Most American archaeologists are aware of plants being associated with sites of past human activity, including vegetation persisting until this day as well as vegetation that has come and inhabited ruins for a new home. Still, plants largely remain under credited for their contributions to archaeological discoveries of the whereabouts of sites and their cultural features/structures. The new field of phytoarchaeology is concerned with such things and is in great need of sites with better opportunities to study known cultural features with their vegetal signatures of human activity and ideal sites that see little recent human manipulation- thus making abandoned or under-manicured historical cemeteries ideal places to begin such controlled studies. So this is something that I hope many of you might consider aiding with advancing this kind of knowledge; because cemetery vegetation is an important part of many cemeteries and burials, both plants left deliberately and those inadvertently responding to human manipulation of the soil. While this talk is called "cemetery botany", I will not be discussing plant physiology or identification; however, I will give an overview of the importance of cemetery plants in landscape, symbolism, grave indicators, and advice on what you could do to help through recording.

By "landscape" I do not merely mean the lay of the land or a pictorial scene, rather I mean the land as it is lived, experienced, and imagined by people. So when viewing cemeteries as landscape, cemeteries are not simply interred corpses and headstones; rather, they are parts of collections of objects (including vegetation) in space that make a place, a place in the minds of its makers and visitors. From this perspective every element from plants to stones to orientation of graves carry traditional meaning. Vegetation particularly often play a important role in people's consciousness about what makes a cemetery, as evinced by the numerous cemeteries having botanical names, such as those invoking roses, forests, gardens, groves, and evergreens in their titles. On one hand, plants are used in landscaping another world, sometimes impressing upon its visitors a sense of an orderly or better world with hope embedded into its design, or an in-between space between multiple worlds; while to others it is a tranquil place or a green space for conservation, even preserving important native and nonnative species- a sort of botanical window into another time. To take a local modern example of green space and conservation, the Spring Creek cemetery in near Kalispell contains of the last remains of the original prairie vegetation not wiped out by the settlers' farming. In recent years, there are some who feel leaving plants untrimmed, unmowed, and unweeded as disrespectful to the dead. Fortunately the

cemetery board president appreciates these plants as part of the historical picture of this cemetery and offers locals a special opportunity to appreciate the space as a conservation space for nature vegetation. In doing so, this offered me a special opportunity to conduct my research at a good example of a historical cemetery with good examples of extent anthropogenic vegetation. On the subject of cemetery landscapes as otherworldly, In colonial America, Scottish-Americans viewed cemeteries as a wild place and a place for demons, carrying on older notions of crofts where spirits tarried or faerie hills and thus they were places fraught of danger, as such various protective measures were taken, including the planting of choice plants (e.g., rowens, evergreens, and beeches). Colonial Americans, particularly the Puritans' treatment of cemeteries, were used to make a statement against the "popishness" of Catholics, yet deliberately chose infertile soil for cemeteries and allowed it to become overgrown with scraggily vegetation, as a chaotic message of how one's vanity comes to nothing with their inevitable mortality. Puritans, kept the notion of the cemetery as a transitional (liminal space) between heaven and hell, though did much to change the treatment of the cemetery as sacred space through their lack of ornamental vegetation, minimalistic graveside service, permitting boys to play sports in their walls, businessmen using it for markets, planting turnips, and grazing livestock. With the spread of Unitarianism, the Puritan's dogmatic messages of impending death were softened by more neutral, this world-oriented, and messages of sorrow of the lost. During this time, willows came more into vogue as a cemetery tree and motif about sorrow. Meanwhile, southern colonists engaged in "scraping" cemetery plots and planted cedars, gardenias, mimosas, and crepe myrtles in their family plots.

