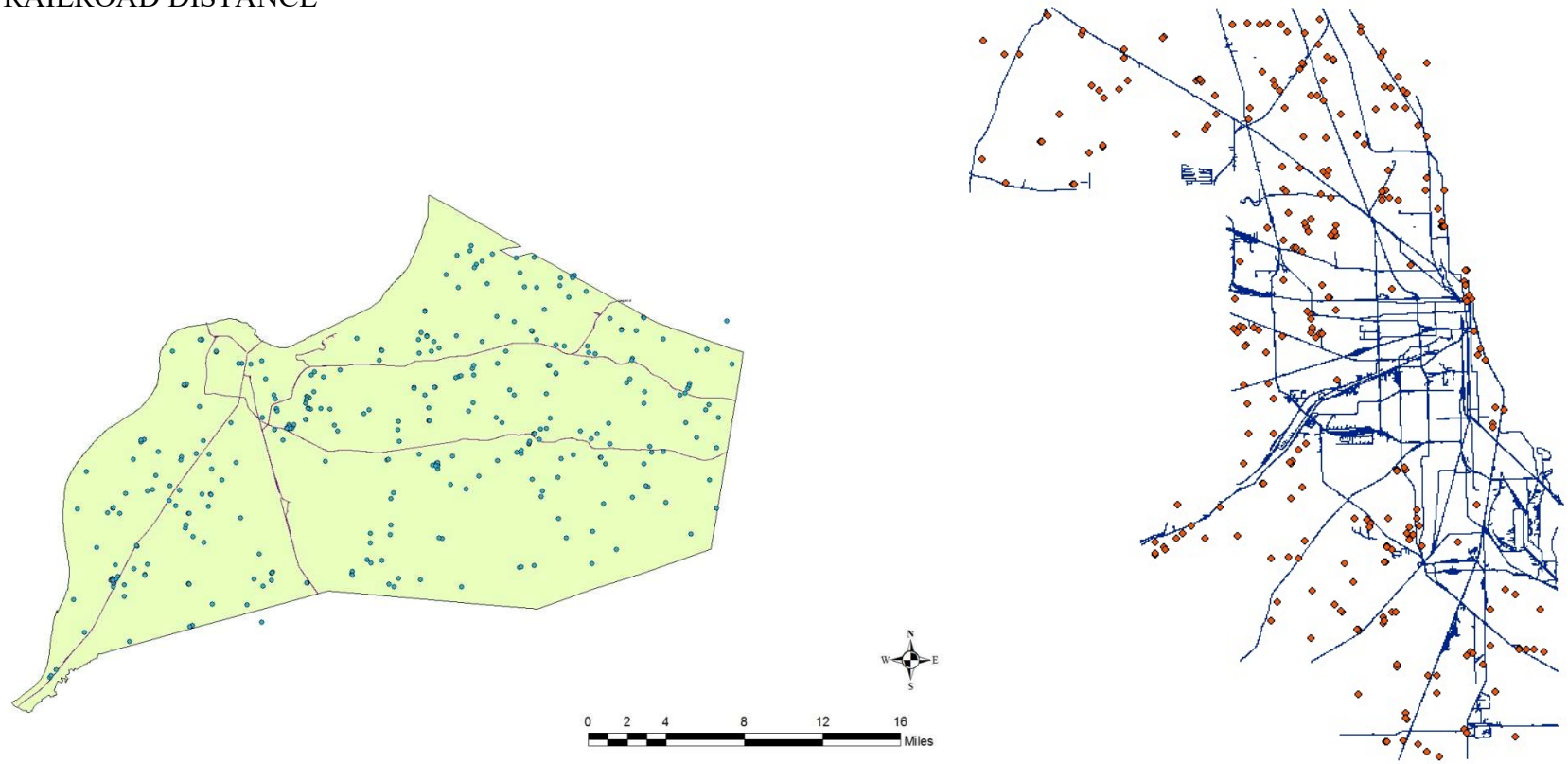
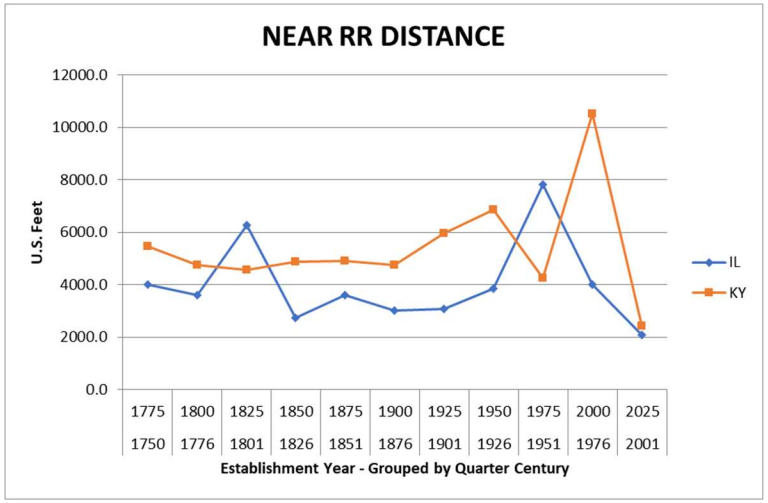
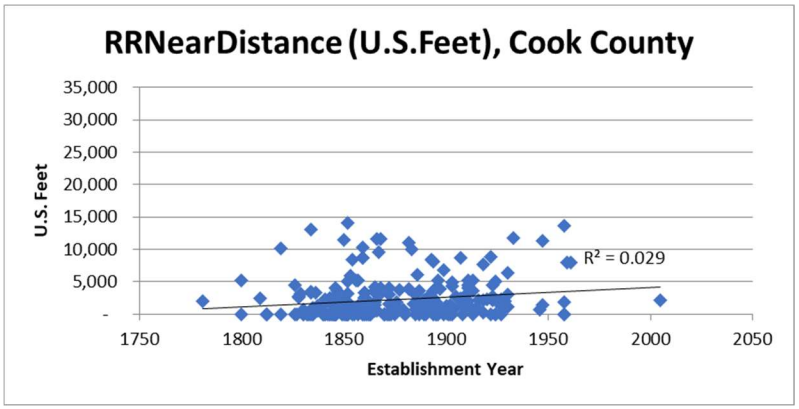


Figure 10 -- RAILROAD DISTANCE - continued





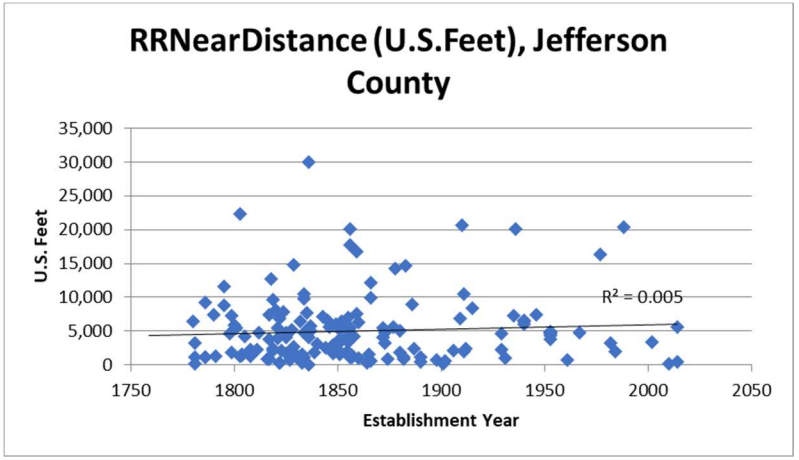


Figure 11 -- OPEN WATER DISTANCE

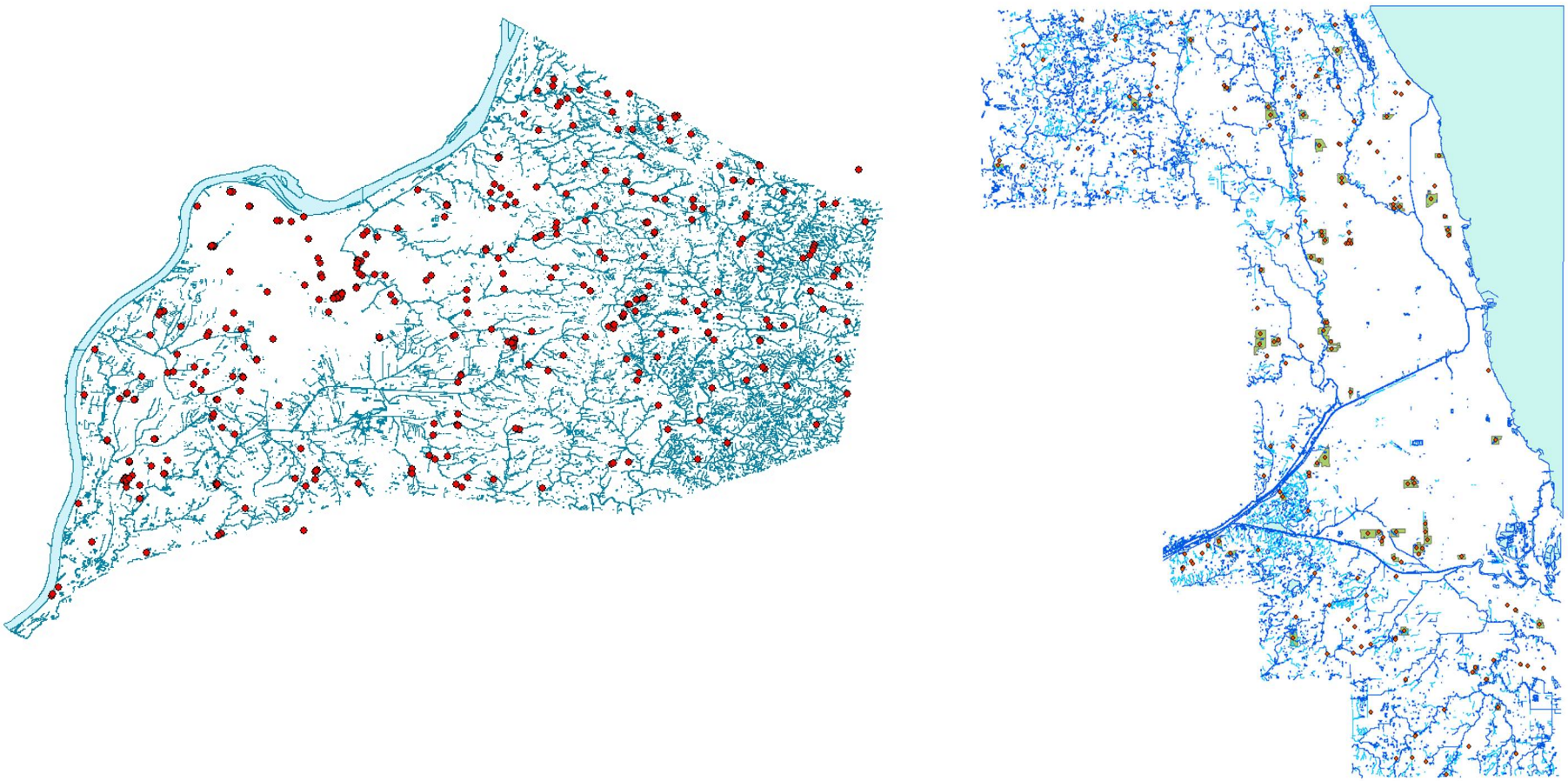
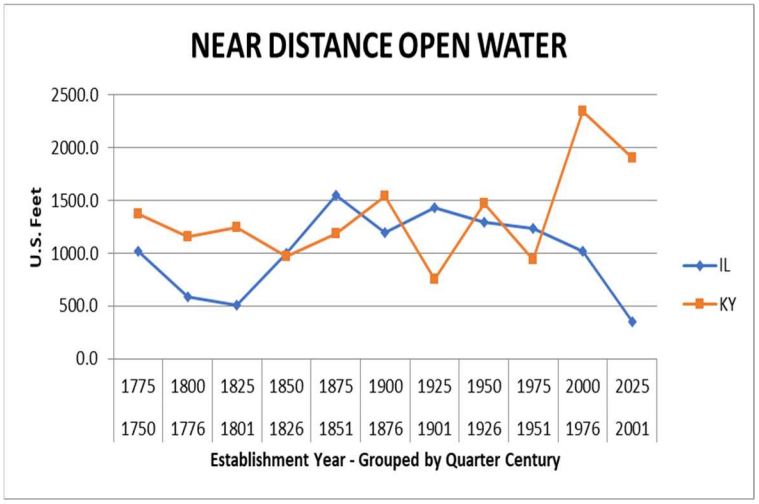
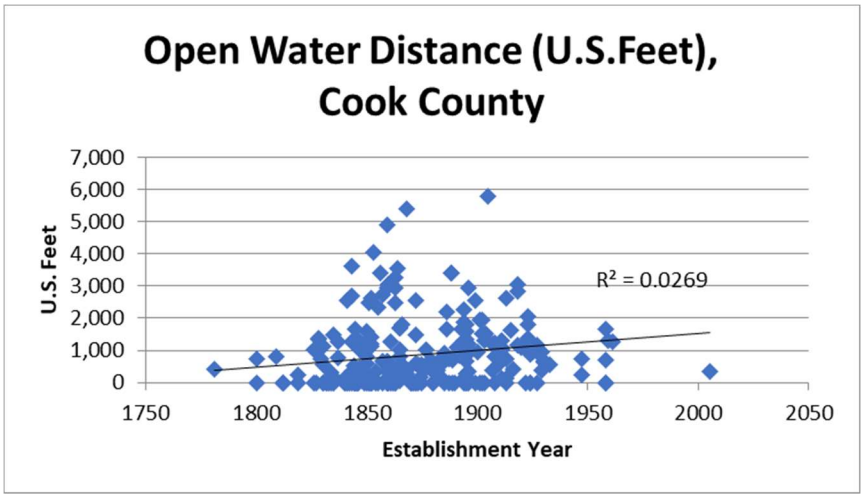


Figure 12 -- OPEN WATER DISTANCE -- continued





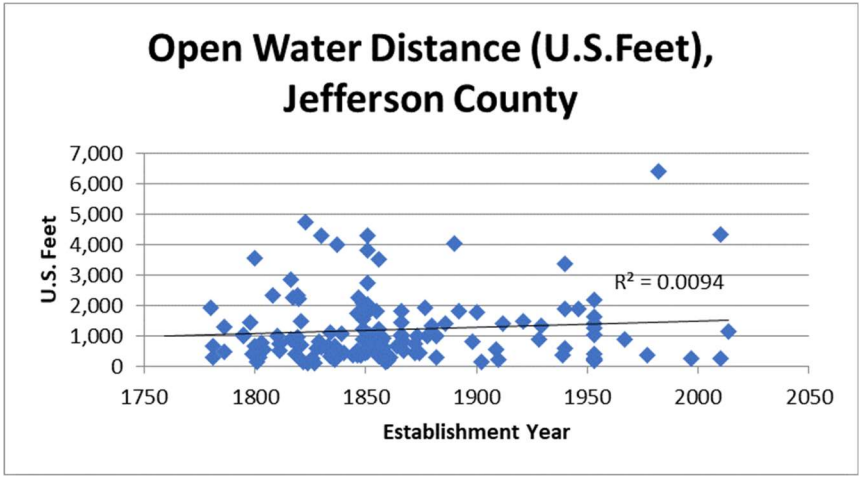
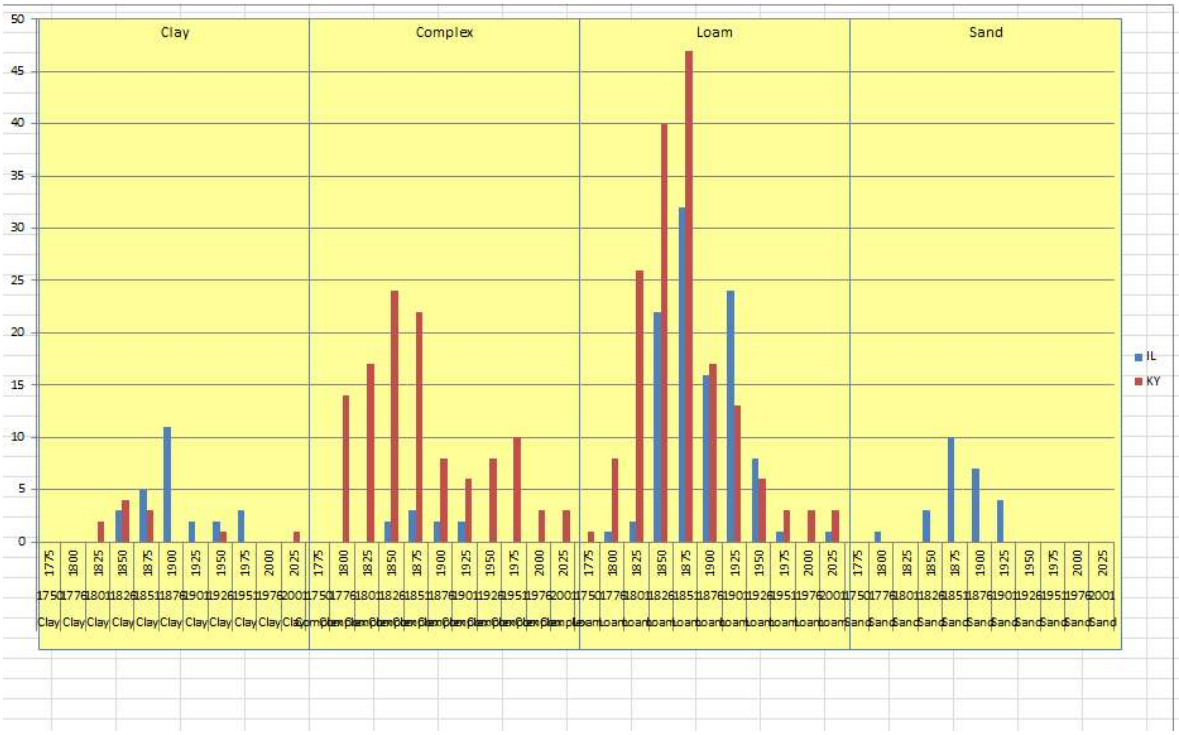


