

## **Bio Burial**

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## Outline

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    - The population on earth continues to climb.
    - Our natural resources are being overused and contaminated.
- II. Body
  - A. We are running out of places to put the dead.
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Do you know why cemeteries around the world are so overcrowded? Because people are just dying to get in! It is sometimes fun to joke, but the issue of cemetery overcrowding is no laughing matter. Whether we like it or not, the population on earth is continually climbing. By the year 2050, approximately 9 billion people will inhabit the earth, which is 6.5 billion more than in 1950, and 7.8 billion more than in 1850. Every year around the world approximately 56,605,700 people pass away. This breaks down to an astounding 155,000 deaths a day and 108 every single minute. These facts are quite disturbing, considering the state of crisis that our planet is currently in. Both burial and cremation practices come with numerous environmental drawbacks, such as the contamination and overuse of our natural resources, contribution to the climate change, as well as the monopolizing of innumerable acres of increasingly precious land. However, there are alternatives. Natural burial and an innovative process called alkaline hydrolysis are excellent alternatives that have the potential to move us all to a healthier state (“Alkaline Hydrolysis,” n.d.).

Finding places to store the dead is becoming more and more of an issue in urban areas around the world as cities grow in population and developers buy up all the land. Hong Kong has taken a rather interesting approach for a solution to this post-mortem predicament. They have designed a cruise ship that would double as a cemetery and continually circle the South China Sea. It would essentially hold up to 370,000 remains and dock periodically for visits from loved ones. Connecticut has tried to alleviate their overcrowding problem by stacking caskets two-deep and sometimes even burying them beneath unutilized roads. In the 1980’s, Brazil constructed a thirty-two-story high-rise cemetery called the Memorial Necropole Ecumenica. The development, even though it’s not the only high-rise cemetery in the world, is

the tallest. Although these ideas are incredibly innovative, they are also, however, just a temporary fix while there is a desperate need for a more permanent solution (“A solution to Hong Kong's overcrowded cemeteries,” n.d.).

As far back as 60,000 BC, man has handled the remains of their dead with ritual and ceremony (“Burial,” n.d.). Families and friends of the deceased tend to have very specific ideas about how they intend to handle their loved one’s remains after they have passed.

Customarily, decisions like these are made surrounding a decedent or their family’s political and/or religious views, as well as their financial situation, throughout history, though many cultures’ practices have invariably come to change over time. For example, aristocratic Greeks were accustomed to erecting single, crater-like graves in the soil or out of rock, but during the archaic period, things start to change, and they began constructing a variety of graves in underground hollows, bricked tombs, and raised mounds. These gravesites were regularly found adorned with magnificent jewels and gold. The more elaborate and beautifully adorned the ultimate resting place, the more affluent the individual. Though these decisions for change more than likely weren’t made because of concerns for the environment, they are, however, a testimony to long-standing traditions slowly changing, for whatever the reason, over time (Powell, n.d.).

The United States has 22,500 cemeteries that bury approximately “827,060 gallons of embalming fluid (including formaldehyde), 104,272 tons of steel for caskets and vaults, 2,700 tons of copper and bronze for more caskets, 30 million plus feet of wood, and 1,636,000 tons of concrete” every single year—enough materials to conceptually construct a small city (“Green Burials,” n.d.)! Add up the amount of energy that’s used to ship these vaults and caskets, and

it's easy to see the environmental impact that the traditions of casket burial is truly having on our planet ("Green Burials," n.d.). The chemicals used in preparing a body for burial, such as formaldehyde-based embalming fluids, tend to eventually seep out into the soil and then into the groundwater. Even though formaldehyde is a chemical that is naturally occurring, and easily biodegrades in the air, as well as in the ground, it is also recognized as a carcinogen by the EPA and tends to cause health problems over long periods of exposure ("Environmental Impact," 2012).