Plants are used as stand-ins for the dead and are means of inscribing memory on a place. In the past, it was common for families to plant trees and shrubs on the occasions of weddings, newly built houses, births, and deaths. Given the anthropomorphic nature of trees, trees are sometimes acknowledged with a degree of personhood, in some places there are trees that legally 'own' themselves; in some cultures trees and other plants may be believed as possessing a soul; and others have viewed trees as stand-ins for the deceased presence as a means of encountering their loved ones, and omens of the fate of their loved ones. For example, a birth tree continuing to grow after the child has grown up may be viewed as sympathetically connected- where the fate of the tree would affecting the wellbeing of the child or the well-being of the child affecting the tree. Therefore, parents may not simply think of their children through seeing their child's

tree but receive special attention so as to send their child good health and blessings. Similarly, living memorials of the dead may be viewed as creating a focal point or place for the deceased mourners to meet their departed one- even in cases where no body was found, the tree planted in commemoration of the dead is treated differentiately as a way for the living to feel close to the Departed. In cases where plants are planted over a fresh graves, it is not uncommon for the living to view the plants as having become a part of their loved one- this is phenomenon seen where personhood and notions of the soul is thought to be 'contagious' and transferring to another person, as has been observed among organ donors' and organ recipients' families. Vegetation may also be chosen for expressing identity or class, as is the case with lilacs. Lilacs, while having overtones of longevity given their clonal spreading ability, represented Victorian middle class values and notions of having 'arrived' and civility.

We must also recognize that vegetation is not 'for the dead' necessarily, but for the living where the acts of planting and tending grave flora is seen as more than communion with the dead but a psychological act of healing the grieving hearts of the living, giving a sense of control over the otherwise uncontrollable, and giving the living a feeling of hope in the place of loss by counteracting the feeling of loss through an act of giving new life in the form of tree plantings. These plantings themselves can compromise a place of memory and in turn take on the nature of a shrine. For example, it is not uncommon for families to plant trees in honor of the deceased to add their name and to perform deeds in the name of their loved ones in the wake of wildfires and desertification. There are instances of trees, which survive certain disasters, terrorist attacks, atom bomb explosions, and battlefields that leave these survival trees very emblematic of the survivors' hope, spirituality, and battered but still resilient like themselves and they become living memorials. Even during war time in WW2 and afterwards, there are reports of soldiers in the trenches engaging in trench gardens, soldiers making gardens out of bomb craters, gardens in ghetto quarters, and gardens in Japanese internment camps- where people found solace in life, beauty, and order amidst their daily turmoil and uncertainty they faced. To further elaborate on living memorials, American Elm and Oklahoma's state tree Redbud, were planted for their historical patriotic symbolism, and had its seeds were distributed to survivors to plants as symbol for survivors' tenacity to refuse to succumb to fear in the face of the Oklahoma City bombings. Similarly, various 9/11 memorials have gardens designed around patriotism through flag colored plantings as well as yellow remembrance ribbon colored plantings. Other plantings were chosen

for their fiery or smoky colors or word plays on the names of plantings, while others used purples and reds for firefighters and military symbolism. Still others were chosen for their tall stature for emulating the Twin Towers, including placing two together. While others were chosen for their weeping shapes for mourning.