Figure 13 -- SOIL TEXTURE



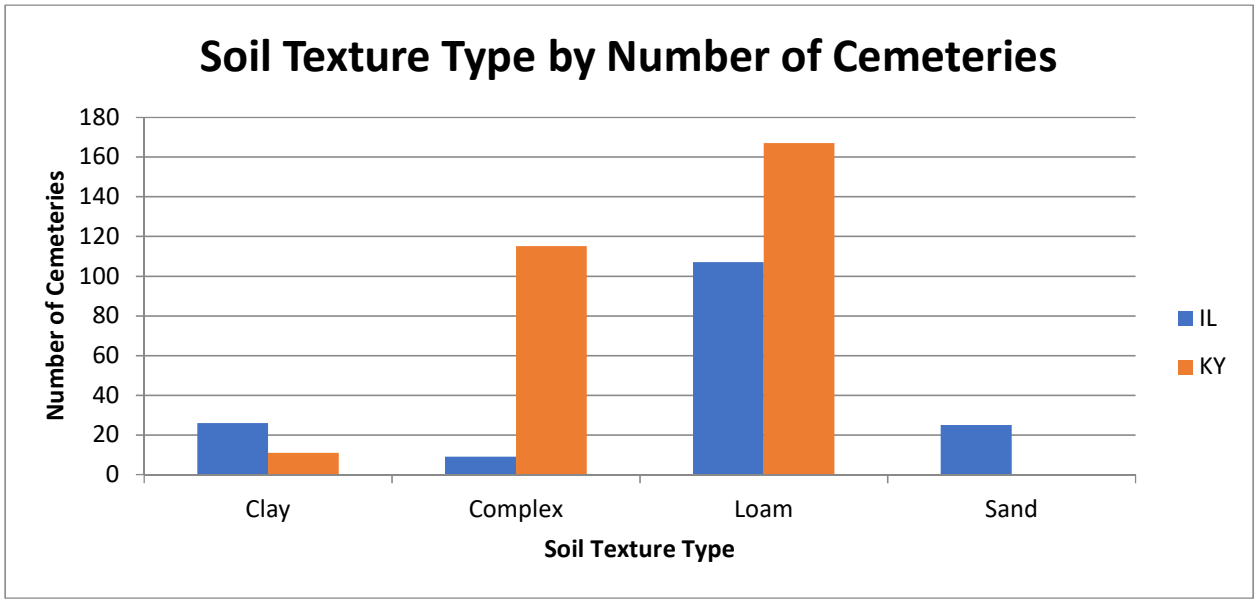


Figure 14 – CEMETERY NAME INFERENCE

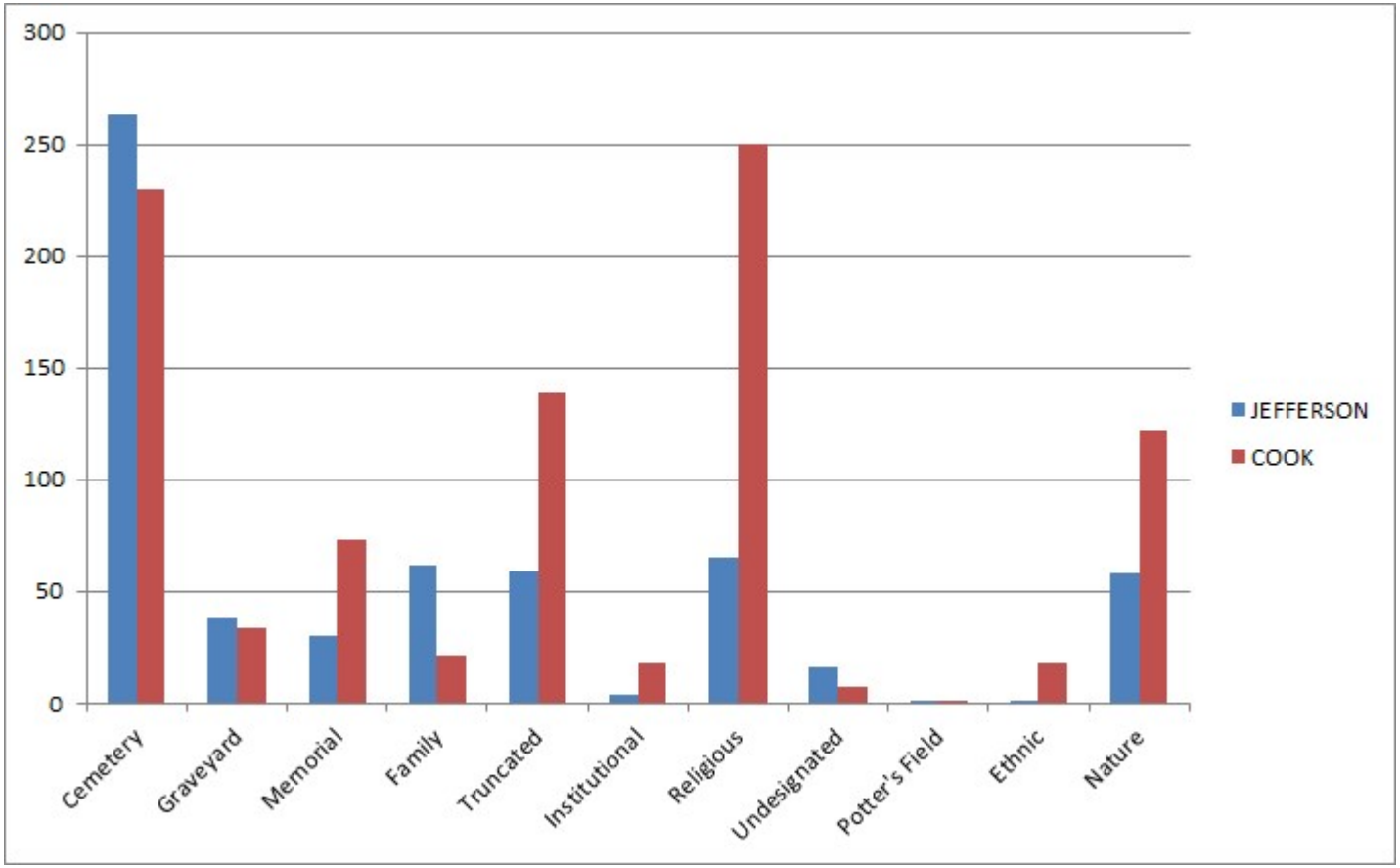


Figure 15 – PRINCIPAL COMPONENT ANALYSIS

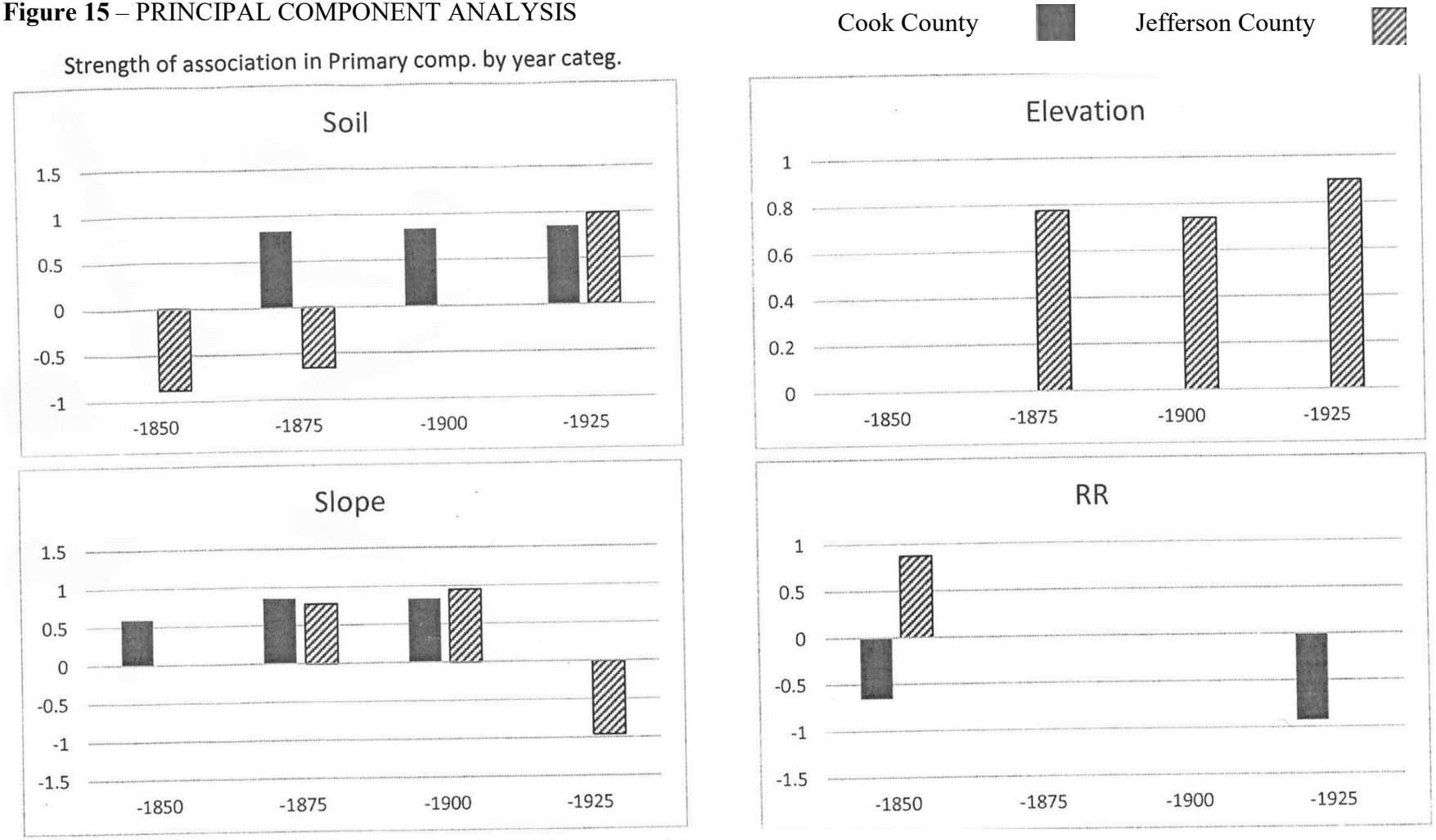


Figure 16 – PRINCIPAL COMPONENT ANALYSIS -- continued

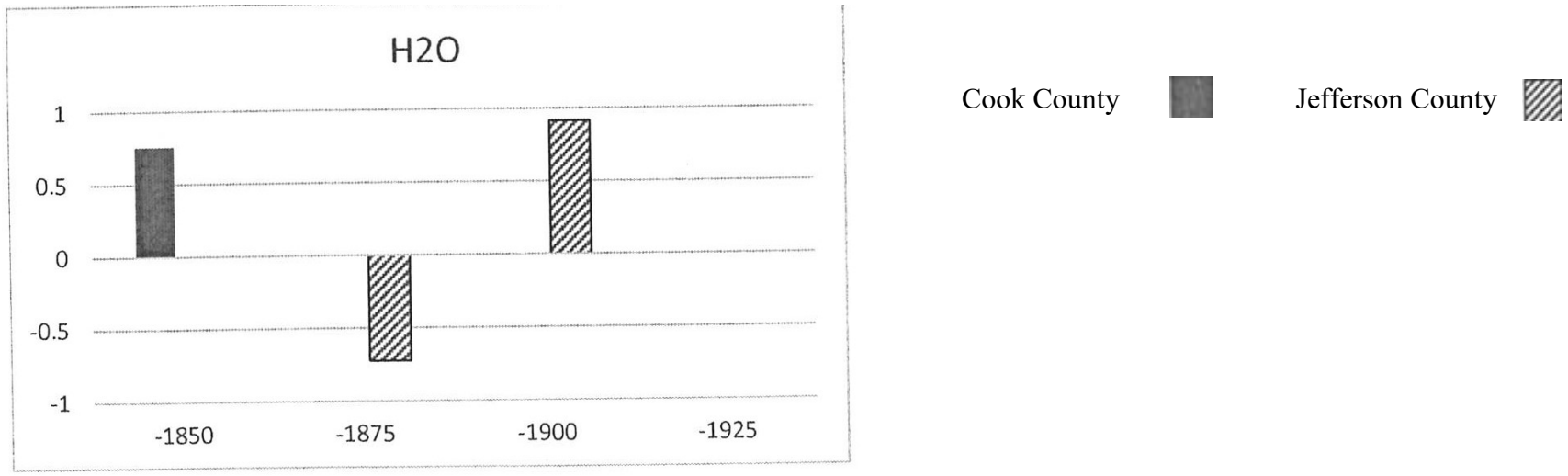


Table 1 -- POPULATION INCREASE, TOTAL DEATHS, MORTALITY RATE

Name	Illinois	Statehood ---> 1818			Kentucky	Statehood --> 1792		
		Increase	Death	Mortality Rate		Increase	Death	Mortality Rate
1790					73,677			
1800	2,458		553	2.25%	220,959	200%	49,716	2.25%
1810	12,282	400%	2,763	2.25%	406,511	84%	91,465	2.25%
1820	55,211	350%	12,422	2.25%	564,317	39%	126,971	2.25%
1830	157,445	185%	35,425	2.25%	687,917	22%	154,781	2.25%
1840	476,183	202%	107,141	2.25%	779,828	13%	175,461	2.25%
1850	851,470	79%	191,581	2.25%	982,405	26%	221,041	2.25%
1860	1,711,951	101%	385,189	2.25%	1,155,684	18%	260,029	2.25%
1870	2,539,891	48%	571,475	2.25%	1,321,011	14%	297,227	2.25%
1880	3,077,871	21%	692,521	2.25%	1,648,690	25%	370,955	2.25%
1890	3,826,351	24%	860,929	2.25%	1,858,635	13%	418,193	2.25%
1900	4,821,550	26%	1,214,066	2.52%	2,147,174	16%	540,658	2.52%
1910	5,638,591	17%	1,306,574	2.32%	2,289,905	7%	530,617	2.32%
1920	6,485,280	15%	1,388,758	2.14%	2,416,630	6%	517,497	2.14%
1930	7,630,654	18%	1,483,247	1.94%	2,614,589	8%	508,224	1.94%
1940	7,897,241	3%	1,409,658	1.79%	2,845,627	9%	507,944	1.79%
1950	8,712,176	10%	1,259,781	1.45%	2,944,806	3%	425,819	1.45%
1960	10,081,158	16%	1,350,069	1.34%	3,038,156	3%	406,870	1.34%
1970	11,113,976	10%	1,358,795	1.22%	3,218,706	6%	393,519	1.22%
1980	11,426,518	3%	1,186,872	1.04%	3,660,777	14%	380,245	1.04%
1990	11,430,602	0%	1,072,190	0.94%	3,685,296	1%	345,681	0.94%
2000	12,419,293	9%	1,079,237	0.87%	4,041,769	10%	351,230	0.87%
2010	12,830,632	3%	958,448	0.75%	4,339,367	7%	324,151	0.75%
TOTAL	123,198,784		17,927,695		46,942,436		7,398,295	

Data compiled from:

Bastian B, Tejada Vera B, Arias E, et al. Mortality trends in the United States, 1900–2017. National Center for Health Statistics. 2019.

Haines, Michael R. 2001. The urban mortality transition in the United States, 1800 – 1940. National Bureau of Economic Research, Historical Paper 134. NBER Working Paper Series on Historical Factors in Long Run Growth. 39 pgs

Table 2 -- RAW DATA SUMMARY

ILLINOIS	Min.	Max.	Average	Median
Slope	1.00	25.00	3.04	3.00
Elevation	0.00	244.00	60.76	45.00
Actual Elevation	583.20	827.20	643.96	628.20
RR Distance	5.06	14038.97	3346.93	2295.27
H2O Distance	53.58	7287.22	1291.29	1009.44
Soil Texture	Complex	Loam		Clay & Sand
Size	500.00	37,419,520	3,337,273	807,400
KENTUCKY	Min.	Max.	Average	Median
Slope	0.00	31.00	6.51	6.00
Elevation	1.20	346.50	188.46	248.40
Actual Elevation	425.90	771.20	613.16	673.10
RR Distance	89.79	29948.40	5010.35	3840.74
H2O Distance	89.03	6420.34	1192.21	818.21
Soil Texture	Clay	Loam		Complex
Size	25.00	12,443,655	238,859	5,200

Table 3 -- NUMBER OF CEMETERIES BY ESTABLISHMENT YEAR

Cemetery Number			
YEAR RANGE		IL	KY
1750	1775	**0**	**1**
1776	1800	**3**	**23**
1801	1825	**6**	**46**
1826	1850	**62**	**68**
1851	1875	**78**	**73**
1876	1900	**50**	**25**
1901	1925	**41**	**19**
1926	1950	**12**	**15**
1951	1975	**6**	**13**
1976	2000	**0**	**6**
2001	2025	**1**	**7**
Total		259	296

Table 4 -- CEMETERY SIZE

SIZE			
YEAR RANGE		IL	KY
1750	1775	**2,606,834**	100
1776	1800	161,172	42,994
1801	1825	673,723	74,962
1826	1850	3,829,882	234,731
1851	1875	2,297,031	151,956
1876	1900	2,639,927	55,181
1901	1925	5,660,394	781,492
1926	1950	3,630,510	800,662
1951	1975	4,214,589	609,264
1976	2000	**2,606,834**	178,041
2001	2025	354,279	60,484

Note: The figures in yellow highlighting are an average of the other values in order to perform the statistical computation.

Table 5 -- SLOPE

AVERAGE SLOPE			
YEAR RANGE		IL	KY
1750	1775	**2.6**	9.0
1776	1800	2.3	5.7
1801	1825	1.0	6.4
1826	1850	2.8	7.0
1851	1875	3.0	7.4
1876	1900	4.3	6.1
1901	1925	2.4	7.2
1926	1950	2.4	4.5
1951	1975	2.5	2.5
1976	2000	**2.6**	5.7
2001	2025	3.0	7.3

Note: The figures in yellow highlighting are an average of the other values in order to perform the statistical computation.

Table 6 -- ELEVATION

NEAREST MINIMUM ELEVATION			
YEAR RANGE		IL	KY
1750	1775	**69.7**	282.1
1776	1800	102.7	205.3
1801	1825	71.3	172.5
1826	1850	60.6	194.5
1851	1875	46.0	189.4
1876	1900	71.5	210.2
1901	1925	64.5	220.0
1926	1950	65.1	191.4
1951	1975	82.2	126.6
1976	2000	**69.7**	110.6
2001	2025	63.6	168.7

Note: The figures in yellow highlighting are an average of the other values in order to perform the statistical computation.

Table 7 -- DISTANCE TO RAILROADS

RR DISTANCE			
YEAR RANGE		IL	KY
1750	1775	**4001.0**	**5454.5**
1776	1800	3591.7	4761.3
1801	1825	6256.8	4552.1
1826	1850	2743.2	4876.3
1851	1875	3594.6	4890.8
1876	1900	3008.4	4752.4
1901	1925	3066.7	5967.0
1926	1950	3837.9	6873.1
1951	1975	7822.0	4239.4
1976	2000	**4001.0**	10510.1
2001	2025	2088.1	2429.5

Note: The figures in yellow highlighting are an average of the other values in order to perform the statistical computation.

Table 8 -- DISTANCE TO OPEN WATER

OPEN H2O DISTANCE			
YEAR RANGE		IL	KY
1750	1775	**1014.7**	**1371.7**
1776	1800	586.8	1156.2
1801	1825	510.9	1241.5
1826	1850	995.3	967.5
1851	1875	1547.6	1185.5
1876	1900	1191.7	1538.3
1901	1925	1426.6	752.7
1926	1950	1289.3	1474.7
1951	1975	1232.9	943.4
1976	2000	**1014.7**	2343.5
2001	2025	351.6	1898.5

Note: The figures in yellow highlighting are an average of the other values in order to perform the statistical computation.

Table 9 -- SOIL TEXTURE

	IL	KY
Clay	26	11
Complex	9	115
Loam	107	167
Sand	25	0

Table 10 -- CEMETERY NAME CATEGORIZATIONS

Referential Term	Terms Compiled
Cemetery	Cemetery Cemeter*
Graveyard	Grave Site Burying Ground Graveyard Burial Ground Churchyard Burial Site Grave*
Memorial	Memor* (as in Memorial or Memory) Garden* Park
Family	Family Burial Site Grave
Institutions	National City State Hospital Village Township
Religious	Relig* Saint Catholic Lutheran Evang* Eden Baptist Church Christ* Our Lady Angel* Sacred Resurrection Pass* (Passion) Benevolent

	Light Hope Holy Mount First United Methodist Trinity Jewish Hebrew Zion
Ethnic	German Polish Bohemian Indian
Nature	Oak Cave Hill* Acacia Forest River Lake Bloom Apple Hackberry Berry Brook Rock Prairie Run Hollow Flower Deer Elk Country Flora* Ridge View Green Island Willow

	Rose Woods Grove Lawn Evergreen
Animal	Deer Elk
Ecosystem	Forest Grove Lawn Prairie Woods
Flower	Bloom Flora* Flower Rose
Fruit	Apple Berry
Land Description	Cave Country Hill* Hollow Island Ridge Rock
Other	Green View
Tree	Acacia Evergreen Hackberry Oak Willow
Water	Brook Lake River Run
Sacred	Holy
General	Church First Relig* United

Catholic	Angel* Baptist Catholic Christ* Eden Evang* Lutheran Methodist Mount Our Lady Pass* (Passion) Resurrection Sacred Saint Trinity
Inspirational	Benevolent Hope Light
Jewish	Jewish Zion
Hebrew	Hebrew
* = represents a wildcard character in the excel formula. For example, cemetery, cemeteries will both be tallied with the * in the formula.	
N.S. = not significant	

Table 11 -- CEMETERY NAME STATISTICS BETWEEN COUNTIES

BINOMIAL PROPORTIONS TEST ON NAMES	
	SIGNIFICANCE BETWEEN COUNTIES
Cemetery	N.S.
Graveyard	N.S.
Memorial	P <.001 (Cook)
Family	P <.001 (Jefferson)
Institutions	N.S.
Religious	P <.001 (Cook)
Ethnic	P <.05 (Cook)
Nature	N.S.
Animal	Not enough frequencies to test
Ecosystem	P <.001 (Cook)
Flower	Not enough frequencies to test
Fruit	Not enough frequencies to test
Land Description	N.S.
Other	N.S.
Tree	P <.001 (Cook)
Water	P <.005 (Jefferson)
Sacred	P <.001 (Cook)
General	P <.05 (Cook)
Catholic	P <.001 (Cook)
Inspirational	P =.001 (Cook)
Jewish	P <.001 (Cook)
Hebrew	Not enough frequencies to test
County with the greatest frequency listed	
N.S. = not significant	

Table 12 -- CEMETERY NAME STATISTICS WITHIN COUNTIES

BINOMIAL PROPORTIONS TEST ON NAMES		
	SIGNIFICANCE WITHIN COUNTY BY DATE	
	JEFFERSON	COOK
Cemetery to Graveyard	P <.001 (cemetery)	P <.001 (cemetery)
Cemetery to Memorial	P <.001 (cemetery)	P <.001 (cemetery)
Graveyard to Memorial	N.S.	P <.005 (cemetery)
Family to Institutional	P <.001 (family)	N.S.
Family to Religious	N.S.	P <.001 (family)
Institutional to Religious	P <.001 (religious)	P <.001 (religious)
N.S. = not significant		
Term with highest frequency indicated		

Table 13 -- STATISTICS SUMMARY

STATISTICS SUMMARY OF VARIABLES			
	SIGNIFICANCE BETWEEN COUNTIES	SIGNIFICANCE WITHIN COUNTY BY DATE	
		JEFFERSON COUNTY	COOK COUNTY
SIZE	P <.001	P <.001, +	P <.001, +
SLOPE	P <.001	P <.001, -	P <.001, +
ELEVATION	P <.001	P <.001, -	P <.001, +
DISTANCE TO RAILROAD	N.S.	P <.001, +	N.S.
DISTANCE TO OPEN WATER	N.S.	P <.001, +	P <.001, +
SOIL TEXTURE	Not tested	P <.001	P <.001
+ or - indicates positive or negative trend			
N.S. = not significant			

ENDNOTES – DEFINITIONS, MEANINGS, AND CAVEATES

Throughout this paper, various terms were used. Many have specific meaning from a historical perspective and yet others from a practical-daily-usage perspective. Consequently, in brief, some terms are delineated below.

CULTURE, SOCIAL, AND SOCIOCULTURAL

"Culture is an integrated system of symbols, ideas and values that should be studied as a working system, an organic whole" (Kuper, 1999).

CEMETERY, GRAVEYARD, DEATHSCAPE, ETC.

The term *deathscape* spans the entirety of landscapes around which burials are created (Higgins, 2013). The term gain popularity in the 1990s (Google Ngram Viewer, Deathscape). The term cemetery (Pardoe, 1988), graveyard, burial ground, churchyard, and necropolis became popular in the 1800s, the 1840s, 1800s, 1530s, and 1820s respectively (see Figure 1 for Google Ngram Viewer, Cemetery; Google Ngram Viewer, Graveyard; Google Ngram Viewer, burial ground; Google Ngram Viewer, Churchyard; and Google Ngram Viewer, necropolis).

The term *burial ground* is a term in reference to areas within which burials are done including family plots, individual graves, and graves that are not laid out in a specific geometricized order.

Cemetery is an old term but has been in more common usage with the advent of organized, geometricized burial areas (Curl, 1983) representing numerous individuals that are not all related (Semerani, 1983; Rugg, 2000a). *Churchyards* (and *church yards*) refer simply to graveyards associated with a church. However, *necropolis* is a term referring more precisely to the Greek burial grounds posited at the entrance to the cities.

Nevertheless, the above terms were used synonymously.

SITING OR PLACEMENT

The term *siting* is a term used more often by urban planners, landscape architects, and architects. It is a term that is infused with an analysis of the location based upon various criteria to determine suitability. Nonetheless, for simplicity sake, the terms *siting* and *placement* were used with the same meaning.

AMERICA/ AMERICAN VS. UNITED STATES

Throughout this thesis, the terms America, American, United States, North America were used with synonymy. Even in reference to the states discussed through the Civil War, the term *United States* were used in reference primarily to all the states, unless otherwise denoted. Furthermore, America or American will refer specifically to the *United States* whether the political designated term was in place or not.

LANGUAGE FLUENCY AND LITERACY

Throughout this paper, descriptions, analyses, and arguments are made. These are made in context to the literature reviewed. Of this literature, primarily English literature was reviewed. However, an enormous amount of literature exists in Latin, Egyptian, Greek, Armenian, Tamil, Chinese, and others from which this thesis does not address.

Additionally, literacy world-wide was not represented in a meaningful way until the last few thousand years (Sampson, 1985). And most people were not able to write until the late 19th and early 20th century. Consequently, a lot of ideas, beliefs, and rationale were not available for analysis. For example, while many theories on health and disease were written by the "educated", these are the ones that perpetuated far and wide and not those of individual towns, villages, nor homes.

SUPERNATURAL

The term supernatural is used to reflect the ideas, theories, and belief systems that are not enwrapped in a religion or in a formalized theory. Such references include, in part, beliefs in vampires, witchcraft, magic, and other phantomisic. However, the term is not intended to include sociocultural practices of the time. Delineating the rationale between culture, social, and supernatural belief system differences is beyond the scope of this paper but suffice it to say that *supernatural* is intended to refer to beliefs and practices more hyper-normal. An argument can be made that vampiric and witchcraft fears were a social construct, but the beliefs were seen historically as more isolated, village-bound beliefs. They were not widespread until more recent times.