Traditional burial begins when the body arrives at the funeral home, and it is then embalmed. This usually takes place within the first eight hours after a person's death. This process preserves the body by replacing its fluids with embalming fluid, causing it to feel hard to the touch. Before a body is embalmed, it is thoroughly washed and then the hands are positioned and the eyes and mouth are shut. Contrary to popular belief, embalmers do not sew the eyes or mouth closed. Instead, special oversized contacts are used to keep the eyelids in place, and a particular type of cream is applied on the lips to help keep them together. A variety of types and combinations of embalming fluids are used, depending on the situation. Using specialized tools, embalming fluid is introduced into a major artery, forcing blood out of the corresponding vein. The blood is then disposed into an EPA-approved sewer system. After this process is completed, the body is washed for a second time, and as a precautionary measure, a disinfectant is used. The body is then dressed, the hair is styled, and make-up is applied in preparation for the viewing (Kenney, n.d.).

One excellent alternative that is quickly gaining popularity is "green" burial or natural burial. This type of interment, which was once common practice, has slowly succumbed to the

Western practices of today. Essentially, this is burial without the need for metal caskets, concrete vaults, or embalming with toxic chemicals (“What is Green Burial,” n.d.). The body is instead laid to rest in a casket or shroud made out of all-natural, readily biodegradable materials such as wool, cotton, fast-growing willow, bamboo, sea grass, mulberry paper, and soft woods like pine. The families of the departed also have the option to keep and ready the body at their home and may even perform the funeral and burial services themselves. Some states may require a funeral director be present. Laws concerning natural burial tend to vary from state to state; therefore, research is important. A number of natural cemeteries have been popping up everywhere that are centered on land conservation and offer burial in natural landscapes. Headstones, if used at all, are generally made out of fieldstones found in the area and are laid flush on the ground. Flowers, shrubs or trees may also be used to help mark these gravesites. Burial grounds like these are environmentally friendly and create a wonderfully amazing atmosphere for friends and family to gather and reflect (“Green Burial,” 2014).

Since the beginning of time, ancient cultures have used cremation as a method to dispose of the dead. Modern cremation, however, began a little over a century ago when Professor Brunetti of Italy perfected a dependable cremation chamber. Like all other processes, cremation has also evolved over time. It begins with body being readied by removing any pacemakers, silicone implants, prostheses, as well as any radioactive isotopes that may be used in cancer patients. Other external objects such as jewelry or glasses are also removed. There is really no a need for embalming the body before cremation unless, of course, the family prefers to have an open-casket funeral. Often the corpses are refrigerated to slow down the decomposition process instead. They are then placed into a casket constructed from

highly flammable materials, such as pine, plywood or cardboard. The incinerator is then preheated to about 1,800 degrees Fahrenheit, the doors open, and the container quickly rolls into the main cremating chamber. Once the door is closed, the body is subjected to a flame similar to a jet-engine that is then aimed towards the center of the body. A second flame is then ignited in another chamber to burn off any dust or particles that are in the air that may be escaping the retort, to aid in reducing emissions, odors and smoke. Also, there is a device called a wet scrubber, which can be found in the emissions stack that releases a mist of water trapping any particles that might be escaping the retort. Once the cremation processes are complete, the chamber is cooled, and what remains is then swept into a small tray and placed into a grinder, or cremulator which pulverizes the bones into an ash like substance. Depending on the size, the human cadaver normally takes about two to three hours to completely burn and will produce anywhere from 3 to 9 pounds of ash ("Cremation FAQ," 2014).

There are a number of issues to be considered for this type of cremation process. For instance, once a body is reduced to ash, there is no undoing what is done. In the occurrence of a homicide or wrongful death case, additional evidence may occasionally need to be collected and bodies exhumed. Families of the deceased sometimes desire to relocate the remains of their loved ones when they move, as well as for other personal reasons. This can no longer be an option once a cremation has taken place. The impact that cremations have on the environment is much less severe than with traditional burials, although the impact is still considerable. As the corpse and casket burn, harmful toxins are released into the air, including dioxin, hydrochloric and hydrofluoric acids, mercury, carbon dioxide and sulfur dioxide. Furthermore, an enormous amount of energy is required to cremate a body. Metal abatement

systems and cost-efficient, high-temperature filters will hopefully become available in the near future and may help eradicate these problems. On the up side, the heat generated during the cremation process can be trapped to create usable energy. For example, Helsingborg, Sweden, acquires enough energy from its crematoriums to provide ten percent of the power needed to heat every one of its homes (“Cremation FAQ,” 2014).