In other words, when plants are planted in the cemetery landscape or as living memorials, the symbolic decisions for choosing one plant over another is not entirely an arbitrary or a non-arbitrary one. There are semi-arbitrary reasons for selecting plants for symbolic reasons, as demonstrated by different cultures across the globe coming to the same conclusion about the same plant or kind of plant. This is because plants have particular sensorial properties that bear a resemblance to some shared experiences with death, grieving, and reasons for hope, a pattern that becomes apparent when reading on plant folklore and uses. So what are these sensorial properties you may ask? One category would be the overall growth habit, form, and stature of a plant, such as whether its form is weeping, thin, stout, tall, phallic, etc. The behavior, longevity, and life cycle of a plant can be symbolically meaning, such as whether it is long or short lived, pioneer species, climax forest associated, etc. The relation or association of a plant with other plants, animals, and types of people can imbue a plant with symbolic significance. Color is especially an important category, such as whether certain colors are associated with natural phenomena/features, associations with blood, milk, semen, corpses, etc. Plants can even symbolically assigned for its olfactory properties, due to its aromatic volatile oils or repulsive odor. Gustatory properties, or taste, such as whether it is sour, sweet, bitter, salty, spicy, metallic, acrid, crunchy, tender, slimy, etc. can affect how meaning is attached to a plant. The auditory properties of plants also important, an example of which would be whether it known for its creaking or the rustles its leaves or the effect of the rustling resembles rain or water sound effects (e.g., the shaking of the *lulav* and *etrog* set used in the Jewish festival of *Sukkot*, which includes prayer for the rainy season). A plant's tactile properties, such as whether it is thorny/sharp, sticky, hairy, smooth, slick, rough, etc. can affect its symbolic associations. The shapes and numbers of plant parts, such as whether a plant's leaves, petals, seeds, fruit, etc. have a symbolic shape, a form lending itself to the doctrine of signatures, or grouping of numerological significance in a group's cosmology. Finally, a plant's special utilitarian or experientially realized properties, such as whether it is flexible, strong tensile strength, toxic, hallucinogenic, aerial seed dispersal properties, uses in play, all lend themselves to symbolic notions.

Understanding some of the reasons for why plants possess symbolic properties assists preservationist professionals in seeing cemetery vegetation as more than scenery, maintenance work, and changes how vegetation is viewed as just as important as other cemetery memorials; Moreover, this understanding makes sense of why cemeteries are frequented by particular plants over and over, and offers us the chance to decode their meaning in the minds of their planters and how they viewed the cemetery place. For example, since purposefully planted cemetery vegetation serve psychologically healing experiences through selecting, planting, and maintaining plants, the survivors or visitors have a means of working through their grief and find hope. This primal idea of human need for finding hope, makes sense of why people have continued ancient pagan traditions of cemetery plants until the present, and appears in the form of acknowledging notions of timeless renewal and rebirth through honoring symbols of spring and fertility, which by extent has transferred to symbols affirming a hope of the resurrection of body and spirit. To express these ideas, plants whose flowers and fruits often have a multitude of seeds, have reproductive structures similar to human male or female genitalia, colors akin to blood, and colors and shapes akin to the ageless sun. Similarly, hopes of immortality, endurance, and affirming notions of an eternal experience are made manifest through plants that are evergreen; phallic shapes; long lasting aroma; having many seeds or petals; and behavior imitating the sun with it opening with the rising of the sun and closing with the setting of the sun, or following the sun throughout the day. Cemetery plant symbolism can helpful with clues towards the gender, age, ethnicity, religion, and social standing of the deceased, not just in live flora but also in motifs on structures and headstones. For example, the graves of women tend to have plants associated with the divine feminine, mother goddesses, and the Virgin Mary, due to the aromas, colors, and shapes that emulating female genitals. The same could be said of masculine plants, due to their similar to the male genitals, covering the graves of men. The graves of children, virgins, and young women have their set of plants affiliated with them, with imagery of lives cut short through images of tree trunks, seedpods, buds, plants affiliated with play, colors like yellow and white affiliated with purity and joy, and other plants affiliated with men or women. It is also common for the graves of women and children to be accompanied by lilies and irises, or even sometimes to be a grave marker in place of a headstone if indigent enough. Plants may also be symbolic for their associations with religious texts and myth, such as the affirmation of redemption through affirming the Passion Story through plants possessing

blood like properties in color or texture, thorns or hooked like flower structures, or resurrection through perennial bulbous plants like lilies and irises. Another example would be plants affiliated with Greek myths concerning Hades, Persephone, and the Underworld, due to their role in stories. Other plants due to their bending and drooping shape, like willows, or due to their painful sharp thorns, like thistles, offer notions of loss, pain, and grieving. Now, the listener may argue that people simply choose things because they are pretty, but I would ask the listener to consider how people are raised and taught to think about what is 'normal', 'proper', and 'expected' for planting in cemeteries- these unconscious notions engrained in us from tradition have deep historical pedigrees originating in myth and ancient people's experiences with plants.