PUBLIC LAND SURVEY SYSTEM (PLSS)

The PLSS system is the system used to subdivide and describe the United States land parcels. This measuring system divided the states (https://nationalmap.gov/small_scale/a_plss.html) into 6-mile square townships and described legally into townships, ranges, directions, and section numbers. This was done so that the land could be sold. After the Revolutionary War, the United States was broke and needed money to fund a defense force and to fund the federal government.

Consequently, the government sent survey crews, of at least 3, across the land which had not already been established as states to measure, to mark corners, and to describe 30 southern and western states. The original descriptions were oftentimes wooden stakes, marked trees, piles of rock, or natural features.

Land transactions after these initial surveys were documented through land patents and subsequently as land deeds. Many of these transactions were recorded legally. Today, they are available in the U.S. Library of Congress.

REFERENCES

"Eternal Reefs -- living legacies preserving the marine environment for future generations." *Eternal Reefs*, www.eternalreefs.com/.

"Laws and Regulations." *History of the Clean Water Act*, edited by EPA, United States Environmental Protection Agency, www.epa.gov/laws-regulations/history-clean-water-act.

Annese, D. 1983. Construction – Cemetery Design Standards. Landscape Architecture, Jan: 85 – 87.

Anthony, S., 2016. Materialising Modern Cemeteries: Archaeological Narratives of Assistens Cemetery, Copenhagen. MediaTryck Lund.

Aristotle, W.D. and Ross, J.A., 1908. Works Translated Into English Under the Editorship of WD Ross.--.

Associated Press. (1989-11-28). "Thousands Buried in Old Graves, Investigators in Kentucky Report". The New York Times. ISSN 0362-4331. Retrieved 2017-03-07.

Association of Graveyard Rabbits. 2008. Graveyard Rabbit of Sandusky Bay, Cholera Cemetery. Graveyardrabbitofsanduskybay.blogspot.com.

Bastien, J.W., 1989. Differences between Kallawaya-Andean and Greek-European humoral theory. Social Science & Medicine, 28(1), pp.45-51.

Ball, P., 2016. Man made: a history of synthetic life. Distillations, 2(1), pp.15-23.

Bannos, P. 2019. Hidden Truths: the Chicago City Cemetery and Lincoln Park. Contributing factors in moving the cemetery: Sanitary Concerns. http://hiddentruths.northwestern.edu/factors/sanitary.html

Bar-Yosef, O. and Belfer-Cohen, A., 2002. Facing environmental crisis. Societal and cultural changes at the transition from the Younger Dryas to the Holocene in the Levant. *The dawn of farming in the Near East*, *6*, pp.55-66.

Barber, P., 1988. Vampires, burial, and death: Folklore and reality. Yale University Press.

Bastian B, Tejada Vera B, Arias E, et al. 2019. Mortality trends in the United States, 1900–2017. National Center for Health Statistics.

Batchelder, P D. 2008. Dust in the wind – the bell tolls for crematory mercury. Golden Gate University of Environmental Law Journal, 2: 118 – 161.

Bellah RN. Religion in human evolution. Harvard University Press; 2011 Sep 15.

Bellis, Mary. 2019. Famous Inventions: History of the Bulldozer. ThoughtCo, March 18. https://www.thoughtco.com/history-of-the-bulldozer-19913538

Bender, T. 1974. The "Rural" Cemetery Movement: Urban Travail and the Appeal of Nature. New England Quarterly, 47 (2): 196 - 211.

Berger, L. R., et al. (2015). "Homo naledi, a new species of the genus Homo from the Dinaledi Chamber, South Africa." Elife 4.

Bigelow, J., 1860. *A history of the cemetery of Mount Auburn*. J. Munroe.

Bitton, G., Farrah, S.R., Ruskin, R.H., Butner, J., Chou, Y.J., 1983. Survival of pathogenic
and indicator organisms in groundwater. Ground Water 21 (4), 405–410.

Bitton G, Harvey RW. Transport of pathogens through soils and aquifers. Environmental microbiology. 1992 Apr 7;19:103-23.

Blankenship, J. (2012). Civil War gave birth to National Cemeteries. VFW.Org

Blaser MJ. Who are we? Indigenous microbes and the ecology of human diseases. EMBO reports. 2006 Aug;7(10):956-60.

Bordenave G. Louis Pasteur (1822–1895). Microbes and infection. 2003 May 1;5(6):553-60.

Boyd Dent B. 2005. Vulnerability and the unsaturated zone – the case for cemeteries. New Zealand Hydrologica Society, Conference Proceedings, pp. 1-9.

Braz, V.N., Menezes, L.B.C. and Berredo, F., 2000. Contribution to the study of contaminated water from cemeteries in the city of Belem-PA [Para, Brazil]. Boletim do Museu Paraense Emilio Goeldi, Ciencias da Terra, 12, pp.105-122.

Budreau, L.M., 2010. Bodies of war: World War I and the politics of commemoration in America, 1919-1933. NYU Press.

Bucheli S R, A M Lynne. 2016. The microbiome of human decomposition. Microbe, 11 (4): 165-171.

Bujalkova, M., Straka, S. and Jureckova, A., 2001. Hippocrates' humoral pathology in nowaday's reflections. Bratislavske lekarske listy, 102(10), pp.489-492.

Burns, Stanley B. "Nursing in the Civil War." PBS, Public Broadcasting Service, www.pbs.org/mercy-street/uncover-history/behind-lens/nursing-civil-war/. Accessed July 07, 2019.

Burt, Rebecca. 2011. Soil survey investigations report no. 45, version 2.0. United States Department of Agriculture, Natural Resources Conservation Service, National Soil Survey Center, Lincoln, Nebraska. (www.nrcs.usda.gov/wps/PA_NRSCSConsumption

Callicott, J.B., 1982. Traditional American Indian and Western European attitudes toward nature: an overview. Environmental Ethics, 4(4), pp.293-318.

Cameron D, Jones IG. John Snow, the Broad Street pump and modern epidemiology. International journal of epidemiology. 1983;12(4):393-6.

Cappella A, Bertoglio B, Castoldi E, Maderna E, Di Giancamillo A, Domeneghini C, Andreola S, Cattaneo C. 2015. The taphonomy of blood components in decomposing bone and its relevance to physical anthropology. American Journal of Physical Anthropology, 158: 636-645.

Carrara, C., Ptacek, C.J., Robertson, W.D., Blowes, D.W., Moncur, M.C., Sverko, E.D. and Backus, S., 2008. Fate of pharmaceutical and trace organic compounds in three septic system plumes, Ontario, Canada. Environmental science & technology, 42(8), pp.2805-2811.

Castner, Charles B. 2019. "Brief History of the Louisville and Nashville Railroad." L&N Railroad, www.lnrr.org/History.aspx. Accessed 1 Sept. 2019.

CDC.gov. (2019). Information for Funeral and Crematory Practitioners | Creutzfeldt-Jakob Disease, Classic (CJD) | Prion Disease | CDC. [online] Available at: https://www.cdc.gov/prions/cjd/funeral-directors.html

Chadwick, E., 1843. Report on the Sanitary Conditions of the Labouring Population of Great Britain: A Supplementary Report on the Results of a Special Inquiry Into the Practice of Interment in Towns. Made at the Request of Her Majesty's Principal Secretary of State for the Home Department. W. Clowes and sons.

Chan, G.S., Scafe, M. and Emami, S., 1992. *Cemeteries and Groundwater: An Examination of the Potential Contamination of Groundwater by Preservatives Containing Formaldehyde: Report*. Environment Ontario.

Charzyński, P., Bednarek, R. and Śołnowska, B., 2010. Characteristics of the soils of Toruń cemeteries. In Proceedings of the 19th World Congress of Soil Science: Soil solutions for a changing world, Brisbane, Australia, 1-6 August 2010. Working Group 3.3 Soils in urban and industrial areas (pp. 13-16). International Union of Soil Sciences (IUSS), c/o Institut für Bodenforschung, Universität für Bodenkultur.

Chiappelli, J. and Chiappelli, T., 2008. Drinking grandma: the problem of embalming. Journal of environmental health, 71(5), pp.24-29.

Chicago (Ill.)., Mason, R. Bertram., Arthur, W. Henry., Tolman, E. Bronson. (1905). The revised municipal code of Chicago of 1905: Passed March 20, 1905 ... Chicago: The Lawyers' co-operative publishing company.

Clogher, William. 1849. " Rees & Rucker Map of Chicago and Vicinity, 1849." Map. Encyclopedia of Chicago. Chicago Historical Society, www.encyclopedia.chicagohistory.org/pages/10343.html.

Comrie, J.D., 1933. The Evolution of Ideas Regarding Disease. Edinburgh medical journal, 40(8), p.369.

da Costa Silva, .RW. and Malagutti Filho, W., 2012. Geoelectrical mapping of contamination in the cemeteries: the case study in Piracicaba, São Paulo/Brazil. Environmental earth sciences, 66(5), pp.1371-1383.

Costandi M. 2015. Life after death: the science of human decomposition. Forensic Science, Neurophilosophy, May 5: https://www.theguardian.com/science/neurophilosophy/2015/may/05/life-after-death.

Cox, L. 2013. Who invented the microscope? Live Science, September 14. https://www.google.com/amp/s/www.livescience.com/amp/39649-who-invented-the-microscope.html

Crawfurd, R. 1914. Plague and pestilence in literature and art. *Plague and Pestilence in Literature and Art*.

Culotta, Elizabeth. "On the origin of religion." (2009): 784-787.

Curl, J. S. (1975). "The architecture and planning of the nineteenth-century cemetery." Garden History 3(3) 13-41.

Curl, J.S. 1983. John Claudius Loudon and the garden cemetery movement. Garden History, 11 (2): 133-156.

Darwin C. The descent of man and selection in relation to sex. D. Appleton; 1896.

Davidson, M.W., 2009. Pioneers in optics: Zacharias Janssen and Johannes Kepler. Microscopy Today, 17(6), pp.44-47.

Davies, D J. 2005. A Brief History of Death. Blackwell Publishing, Malden, MA. 184 pgs.

Dent, B. B., et al. (2004). "Review of human decomposition processes in soil." Environmental Geology 45(4): 576-585.

Dethlefsen, E.S., 1981. The cemetery and culture change: archaeological focus and ethnographic perspective. In Modern Material Culture (pp. 137-159). Academic Press.

Diakonidze, R., Supatashvili, T., Shavlakadze, M., Kupreishvili, S. and Lortkifanidze, F., 2013. Evaluation Of The Impact Of Substances Secreted From The Decomposition Of Corpse Buried At Cemeteries On Fresh Water Resources, Specifically On The Quality Of Potable Water. Georgian International Journal of Science, Technology and Medicine, 5(1/2), p.21.

Dirks, P. H., et al. (2015). "Geological and taphonomic context for the new hominin species Homo naledi from the Dinaledi Chamber, South Africa." Elife 4.

Dirks, P. H., et al. (2017). "The age of Homo naledi and associated sediments in the Rising Star Cave, South Africa." Elife 6.

Dobell C. Antony van Leeuwenhoek and his" Little animals": being some account of the father of protozoology and bacteriology and his multifarious discoveries in these disciplines. London: Staples Press; 1932.

Duboise, S.M., Moore, B.E. and Sagik, B.P., 1976. Poliovirus survival and movement in a sandy forest soil. Appl. Environ. Microbiol., 31(4), pp.536-543.

Eastern Cemetery documentary 'Facing East' aims to finally tell the full story – Insider Louisville". Insider Louisville. 2017-01-17. Retrieved 2017-03-07.

Environmental Agency. (2004). Assessing the Groundwater Pollution Potential of Cemetery Developments, National Groundwater and Contaminated Land Centre Solihull, UK.

Etlin, R A. 1982. The Geometry of Death. Progressive Architecture, 5 (May): 134 – 137.

Faull, M.L., 1976. The location and relationship of the Sancton Anglo-Saxon cemeteries. The Antiquaries Journal, 56(2), pp.227-233.

Feynman J, Ruzmaikin A. Climate stability and the development of agricultural societies. Climatic Change. 2007;84(3-4):295-311.

Finley S J, Pechal J L, Benbow M E, Robertson B K, Javan G T. 2016. Microbial signatures of cadaver gravesoil during decomposition. Microbial Ecology, 71: 524-529.

Fleig, Barry A. 2018. Why are Cemeteries where they are?. Chicago and Cook County Cemeteries A Historical and Contemporary Resource, chicagoandcookcountycemeteries.com/2018/08/27/why-are-cemeteries-where-they-are/.

Francaviglia, R. V. (1971). "The cemetery as an evolving cultural landscape." Annals of the Association of American Geographers 61(3) 501-509.

Fred EB. Antony van Leeuwenhoek: On the three-hundredth anniversary of his birth. Journal of bacteriology. 1933 Jan;25(1):iv-2.

French, S., 1974. The cemetery as cultural institution: the establishment of Mount Auburn and the" Rural Cemetery" movement. American Quarterly, 26(1), pp.37-59.

Freundorfer S, Grupe G, Weickmann D. 1995. Mineral-bound noncollagenous proteins in archaeological human skeletons. Electrophoresis, 16: 817-819.

Fryar, C.D., Gu, Q., Ogden, C.L. and Flegal, K.M., 2016. Anthropometric reference data for children and adults; United States, 2011-2014.

Gammack SM, Paterson ER, Kemp JS, Cresser MS, Killham KE. Factors affecting the movement of microorganisms in soils. Soil biochemistry. 1992;7:263-305.

Geake, H., 1992. Burial practice in seventh-and eighth-century England. The Age of Sutton Hoo, pp.83-94.

Georgics. (2019, October 20). Retrieved from https://en.m.wikipedia.org/wiki/Georgics.

Gibbons, A. 2012. Bonobos Join Chimps as Closest Human Relatives. Science, June 13. https://www.sciencemag.org/news/2012/06/bonobos-join-chimps-closest-human-relatives

Goetz, J.L., Keltner, D. and Simon-Thomas, E., 2010. Compassion: an evolutionary analysis and empirical review. Psychological bulletin, 136(3), p.351.

Graeber, J. 2012. Are cemetery bodies polluting Stoughton wells. Stoughton Journal, Stoughton, Massachusetts, March 5, 2012.

Grosman, L and N D Munro. 2007. The sacred and the mundane: domestic activities at a Late Natufian burial site in the Levant. Before Farming, 4 (4): 1-14.

Grover, N.C. and Mansfield, G.R., 1938. Floods of Ohio and Mississippi Rivers, January-February 1937, with a section on the Flood deposits of the Ohio River, January-February 1937 (No. 838, pp. 1-746). US Government Printing Office.

Guarino F M, F Angelini, G Odiema, M R Bianco, G Di Bernardo, A Forte, A Cascino, M Cipollaro. 2000. Detection of DNA in ancient bones using histochemical methods. Biotechnic and Histochemistry, 75 (3): 110-117.

Habenstein, R.W., 1962. Sociology of occupations: The case of the American funeral director. Human Behavior and Social Processes: an interactionist approach, pp.225-46.

Haines, Michael R. 1977. Mortality in nineteenth century America: Estimates from New York and Pennsylvania census data, 1865 and 1900. Demography, 14 (3): 311-331.

Haines, Michael R. 2001. The urban mortality transition in the United States, 1800 – 1940. National Bureau of Economic Research, Historical Paper 134. NBER Working Paper Series on Historical Factors in Long Run Growth. 39 pgs

Halliday S. Death and miasma in Victorian London: an obstinate belief. Bmj. 2001;323(7327):1469-71.

Hardy K, Radini A, Bermúdez de Castro J, et al. 2017. Diet and environment 1.2 million years ago revealed through analysis of dental calculus from Europe's oldest hominin at Sima del Elefante, Spain.

Harker, A., 2012. Landscapes of the dead: an argument for conservation burial. Berkeley Planning Journal, 25(1).

Harvard University Library, Open Collections Program. 2018. Contagion Historical Views of Diseases and Epidemics. Concepts of Contagion and Epidemics. http://ocp.hul.harvard.edu/contagion/concepts.html. Accessed online 4/15/18

Härke, H., 1990. " Warrior Graves"? The Background of the Anglo-Saxon Weapon Burial Rite. Past & present, (126), pp.22-43.

Harker, A., 2012. Landscapes of the dead: an argument for conservation burial. Berkeley Planning Journal, 25(1).h

Hawkins, D., 1990. The Black Death and the new London cemeteries of 1348. Antiquity, 64(244), pp.637-642.

Hawksworth, D.L. and Wiltshire, P.E., 2011. Forensic mycology: the use of fungi in criminal investigations. Forensic Science International, 206(1-3), pp.1-11.

Hays, J.N., 2005. Epidemics and pandemics: their impacts on human history. Abc-clio.

Hecker, J.F.K. 1832. Die Tanzmith, einc Volkskrankheil Tenenti, A. (1957). *Senso delta Morte e VAmore delta Vita im Milli'latier* (1832).

Hicks, R.D. ed., 1907. De Anima: with translation, introduction and notes. University Press.

Higham, T., et al. (2014). "The timing and spatiotemporal patterning of Neanderthal disappearance." Nature 512(7514): 306-309.

Hoeing, Joseph Bernard. Preliminary map of Kentucky . Prepared for the Kentucky railroad commissioners by the Kentucky Geological Survey, John R. Procter, Director. New York, 1889. Map. https://www.loc.gov/item/98688487/.

von Hofsten, N., 1936. Ideas of creation and spontaneous generation prior to Darwin. Isis, 25(1), pp.80-94.

Holden, M.H. and McDonald-Madden, E., 2018. Conservation from the grave: human burials to fund the conservation of threatened species. Conservation Letters, 11(1), p.e12421.

Jackson, R.D., 2006. Estimates of soil erosion from perched cemeteries, Sampson County, North Carolina. southeastern geographer, 46(1), pp.23-34.

Jamieson, E., & Adams, F. (1881). Municipal code of Chicago: comprising the laws of Illinois relating to the city of Chicago, and the ordinances of the City Council. Chicago: Beach, Barnard.

Jenner M. 2005. Death, decomposition and dechristianisation? Public health and church burial in eighteenth-century England. The English Historical Review, 120 (487): 615-632.

Jouanna, J., 2012. Air, miasma and contagion in the time of Hippocrates and the survival of miasmas in post-Hippocratic medicine (Rufus of Ephesus, Galen and Palladius). In Greek Medicine from Hippocrates to Galen (pp. 119-136). Brill.

Karamanou, M., Panayiotakopoulos, G., Tsoucalas, G., Kousoulis, A.A. and Androutsos, G., 2012. From miasmas to germs: a historical approach to theories of infectious disease transmission. Infez Med, 20(1), pp.58-62.

Keister, D., 2004. Stories in Stone: A Field Guide to Cemetery Symbolism and Iconography. Gibbs.

Keyworth, D. 2010. Aetiology of vampires and revenants theological debate and popular belief. Journal of Religious History, 34 (2) 158-173.

Kokayeff, N., 2012. Dying to be discovered: Miasma vs germ theory. ESSAI, 10(1), p.24.

Kümmerer, K., 2008. Pharmaceuticals in the environment–a brief summary. In Pharmaceuticals in the Environment (pp. 3-21). Springer, Berlin, Heidelberg.

Kuper, A. 1999. Culture: The Anthropologist's Account. Harvard University Press, Cambridge.

Landscapes of the Dead Memorial Ecosystems. 2010. Accessed December 15. http://www.memorialecosystems.com.

Lawson, Bellett. 1910. Cemetery Drainage. An address before Association of American Cemetery Superintendents. The Cemetery Handbook: A Manual of Useful Information Cemetery Development and Management Allied Arts Publishing Company . 2ndnd ed., Park and Cemetery Publishing Company, p. 308-309.

Lee, D., 2014. The L&N Railroad in the Civil War: A Vital North-South Link and the Struggle to Control It. McFarland.

Lee, J. J. 2017. World's Oldest Genome Sequenced From 700,000-Year-Old Horse DNA. National Geographic, November. https://www.nationalgeographic.co.uk/history-and-civilisation/2017/11/worlds-oldest-genome-sequenced-700000-year-old-horse-dna

Loerzel, Robert. "A Conservatory, a Zoo, and 12,000 Corpses." Chicago Reader. Chicago Reader, August 29, 2019. https://www.chicagoreader.com/chicago/a-conservatory-a-zoo-and-12000-corpses/Content?oid=1109775.

McClary A. Germs are Every where: The Germ Threat as Seen in Magazine Articles 1890-1920. Journal of American Culture. 1980;3(1):33-46.

McCaulou DR, Bales RC, McCarthy JF. Use of short-pulse experiments to study bacteria transport through porous media. Journal of Contaminant Hydrology. 1994 Jan 1;15(1-2):1-4.

MacLachlan, W. 2013. How much fertilizer do I need to fertilize my lawn? University of Maryland Extension, April 11. https://extension.umd.edu/learn/how-much-fertilizer-do-i-need-fertilize-my-lawn

Maddicott, J.R., 1997. Plague in seventh-century England. Past & Present, (156), pp.7-54.

Maggio, Alice. 2004. Who is buried in Couch's Tomb? Ask the Librarian. Gapers Block. Accessed August 31, 2019. http://gapersblock.com/airbags/archives/who_is_buried_in_couchs_tomb/.

Magner, L. N. 2009. Biomedicine and Health: The Germ Theory of Disease. Encyclopedia.com. https://www.encyclopedia.com/science/science-magazines/biomedicine-and-health-germ-theory-disease

Marcucci, D.J. 2000. Landscape history as a planning tool. Landscape and Urban Planning, 49: 67-81.

Martensen, R., 2009. Landscape designers, doctors, and the making of healthy urban spaces in 19th century America. In: Campbell, Lindsay; Wiesen, Anne, eds. Restorative commons: creating health and well-being through urban landscapes. Gen. Tech Rep. NRS-P-39. US Department of Agriculture, Forest Service, Northern Research Station: 26-37.

Mawdsley JL, Bardgett RD, Merry RJ, Pain BF, Theodorou MK. Pathogens in livestock waste, their potential for movement through soil and environmental pollution. Applied soil ecology. 1995 Mar 1;2(1):1-5.

Meller, H. and Parsons, B., 2011. London cemeteries: an illustrated guide and gazetteer. The History Press.

Metcalf JL, Xu ZZ, Weiss S, Lax S, Van Treuren W, Hyde ER, et al. Microbial community assembly and metabolic function during mammalian corpse decomposition. Science. 2016;351(6269):158-62.

Meyer J, B Anderson, D O Carter. 2013. Seasonal variation of carcass decomposition and gravesoil chemistry in a cold (Dfa) climate. Journal of Forensic Science, 58 (5): 1175-1182.

Miller, N.G. and Trigoboff, N., 2001. A European feather moss, Pseudoscleropodium purum, naturalized widely in New York State in cemeteries. The Bryologist, 104(1), pp.98-104.