In 1988, a new environmentally friendly, water-based technique was developed known as alkaline hydrolysis. It was originally invented in the United States by Amos Herbert, in an attempt to get rid of animal carcasses, but later evolved into its new use, disposing of human remains. The process begins with the body being put into a corn-silk bag and placed inside a coffin-shaped metal cage covered with small holes, slightly resembling a kitchen strainer. First, the body is then loaded into a cylindrical stainless steel machine called a Resomator, which first weighs the body to ensure the right amount of chemicals will then be added, in order for the corpse to fully dissolve. Next, a combination of sodium hydroxide and potassium hydroxide are deposited inside the vessel, and the door is shut. The cylinder is then gently raised to a tilted position, the head being upward, to ensure even coverage of the chemicals over the body. The machine is set to 365 degrees Fahrenheit and is then turned on. The Resomator has a half-horse-power engine on its side that helps to circulate the chemical concoction around the body, similar to the way a washing machine works at home. The chemicals compounds and the process that is used in alkaline hydrolysis mimic that of a natural ground burial, where the body was left to decompose in the soil, just at a much faster rate of speed. At the end of this three-hour procedure, a fairly minute amount of brownish-green broth made up of sugars, salts, amino acids, and peptides are left. This fluid is safe and can be even used as fertilizer for



use in a memorial garden, or can be simply flushed into the sewer system. Remaining bone fragments, which have turned soft and permeable by the chemical bath, are then dried, pulverized into a fine white ash in a cremulator, and placed in an urn. This process, if made available for use, could really help to make a huge impact on the environment as well as working to make mercury filings recoverable, which is vital since mercury can change into an extremely toxic compound called methylmercury, which leads to horrible birth defects in children. Alkaline hydrolysis is pollutant free and does not produce emissions or emit greenhouse gases into the air. It actually emits twenty times less CO<sup>2</sup> than standard cremation and uses on tenth of the energy. The low cost of operation and maintenance makes the choice of alkaline hydrolysis a smart investment. Even though this system of cremation is very environmentally friendly, it also has its critics. Members of the clergy and even elected officials have voiced very strong opinions in relation to this new-age cremation process and have even labeled it “disturbing.” What’s more, only two states in the U.S. offer alkaline hydrolysis; others are still fighting to make it legal (“10 Crazy Things,” 2013).

There is wide variety of possibilities available when deciding what to do with a loved one’s “cremains,” if you will. For example, they can be blasted into outer space on a rocket, pressed into a synthetic diamond and worn in jewelry, stirred into paint and turned into a masterpiece, mixed with gunpowder and made into a bullet, mixed with combustible particles to create a spectacular fireworks display that can be view by survivors. They also can be mixed with concrete and formed into an artificial reef to be placed at bottom of the sea floor. There is even an option of pressing them into a vinyl record that could play the deceased’s favorite song (“10 Crazy Things,” 2013).

Biodegradable urns are also rapidly becoming a popular, eco-friendly way of scattering ashes. These urns are available for purchase online from an assortment of reputable dealers. EterniTrees™, a small company out of Portland, Oregon, provides urns that have a tree seedling encased inside the lid. They're made out of an easy-dissolving mixture of clay and cornstarch, allowing the urn and the expanding nutrients inside of the lid to be quickly released into the soil, neutralizing the PH balance and making the soil optimal for the growth of the tree. They offer 21 beautiful varieties of trees and have been specifically designed to compliment the natural scenery of the area you have chosen to bury it ("EterniTrees,"n.d.).

This tiny planet that we inhabit is in an ecological state of emergency, and it is time to take action! Cemetery overcrowding is forcing countries around world to invent several different strategies in an attempt to keep this madness going. Instead of trying to of fix a dam leak with a band aid, it's vitally important that we as individuals make the decisions in life and in death that will trigger some real changes for this planet. Both burial and cremation practices come with numerous environmental drawbacks , while natural burials and alkaline hydrolysis on the other hand, are environmentally friendly alternatives that will lend a hand in reducing the impact that death has recently been leaving behind and potentially leave a clean and nourishing world generations to come.

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