Now, besides viewing cemetery vegetation as meaningful on account of cultural significance attached to them, there is another overlooked area for considering cemetery vegetation of worth mentioning here. Plants do not merely pertain to humans if they are cultivated ornamentals; there are several others ways that plants indicate the presence of human activities, such as burials. First, there are those, which are innately connected to human activities through direct human modification, such as cultivars and human-dependent species and directly modified species. Since cultivars and human-dependent species are pretty self-explanatory, I would clarify directly modified plants as that which are overtly changed, trained/bent, cut, painted, signed, enwrapped, marked/carved by human actions, they may be living (i.e., vivifacts, vivifeatures) or dead (e.g. logging stumps). Then there are those categories where plants are contextually-related to humans, such as those individual plants' form that has been indirectly modified by humans, those plants who quality and spread is affected by human-modified soil conditions (e.g., edaphic), those spatially modified, and those plants meaningful for whatever else they occur with.

To clarify, indirect modification to plant morphology and growth patterns can be observed through coppices or branch growth shape and orientation, due to branches being exposed to grazing or growth of branches indicating an open canopy in a former pasture or evidence of other land clearance. Indirect modification can be brought on by the interaction of non-human agents and forces with former human changes or structures to the environment (e.g., "L" or rectangular shaped growth patterns of gooseberries and currants around former wooden structures, such as log cabins and burial plot fences).

Because human modify soil through many different ways, such as earth moving, filling, treading/roads, polluting, and enriching (burials), these disturbance and manipulations of soil can have positive and negative effects on the plants which inhabit these sites of human-modification. Those having a positive effect on vegetation call be called hemerophilic ("culture-loving") and can be manifest in the appearance of native vegetation deriving benefit from a given type of human-modified soil; denser colonization patterns (called "sociability") of spread for a certain species; greater than expected signs of a species completing its life cycle (called "vitality") and succeeding; greater than expected abundance (in terms of cover or counts). Those having a negative effect on vegetation call be called hemerophobic ("culture-fearing") and can be manifest in the signs of plant stress (dwarfism, gigantism, premature flowering or premature senescence, retarded growth or delayed senescence, discoloration, and subdued growth); absence of locally expected species, not simply bare earth; lower than expected colonization patterns of spread for a certain species; lower than expected signs of a given species seems to struggle to establish itself, it is not lush, and there are signs of it not completing its life cycle; and less than expected abundance of an expected species.

Cemetery vegetation can be significant for its spatial patterns pertaining to humans, particularly burials. The presence of "off-place" plants (called anthropophytes) or introduced species deriving benefit from a human-modified environment, are plants outside their expected natural range due to intentional or unintentional human agency extending their range and not necessarily through its own dispersal mechanisms, or a species present in an area normally hostile to its survival, only due to human-created habitat/ edaphic conditions for it to survive. Another spatial pattern would be non-random shapes (may be geometric or asymmetric) or an outline of a species' distribution is evidently due to either (intentional or unintentional) human spreading or inhabiting human-created edaphic conditions. Finally, non-random geometric patterns (e.g. straight edges, linear planting patterns along linear features) are another spatial pattern left due to deliberate human planting.

Relational patterns in vegetation are another, but more difficult, area to establish the presence of burials. These patterns may be botanical co-occurrences and botanical-site feature associations. Botanical occurrences would where the presence of two or more plants are meaningful in a way that only by itself would not be, so it is when there is an association between species occurring together (e.g., a particular forest succession, or forest composition

from a particular human- caused disturbance). Botanical-site feature associations a species has a propensity for co-occurring with certain archaeological features or site types. For example, there are a few articles on forensic botany and forensic mycology demonstrating the potential of certain plants and fungi to demonstrate the presence of a burial as well as establishing a post-mortem interval.