Moffett JR. Miasmas, germs, homeopathy and hormesis: commentary on the relationship between homeopathy and hormesis. Hum Exp Toxicol. 2010;29(7):539-43.

Morelli G, Song Y, Mazzoni CJ, Eppinger M, Roumagnac P, Wagner DM, et al. Yersinia pestis genome sequencing identifies patterns of global phylogenetic diversity. Nat Genet. 2010;42(12):1140-3.

Morgan, P.P., 1985. Should scientists study "20th-century disease"?. *CMAJ: Canadian Medical Association Journal*, *133*(10), p.961.

Moseley, E.L., 1939. Long time forecasts of Ohio River floods.

Mumford, Lewis. 1961. The City in History. San Diego: Harcourt, Brace & World, Inc.

Nash, R. 1963. The American Wilderness in Historical Perspective. Forest History Newsletter, 6(4): 2-13.

National Day Calendar. (2019). NATIONAL SPIRIT OF '45 Day- Second Sunday in August - National Day Calendar. [online] Available at: https://nationaldaycalendar.com/national-spirit-of-45-day-second-sunday-in-august/ [Accessed 21 Nov. 2019].

Natural Burial, Wikipedia, the Free Encyclopedia, en.wikipedia.org/wiki/Natural_burial.

Nelson, K.E. and Williams, C.M. eds., 2014. Infectious disease epidemiology: theory and practice. Jones & Bartlett Publishers.

Newman, W.R., 2005. Promethean ambitions: alchemy and the quest to perfect nature. University of Chicago Press.

Nielsen, C.F., Kidd, S., Sillah, A.R., Davis, E., Mermin, J. and Kilmarx, P.H., 2015. Improving burial practices and cemetery management during an Ebola virus disease epidemic—Sierra Leone, 2014. MMWR. Morbidity and mortality weekly report, 64(1), p.20.

Nieschmidt, A K, N D Kim. 1997. Effects of mercury release from amalgam dental restorations during cremation on soil mercury levels of three New Zealand crematoria. Bulletin of Environmental Contamination and Toxicology, 58: 744 – 751.

Nutton, V., 2013. Humoralism. In Companion encyclopedia of the history of medicine (pp. 307-317). Routledge.

Occupational Safety and Health Act (United States), Wikipedia, the Free Encyclopedia, en.wikipedia.org/wiki/Occupational_Safety_and_Health_Act.

OpenStax. (n.d.). Microbiology. Retrieved from https://courses.lumenlearning.com/microbiology/chapter/spontaneous-generation/.

Orlando, L., Ginolhac, A., Zhang, G., Froese, D., Albrechtsen, A., Stiller, M., Schubert, M., Cappellini, E., Petersen, B., Moltke, I. and Johnson, P.L., 2013. Recalibrating

Equus evolution using the genome sequence of an early Middle Pleistocene horse. Nature, 499(7456), p.74.

Paíga, P. and Delerue-Matos, C., 2016. Determination of pharmaceuticals in groundwater collected in five cemeteries' areas (Portugal). Science of the Total Environment, 569, pp.16-22.

Pannell, L.B., 2016. Viperous Breathings: The Miasma Theory in Early Modern England (Doctoral dissertation).

Pardoe, C., 1988. The cemetery as symbol. The distribution of prehistoric Aboriginal burial grounds in southeastern Australia. Archaeology in Oceania, 23(1), pp.1-16.

Pattison, W.D., 1955. The cemeteries of Chicago: A phase of land utilization. Annals of the Association of American Geographers, 45(3), pp.245-253.

Pelling, M., 1993. Contagion/germ theory/specificity. Companion encyclopedia of the history of medicine, 1, pp.309-334.

Perry, R.D. and Fetherston, J.D., 1997. Yersinia pestis--etiologic agent of plague. Clinical microbiology reviews, 10(1), pp.35-66.

PBS. 2015. "Death And The Civil War." Written by Ric Burns, American Experience, Public Broadcasting Company, 12 Sept. 2012. , www.youtube.com/watch?v=N1-7Me9anxM. Accessed 1 Sept. 2019.

Pinhasi, R., et al. (2011). "Revised age of late Neanderthal occupation and the end of the Middle Paleolithic in the northern Caucasus." Proc Natl Acad Sci U S A 108(21): 8611-8616.

Pitt, D. and Aubin, J.M., 2012. Joseph Lister: father of modern surgery. Canadian Journal of Surgery, 55(5), p.E8.

Platt, A., 1910. De generatione animalium. Clarendon Press.

Powers, R. H. (2005). The decomposition of human remains. Forensic Medicine of the Lower Extremity, Springer 3-15.

Pregill, P. and Volkman, N., 1999. Landscapes in history: design and planning in the Eastern and Western traditions. John Wiley & Sons.

Priola S.A., Priola I. (2004) Molecular Aspects of Disease Pathogenesis in the Transmissible Spongiform Encephalopathies. In: Spencer J.F.T., Ragout de Spencer A.L. (eds) Public Health Microbiology. Methods in Molecular Biology, vol 268. Humana Press

Prudential Insurance Company. ~1920. Mortality of Chicago, 1844-1920. Accessed 1 September, 2019. http://www.encyclopedia.chicagohistory.org/pages/3608.html.

Prüfer, K., Munch, K., Hellmann, I., Akagi, K., Miller, J.R., Walenz, B., Koren, S., Sutton, G., Kodira, C., Winer, R. and Knight, J.R., 2012. The bonobo genome compared with the chimpanzee and human genomes. Nature, 486(7404), p.527.

Puckle, Bertram S. Funeral Customs, Their Origin and Development. London, T. Werner Laurie Ltd, 1926.

Raish C, Gonzalez-Caban A, Martin W, Martin I, Bender H. Cultural variation in public perceptions concerning fire use and management. Daniel, TC; Carroll, M.; Moseley, C.; Raish, C. 2007:70-88.

Rendu W, Beauval C, Crevecoeur I, Bayle P, Balzeau A, Bismuth T, Bourguignon L, Delfour G, Faivre J P, Lacrampe-Cuyaubere F, Tavormina C, Todisco D, Turq A, and Maureille B. 2014. Evidence supporting an intentional Neandertal burial at La Chapelle-aux-Saints. PNAS, 111 (1): 81-86.

Renfrew, C. 2006. Inception of agriculture and rearing in the Middle East. Comptes Rendus Palevol, 5 395-404.

Rosen, G. 1972. Psyche and history, editorial. Psychological Medicine, 2: 205-207.

Robertson, N., 1983. The Collective Burial of Fallen Soldiers at Athens, Sparta and Elsewhere:" Ancestral Custom" and Modern Misunderstanding. Echos du monde classique: Classical views, 27(1), pp.78-92.

Rosier E, Loix S, Develter W, Van de Voorde W, Tytgat J, Cuypers E. 2016. Time-dependent VOC-profile of decomposed human and animal remains in laboratory environment. Forensic Science International, 266: 164-169.

Rosier, E., et al. (2015). "The search for a volatile human specific marker in the decomposition process." PloS one 10(9) e0137341.

Rotundo B. Mount Auburn: Fortunate coincidences and an ideal solution. The Journal of Garden History. 1984;4(3):255-67.

Rugg, J. 2000a. From cradle to grave: Birth, marriage and death in England 1700-2000. Mortality, 5 (3): 339

Rugg, J. 2000b. Defining the place of burial: what makes a cemetery a cemetery?. Mortality, 5(3), pp.259-275.

Rugg, J. 2013a. Choice and constraint in the burial landscape: re-evaluating twentieth-century commemoration in the English churchyard. Mortality, 18 (3): 215-234.

Rugg, J. 2013b. Constructing the grave: competing burial ideals in the nineteenth-century England. Social History, 38 (3): 328-345.

Rugg, J., Stirling, F. and Clayden, A., 2014. Churchyard and cemetery in an English industrial city: Sheffield, 1740–1900. Urban history, 41(4), pp.627-646.

Rumble, H., Troyer, J., Walter, T. and Woodthorpe, K., 2014. Disposal or dispersal? Environmentalism and final treatment of the British dead. Mortality, 19(3), pp.243-260.

Sanford, M. R. (2015). "Forensic entomology of decomposing humans and their decomposing pets." Forensic science international 247 e11-e17.

Schmidt, J.M., 2010. 200 years Organon of Medicine–A comparative Review of its six editions (1810–1842). Homeopathy, 99(04), pp.271-277.

Shukitis, A., 2012. History of Lawn Mowers.

Schuyler, D. (1984). "The evolution of the Anglo-American rural cemetery landscape architecture as social and cultural history." The Journal of Garden History 4(3) 291-304.

Siegel, S. and Castellan Jr, N.J., 1988. Nonparametric statistics second edition.

Smirnov, Y. 1989. Intentional human burial: Middle Paleolithic (Last Glaciation) beginnings. Journal of World Prehistory, 3 (2): 199-233.

Smith, T.W. and Jarkko, L., 1998. National pride: A cross-national analysis. Chicago, IL: National Opinion Research Center, University of Chicago.

Stadler, S., et al. (2015). "Inter-year repeatability study of volatile organic compounds from surface decomposition of human analogues." International journal of legal medicine 129(3) 641-650.

Stetson G R. 1896. The animistic vampire in New England. American Anthropologist, 9 (1): 1-13.

Stone S L. 1987. “Blessed are they that mourn”: Expressions of grief in South Central Kentucky, 1870-1910. The Register of the Kentucky Historical Society, 85 (3): 213-236.

Svizzero, S. and Tisdell, C., 2014. Theories about the commencement of agriculture in prehistoric societies: A critical evaluation. Rivista di storia economica, 30(3), pp.255-280.

Szczygiel, B. and Hewitt, R., 2000. Nineteenth-century medical landscapes: John H. Rauch, Frederick Law Olmsted, and the search for salubrity. Bulletin of the History of Medicine, 74(4), pp.708-734.

Tarlow, S. 2000. Landscapes of memory: the nineteenth-century garden cemetery. European Journal of Archaeology, 3 (2): 217-239.

Tesh, S.N., 1995. Miasma and "social factors" in disease causality: Lessons from the nineteenth century. Journal of Health Politics, Policy and Law, 20(4), pp.1001-1024.

Thagard, P., 1996. The concept of disease: Structure and change. Communication and Cognition, 29, pp.445-478.

Üçisik, Ahmet S, and P. S. Rushbrook. 1998. Impact of cemeteries on the environment and public health. WHO, Regional Office for Europe, Waste Management, WHO Regional Office for Europe, European Centre for Environment and Health, Nancy Project Office.

United States Labor Law, Wikipedia, the Free Encyclopedia, en.wikipedia.org/wiki/United_States_labor_law.

University of Chicago, Map Room, 1100 East 57th Street, Chicago, IL 60637. "Map of Cook County, Illinois." Map. Rand McNally and Company, 1910.

Vass A, Barshick S-A, Sega G, Caton, Skeen J T, Love J C, Synstelien J A. 2002. Decomposition chemistry of human remains: a new methodology for determining the postmortem interval. Journal of Forensic Sciences, 47 (3): 542-553.

Vass A, Bass W M, J D Wolt, J E Foss, J T Ammons. 1992. Time since death determinations of human cadavers using soil solution. Journal of Forensic Sciences, 37 (5): 1236-1253.

Vass A. 2001. Beyond the grave – understanding human decomposition. Microbiology Today, 28: 190-192.

Vass A. 2011. Elusive universal post-mortem interval formula. Forensic Science International, 204: 34-40.

Vidutis, R. and V. A. Lowe (1980). "The Cemetery as a Cultural Text." Kentucky Folklore Record 26(3) 103.

Walter, T. 2005. Three ways to arrange a funeral: Mortuary variation in the modern West. Mortality, 10 (3): 173-192.

Welford, J., 1992. American death and burial custom deviation from Medieval European cultures. In Forum, 6 (Vol. 9).

Wilford, J.N., 2013. Neanderthals and the Dead. *The New York Times*, *13*, pp.1859-1962.

Williams, G.W., 2002. Aboriginal use of fire: are there any "natural" plant communities. USDA Forest Service, Washington DC.

Withington, E.T., 1892. Medical History from the Earliest Times: XXIV.—The Influence of Christianity on Medicine. The Hospital, 12(312), p.405.

Wolfe, A., 2011. The Origins of Religion, Beginning With the Big Bang. *New York Times Sunday Book Review*, *2*.

Wolfram, S., 2002. A new kind of science (Vol. 5, p. 130). Champaign, IL: Wolfram media.

Worpole, K., 2003. Last landscapes: The architecture of the cemetery in the West. Reaktion Books.

Zychowski J, Bryndal T. Impact of cemeteries on groundwater contamination by bacteria and viruses - a review. J Water Health. 2015;13(2):285-301.

Żychowski, J. (2011). "Geological aspects of decomposition of corpses in mass graves from WW1 and 2, located in SE Poland." Environmental Earth Sciences 64(2) 437-448.

Żychowski, J. (2012). "Impact of cemeteries on groundwater chemistry A review." Catena 93 29-37.

APPENDIX 1 – CEMETERY LIST

OBJECTI	COUNTY	CEMETERY_NAME	STAT	Establishe	Establishe	SIZE	SoilTexture(Praminen	SoilTexture(Praminen	AvgSlope(%)_SoilMUDerivo	NearestSpotElevation_above	Nearest Spot	RRNearDistance
659	Cook	South Chapel Hill Gardens [Part of Zion Gardens; Chapel Hill Garden South]	IL	1900	1/1/1900	4,000,000				43.20	626.40	1,268
602	Cook	Saint Joseph's Cemetery - River Grove	IL	1901	1/1/1901	5,650,000	2	Loam	1.00			994
612	Cook	Saint Mary's Retreat House [Technoy, Brotherhood Catholic, Holy Ghost, Saint Norbert]	IL	1901	1/1/1901							
197	Cook	Bloomvale Cemetery	IL	1902	1/1/1902	3,300,000	4	Complex	3.50	19.40	602.60	147
65	Cook	Montrose Cemetery	IL	1902	1/1/1902	4,200,000	2	Loam	1.00	20.20	603.50	1,374
558	Cook	Rose Farm Family Burying Ground [Part of Zion Gardens]	IL	1902	1/1/1902							
459	Cook	Mount Hope Cemetery – Hanover Township	IL	1903	1/1/1903							
271	Cook	Saint Casimir Lithuanian Cemetery	IL	1903	1/1/1903	5,000,000	2	Loam	1.00	90.60	673.80	4,283
634	Cook	Saints Cyril and Methodius Catholic Cemetery [Lithuanian Catholic Cemetery]	IL	1903	1/1/1903	176,964	2	Loam	5.00	108.20	691.50	4,896
78	Cook	Saint Joseph Catholic Cemetery [Cooper Grove; Saint Joseph Cemetery]	IL	1904	1/1/1904	5,600,000	2	Loam	1.00	24.60	607.80	884
624	Cook	Saint Paul's Evangelical Lutheran Cemetery - Skokie	IL	1905	1/1/1905	210,905	3	Sand	3.50			2,732
203	Cook	Calvary [Steger]	IL	1907	1/1/1907	480,000	2	Loam	3.00	10.10	593.30	8,679
110	Cook	Resurrection Cemetery [Resurrection Catholic Cemetery and Mausoleum]	IL	1907	1/1/1907	9,200,000	2	Loam		131.10	714.30	2,503
183	Cook	Anshe Luknik Cemetery	IL	1908	1/1/1908		2	Loam	1.00	45.00	628.20	1,754
218	Cook	Elmhurst Cemetery	IL	1908	1/1/1908							
138	Cook	Hillside Cemetery [Greendale Cemetery]	IL	1908	1/1/1908	203,104	4	Complex	3.50	232.60	815.80	1,202
19	Cook	Evergreen Cemetery (Worth Township)	IL	1910	1/1/1910	3,200,000	3	Sand	3.50	20.80	604.00	1,111
108	Cook	Mount Forest Cemetery	IL	1910	1/1/1910		3	Sand	1.00	11.20	594.40	1,942
310	Cook	Cook County Cemetery at Oak Forest	IL	1911	1/1/1911	10,768,000	2	Loam	3.00	31.90	615.10	3,286
95	Cook	Cook County Cemetery for the Indigent [Central Plant Cemetery; Cook County Cemetery at Oak Forest; Cook County Potter's Field; Oak Forest Ceme	IL	1911	1/1/1911		2	Loam	3.00	31.00	614.20	4,399
21	Cook	Lincoln Cemetery [Chicago Cemetery Association, Chicago Cemetery Corporation]	IL	1911	1/1/1911	4,878,720	2	Loam	3.00	120.60	713.80	1,952
92	Cook	Lithuanian National Cemetery	IL	1911	1/1/1911	796,800	2	Loam	5.00	38.30	621.50	4,018
248	Cook	Memorial Park Cemetery and Mausoleum [Memorial Park Cemetery and Crematorium]	IL	1911	1/1/1911	5,600,000	2	Loam	1.00	27.90	611.10	5,189
315	Cook	Fair Oaks Park Cemetery [Fair Oaks Cemetery Association; Elliot Park]	IL	1913	1/1/1913							
34	Cook	Memorial Park Cemetery [Grass Point Cemetery, Grasse Pointe Cemetery, Central Cemetery Co.]	IL	1913	1/1/1913	5,600,000	2	Loam	1.00	27.90	611.10	5,189
272	Cook	Saint Gabriel Cemetery	IL	1913	1/1/1913	630,000	2	Loam	5.00	40.30	622.50	3,600
582	Cook	Saint Heinrich Catholic Church Cemetery	IL	1913	1/1/1913	108,000	3	Sand	3.50	32.80	616.00	757
102	Cook	Waldheim Cemetery [Rich Cemetery]	IL	1915	1/1/1915	4,600,000	2	Loam	1.00	58.50	641.70	932
123	Cook	Glen Oak Cemetery [Jewish Oakridge Cemetery; Maples Clear Oak Cemetry; Glen Oak Cemetery Company]	IL	1916	1/1/1916	7,000,000	2	Loam	1.00	80.80	664.00	2,158
181	Cook	American Progressive Cemetery	IL	1918	1/1/1918		2	Loam	1.00	39.80	622.00	239
67	Cook	Irving Park Cemetery [Irving Park Boulevard Cemetery]	IL	1918	1/1/1918	4,000,000	1	Clay	1.00	77.80	661.00	7,651
645	Cook	Seiden Prairie Cemetery [part of Burr Oak Cemetery]	IL	1918	1/1/1918	37,419,520	2	Loam		139.00	722.20	2,103
220	Cook	Ebenezer Cemetery [Ebenezer Lutheran Cemetery]	IL	1920	1/1/1920	11,000	2	Loam	3.00	116.90	700.10	2,266
155	Cook	Acacia Park Cemetery and Mausoleum	IL	1922	1/1/1922	3,266,800	1	Clay	4.00	73.60	656.80	8,779
553	Cook	River Burying Ground [Ridgewood Cemetery Company]	IL	1922	1/1/1922							
112	Cook	All Saints Catholic Cemetery and Mausoleum	IL	1923	1/1/1923	7,552,971	2	Loam		60.80	644.00	2,082
171	Cook	Holy Sepulchre Cemetery	IL	1923	1/1/1923	13,400,000				52.40	635.60	2,660
262	Cook	Our Lady of Sorrows Cemetery [Our Lady of Sorrow; Slovak Cemetery]	IL	1923	1/1/1923	9,000,000	2	Loam	3.00	79.80	663.00	4,410
227	Cook	Franciscan Cemetery [St. Mary's Retreat House Cemetery; Custody of the Holy Cross Cemetery]	IL	1924	1/1/1924							
124	Cook	Memory Gardens Cemetery [Euclid Cemetery, Euclid Lawn Cemetery, Euclid-Rand Cemetery]	IL	1924	1/1/1924	3,200,000	2	Loam	1.00	19.10	602.30	5,086
546	Cook	Reformed Church of Northfield Cemetery	IL	1924	1/1/1924							
224	Cook	Fairview Memorial Park [Fairview Memorial Cemetery]	IL	1925	1/1/1925	498,646	2	Loam	1.00	127.40	710.60	1,934
82	Cook	Burr Oak Cemetery	IL	1927	1/1/1927	1,742,400	2	Loam		26.20	609.40	2,301
202	Cook	Burr Oak Lutheran Cemetery	IL	1927	1/1/1927							
8	Cook	Chapel Hill Gardens South [Sloopy Hallau Memorial Garden]	IL	1927	1/1/1927	3,600,000				47.40	630.60	1,269
25	Cook	Fairview Memorial Cemetery	IL	1929	1/1/1929	498,646	2	Loam	1.00	127.40	710.60	1,934
258	Cook	Oakridge-Glen Oak Cemetery	IL	1929	1/1/1929	7,500,000	2	Loam	3.00	64.80	648.00	1,074
422	Cook	Lakewood Memorial Park [Lake Street Cemetery]	IL	1930	1/1/1930	952,605	2	Loam	3.00	17.90	601.10	3,065
249	Cook	Monarch Gardens [Chicago Suburban Cemetery, Peace Cemetery]	IL	1930	1/1/1930	770,000	2	Loam	1.00	60.70	643.90	1,102
464	Cook	Mount Vernon Memorial Gardens [Polar Hills Memorial Park, Memorial Estates, Memorial Gardens]	IL	1930	1/1/1930	371,917	2	Loam	1.00	97.30	680.50	6,294
6	Cook	Cooper's Grove Cemetery	IL	1933	1/1/1933	126,000	2	Loam	3.00	20.90	604.10	11,814
238	Cook	Immaculate Conception Monastery Cemetery	IL	1946	1/1/1946		1	Clay		14.20	597.40	653
97	Cook	Queen of Heaven Cemetery [Immanuel Evangelical Lutheran Church Cemetery; Queen of Heaven Catholic Cemetery]	IL	1947	1/1/1947	20,560,320	1	Clay	4.00	63.10	646.30	1,405
121	Cook	Randhill Park Cemetery	IL	1947	1/1/1947	183,214	2	Loam	3.00	176.20	759.50	11,307
300	Cook	Bauen Memorial Garden	IL	1958	1/1/1958	10,000	1	Clay	1.00	9.20	592.40	1,842
281	Cook	Saint Michael the Archangel Catholic Cemetery	IL	1958	1/1/1958	2,200,000	2	Loam	3.00	244.00	827.20	13,624
621	Cook	Saint Paul Evangelical Lutheran Church Cemetery – Seiden Prairie	IL	1958	1/1/1958							
647	Cook	Sherman Burial Site	IL	1958	1/1/1958							
246	Cook	Mary Hill Cemetery	IL	1959	1/1/1959	11,000,000	1	Clay	3.00	37.80	621.00	7,917
443	Cook	Maryhill Catholic Cemetery & Mausoleum	IL	1961	1/1/1961	3,648,356	1	Clay	3.00	37.80	621.00	7,905
90	Cook	Good Shepherd Catholic Cemetery	IL	2005	1/1/2005	354,279	2	Loam	3.00	63.60	646.80	2,088
206	Cook	Christ Church Churchyard [Church on the Hill Churchyard]	IL	1781	1/1/1781	1,198	3	Sand	3.50	98.80	682.00	1,924
43	Cook	Arlington Heights Cemetery	IL	1800	1/1/1800							
185	Cook	Arlington Heights Cemetery (Wheeling Township)	IL	1800	1/1/1800	321,145	2	Loam	1.00	106.60	689.80	5,259
154	Cook	Assumption Catholic Cemetery and Mausoleum	IL	1809	1/1/1809	1,302,646	2	Loam	1.00	4.80	588.00	2,409
415	Cook	Kinzie Residence Burying Ground	IL	1812	1/1/1812							
416	Cook	La Lime Burial Site	IL	1812	1/1/1812							
444	Cook	Massacre Site south of Fort Dearborn	IL	1812	1/1/1812							
214	Cook	East Wheeling Cemetery	IL	1819	1/1/1819							
44	Cook	Elk Grove Cemetery	IL	1819	1/1/1819	44,800	2	Loam	1.00	137.70	720.90	10,105
73	Cook	Archer Woods Cemetery	IL	1826	1/1/1826							
184	Cook	Archer Woods Cemetery (Mount Glenwood West)	IL	1826	1/1/1826	2,400,000	2	Loam	3.00	152.40	735.60	4,531
217	Cook	Elm Lawn Cemetery	IL	1827	1/1/1827							
192	Cook	Bethany Cemetery	IL	1828	1/1/1828	140,000	2	Loam	3.00	122.60	705.80	2,656
170	Cook	Bethany Lutheran Cemetery	IL	1828	1/1/1828	140,000	2	Loam	3.00	122.60	705.80	2,642
85	Cook	Cedar Park Cemetery	IL	1829	1/1/1829	3,936,667	2	Loam		101.70	684.90	3,112
194	Cook	Beverly Cemetery	IL	1830	1/1/1830	3,200,000	2	Loam	1.00	27.20	610.40	689
83	Cook	Beverly Memorial Park Cemetery	IL	1830	1/1/1830							