Cemetery vegetation offers another very special data potential needed by archaeologists, that are very difficult to come-by without the aid of local cemeteries, when it goes to dating an archaeological site- especially rock features (e.g., tipi rings, fasting beds, and cairns). One way is collect data on the presence of ornamentals and their presence at known dated graves, to build a seriation chart as is done with other artifacts, which is based on the assumption of artifact style/preferences having a range of popularity before tapering off. Both the use of archival evidence and field data on the certain plants correlating to certain groups and times would be a valuable tool for archaeologists. Another way cemetery vegetation can be helpful for dating is lichenometry, or the use of lichens on dated headstones to date other stone structures without a particular date, this is based on the assumption of a constant growth rate of a species of crustose rock lichens. The caveat to using this technique is that it only works when the unknown rock features shares that same vegetation zone, type of stone the lichen grows on, possesses no evidence for fire, and shares the same average temperature ranges and precipitation between the dated cemetery headstone's lichen and the unknown dated rock structure. To collect a growth rate, one must take large old growths of lichen on headstones that have been left in place since first being installed, have the lichen and rock substrate they grown on identified (do this for each different lichen species you encounter on the headstones, measure the length and width of the spread of lichen (by mm), multiply the length and width of the lichen growth to get the area, divide the area by the years accumulated since the death date on the headstone, and do this multiple times with the same species to get an average.

While some cemetery maintainers may be keen to left vegetation damage and obscure graves, or detract from the aesthetic of the cemetery, it would behoove such individuals to record greater botanical information prior to lawn maintenance, scrapping burials, weed control, or cleaning headstones- as valuable information is lost. First, inventorying a list of species present in a cemetery is good, but such an inventory offers little research prospects with knowing the context surrounding these plants such as demographic information of affiliated graves (e.g., age

when died, age of the grave itself, gender, and religious or ethnic signs). Maps and GPS points of spatial distribution patterns of plant growth could be valuable. Collected specimens and pictures of cultivars are valuable for tracking down the origins and the identity of a cultivar variety from archival sources in ways that plant guides are unable to help with. Predetermining the area of a survey block around a curious patch of green around a known grave, such a 4x4 m^2 would allow an estimation of cover, sociability, vitality, and observations of plant stress to be made.

Additionally, when trying to make identifications, assign unknown plants with number (never use the same number) and prepare a little photo sign with the field specimen number in each picture of the plant in question (ideally grid paper, for use as a scale), be sure to include a picture of the overall plant, but also any flowers, seeds/fruit, leaves (but underside and top), stem (including its texture), bark, branch with leaf arrangements on it. Be sure to control the lighting even making artificial shade as needed, adjust brightness as needed, and use your macro setting when taking up-close pictures. Keep a specimen log of each of field specimen numbers you assign, note each one's plant (tree, shrub, herb/forb, grass, moss/bryophyte, and fungi/lichen), and keep a notebook about the grave plots or locations of known graves and the species or field specimen numbers found in them, as well as their qualitative information mentioned previously. Cemeteries, comparatively speaking, have ideal controls placed on them so that a guide on local botanical-burial associations can be made, but this is not the job of one person- this endeavor requires the help at the local level because the botanical signatures in another vegetation zone may be different from another in the same state, let alone each state having their own differences. Because of the potential of cemetery vegetation to contribute knowledge of local grave indicators to unmarked graves, and because the cultural heritage value of these plants handed down to us, I hope more consideration may given to graveyard greenery in as much as attention to give to statuary and headstones. Thank you.

***This incomplete paper is not intended for reading, publishing, or sharing, but intended as a sort of script for a referenced script. For a comprehensive explanation of this subject, terms, concepts, practices, and credits and citation sources, please see my thesis "The Sylvan Blindspot: the Archaeological Value of Surface Vegetation and a Critique of its Documentation" at either of these links: https://scholarworks.umt.edu/etd/11214 or https://umontana.academia.edu/JohnHarris