	OBJECTI	COUNTY	CEMETERY_NAME	STAT	Establishe	Establishe	SIZE	SoilTexture(Praminen	SoilTexture(Praminen	AvgSlope(%)_SoilMUDeriv	NearestSpatElevation_above-	NearestSpat	RRNearDistance
7	85	Cook	Cedar Park Cemetery	IL	1829	1/1/1829	3,986,667	2	Loam		101.70	684.90	3,112
8	194	Cook	Beverly Cemetery	IL	1830	1/1/1830	3,200,000	2	Loam	1.00	27.20	610.40	689
9	83	Cook	Beverly Memorial Park Cemetery	IL	1830	1/1/1830							
0	173	Cook	Hazel Green Cemetery [Hazelgreen Cemetery]	IL	1830	1/1/1830	33,758	2	Loam	1.00	59.80	642.00	403
1	695	Cook	Unknown Burial Site - Whitebock Homestead	IL	1830	1/1/1830							
2	199	Cook	Boardman Cemetery	IL	1832	1/1/1832	42,800						
3	419	Cook	Lake & Wabash Burial Site [Cholera Cemetery at Fort Dearborn]	IL	1832	1/1/1832							
4	586	Cook	Saint James Catholic Cemetery [Sag, Sag Bridge, Saint James Sag, Saganash]	IL	1833	1/1/1833							
5	18	Cook	Bachelor Grave Cemetery	IL	1834	1/1/1834	3,484,800						
6	186	Cook	Bachelor's Grave Cemetery	IL	1834	1/1/1834	3,484,800	2	Loam	1.00	30.90	614.10	13,000
7	46	Cook	Barrington Center Cemetery	IL	1834	1/1/1834	61,781	2	Loam	3.00	201.20	784.40	3,412
8	188	Cook	Barrington Center Cemetery [Miller's Grave]	IL	1834	1/1/1834	125,000	2	Loam	3.00	17.40	600.60	3,342
9	103	Cook	Forest Home Cemetery	IL	1835	1/1/1835	8,579,495				63.80	647.00	989
0	513	Cook	Old Thornton Township Cemetery [Abraham or Thornton Township Cemetery]	IL	1835	1/1/1835							
1	663	Cook	Southside Cemetery - Chicago [Union Cemetery; German Cemetery]	IL	1835	1/1/1835							
2	35	Cook	Dewes Cemetery	IL	**1836**	1/1/1836	800	2	Loam	1.00	11.70	594.90	3,238
3	20	Cook	Rosevale Cemetery	IL	1837	1/1/1837	2,600,000	2	Loam	1.00	42.60	625.80	578
4	273	Cook	Saint James at Sag Bridge Catholic Church [Saint James at Sag Bridge Church Cemetery]	IL	1837	1/1/1837	360,000	2	Loam	16.00	73.00	656.20	1,312
5	531	Cook	Plum Grove Cemetery (old) [Last Plum Grove Cemetery and Wolfrum Cemetery]	IL	1840	1/1/1840							
6	567	Cook	Saint Adalbert Catholic Cemetery	IL	1840	1/1/1840							
7	45	Cook	Sutherland Cemetery [Saylor Cemetery]	IL	1840	1/1/1840	48,000	2	Loam	5.00	13.30	596.50	
8	288	Cook	Thornton Township Cemetery [Strozzler Cemetery, Staplor Corner Cemetery, Saylor Cemetery; Old Thornton Cemetery]	IL	1840	1/1/1840	38,000	3	Sand	3.50	10.50	592.70	388
9	48	Cook	Cady Cemetery	IL	1841	1/1/1841	18,087	2	Loam	1.00	7.90	591.10	1,682
0	414	Cook	Konnicott Burial Ground	IL	1841	1/1/1841							
1	254	Cook	Norwood Park Home Cemetery	IL	1841	1/1/1841	77,280	1	Clay	4.00	67.30	650.50	2,290
2	690	Cook	Unknown Burial Site - Rexford House [Norwood Park Cemetery Association and Union Ridge Cemetery Association]	IL	1841	1/1/1841							
3	587	Cook	Saint Johannes Cemetery Niles Township - Sauk Village [Strassburg, Saint Jacob]	IL	1842	1/1/1842							
4	196	Cook	Bloom Presbyterian Cemetery [First Presbyterian]	IL	1843	1/1/1843	101,000	4	Complex	3.50	12.70	596.90	5
5	205	Cook	Chicago and Suburban Cemetery	IL	1843	1/1/1843		2	Loam		123.40	706.60	2,396
6	36	Cook	Saint Joseph Catholic Cemetery (Wilmette) [Saint Joseph Cemetery]	IL	1843	1/1/1843	55,000	4	Complex		15.90	599.10	2,370
7	603	Cook	Saint Lucas Cemetery [Grasse Point Cemetery]	IL	1843	1/1/1843	1,400,000	2	Loam	1.00	38.80	622.00	1,957
8	683	Cook	Union Cemetery, Barrington [Park Ridge Cemetery, Maine Cemetery]	IL	1843	1/1/1843							
9	287	Cook	Silverman & Weisz Cemetery	IL	1844	1/1/1844	8,400,000						
0	101	Cook	Waldheim Cemetery [Jewish Waldheim Cemeteries; Waldheim Jewish Cemetery]	IL	1844	1/1/1844	17,927,024	2	Loam	1.00	45.00	628.20	1,570
1	179	Cook	Alexander Cemetery	IL	1845	1/1/1845	43,560						
2	403	Cook	Jewish Cemetery at Lincoln Park	IL	1845	1/1/1845							
3	503	Cook	Old Burying Ground opposite foot of 92nd Street	IL	1845	1/1/1845							
4	260	Cook	Old Settlers Cemetery [Glar Cemetery, Bahlander's Cemetery]	IL	1845	1/1/1845	45,000	1	Clay	3.00	113.90	697.10	2,121
5	405	Cook	Jewish Waldheim Cemeteries -- Cemeteries No. 1-33	IL	1846	1/1/1846	15,246,000						
6	406	Cook	Jewish Waldheim Cemeteries -- Cemeteries No. 200 and up	IL	1846	1/1/1846	15,246,000						
7	407	Cook	Jewish Waldheim Cemeteries -- Cemeteries No. 34-62	IL	1846	1/1/1846	15,246,000						
8	408	Cook	Jewish Waldheim Cemeteries -- Cemeteries No. 63-83	IL	1846	1/1/1846	15,246,000						
9	409	Cook	Jewish Waldheim Cemeteries -- Cemeteries No. 84-129	IL	1846	1/1/1846	15,246,000						
0	243	Cook	Jewish Waldheim Cemetery	IL	1846	1/1/1846	15,246,000						
1	98	Cook	Parkholm Cemetery [LaGrange Cemetery, Oak Hill Cemetery]	IL	1846	1/1/1846	610,000	3	Sand	3.50	56.70	639.90	2,801
2	114	Cook	Ridgewood Cemetery [Evanston Graveyard]	IL	1846	1/1/1846	1,987,345	2	Loam	1.00	60.10	642.30	4,100
3	561	Cook	Sacred Heart [Coperley, West, Reid, Squires, Wing family burial grounds]	IL	1846	1/1/1846							
4	598	Cook	Saint John's Evangelical Lutheran Cemetery - Radenburg - Plum Grove [Mount Hope Cemetery, United Evangelical Congregation Wickliffe, Highland	IL	1846	1/1/1846							
5	303	Cook	Chicago City Cemetery (Defunct)	IL	**1847**	1/1/1847	27,654	2	Loam		123.40	706.60	2,396
6	274	Cook	Saint James Cemetery (Sauk Village)	IL	1847	1/1/1847	107,000	2	Loam	3.00	16.70	599.90	3,562
7	115	Cook	Sunset Memorial Gardens [Schueen's Grave, Sarah's Grave]	IL	1847	1/1/1847	1,400,000				68.10	651.30	668
8	556	Cook	Radenburg Cemetery	IL	1849	1/1/1849							
9	207	Cook	Church of the Holy Comforter Cemetery	IL	1850	1/1/1850		1	Clay	1.00	9.20	592.40	1,914
0	216	Cook	Elliott Cemetery	IL	**1850**	1/1/1850	6,621	2	Loam	1.00	89.80	673.00	2,302
1	62	Cook	Evergreen Cemetery (Barrington) [Evergreen Hill Cemetery]	IL	1850	1/1/1850	747,548	3	Sand	3.50	20.80	604.00	1,111
2	446	Cook	McCumber Burying Ground	IL	1850	1/1/1850							
3	276	Cook	Saint Johns Cemetery	IL	1850	1/1/1850	30,250	2	Loam	3.00	17.60	600.80	11,499
4	107	Cook	Hebrew Benevolent Cemetery [split into 4 -- B'nai Zion; Congregation KAM Isaiah Israel at Hyde Park; Hebrew Benevolent Society; Chevra Kadisha Ch	IL	1851	1/1/1851	800,000						
5	242	Cook	Jewish Graceland and Lakeview Cemetery [Hebrew Cemetery; Jewish Graceland Cemetery]	IL	1851	1/1/1851	5,700,000	3	Sand	3.50	8.70	591.90	1,052
6	599	Cook	Saint John's Evangelical Lutheran Cemetery Lansing [Radenburg, Rhadenberg Cemetery]	IL	1851	1/1/1851							
7	210	Cook	Couch Mausoleum [City Cemetery]	IL	1852	1/1/1852		2	Loam		125.40	708.60	1,881
8	322	Cook	First Reformed Church of Roseland Cemetery (vanished)	IL	1852	1/1/1852		4	Complex		10.60	592.80	3,196
9	372	Cook	Immanuel Evangelical Lutheran Cemetery [Skunk's Grove Cemetery]	IL	1852	1/1/1852							
0	55	Cook	Immanuel United Church of Christ Cemetery [Immanuel Lutheran Cemetery; Hanlon's Grove Cemetery]	IL	1852	1/1/1852	30,241	2	Loam	1.00	0.00	583.20	14,039
1	439	Cook	Lyonsville Congregational Church Cemetery [Flag Creek Cemetery, Indian Head Park, Original Cemetery]	IL	1852	1/1/1852							
2	573	Cook	Saint Benedict Catholic Cemetery [Old] [Saint Anna]	IL	1852	1/1/1852							
3	583	Cook	Saint Jacob's Catholic Cemetery [Angel Guardian, Angel Guardian Croatian, Saint Heinrich]	IL	1852	1/1/1852							
4	608	Cook	Saint Mary's Catholic Cemetery - Evergreen Park [Saint Mary's Buffalo Grove]	IL	1852	1/1/1852							
5	615	Cook	Saint Matthew's Lutheran Cemetery - Niles [Lutheran Cemetery near Lemont]	IL	1852	1/1/1852	44,703	2	Loam	3.00	132.90	716.10	5,059
6	2	Cook	Berger Cemetery	IL	1853	1/1/1853	52,000	2	Loam	1.00	46.60	629.80	5,916
7	147	Cook	Cook County Cemetery at Dunning	IL	1854	1/1/1854		4	Complex		28.80	612.00	8,378
8	235	Cook	Hebrew Benevolent Society of Chicago	IL	1854	1/1/1854	5,800,000						
9	182	Cook	Andrew Van Zirngibl Gravesite	IL	1855	1/1/1855	500						
0	158	Cook	Mount Olivet Cemetery [Mount Olivet Catholic Cemetery]	IL	1855	1/1/1855	4,051,080	2	Loam	1.00	75.00	658.20	815
1	61	Cook	Mount Mayriv Cemetery (Old)	IL	1856	1/1/1856	780,000	1	Clay	1.00	101.00	684.20	5,148
2	165	Cook	Homewood Memorial Gardens	IL	1857	1/1/1857	1,306,350	3	Sand	3.50	13.50	596.70	1,223
3	456	Cook	Mount Holland Cemetery [Holland, Oak Lawn, Homewood Memorial Gardens, Old Holland]	IL	1857	1/1/1857							
4	267	Cook	Rosemont Cemetery	IL	1857	1/1/1857	780,000	1	Clay	1.00	65.80	649.00	5,158

OBJECTI	COUNTY	CEMETERY_NAME	STAT	Establishe	Establishe	SIZE	SoilTexture(Praminen	SoilTexture(Praminen	AvgSlope(%)_SoilMUDeriv	NearestSpotElevation_above	NearestSpot	RRNearDistance
121	Cook	Calvary Cemetery	IL	1859	1/1/1859	292,709	2	Loam	3.00	10.10	593.30	8,683
175	Cook	Calvary Cemetery	IL	1859	1/1/1859	4,000,000	2	Loam	3.00	10.10	593.30	8,683
515	Cook	Orland Memorial Park [Old German Methodist Cemetery, United Methodist [Old]]	IL	1859	1/1/1859							
630	Cook	Saint Peter's Evangelical & Reformed Church Cemetery - Skokie	IL	1859	1/1/1859	290,107	3	Sand	3.50	121.00	704.20	1,057
633	Cook	Saint Peter's Lutheran Cemetery - Schaumburg [Evangelisch Lutherische Saint Paul Gesillschaft Cemetery]	IL	1859	1/1/1859	74,987	2	Loam	3.00			10,311
153	Cook	Union Ridge Cemetery [Bachelor's Grove, Borzel's Grove Cemetery]	IL	1859	1/1/1859	520,000	2	Loam	3.50	26.70	609.90	777
686	Cook	United Methodist Church Cemetery (New)	IL	1859	1/1/1859							
717	Cook	Zion Lutheran Cemetery Tinley Park [German Lutheran, German Protestant, First Evangelical. St. Paul]	IL	1859	1/1/1859	3,419	2	Loam	3.00	22.70	605.90	1,266
47	Cook	Deer Grove Cemetery	IL	1860	1/1/1860	13,131	2	Loam	5.00	209.40	792.60	478
223	Cook	Fairmount Memorial Park [Willow Hills Memorial Park]	IL	**1860**	1/1/1860	3,750,000	2	Loam	5.00	65.40	648.60	2,511
316	Cook	Fairmount-Willow Hills Memorial Park	IL	**1860**	1/1/1860	1,389,150	2	Loam	5.00	65.40	648.60	2,470
1	Cook	First Reformed Cemetery of Lansing [First Reformed Church of Lansing Cemetery]	IL	1860	1/1/1860		2	Loam		1.80	585.00	3,247
225	Cook	First Reformed of Lansing Cemetery [First Reformed Church of South Holland; First Reformed Church of Lansing Cemetery]	IL	1860	1/1/1860	9,600	2	Loam		1.80	585.00	3,247
105	Cook	Graceland Cemetery	IL	1860	1/1/1860	5,270,760	3	Sand	3.50	20.70	603.90	986
637	Cook	Saylor Family Cemetery [Bonnett; Sutherland; Stafler Corners]	IL	1860	1/1/1860	45,000	2	Loam	5.00	13.30	596.50	
648	Cook	Sherman Family Cemetery	IL	1860	1/1/1860							
213	Cook	Douglas Monument Park	IL	1861	1/1/1861	75,000	2	Loam		9.70	592.90	236
59	Cook	Douglas Monument Park Cemetery	IL	1861	1/1/1861	75,000						
532	Cook	Plum Grove Cemetery [Salem Cemetery, Salem Evangelical Church Cemetery, [German Methodist]]	IL	1862	1/1/1862							
522	Cook	Polar Oak Hill Cemetery [Oak Knoll Cemetery, Briar Hill Cemetery]	IL	1863	1/1/1863							
161	Cook	Saint Boniface Catholic Cemetery [Blue Island Catholic; Saint Boniface Cemetery]	IL	1863	1/1/1863	1,500,000	3	Sand	3.50	23.20	606.40	1,677
574	Cook	Saint Bonifaciur Churchyard Chicago [Saint Bonifaciur Cemetery, German Catholic Cemetery]	IL	1863	1/1/1863							
63	Cook	Saint Henry Catholic Church Cemetery [Saint Henry Catholic Cemetery]	IL	1863	1/1/1863	105,000	3	Sand	3.50	13.60	596.80	915
283	Cook	Saint Peter Catholic Cemetery	IL	1863	1/1/1863	140,000	3	Sand	3.50	121.00	704.20	1,195
667	Cook	Strazzlor Cemetery	IL	1863	1/1/1863							
143	Cook	Oak Glen Cemetery	IL	1864	1/1/1864	235,000	3	Sand	3.50	0.40	583.60	1,059
149	Cook	Rosehill Cemetery [Rosehill Cemetery and Mausoleum]	IL	1864	1/1/1864	15,246,000				37.20	620.40	1,146
81	Cook	First Evangelical Lutheran Cemetery	IL	**1865**	1/1/1865	269,352	4	Complex		19.40	602.60	540
53	Cook	Mount Hope Cemetery	IL	1865	1/1/1865	3,968,123	2	Loam	3.00	10.20	593.40	2,532
86	Cook	Mount Hope Cemetery	IL	1865	1/1/1865	43,952	2	Loam	3.00	10.20	593.40	2,532
140	Cook	Mount Hope Cemetery	IL	1865	1/1/1865	814,800	2	Loam	3.00	10.20	593.40	2,532
70	Cook	Oakwoods Cemetery Northfield [Northfield Oakwoods Cemetery]	IL	1865	1/1/1865	7,971,480	2	Loam		26.10	609.30	1,882
7	Cook	Saint Anne Catholic Cemetery	IL	1865	1/1/1865	84,000	2	Loam	3.00	23.20	606.40	4,147
291	Cook	Waldheim Jewish Cemeteries (central div.; Waldheim Jewish Cemetery)	IL	1865	1/1/1865	8,712,000	2	Loam	1.00	45.00	628.20	1,434
189	Cook	Barrington Union Cemetery [Henry Smith]	IL	1866	1/1/1866	54,000	2	Loam	5.00	2.70	585.90	11,618
302	Cook	Cemetery of Blue Island	IL	1866	1/1/1866	25,000	3	Sand	3.50	138.00	721.20	533
670	Cook	The Grove -- Konnicott Family Burying Ground [Konnicott Burying Ground] (vanished)	IL	1866	1/1/1866	10,000	2	Loam	3.00	69.60	652.80	2,944
198	Cook	Blue Island Cemetery	IL	1867	1/1/1867	400,000	2	Loam	3.00	13.30	596.50	
156	Cook	Wortlaun Cemetery	IL	1867	1/1/1867	3,136,320	1	Clay	1.00	106.10	689.30	9,623
631	Cook	Saint Peter's Evangelical Lutheran Cemetery [Soiden Prairie Cemetery]	IL	1868	1/1/1868		2	Loam	3.00	8.80	592.00	4,080
664	Cook	Staplar Corners Cemetery [Catholic Cemetery of Saint Peter Niles Centre]	IL	1868	1/1/1868	40,000	2	Loam	5.00	2.70	585.90	11,618
665	Cook	State Harpital Cemetery [Saint Peters United Church of Christ Cemetery]	IL	1868	1/1/1868	113,575	3	Sand	3.50	24.10	607.30	3,108
180	Cook	Altan Cemetery	IL	1870	1/1/1870	21,780						
452	Cook	Mares Montefiore Cemetery [Part of Waldheim Cemetery]	IL	1870	1/1/1870							
569	Cook	Saint Anna Cemetery	IL	1870	1/1/1870							
689	Cook	Unknown Burial Site - Mrs. Courtney [German, South Side Cemetery [Palatine], Palatine Union]	IL	1870	1/1/1870							
373	Cook	Immanuel Lutheran Cemetery, Des Plaines [Des Plaines Lutheran Cemetery; German Evangelical Lutheran Saint Stephens]	IL	1871	1/1/1871							
104	Cook	Concordia Cemetery	IL	1872	1/1/1872	2,000,000	2	Loam		45.50	628.70	1,572
554	Cook	Robinson's Grove Burying Ground [Indian Cemetery, Old Indian Cemetery]	IL	1872	1/1/1872							
268	Cook	Saint Adalbert Cemetery	IL	1872	1/1/1872	8,800,000	1	Clay	1.00	71.00	654.20	2,942
568	Cook	Saint Alphonsus Catholic Cemetery [Old Bohemian, Polish Cemetery, Catholic Bohemian & others]	IL	1872	1/1/1872	2,102,400	2	Loam	5.00	112.70	695.90	4,041
680	Cook	Trinity Lutheran Cemetery [Oak Forest Cemetery, Zion Lutheran Cemetery, Vogt Cemetery, German Evangelical Lutheran Zions Association]	IL	1872	1/1/1872							
231	Cook	German Waldheim Cemetery [Forest Home]	IL	1873	1/1/1873	8,200,000	2	Loam	1.00	45.00	628.20	1,385
562	Cook	Sacred Heart Catholic Cemetery	IL	1873	1/1/1873							
290	Cook	Waldheim Jewish Cemeteries [Free Sons of Israel Cemetery; Waldheim Jewish Cemetery]	IL	1874	1/1/1874	17,937,024	2	Loam	1.00	70.20	653.40	926
339	Cook	German Evangelical Cemetery (vanished)	IL	1875	1/1/1875							
241	Cook	Immanuel Lutheran Cemetery 2	IL	1875	1/1/1875	65,000	1	Clay		62.80	646.00	1,339
116	Cook	Immanuel Lutheran Cemetery (Glenview)	IL	1876	1/1/1876	125,000	1	Clay	3.00	74.20	657.40	1,868
148	Cook	Bohemian National Cemetery	IL	1877	1/1/1877	5,488,560	2	Loam	1.00	35.60	618.80	3,729
454	Cook	Mount Glenwood Memory Gardens - South [Archer Woods]	IL	1879	1/1/1879	3,390,720	3	Sand	3.50	37.10	620.30	378
69	Cook	Mount Greenwood Cemetery	IL	1879	1/1/1879	3,400,000	3	Sand	9.00	134.00	717.20	733
228	Cook	Free Sons Cemetery Association [Jewish Waldheim Cemetery]	IL	1880	1/1/1880							
371	Cook	Immanuel Evangelical Lutheran Cemetery -- Hillside [Previra Lutheran Cemetery; German Evangelical Lutheran Cemetery; Immanuel Church Cemet	IL	1880	1/1/1880							
559	Cook	Russell Family Burying Ground [Gouske Farm, Biesner, Birner Farm]	IL	1880	1/1/1880							
455	Cook	Mount Glenwood Memory Gardens - West [Archer Woods Memorial Park, Glendale Memorial Cemetery]	IL	**1882**	1/1/1882	765,345	2	Loam	3.00	152.40	735.60	3,937
286	Cook	Shalom Memorial Park Jewish Funeral Home [Shalom Memorial Park]	IL	1882	1/1/1882	4,600,000	2	Loam	5.00	172.90	756.10	11,027
93	Cook	Christ Lutheran Cemetery	IL	**1883**	1/1/1883	62,046	2	Loam	25.00	53.20	636.40	9,974
201	Cook	Braun Family Cemetery	IL	1884	1/1/1884	6,594	2	Loam	9.00	149.90	733.10	1,538
178	Cook	Altenheim Cemetery	IL	1885	1/1/1885	73,000	2	Loam		109.70	692.90	726
458	Cook	Mount Hope Cemetery - Worth Township	IL	1885	1/1/1885							
270	Cook	Saint Benedict Cemetery	IL	1885	1/1/1885	510,000	3	Sand	3.50	36.70	619.90	3,060
200	Cook	Bauen Memorial Garden [Koniluarth Union Churchyard]	IL	1886	1/1/1886	10,000	1	Clay	1.00	9.20	592.40	1,840
146	Cook	Mount Olive Cemetery [Scandinavian Lutheran Cemetery]	IL	1886	1/1/1886	2,900,000	1	Clay	1.00	39.70	622.90	6,129
552	Cook	Ridgeville Cemetery [North Park Cemetery Company Inc.]	IL	1887	1/1/1887							
17	Cook	Saint Gabriel Catholic Cemetery	IL	1887	1/1/1887	340,000	2	Loam	5.00	40.30	623.50	3,599
611	Cook	Saint Mary's Mizrian Cemetery [Saint Mary's German Catholic Cemetery, Saint Marian]	IL	1888	1/1/1888	6,388,114	2	Loam	1.00	17.70	600.90	1,450
118	Cook	Saint Marys Cemetery	IL	1888	1/1/1888	7,700,000	2	Loam	1.00	17.70	600.90	1,451
58	Cook	Bluff City Cemetery	IL	1889	1/1/1889	4,704,480	4	Complex	25.00	20.00	603.20	2,102

OBJECTI	COUNTY	CEMETERY_NAME	STAT	Establishe	Establishe	SIZE	SoilTexture(Preminen	SoilTexture(Preminen	AvgSlope(%)_SoilMUDeriv	NearestSpotElevation_above	NearestSpot	RRNearDistance
462	Cook	Mount Mayriv Cemetery - [Nou] [Part af Zion Gardenz]	IL	1889	1/1/1889							
671	Cook	Thampran Cemetery Dalton [Sunset Cemetery Campany]	IL	1890	1/1/1890							
704	Cook	Warhington Memary Gardenz [Oak Farest Cemetery, Zion Lutheran. Cemetery, Tinley Park; Hazelwood]	IL	1891	1/1/1891	3,345,120	3	Sand	1.00	15.10	598.30	2,598
54	Cook	Bartlett Cemetery	IL	1892	1/1/1892	120,000	2	Loam	4.00	19.80	603.00	774
236	Cook	Holy Cruzz Cemetery and Mauraleumz	IL	1893	1/1/1893	5,000,000	3	Sand	3.50	54.20	637.40	8,451
109	Cook	Bethania Cemetery	IL	1894	1/1/1894	3,400,000	2	Loam	1.00	102.00	686.20	3,595
209	Cook	Congregatian Betheran Hamedrarh Hackamdarh Cemetery	IL	1894	1/1/1894	264,000	1	Clay	1.00	61.20	644.40	8,118
166	Cook	Danirh Cemetery	IL	1894	1/1/1894	4,728	2	Loam	5.00	209.40	792.60	478
215	Cook	Eden Memarial Park	IL	1894	1/1/1894	1,606,570	1	Clay	1.00	120.10	703.30	1,928
28	Cook	Eden Memarial Park Cemetery	IL	1894	1/1/1894	1,606,570						
174	Cook	Mount Carmel Cathalic Cemetery	IL	1894	1/1/1894	9,321,840	1	Clay	4.00	81.00	664.20	2,497
256	Cook	Oak Ridge Cemetery - Lanring [Halbrook Cemetery]	IL	1894	1/1/1894	425,000	3	Sand	3.50			138
68	Cook	All Saintz Palirh National Cathalic Cemetery	IL	1895	1/1/1895	2,200,000	2	Loam	1.00	127.50	710.70	1,564
191	Cook	Beth Jacab [Kehilath Jacab Anshe Drohiczen]	IL	1895	1/1/1895	44,000	1	Clay		126.90	710.10	4,063
128	Cook	Beth Jacab Cemetery [Martan Grave Cemetery]	IL	1895	1/1/1895							
150	Cook	Beth-El - Ridgelawn Cemetery	IL	1895	1/1/1895		1	Clay	1.00	39.20	622.40	1,448
193	Cook	Bethel Cemetery [anather name??]	IL	1895	1/1/1895	300,000	4	Complex		27.20	610.40	594
142	Cook	Church af the Holy Camfarter Caurtyard	IL	1895	1/1/1895	18,600	1	Clay	1.00	9.20	592.40	1,906
453	Cook	Mount Auburn Cemetery [Chicaga Park Cemetery]	IL	1895	1/1/1895							
126	Cook	New Light Jewirh Cemetery [New Hope Cemetery, Tezrville]	IL	1895	1/1/1895	87,000	2	Loam		149.90	733.10	1,014
551	Cook	Ridgelawn Cemetery [White Cemetery]	IL	1895	1/1/1895							
79	Cook	Elmwaad Cemetery [Elmwaad Cemetery and Mauraleum]	IL	1896	1/1/1896	10,000,000	2	Loam	1.00	82.70	665.90	899
160	Cook	Mount Iraiah Israel Cemetery	IL	1896	1/1/1896	1,600,000	1	Clay	1.00	72.10	655.30	5,141
461	Cook	Mount Jahazhua Cemetery [Part af Zion Gardenz]	IL	1896	1/1/1896							
265	Cook	Ridgelawn Cemeteries - Beth El Cemeteries	IL	1896	1/1/1896	290,000	1	Clay	1.00	27.20	610.40	627
651	Cook	Slavirh Cemetery [Queen af Heaven; Our Ladyaf Sarrau Cemetery]	IL	1897	1/1/1897	12,000,000	2	Loam	3.00	68.50	651.70	3,892
257	Cook	Oakland Memary Lanez Cemetery [Oakland, Thampran Cemetery, Dalton, Old Dalton Cemetery]	IL	1899	1/1/1899	980,000	3	Sand	3.50	35.80	619.00	6,770
594	Cook	Saint Jahn'z Evangelical Lutheran Cemetery	IL	1899	1/1/1899							
313	JEFFERSON	Bachtald Snyder Cemetery [Snyder Cemetery]	KY	1900	1/1/1900	15,000	2	Loam	9	282.10	706.80	
322	JEFFERSON	Beverly Ebbz Burial Site	KY	1901	1/1/1901	1,100,000	4	Complex	6	294.10	718.80	220
325	JEFFERSON	Blevinz Cemetery	KY	1902	1/1/1902	32	2	Loam	9	282.10	706.80	
460	JEFFERSON	Laurence Family Graveyard [Laurence Family Cemetery]	KY	1902	1/1/1902	96	2	Loam	9	282.10	706.80	
574	JEFFERSON	Sebartian Family Cemetery	KY	1902	1/1/1902	64	2	Loam	9	282.10	706.80	
43	JEFFERSON	Sauth Jefferzan Cemetery	KY	1902	1/1/1902	662,373	4	Complex	0	137.90	562.60	546
309	JEFFERSON	Anderzan Family Cemetery [Saldierz Retreat Cemetery]	KY	1906	1/1/1906	36,000	4	Complex	0	284.40	709.10	2,164
496	JEFFERSON	Mount Helly Cemetery	KY	1909	1/1/1909	25,000	2	Loam	18.5	92.30	517.00	6,859
287	JEFFERSON	Flay dr Fark Burying Graund [Flaydr Fark Baptirt Church Cemetery Or Flaydr Fark Cemetery]	KY	1910	1/1/1910	32,000	4	Complex	6	138.50	563.20	20,628
374	JEFFERSON	Eduard Tylor Family Cemetery	KY	1911	1/1/1911	20,250	4	Complex	6	91.10	515.80	1,987
556	JEFFERSON	Saint Lauir Cathalic Cemetery	KY	1911	1/1/1911	2,133	2	Loam	9	203.40	628.10	10,429
340	JEFFERSON	Cathedral Cemetery (Defunct) Cemetery	KY	1912	1/1/1912	25	2	Loam	9	282.10	706.80	
133	JEFFERSON	Unnamed In Hunting Creek Sub Cemetery*	KY	1912	1/1/1912	3,600,000	4	Complex	0	115.70	540.40	2,406
549	JEFFERSON	Rudy Burial Graund	KY	1913	1/1/1913	32	2	Loam	9	282.10	706.80	
602	JEFFERSON	Thampran Farm Cemetery	KY	1915	1/1/1915	64	2	Loam	1	1.20	425.90	8,464
585	JEFFERSON	Spaad Cemetery	KY	1916	1/1/1916	512	2	Loam	9	282.10	706.80	
451	JEFFERSON	Kellar, Mazer Cemetery	KY	1917	1/1/1917	128	2	Loam	9	282.10	706.80	
475	JEFFERSON	Manrlick Cemetery	KY	1920	1/1/1920	2,400,000	2	Loam	9	282.10	706.80	
341	JEFFERSON	Cathedral Of The Azzumptian (Defunct) Cemetery	KY	1921	1/1/1921	6,969,600	2	Loam	9	282.10	706.80	
535	JEFFERSON	Prather Cemetery [Faxhill Cemetery]	KY	1921	1/1/1921	32	2	Loam	9	282.10	706.80	
394	JEFFERSON	Fauntaine Ferry Park Graundz Cemetery	KY	1928	1/1/1928	162	2	Loam	9	282.10	706.80	
303	JEFFERSON	Achorz Cemetery	KY	1929	1/1/1929	3,600,000	4	Complex	0	115.70	540.40	
354	JEFFERSON	Canfederate Cemetery	KY	1929	1/1/1929	18,000	4	Complex	6	120.70	545.40	4,682
183	JEFFERSON	Rarthaven Memarial	KY	1929	1/1/1929	3,600,000	4	Complex	0	115.70	540.40	2,319
323	JEFFERSON	Blankenbaker Cemetery	KY	1931	1/1/1931	1,900,000	4	Complex	0	120.10	544.80	1,071
577	JEFFERSON	Simpran Memarial Gardenz	KY	1933	1/1/1933	32	2	Loam	9	282.10	706.80	
310	JEFFERSON	Arnaldtaun Cemetery	KY	1935	1/1/1935	25	1	Clay	6	190.40	615.10	7,284
512	JEFFERSON	Ormsby Burial Graund	KY	1936	1/1/1936	160	2	Loam	4	216.10	640.80	20,096
371	JEFFERSON	Eartwaad Cemetery #2	KY	1939	1/1/1939	96	2	Loam	9	282.10	706.80	
48	JEFFERSON	Lauirville Memarial Gardenz Eart	KY	1940	1/1/1940	902,694	4	Complex	0	153.50	578.20	6,436
136	JEFFERSON	O'Bannan Cemetery [In Farest Spring Sub]	KY	1940	1/1/1940	172,106	4	Complex	0	153.50	578.20	6,533
231	JEFFERSON	Western [Jefferzan Street] Cemetery A	KY	1940	1/1/1940	983,193	4	Complex	0	153.50	578.20	5,971
473	JEFFERSON	Lauirville Prezbyterian Seminary Memarial Garden	KY	1941	1/1/1941		2	Loam	9	282.10	706.80	
620	JEFFERSON	Wolrh Cemetery	KY	1942	1/1/1942	20,800	2	Loam	9	282.10	706.80	
566	JEFFERSON	Saint Thamar Epircapal Church Meditatian Garden	KY	1946	1/1/1946	12,000	4	Complex	6	120.80	545.50	7,465
351	JEFFERSON	Clark Cemetery	KY	1953	1/1/1953		2	Loam	9	282.10	706.80	
207	JEFFERSON	Eartview Ch Of Chriri(Mccauley) Cemetery	KY	1953	1/1/1953	103,542	4	Complex	0	55.20	479.90	4,909
268	JEFFERSON	Jmf Caral Ridge Seperate Baptirt Cemetery	KY	1953	1/1/1953	101,495	4	Complex	0	55.20	479.90	4,787
206	JEFFERSON	Okalana Graveyard - Miller Cemetery	KY	1953	1/1/1953	28,096	4	Complex	0	55.20	479.90	4,727
291	JEFFERSON	Pennrylvania Run Cemetery [Old Penn Run Cemetery, Old Pennrylvania Run Prezrytarian Cemetery, Penn Run Cemetery, Pennrylvania Run Memaria	KY	1953	1/1/1953	1,696,314	4	Complex	0	29.90	454.60	4,376
238	JEFFERSON	Rarthaven Memarial Cemetery	KY	1953	1/1/1953	157,208	4	Complex	0	55.20	479.90	4,887
221	JEFFERSON	Sanderz Family Alva At Haure Number 2605 Cemetery	KY	1953	1/1/1953	3,023,064	4	Complex	0	215.30	640.00	3,786
185	JEFFERSON	Unnamed [Nash Caurt] Partnerzhip Ownerz Cemetery*	KY	1953	1/1/1953	26,354	4	Complex	0	55.20	479.90	4,765
240	JEFFERSON	Unnamed In Iraquoir Heightz Sub Cemetery*	KY	1953	1/1/1953	363,595	4	Complex	0	29.90	454.60	4,645
462	JEFFERSON	Lauir Family Cemetery	KY	1955	1/1/1955	32	2	Loam	9	282.10	706.80	
361	JEFFERSON	Crune Cemetery	KY	1961	1/1/1961	2,200	4	Complex	6	153.20	577.90	748
358	JEFFERSON	Cauntry Hame Cemetery	KY	1967	1/1/1967		2	Loam	9	282.10	706.80	
639	JEFFERSON	Zachary Taylar National Cemetery	KY	1967	1/1/1967	1,200,000	4	Complex	0	94.60	519.30	4,763
47	JEFFERSON	Lane Hill Baptirt Church Cemetery	KY	1977	1/1/1977	160,954	4	Complex	6	46.10	470.80	16,349
384	JEFFERSON	Flat Rack Chriztian Church Cemetery	KY	1982	1/1/1982		4	Complex	0	35.30	460.00	3,311

OBJECTI	COUNTY	CEMETERY_NAME	STAT	Establishe	Establishe	SIZE	SoilTexture(Praminen	SoilTexture(Praminen	AvgSlope(%)_SoilMUDeriv	NearestSpotElevation_above	NearestSpot	RRNearDistance
562	JEFFERSON	Saint Paul United Methodist Church Columbarium	KY	1984	1/1/1984	1,200	4	Complex	6	7.80	432.50	1,998
546	JEFFERSON	Ronald Cox'S Farm Cemetery	KY	1987	1/1/1987	317,988	2	Loam	9	282.10	706.80	
363	JEFFERSON	Day Cemetery	KY	1988	1/1/1988	410,000	2	Loam	4	10.10	434.80	20,382
573	JEFFERSON	Seaton - Mills Family Cemetery	KY	1997	1/1/1997	64	2	Loam	9	282.10	706.80	
567	JEFFERSON	Samuel Frederick Cemetery	KY	2001	1/1/2001	96	2	Loam	9	282.10	706.80	
356	JEFFERSON	Coal Brook Cemetery	KY	2002	1/1/2002	3,000	1	Clay	6	16.40	441.10	3,441
476	JEFFERSON	Markwell Cemetery	KY	2007	1/1/2007		2	Loam	9	282.10	706.80	
118	JEFFERSON	Meadow View Cemetery	KY	2010	1/1/2010	103,891	4	Complex	6	8.60	433.30	188
565	JEFFERSON	Saint Stephen'S Cemetery	KY	2010	1/1/2010		2	Loam	9	282.10	706.80	
305	JEFFERSON	Agape Of Jesus Catholic Church Cemetery	KY	2014	1/1/2014	134,949	4	Complex	6	294.10	718.80	469
569	JEFFERSON	Sanders - Baloe Family Cemetery	KY	2014	1/1/2014		4	Complex	6	15.60	440.30	5,621
329	JEFFERSON	Bridwell Family Cemetery	KY	1759	1/1/1759	100	2	Loam	9	282.10	706.80	
389	JEFFERSON	Forest Springs Cemetery	KY	1780	1/1/1780	8,000	4	Complex	6	226.90	651.60	6,431
337	JEFFERSON	Caleb Duncan Farm Cemetery	KY	1781	1/1/1781	17,000	4	Complex	6	132.70	557.40	1,196
89	JEFFERSON	Eastwood Methodist Church [Tunnel Hill Cemetery]	KY	1781	1/1/1781	55,931	4	Complex	6	33.70	458.40	166
395	JEFFERSON	Frederick Private Cemetery	KY	1781	1/1/1781	100	4	Complex	0	16.00	440.70	3,276
472	JEFFERSON	Louisville Memorial Gardens West [Louisville Memorial Park]	KY	1781	1/1/1781	100	2	Loam	9	282.10	706.80	
278	JEFFERSON	Saint Michaels Cemetery	KY	1781	1/1/1781							
467	JEFFERSON	Logan Cemetery	KY	1782	1/1/1782	64	2	Loam	9	282.10	706.80	
435	JEFFERSON	Hazard Cemetery	KY	1784	1/1/1784	64	2	Loam	9	282.10	706.80	
277	JEFFERSON	Breckenridge - Floyd Cemetery	KY	1786	1/1/1786	60,810	2	Loam	9	267.20	691.90	9,232
276	JEFFERSON	Eastern Cemetery	KY	1786	1/1/1786	87,207	4	Complex	6	271.80	696.50	1,178
442	JEFFERSON	Jeffersontaun Evangelical Cemetery	KY	1786	1/1/1786	100,000	4	Complex	6	271.80	696.50	1,175
611	JEFFERSON	Vance Cemetery	KY	1786	1/1/1786		2	Loam	9	282.10	706.80	
335	JEFFERSON	Bullitt Family Cemetery	KY	1790	1/1/1790	8,000	4	Complex	6	231.60	656.30	7,359
592	JEFFERSON	Stilwell Cemetery	KY	1790	1/1/1790		2	Loam	9	282.10	706.80	
514	JEFFERSON	Our Lady Of Laurds Cemetery	KY	1791	1/1/1791	6,800	4	Complex	0	149.90	574.60	1,262
327	JEFFERSON	Breckinridge Cemetery	KY	1795	1/1/1795	100	2	Loam	9	282.10	706.80	
294	JEFFERSON	Cooper Cemetery	KY	1795	1/1/1795	233,917	4	Complex	0	175.80	600.50	11,574
171	JEFFERSON	Hall, Marcr Cemetery	KY	1795	1/1/1795	24,786	4	Complex	0	120.80	545.50	8,792
502	JEFFERSON	Nancy Stone Grave Site	KY	1798	1/1/1798	5,800	4	Complex	6	120.70	545.40	4,641
317	JEFFERSON	Benajah Thampran Family Cemetery	KY	1799	1/1/1799	5,200	4	Complex	6	41.70	466.40	7,306
404	JEFFERSON	Goldstein Cemetery	KY	1799	1/1/1799	58,000	4	Complex	6	218.70	643.40	1,890
320	JEFFERSON	Bethany Memorial Cemetery [Bethany Cemetery]	KY	1800	1/1/1800		2	Loam	9	282.10	706.80	
168	JEFFERSON	Greenwood Cemetery	KY	1800	1/1/1800	145,011	4	Complex	0	261.70	686.40	5,941
143	JEFFERSON	Arterburn Cemetery	KY	1801	1/1/1801	198,459	2	Loam	4	35.90	460.60	5,438
312	JEFFERSON	Beard - Buckner - Gilliland Graveyard	KY	1802	1/1/1802	9,000	2	Loam	9	282.10	706.80	
608	JEFFERSON	Upper Jefferson Street Cemetery	KY	1802	1/1/1802	3,500	2	Loam	9	282.10	706.80	
610	JEFFERSON	Vance - Rabizan Cemetery	KY	1802	1/1/1802	173,804	2	Loam	9	282.10	706.80	
538	JEFFERSON	Quillman - Gutermuth Cemetery	KY	1803	1/1/1803	2,700	4	Complex	6	19.10	443.80	1,255
576	JEFFERSON	Simcae Cemetery	KY	1803	1/1/1803	1,500	2	Loam	4	143.60	568.30	22,340
405	JEFFERSON	Good Shepherd Convent Cemetery	KY	1804	1/1/1804	770	2	Loam	9	282.10	706.80	
116	JEFFERSON	Habbr Chapel And Cemetery	KY	1804	1/1/1804	41,164	4	Complex	6	135.70	560.40	1,529
568	JEFFERSON	Samuel Oldham Burial Ground	KY	1804	1/1/1804	420,000	4	Complex	0	31.20	455.90	1,415
443	JEFFERSON	Jeffersontaun Lutheran Cemetery	KY	1805	1/1/1805	225,000	4	Complex	0	19.40	444.10	4,198
349	JEFFERSON	Churchill Family Cemetery	KY	1806	1/1/1806	100	2	Loam	9	282.10	706.80	
463	JEFFERSON	Lightfoot Cemetery	KY	1807	1/1/1807	640	2	Loam	9	282.10	706.80	
430	JEFFERSON	Hite Burial Ground	KY	1808	1/1/1808	6,000	4	Complex	0	112.80	537.50	2,230
121	JEFFERSON	Portland Cemetery	KY	1808	1/1/1808	385,000	4	Complex	0	260.50	685.20	1,262
438	JEFFERSON	Jefferson County Poor Farm Cemetery	KY	1810	1/1/1810	96	2	Loam	9	282.10	706.80	
396	JEFFERSON	Gagel Family Cemetery	KY	1811	1/1/1811	95,500	4	Complex	6	276.40	701.10	2,320
560	JEFFERSON	Saint Michael Cemetery	KY	1811	1/1/1811		2	Loam	9	282.10	706.80	
326	JEFFERSON	Brashear Farm Cemetery	KY	1812	1/1/1812	3,000	2	Loam	9	282.10	706.80	
474	JEFFERSON	Maurlick Cemetery	KY	1812	1/1/1812	1,400,000	4	Complex	0	94.60	519.30	4,742
633	JEFFERSON	Wasden Family Cemetery	KY	1814	1/1/1814	1,164	2	Loam	9	282.10	706.80	
152	JEFFERSON	J-Town Colored - Lutheran - Braun'S Ct Cemetery	KY	1816	1/1/1816	33,585	2	Loam	6	66.40	491.10	838
489	JEFFERSON	Mitchell Family Cemetery	KY	1816	1/1/1816	256	2	Loam	9	282.10	706.80	
286	JEFFERSON	Jeffersontaun Cemetery Co	KY	1817	1/1/1817	4,269	4	Complex	6	48.90	473.60	7,390
481	JEFFERSON	Mcnutt Cemetery	KY	1817	1/1/1817	7,000	4	Complex	0	21.00	445.70	853
513	JEFFERSON	Orr Cemetery	KY	1817	1/1/1817	576	2	Loam	9	282.10	706.80	
604	JEFFERSON	Tunnel Hill Cemetery	KY	1817	1/1/1817	44,000	4	Complex	6	264.50	689.20	3,748
157	JEFFERSON	Slack Cemetery	KY	1818	1/1/1818	18,818	2	Loam	9	112.30	537.00	12,762
315	JEFFERSON	Boorsarth Cemetery	KY	1819	1/1/1819	500	2	Loam	18.5	287.80	712.50	9,713
36	JEFFERSON	Kalfus Family Cemetery [Kalfus Cemetery]	KY	1819	1/1/1819	22,869	2	Loam	4	52.80	477.50	2,344
450	JEFFERSON	Keller, Abraham Cemetery	KY	1819	1/1/1819	1,500	2	Loam	6	18.70	443.40	2,081
120	JEFFERSON	Portland Cemetery	KY	1819	1/1/1819							
440	JEFFERSON	Jeffersontaun Cemetery	KY	1820	1/1/1820	1,800	1	Clay	6	30.60	455.30	8,174
636	JEFFERSON	Xaverian Cemetery	KY	1820	1/1/1820	64	2	Loam	9	282.10	706.80	
93	JEFFERSON	Cane Run Presbyterian Cemetery	KY	1821	1/1/1821	20,647	4	Complex	6	207.80	632.50	5,410
390	JEFFERSON	Farmster Burial Ground	KY	1821	1/1/1821	38,000	2	Loam	4	38.00	462.70	3,878
422	JEFFERSON	Herr Cemetery 1 [Magnalia Farm Cemetery]	KY	1821	1/1/1821		2	Loam	9	282.10	706.80	
397	JEFFERSON	Gailbreath - Ferring Family Cemetery	KY	1822	1/1/1822	32	4	Complex	6	31.40	456.10	6,835
530	JEFFERSON	Pape Cemetery	KY	1822	1/1/1822	750	4	Complex	6	293.80	718.50	374
628	JEFFERSON	Williams - Phillips Cemetery	KY	1822	1/1/1822	470	4	Complex	6	149.00	573.70	370
259	JEFFERSON	Saint Stephens Cemetery	KY	1823	1/1/1823	19,907	2	Loam	6	108.60	533.30	2,142
232	JEFFERSON	Bullitt Family [Oxmoor Cemetery]	KY	1824	1/1/1824	1,350	1	Clay	6	116.40	541.10	7,893
578	JEFFERSON	Slack Family Cemetery	KY	1824	1/1/1824	288	2	Loam	9	282.10	706.80	
598	JEFFERSON	Temple Shalam Cemetery	KY	1824	1/1/1824	288	2	Loam	9	282.10	706.80	

OBJECTI	COUNTY	CEMETERY_NAME	STAT	Establishe	Establishe	SIZE	SoilTexture(Praminen	SoilTexture(Praminen	AvgSlope(%)_SoilMUDeriv	NearestSpotElevation_above	NearestSpot	RRNearDistance
232	JEFFERSON	Bullitt Family [Oxmoor Cemetery]	KY	**1824**	1/1/1824	1,350	1	Clay	6	116.40	541.10	7,893
578	JEFFERSON	Slack Family Cemetery	KY	1824	1/1/1824	288	2	Loam	9	282.10	706.80	
598	JEFFERSON	Temple Shalom Cemetery	KY	1824	1/1/1824	288	2	Loam	9	282.10	706.80	
407	JEFFERSON	Graham Cemetery	KY	1825	1/1/1825	7,800	2	Loam	4	201.90	626.60	1,697
487	JEFFERSON	Miller Cemetery	KY	1825	1/1/1825	28,000	4	Complex	6	33.70	458.40	4,042
547	JEFFERSON	Razr Cemetery [Razr Burial Graund]	KY	1825	1/1/1825	3,200	4	Complex	6	35.50	460.20	4,749
529	JEFFERSON	Pleasant Grave Cemetery	KY	1826	1/1/1826	416	2	Loam	9	282.10	706.80	
625	JEFFERSON	Wilcox Family Graveyard	KY	1826	1/1/1826	2,000	4	Complex	6	32.90	457.60	1,703
308	JEFFERSON	Allisan Family Cemetery	KY	1827	1/1/1827	54,668	4	Complex	6	218.70	643.40	1,958
28	JEFFERSON	Blankenbaker Family Cemetery	KY	1827	1/1/1827	653	2	Loam	4	19.10	443.80	801
324	JEFFERSON	Blenheim Plantation Family Graveyard	KY	1827	1/1/1827	12,000	2	Loam	9	282.10	706.80	
551	JEFFERSON	Saint Andrew Cemetery [Saint Andrew Catholic Cemetery]	KY	1828	1/1/1828	14,000	2	Loam	4	13.20	437.90	5,171
311	JEFFERSON	Bate Family Burial Graund; Bate Family Cemetery [Berry Hill Cemetery]	KY	1829	1/1/1829	1,000	2	Loam	9	282.10	706.80	
348	JEFFERSON	Churchill Daunr Derby Muraum Garden	KY	1829	1/1/1829	90,000	4	Complex	6	32.70	457.40	14,803
508	JEFFERSON	Old Cane Run Methadirt Cemetery	KY	1829	1/1/1829	25,000	4	Complex	6	192.40	617.10	2,672
141	JEFFERSON	Cave Hill Cemetery	KY	**1830**	1/1/1830	4,835	4	Complex	18.5	30.40	455.10	1,209
119	JEFFERSON	Janer Cemetery - Shively	KY	**1830**	1/1/1830	10,062	2	Loam	6	18.70	443.40	1,378
490	JEFFERSON	Mix Family Cemetery	KY	1830	1/1/1830	544	2	Loam	9	282.10	706.80	
624	JEFFERSON	Wilcox - Clare Cemetery	KY	1830	1/1/1830	444,312	2	Loam	9	282.10	706.80	
400	JEFFERSON	Gaunt Cemetery	KY	1832	1/1/1832	1,024	2	Loam	9	282.10	706.80	
421	JEFFERSON	Hobbs Chapel Burial Graund	KY	1832	1/1/1832	400	4	Complex	6	52.50	477.20	6,449
69	JEFFERSON	Farnsley (Lear Lane Church) Cemetery	KY	**1833**	1/1/1833	4,138	4	Complex	0	286.50	711.20	1,173
449	JEFFERSON	Kalfur Family Cemetery	KY	1833	1/1/1833	5,400	4	Complex	6	206.40	631.10	295
613	JEFFERSON	Walker Cemetery	KY	1833	1/1/1833	3,650	2	Loam	9	282.10	706.80	
618	JEFFERSON	Weaver And Hallir Cemetery	KY	1833	1/1/1833	96	2	Loam	9	282.10	706.80	
631	JEFFERSON	Wilran - Snauder Cemetery	KY	1833	1/1/1833	3,800	4	Complex	6	248.40	673.10	1,549
314	JEFFERSON	Beeler Graham Cemetery	KY	1834	1/1/1834	12,000	1	Clay	6	28.80	453.50	10,478
359	JEFFERSON	Crark - Hobbs Familier Cemetery	KY	1834	1/1/1834	64	2	Loam	9	282.10	706.80	
372	JEFFERSON	Earum Family Cemetery	KY	1834	1/1/1834	2,700	4	Complex	6	140.30	565.00	9,752
401	JEFFERSON	Gorman Reformed Prorbyterian Cemetery	KY	1834	1/1/1834	2,200	4	Complex	6	47.40	472.10	1,191
630	JEFFERSON	Williamran Cemetery	KY	1834	1/1/1834	341	4	Complex	6	52.90	477.60	4,806
156	JEFFERSON	Cane Run Bapirt - Methadirt (Maare) Cemetery	KY	**1835**	1/1/1835	1,612	1	Clay	6	72.50	497.20	7,651
368	JEFFERSON	Duncan - Joffery Cemetery	KY	1835	1/1/1835	200	2	Loam	9	282.10	706.80	
380	JEFFERSON	Finley Cemetery	KY	1836	1/1/1836	145,000	4	Complex	0	41.60	466.30	29,948
250	JEFFERSON	Pennrylvania Run Cemetery Inc	KY	**1836**	1/1/1836	19,471	4	Complex	6	30.20	454.90	90
552	JEFFERSON	Saint Eduard'S Cemetery	KY	1836	1/1/1836	128	2	Loam	9	282.10	706.80	
76	JEFFERSON	Tyler Family Cemetery	KY	1836	1/1/1836	3,223	4	Complex	6	46.10	470.80	4,105
175	JEFFERSON	B'Nai Jacab Cemetery	KY	**1837**	1/1/1837	3,006	1	Clay	6	158.60	583.30	5,110
144	JEFFERSON	Greenwaad Cemetery	KY	1837	1/1/1837	42,819	2	Loam	4	30.30	455.00	5,811
375	JEFFERSON	Ellingruarth - Frederick Cemetery	KY	1838	1/1/1838	4,500	2	Loam	9	282.10	706.80	
409	JEFFERSON	Gray Cemetery (Fart Gearge)	KY	1838	1/1/1838	1,600	2	Loam	9	282.10	706.80	
417	JEFFERSON	Harradr Creek Cemetery	KY	1838	1/1/1838	320	2	Loam	9	282.10	706.80	
587	JEFFERSON	St John'S Cemetery	KY	1838	1/1/1838	3,938	2	Loam	9	282.10	706.80	
21	JEFFERSON	Camp Cemetery	KY	**1839**	1/1/1839	2,222	4	Complex	0	32.20	456.90	1,871
264	JEFFERSON	Forest Hame - Prather Cemetery	KY	**1840**	1/1/1840	10,672	4	Complex	6	215.20	640.00	3,116
494	JEFFERSON	Marzo Family Graveyard	KY	1840	1/1/1840	160	2	Loam	9	282.10	706.80	
339	JEFFERSON	Campgraund Cemetery	KY	1841	1/1/1841	2,200	2	Loam	9	282.10	706.80	
385	JEFFERSON	Flat Rack Raad Cemetery	KY	1841	1/1/1841	320	2	Loam	9	282.10	706.80	
352	JEFFERSON	Caffey Family Cemetery	KY	1842	1/1/1842	100	2	Loam	9	282.10	706.80	
402	JEFFERSON	Gilmare - Beeler Cemetery	KY	1843	1/1/1843	2,500	4	Complex	6	94.90	519.60	7,181
379	JEFFERSON	Foy Family Cemetery	KY	1844	1/1/1844	384	2	Loam	9	282.10	706.80	
81	JEFFERSON	Ormsby Cemetery - Kymilitaryinr - Ormsby Hall	KY	**1844**	1/1/1844	958	2	Loam	4	187.10	611.80	2,523
501	JEFFERSON	Myerr - Cardinal Hill Cemetery	KY	1845	1/1/1845	24,000	4	Complex	6	346.50	771.20	6,651
498	JEFFERSON	Maunt Zian Lutheran Cemetery	KY	1846	1/1/1846		2	Loam	9	282.10	706.80	
509	JEFFERSON	Old Heady Raad Cemetery	KY	1846	1/1/1846	768	2	Loam	9	282.10	706.80	
553	JEFFERSON	Saint Francir In The Fields Episcapal Church Cemetery	KY	1846	1/1/1846	356	4	Complex	6	190.60	615.30	5,587
591	JEFFERSON	Stewart Cemetery	KY	1846	1/1/1846	512	2	Loam	9	282.10	706.80	
457	JEFFERSON	King Family Cemetery	KY	1847	1/1/1847	1,000	2	Loam	9	282.10	706.80	
499	JEFFERSON	Mulberry Hill Cemetery [Clark Cemetery]	KY	1847	1/1/1847	340,000	4	Complex	0	11.00	435.70	5,888
142	JEFFERSON	Bullitt Family [Oxmoor Cemetery]	KY	1848	1/1/1848	12,443,655	4	Complex	0	28.90	453.60	3,017
102	JEFFERSON	Cave Hill National Cemetery	KY	**1848**	1/1/1848	192,000	4	Complex	0	26.50	451.20	1,683
596	JEFFERSON	Taylartaun Cemetery	KY	1848	1/1/1848	978	2	Loam	9	282.10	706.80	
597	JEFFERSON	Temple Cemetery [Addath Israel Cemetery; Congregatian Adath Israel Brith Shalam; Temple Brith Shalam Cemetery]	KY	1848	1/1/1848	6,800	4	Complex	6	94.60	519.30	1,887
600	JEFFERSON	The Temple Brith Shalam Cemetery	KY	1848	1/1/1848	620,000	2	Loam	9	282.10	706.80	
319	JEFFERSON	Beth Haven Cemetery	KY	1849	1/1/1849	19,000	2	Loam	6	247.70	672.40	5,977
353	JEFFERSON	Cammunity Of Christ Scripture Garden	KY	1849	1/1/1849	250	2	Loam	9	282.10	706.80	
544	JEFFERSON	Rabb Family Cemetery	KY	1849	1/1/1849	1,626	2	Loam	9	282.10	706.80	
550	JEFFERSON	Rudy Graveyard	KY	1849	1/1/1849	417	2	Loam	9	282.10	706.80	
582	JEFFERSON	Snauder Family Cemetery	KY	1849	1/1/1849	516	2	Loam	9	282.10	706.80	
344	JEFFERSON	Central State Harpital Cemetery [Lakeland Cemetery]	KY	1850	1/1/1850		2	Loam	9	282.10	706.80	
292	JEFFERSON	Fart Nelran Burial Graund (Defunct)	KY	1850	1/1/1850	6,000	1	Clay	6	161.90	586.60	2,311
515	JEFFERSON	Ouenr Cemetery	KY	1850	1/1/1850		2	Loam	9	282.10	706.80	
570	JEFFERSON	Sanderr Cemetery	KY	1850	1/1/1850		2	Loam	9	282.10	706.80	
637	JEFFERSON	Yeuell Cemetery	KY	1850	1/1/1850	424,274	2	Loam	9	282.10	706.80	
200	JEFFERSON	Daup Cemetery	KY	1851	1/1/1851	118,832	4	Complex	0	42.40	467.10	3,699
424	JEFFERSON	Herr Cemetery 3	KY	1851	1/1/1851	650	2	Loam	6	41.40	466.10	5,201
235	JEFFERSON	Kenareth, Israel Cangregatian In Cemetery	KY	1851	1/1/1851	104,500	4	Complex	0	42.40	467.10	3,841
281	JEFFERSON	Kennedy Graveyard Aka Old Kennedy	KY	1851	1/1/1851	82,198	4	Complex	0	42.40	467.10	3,443

OBJECTI	COUNTY	CEMETERY_NAME	STAT	Establishe	Establishe	SIZE	SoilTexture(Praminen	SoilTexture(Praminen	AvgSlope(%)_SoilMUDeriv	NearestSpotElevation_above	NearestSpot	RRNearDistance
424	JEFFERSON	Horr Cemetery 3	KY	1851	1/1/1851	650	2	Loam	6	41.40	466.10	5,201
235	JEFFERSON	Kenereth, Israel Congregation In Cemetery	KY	1851	1/1/1851	104,500	4	Complex	0	42.40	467.10	3,341
281	JEFFERSON	Kennedy Graveyard Aka Old Kennedy	KY	1851	1/1/1851	82,198	4	Complex	0	42.40	467.10	3,443
520	JEFFERSON	Pendleton Cemetery	KY	1851	1/1/1851		2	Loam	9	282.10	706.80	
534	JEFFERSON	Pound Family Cemetery #2	KY	1851	1/1/1851	128	2	Loam	9	282.10	706.80	
215	JEFFERSON	Razr Maybe Arlington Road Cemetery	KY	1851	1/1/1851	21,954	4	Complex	0	42.40	467.10	3,561
557	JEFFERSON	Saint Louis Cemetery (Relocated Twice)	KY	1851	1/1/1851	392,040	2	Loam	9	282.10	706.80	
558	JEFFERSON	Saint Luke'S Memorial Garden	KY	1851	1/1/1851	392,040	4	Complex	0	231.50	656.20	1,575
563	JEFFERSON	Saint Paul'S Episcopal Memorial Gardens	KY	1851	1/1/1851	2,090,880	4	Complex	0	42.40	467.10	3,429
173	JEFFERSON	Saint Stephens Cemetery	KY	1851	1/1/1851	1,693,264	4	Complex	0	42.40	467.10	3,366
427	JEFFERSON	Hiker Family Burying Ground	KY	1852	1/1/1852	1,500	4	Complex	6	138.60	563.30	6,512
539	JEFFERSON	Quillman Cemetery	KY	1852	1/1/1852	291	2	Loam	9	282.10	706.80	
336	JEFFERSON	Burkr Family Cemetery	KY	1854	1/1/1854	100	2	Loam	9	282.10	706.80	
362	JEFFERSON	Davis Family Graveyard	KY	1854	1/1/1854	1,500	2	Loam	4	81.20	505.90	1,868
398	JEFFERSON	Gardiner Family Cemetery [Pearce - Taylor Cemetery]	KY	1854	1/1/1854	352	2	Loam	9	282.10	706.80	
540	JEFFERSON	Quillman Cemetery #3	KY	1854	1/1/1854	160	2	Loam	9	282.10	706.80	
605	JEFFERSON	Tyler Cemetery [Edward Tyler Family Cemetery]	KY	1854	1/1/1854	32	2	Loam	9	282.10	706.80	
316	JEFFERSON	Bell Cemetery [Berrytown Cemetery, Inc.]	KY	1855	1/1/1855	15,000	4	Complex	6	182.10	606.80	3,487
425	JEFFERSON	Hart Farm Cemetery	KY	1855	1/1/1855	800	1	Clay	6	183.80	608.50	5,435
432	JEFFERSON	Holy Cross Cemetery	KY	1855	1/1/1855	40,000	4	Complex	6	128.90	553.60	6,934
436	JEFFERSON	Jacob Park Cemetery	KY	1855	1/1/1855	64,000	2	Loam	9	282.10	706.80	
470	JEFFERSON	Louis D. Brandeis School Of Law Cemetery	KY	1855	1/1/1855	192	2	Loam	9	282.10	706.80	
488	JEFFERSON	Mills Or Seaton Family Cemetery	KY	1855	1/1/1855	12,000	2	Loam	6	28.00	452.70	1,857
193	JEFFERSON	Pioneer Cemetery Next To [Bate] Cemetery	KY	1855	1/1/1855	11,892	2	Loam	6	28.00	452.70	1,863
554	JEFFERSON	Saint John Cemetery	KY	1855	1/1/1855	230,000	4	Complex	0	91.70	516.40	4,309
586	JEFFERSON	Springdale Burying Ground	KY	1855	1/1/1855	231	4	Complex	6	182.10	606.80	3,400
617	JEFFERSON	Waverly Hills Cemetery	KY	1855	1/1/1855	2,710	2	Loam	9	282.10	706.80	
382	JEFFERSON	Fisher - Reid Cemetery	KY	1856	1/1/1856	640	2	Loam	9	282.10	706.80	
51	JEFFERSON	Hackberry Cemetery [Stack Cemetery]	KY	1856	1/1/1856	305	4	Complex	18.5	331.00	755.70	1,214
505	JEFFERSON	Nouburg Christian Cemetery	KY	1856	1/1/1856	390	2	Loam	4	12.60	437.30	20,096
297	JEFFERSON	Oldham, Samuel Family Cemetery	KY	1856	1/1/1856	17,206	4	Complex	6	24.10	448.80	17,663
545	JEFFERSON	Rocky Hills Cemetery	KY	1856	1/1/1856	65,000	2	Loam	18.5	17.90	442.60	5,490
262	JEFFERSON	Stauers Cemetery	KY	1856	1/1/1856	141,352	4	Complex	0	28.40	453.10	1,170
441	JEFFERSON	Jefferson Town Church Of Christ Cemetery	KY	1857	1/1/1857	238,000	4	Complex	6	46.30	471.00	1,408
159	JEFFERSON	Mount Holly Methodist Cemetery Inc	KY	1857	1/1/1857	43,734	2	Loam	9	254.80	679.50	1,111
517	JEFFERSON	Parks Cemetery	KY	1857	1/1/1857		2	Loam	9	282.10	706.80	
189	JEFFERSON	Jones - Neale Cemetery	KY	1858	1/1/1858	405,549	4	Complex	0	91.70	516.40	4,235
580	JEFFERSON	Smoot Family Cemetery	KY	1858	1/1/1858	6,013	2	Loam	9	282.10	706.80	
182	JEFFERSON	Vanarsdale Cane Run Methodist (Maybe)	KY	1858	1/1/1858							
370	JEFFERSON	Fairview Church Of Christ Cemetery	KY	1859	1/1/1859	128	2	Loam	9	282.10	706.80	
82	JEFFERSON	Harbold Cemetery	KY	1859	1/1/1859	11,543	1	Clay	6	313.80	738.50	16,815
480	JEFFERSON	Medowell Cemetery [Relocated To Bells Mill Road In Bullitt County]	KY	1859	1/1/1859	66,000	4	Complex	6	299.40	724.10	7,508
399	JEFFERSON	Garr Family Cemetery	KY	1860	1/1/1860	500	2	Loam	31	166.50	591.20	6,274
541	JEFFERSON	Quillman Hill Cemetery	KY	1860	1/1/1860	256	2	Loam	18.5	25.90	450.60	1,026
572	JEFFERSON	Scaggan Cemetery	KY	1860	1/1/1860		2	Loam	9	282.10	706.80	
599	JEFFERSON	Terry Cemetery	KY	1861	1/1/1861	25,000	2	Loam	9	282.10	706.80	
108	JEFFERSON	Mccauley Cemetery [Removed]	KY	1863	1/1/1863	31,276	2	Loam	9	282.10	706.80	
38	JEFFERSON	Applegate Cemetery	KY	1864	1/1/1864	16,814	2	Loam	1	26.30	451.00	318
331	JEFFERSON	Braun Cemetery	KY	1865	1/1/1865	500	2	Loam	9	282.10	706.80	
378	JEFFERSON	Farnsley Cemetery	KY	1865	1/1/1865	160	2	Loam	9	282.10	706.80	
415	JEFFERSON	Harbald Cemetery	KY	1865	1/1/1865	1,200,000	4	Complex	0	37.40	462.10	1,572
360	JEFFERSON	Crossroads Gardens	KY	1866	1/1/1866	43,000	2	Loam	18.5	185.80	610.50	617
165	JEFFERSON	Horr Washburn [Devandale] Urgr Cemetery	KY	1866	1/1/1866	101,364	2	Loam	4	15.90	440.60	9,961
583	JEFFERSON	Snyder Cemetery [Bechtold - Snyder Cemetery]	KY	1866	1/1/1866	224	2	Loam	9	282.10	706.80	
90	JEFFERSON	Walden Cemetery	KY	1866	1/1/1866	1,089	4	Complex	6	213.60	638.30	12,113
343	JEFFERSON	Cedar Grove Cemetery	KY	1867	1/1/1867		2	Loam	9	282.10	706.80	
345	JEFFERSON	Chenoweth Run Cemetery	KY	1867	1/1/1867		2	Loam	9	282.10	706.80	
559	JEFFERSON	Saint Matthews Episcopal Church Memorial Gardens	KY	1867	1/1/1867	1,873,080	2	Loam	9	282.10	706.80	
411	JEFFERSON	Greenley Cemetery	KY	1868	1/1/1868	632	2	Loam	9	282.10	706.80	
416	JEFFERSON	Harrison Cemetery	KY	1869	1/1/1869	32	2	Loam	9	282.10	706.80	
504	JEFFERSON	Nou Zion Cemetery	KY	1869	1/1/1869	416	2	Loam	9	282.10	706.80	
433	JEFFERSON	Hapgood Cemetery	KY	1871	1/1/1871	928	2	Loam	9	282.10	706.80	
619	JEFFERSON	Weird Cemetery	KY	1871	1/1/1871	128	4	Complex	6	25.00	449.70	
158	JEFFERSON	Herbert Cemetery	KY	1872	1/1/1872	9,888	2	Loam	6	222.30	647.00	5,487
455	JEFFERSON	King - Willet Cemetery	KY	1872	1/1/1872	192	2	Loam	9	282.10	706.80	
458	JEFFERSON	Knab Creek Cemetery	KY	1872	1/1/1872	3,800	2	Loam	6	10.30	435.00	4,034
524	JEFFERSON	Pewee Valley Cemetery	KY	1872	1/1/1872		2	Loam	9	282.10	706.80	
106	JEFFERSON	Asylum Graveyard	KY	1873	1/1/1873	97,139	2	Loam	9	301.00	725.70	3,201
426	JEFFERSON	Highland Baptist Church Cemetery	KY	1873	1/1/1873	500	1	Clay	6	153.40	578.10	4,802
347	JEFFERSON	Chirler Cemetery	KY	1874	1/1/1874	19,000	4	Complex	6	231.20	655.90	846
408	JEFFERSON	Grarch Family Cemetery	KY	1874	1/1/1874	13,440	2	Loam	9	282.10	706.80	
478	JEFFERSON	Mccauley Cemetery	KY	1874	1/1/1874	313,632	2	Loam	9	282.10	706.80	
321	JEFFERSON	Bethlehem Presbyterian Cemetery	KY	1876	1/1/1876	55,000	2	Loam	9	282.10	706.80	
483	JEFFERSON	Middletown Cemetery	KY	1876	1/1/1876		2	Loam	9	282.10	706.80	
423	JEFFERSON	Horr Cemetery 2	KY	1877	1/1/1877	64	2	Loam	9	282.10	706.80	
448	JEFFERSON	Joyce Cemetery [Joyce Burying Graund]	KY	1877	1/1/1877	4,800	2	Loam	6	255.10	679.80	5,554
95	JEFFERSON	Maddox Cemetery	KY	1878	1/1/1878	106,899	2	Loam	4	168.60	592.30	14,250
181	JEFFERSON	Evergreen Cemetery	KY	1880	1/1/1880	84,027	4	Complex	0	50.70	475.40	5,065

OBJECTI	COUNTY	CEMETERY_NAME	STAT	Establishe	Establishe	SIZE	SoilTexture(Praminen	SoilTexture(Praminen	AvgSlope(%)_SoilMUDeriv	NearestSpotElevation_above	NearestSpot	RRNearDistance
347	JEFFERSON	Christer Cemetery	KY	1874	1/1/1874	19,000	4	Complex	6	231.20	655.90	846
408	JEFFERSON	Grarch Family Cemetery	KY	1874	1/1/1874	13,440	2	Loam	9	282.10	706.80	
478	JEFFERSON	Mccauley Cemetery	KY	1874	1/1/1874	313,632	2	Loam	9	282.10	706.80	
321	JEFFERSON	Bethlehem Presbyterian Cemetery	KY	1876	1/1/1876	55,000	2	Loam	9	282.10	706.80	
483	JEFFERSON	Middletown Cemetery	KY	1876	1/1/1876		2	Loam	9	282.10	706.80	
423	JEFFERSON	Herr Cemetery 2	KY	1877	1/1/1877	64	2	Loam	9	282.10	706.80	
448	JEFFERSON	Jayce Cemetery [Jayce Burying Graund]	KY	1877	1/1/1877	4,800	2	Loam	6	255.10	679.80	5,554
95	JEFFERSON	Maddox Cemetery	KY	1878	1/1/1878	106,809	2	Loam	4	168.60	593.30	14,250
181	JEFFERSON	Evergreen Cemetery	KY	1880	1/1/1880	84,027	4	Complex	0	90.70	475.40	5,065
391	JEFFERSON	Fark Hill Cemetery	KY	1880	1/1/1880	130,000	4	Complex	6	138.90	563.60	1,814
403	JEFFERSON	Girt Cemetery	KY	1880	1/1/1880	96	2	Loam	9	282.10	706.80	
634	JEFFERSON	Warkhaure Cemetery	KY	1880	1/1/1880	1,853	2	Loam	9	282.10	706.80	
419	JEFFERSON	Hauer Cemetery	KY	1881	1/1/1881	256	2	Loam	9	282.10	706.80	
516	JEFFERSON	Oxmaar Family Cemetery	KY	1881	1/1/1881		2	Loam	9	282.10	706.80	
220	JEFFERSON	Maady Cemetery	KY	1882	1/1/1882	134,339	2	Loam	1	85.40	510.10	917
219	JEFFERSON	Rosthaven Memarial Cemetery [Rosthaven Cemetery; Rosthaven Memarial Park]	KY	1882	1/1/1882	529,080	4	Complex	0	80.60	505.30	1,129
492	JEFFERSON	Maare Family Cemetery	KY	1883	1/1/1883	15,000	2	Loam	9	155.40	580.10	14,655
543	JEFFERSON	River Valley Cemetery	KY	1883	1/1/1883	192	2	Loam	9	282.10	706.80	
414	JEFFERSON	Hall Graveyard	KY	1885	1/1/1885	2,618	2	Loam	1	198.40	623.10	
373	JEFFERSON	Ebbr Cemetery	KY	1886	1/1/1886	32,000	4	Complex	6	156.30	581.00	8,921
594	JEFFERSON	Swindler Cemetery	KY	1886	1/1/1886	96	2	Loam	9	282.10	706.80	
629	JEFFERSON	Williams Family Cemetery	KY	1887	1/1/1887	8,000	4	Complex	6	257.90	682.60	2,437
256	JEFFERSON	Greenwaad Cemetery	KY	1890	1/1/1890	70,219	4	Complex	6	140.10	564.80	1,179
456	JEFFERSON	King Cemetery	KY	1890	1/1/1890	288	2	Loam	9	282.10	706.80	
531	JEFFERSON	Partlethwaite Cemetery	KY	1890	1/1/1890	768	4	Complex	0	151.20	575.90	437
626	JEFFERSON	William E. Habbs Cemetery	KY	1892	1/1/1892	160	2	Loam	9	282.10	706.80	
178	JEFFERSON	Green Meadaur Cemetery Llc	KY	1898	1/1/1898	78,495	4	Complex	0	32.00	456.70	669

CURRICULUM VITAE

Thomas D. Cleven

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De Pere, WI 54115

(608) 844.1222
tdcleven@gmail.com

EDUCATION:

University of Wisconsin-Madison	B.S. in Agriculture, Poultry Science - May, 1996
	B.S.L.A. – May, 2014
University of Wisconsin-Oshkosh	B.S. in Anthropology – August, 2017
University of Louisville	M.A. in Anthropology – December, 2019

UNIVERSITY OF LOUISVILLE, Anatomical Sciences & Neurobiology, Louisville, KY 40202
LAB TECHNICIAN III 2017 to current

- Manage three grant budgets totaling $1.8 million.
- Conduct PCR for genotyping of 12 mouse colonies.
- Create and maintain procedures and protocols.
- Create and maintain 12 mouse colonies.
- Project mouse needs for coming years to meet study demand.
- Culture PC12 cells and dorsal root ganglia.
- Learning qPCR and cryosectioning.
- Trained and learning mouse cryopreservation techniques.

VANDE HEY COMPANY, INC, Appleton, WI 54913

LANDSCAPE ARCHITECT – IN-TRAINING 2014 to 2017

- Designed residential and commercial landscapes.
- Specialized in designs for assisted living facilities and large commercial sites.
- Created bids for installation jobs.
- Prepared client presentations.
- Estimate design/ build costs.
- Met with clients and sold designs.

UW-MADISON, DEPARTMENT OF PATHOLOGY, Madison, WI 53706 and
STRATATECH CORPORATION, Madison, WI 53719

RESEARCH SPECIALIST 2010 to 2014

- Performed numerous grafting experiments on rodents.
- Wrote protocols, developed SOPs, created training materials, maintained DEA license.
- Helped develop a Good Laboratory Practices framework for FDA submissions.
- Wrote and assisted in maintenance of IACUC-approved animal use protocols.
- Performed some tissue culture.
- Wrote study procedures and reports.
- Determined bacterial endpoint analysis from experiments.
- Assisted in experiment designs and methodology.

BRUCE COMPANY, Middleton, WI 53562

NURSERY SALES PERSON/ CONSULTANT 2007 to 2014

- Did pencil sketches for customers needing help landscaping areas of their yard.
- Problem solved plant health concerns.
- Assisted in selected the best plant material to meet the customer's needs.
- Sold approximately 5x my wages of nursery stock and services seasonally.

ARTFUL LANDSCAPE DESIGN, Verona, WI 53593

LANDSCAPE DESIGNER, PRINCIPAL 2006 to 2014

- Managed the company with up to 4 employees and 25 jobs at a time.
- Designed and installed residential landscapes.
- Maintained established landscapes.
- Provided consultation services.

COVANCE LABORATORIES, Madison, WI 53704

ASSISTANT SAFETY PHARMACOLOGIST, Toxicology Services 2007 to 2010

- Initiated costing and scheduling requests, prepared draft protocol and amendments, and secured approval for such from the Study Director.
- Verified that the project schedule accurately reflected the requirements of the protocol.
- Collected study data through the use of specific software and equipment used by Safety Pharmacology (DSI Open Art, Ponemah Analysis system, transmitters, receivers, DEM's, plethysmography chambers, amplifiers etc.).
- Set-up protocols with above mentioned system, selected data (ECG cutting and respiratory analysis) and manipulated it as deemed appropriate
- Assisted Study Directors in monitoring critical phases of studies, and reported any problems or deviations to Study Directors.
- Addressed QA audits and client comments relating to reports.
- Ensured that revised or final reports were scheduled and mailed on time.
- Assisted in client lab visits including accompanying clients to observe critical phases and provide data upon request.

SUPERVISOR, Anatomic Pathology Department 2005 to 2007

- Supervised the Anatomic Pathology Operations technical staff.
- Prepared daily and monthly schedules. and coordinated the histology process.
- Gave performance reviews.
- Prosected, collected, trimmed, and processed tissues and organs for histologic processing.
- Recorded lesions, collected organ weights, and documented other pathology data.
- Trained assistants and technicians.

STUDY TECHNICIAN II, Anatomic Pathology Department 2004 to 2005

- Performed general necropsy and histology technical tasks, in compliance with appropriate SOP's and GLP's, on a variety of laboratory species.
- Trimmed and embedded wet tissue into paraffin and performed the basic duties of necropsy and histology.
- Recorded gross observations, weighed tissues, froze tissues, prepared bone marrow and blood smears.
- Prepared fixatives and solutions.
- Performed clear and accurate documentation of all duties.

STUDY TECHNICIAN I, Anatomic Pathology Department 2004

- Performed general necropsy and histology technical tasks on a variety of laboratory species.
- Collected, trimmed, processed, and embedded tissues of all species.
- Performed other miscellaneous duties including recording gross observations, weighing tissues, freezing tissues, preparing bone marrow and blood smears.
- Prepared fixatives and solutions.
- Performed clear and accurate documentation of all duties.

LAKEVILLE GROWERS, Petaluma, CA 94955

AREA FIELD SUPERVISOR 2002 to 2003

- Supervised three antibiotic-free contract and one organic company ranch totaling 1.25 million broilers.
- Monitored the health and administered various prophylactic and preventative treatment programs.
- Ensured that proper husbandry methods were being utilized and that the protocols for organic certification were being followed.
- Designed a facility for renovation that achieved 27 degrees of cooling in summer.
- Decreased age to market on one ranch by three days (worth $1.35 million dollars) and by two days on another (worth $73,235).

FOSTER FARMS, Fresno, CA 93706

BROILER FLOCK SUPERVISOR 2001 to 2002

- Supervise overall management of 2.5 million broilers on company and contract ranches.
- Develop *Performance Improvement Plans* for each flock placed.
- Maintain sound bird health.
- Strengthen relations with contract growers.
- Ensure compliance to sound management practices.
- Manage personnel on company-owned ranches.
- Perform chick evaluations, submit residue samples, and fulfill various administrative functions.

GRIMAUD FARMS OF CALIFORNIA, Hegins, PA 17938

BREEDER/HATCHERY MANAGER 2000 to 2001

- Maximized efficiency and productivity of hatchery for Muscovy ducks, Pekin ducks, and guinea fowl.
- Maximized efficiency and productivity of breeder flocks.
- Managed hatchery and breeder costs.
- Assisted in marketing of commercial ducks.
- Ensured that hatchery, breeders, and contract growers were meeting budgetary, productivity, and planning objectives.
- Supervised contract duck growers.
- Hired, trained, and supervised employees within department.
- Ensured that safety, biosecurity, and company policies were followed.
- Increased egg production by over 10 eggs per hen and decreasing costs by 2.71 cents per egg.

GLACIER LANDSCAPE, Verona, WI 53593

LANDSCAPE CREW SUPERVISOR 1999 to 2000

- Supervised a landscape crew installing various plant material including perennials, shrubs, trees, and sod.
- Interpreted blueprints and landscape plans for installation.
- Involved in constructing a large artificial pond, retaining walls, and brick pathways.

BLAIR LAWN AND LANDSCAPE, Madison, WI 53703

LANDSCAPE FOREPERSON 1999 to 2000

- Supervised lawn maintenance and landscape installation crews.
- Designed landscape plans for clients.
- Performed cost analysis for jobs performed.
- Submitted bids for job proposals.

BUTTERBALL TURKEY CO., Turlock, CA 95380

TURKEY FLOCK SUPERVISOR 1998 to 1999

- Promoted good management practices.
- Monitored, managed, and treated various turkey diseases.
- Developed improved techniques for grade and growth.
- Provided budgetary projections.
- Projected weights, grade, and costs for all flocks.

W. J. MERRILL, CO., Turlock, CA 95381

ASSISTANT PRODUCTION MANAGER 1997 to 1998

- Assisted in managing over 1,000,000 turkeys annually.
- Problem solved issues relating to a gradual decrease in performance.
- Provided advice on new management techniques utilized in Virginia.
- Offered labor assistance when needed.
- Supervised 15 employees.

ROCCO TURKEYS, INC., Dayton, VA 22821

TURKEY GROW-OUT FLOCK SERVICEPERSON 1996 to 1997

- Monitored and treated numerous turkey diseases.
- Ensured proper growth, grade, and feed conversion.
- Instructed growers on good management practices.
- Managed sound biosecurity and sanitation techniques.
- Aided growers in contract and settlement interpretation and procedures.
- Maximized other turkey production factors.

ZACKY FARMS, Fresno, CA 93721

TURKEY BREEDER FIELD SUPERVISOR 1995 to 1996

- Coordinated the production of fertile turkey hatching eggs on two laying farms.
- Produced breeder replacements on one brood-grow and one darkening farm.
- Assisted in organizing placements, selection, vaccination, and artificial insemination.
- Managed supplies, equipment, and overall farm operations.
- Supervised 26 personnel on four farms.
- Responsible for improving egg production, decreasing mortality, maintaining bird weights, monitoring biosecurity practices, and ensuring efficient production techniques.

UW-MADISON, DEPARTMENT OF ANIMAL HEALTH AND BIOMEDICAL SCIENCES, Madison, WI 53706

LABORATORY ASSISTANT 1993 to 1995

- Performed Western Blot Electrophoresis.
- Prepared solutions, buffers, and reagents.
- Performed general laboratory maintenance and ordered supplies.
- Assisted with various histochemical studies.

INDEPENDENT LANDSCAPE SERVICES, Madison, WI 53711

INDEPENDENT LANDSCAPER, Partner in the Business *1991 to 1995*

- Operated business with a colleague. I found the clients, he created the designs, and I installed them.
- Secured and managed clients.
- Installed residential landscape designs.

BRITISH UNITED TURKEYS OF AMERICA, Lewisburg, WV 24901

INTERN 1994

- Rotated through the hatchery, veterinary lab, and rearing and laying sites.
- Assisted in culling breeders, pulling hatches, placing poults, breaking-out eggs, sampling for Mycoplasma and Salmonella, collecting eggs, weighing and traying eggs, inseminating hens, milking toms, and loading birds.
- Established standard values for blood glucose, blood pH, body weight, and rectal temperature and made correlations to poult starve-out mortality.

UW-MADISON, DEPARTMENT OF POULTRY SCIENCE, Madison, WI 53706

RESEARCH ASSISTANT 1993

- Evaluated the effect of two fungicides on feed conversion and growth rate of chickens.
- Determined the effect on feed conversion and immune function of two anti-mycotoxins.
- Performed hemagglutination assays and macrophage isolation and quantification.

UW-MADISON, SCHOOL OF VETERINARY MEDICINE, Madison, WI 53706

RESEARCH ASSISTANT 1990 to 1992

- Assisted with a reproductive study on beagles.
- Inoculated beagles intradermally with *Borrelia burgdorferi*.
- Monitored estrus cycles cytological.
- Bred beagles naturally and artificially.
- Ultrasounded beagles to monitor gestation.
- Helped with parturition.
- Collected blood.
- Necropsied various animals and cultured tissues for *B. burgdorferi* isolation.
- Utilized techniques such as dark-field microscopy, Indirect Immunofluorescent Antibody assays, Western Blot Electrophoresis, Polymerase Chain Reaction, tissue trimming for histology.
- Prepared various solutions and media.

BROWN COUNTY MAINTENANCE DEPT., Green Bay, WI 54301

BROWN COUNTY GROUNDSKEEPER 1988 to 1990

- Designed seasonal display beds totaling several thousand square feet in downtown Green Bay.
- Performed maintenance of seasonal display beds, shrub borders, and trees.
- Installed perennials, shrubs, trees, and sod as needed.

JACK'S LANDSCAPE NURSERY, Green Bay, WI 54302

ASSISTANT NURSERY MANAGER 1987 to 1988

- Managed retail nursery.
- Created simple designs for customers as needed.
- Diagnosed plant health concerns.
- Assisted in plant selection and provided advice on planting and growing conditions.

PUBLICATIONS AND PRESENTATIONS:

T D Cleven, E C Burgess, R W Howe, A I Goldsby. 1992. Absence of *Ixodes dammini* (deer ticks) on *Peromyscus leucopus* (white-footed mice) in Brown and Door Counties, Wisconsin. *Bull. Soc. Vector Ecol.* 17: 70-74.

E C Burgess, M D Wachal, T D Cleven. 1993. *Borrelia burgdorferi* infection in dairy cows, rodents, and birds from four Wisconsin dairy farms. *Vet. Micro.* 35: 61-77.

Presentation titled *Are Deer Ticks (Ixodes dammini) and Lyme Disease in Brown and Door Counties, Wisconsin?* given at the University of Wisconsin-Green Bay, Cofrin Arboretum Undergraduate Research Symposium, Green Bay, Wisconsin, October, 1989.

ADDITIONAL TRAINING:

UW-Madison, Animal Health and Biomedical Sciences, Dr. Richard F. Marsh, 1993 – 1995
Learned flash freezing of hamster brains, basic immunohistochemical staining, and Western blot electrophoresis.

UW-Madison, School of Veterinary Medicine, Dr. Elizabeth C. Burgess, 1990 – 1992
Learned the Indirect Immunofluorescent Antibody and Lowry Assays; aseptic tissue collection during necropsy; culturing *Borrelia burgdorferi*; preparing growth media, buffers, and reagents; canine vaginal cytology, artificial insemination, ultrasounding, and palpation.

Animal Hospital of Verona, Verona, Wisconsin, 1992-1994 and
PetCare Clinics, Madison, Wisconsin, 1991 - 1992
Became skilled at monitoring post-surgery small animals, injecting medicines, maintaining intravenous lines, tube-feeding, and comforting clients.

ParaTechs Corporation, Lexington, Kentucky, 2019
Learned through a hands-on workshop the techniques involved with mouse reproductive techniques including cryopreserving and recovery of sperm and zygotes, and superovulating mice.

ADDITIONAL COURSE WORK:

Wildlife Diseases, University of Wisconsin-Madison, 1995