The Future of Death:
Cryonics and the Telos of Liberal Individualism

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Abstract

This paper addresses four questions: First, what is trajectory of Western liberal ethics and politics in defining life, rights and citizenship? Second, how will neuro−remediation and other technologies change the definition of death for the brain injured and the cryonically suspended? Third, will people always have to be dead to be cryonically suspended? Fourth, how will changing technologies and definitions of identity affect the status of people revived from brain injury and cryonic suspension?

I propose that Western liberal thought is working towards a natural end, a "telos." In response to a variety of biotechnologies, law and public opinion in liberal democracies will be forced to make explicit that the rights of a living thing are determined by its level of consciousness. I discuss the way that technology will force three clarifications about the value of consciousness, at the beginning, the end and boundaries of human life. Sentience and personhood will become the basis of moral concern, regardless of its media. Just as human rights have become independent of race, gender and property, rights will become independent of being a breathing human being.

But even as we make this transition, the cryonically preserved are still likely to be considered dead for pragmatic reasons, albeit with gradually increasing rights as technology makes their reanimation increasingly probable.

I suggest that it could be acceptable to cryonicists that the frozen continue to be defined as dead if assisted suicide can be legalized. Under a liberal assisted suicide policy cryonicists might be allowed to carry out suspension before a declaration of death, preserving the maximum amount of neural information.

The gradual redefinition of life and personal identity in terms of psychological continuity will also have consequences for the legal status of the reanimated. If, due to information loss, the reanimated do not meet a threshold of psychological continuity, they may be considered new persons. Cryonicists may therefore wish to specify ahead of time whether they are still interested in being reanimated if pre−animation assessment suggests that the result will not meet the necessary threshold of continuity.

Finally, I touch on the way that neural technology will fundamentally problematize the separate, autonomous self on which liberal democratic values are based, leading to a legal and political Singularity. It is this looming neural Singularity that makes the proposed liberal democratic telos a final stage in humanistic thought, before it is superceded by something radically different.

The Future of Death: Cryonics and the Telos of Liberal Individualism

Introduction

Technology is problematizing death. Technology has frozen conditions between life and death that had previously only been considered in mythology, fantasy or philosophy. Until the advent of the respirator, the cessation of spontaneous breathing immediately led to the cessation of circulation and unrecoverable brain damage. Since the 1960s we have continually expanded the gray areas between life and death, stabilizing one process after another in the previously inexorable path from life to dust.

Technology did not really create this gray area, but extended it and made it manifest. Death has always been a process, rather than a clearly binary state. In the Buddhist or Parfitian (1984) view to which I am partial, there is no essential or real identity in things. The boundaries we draw around "life" and the "self" are arbitrary, motivated by specific interests and purposes. Life and the self have no essential reality which can be definitively discerned, or boundaries which can be definitively marked. Rather there are a variety of processes involved in being born or dying, processes involved in the illusion of continuous self−identity. The lines that get drawn have mostly to do with the politics, economics, culture and technology of those doing the drawing.

This is the position adopted by Robert Ettinger, back when he wrote his 1965 manifesto for the cryonics movement, *The Prospect of Immortality*.

> The simplest conclusion is that there is really no such thing as individuality in any profound sense… Let us then cut the Gordian knot by recognizing that identity, like morality, is man−made and relative, rather than natural and absolute… Instead of having identity, we have degrees of identity, measured by some criteria suitable to the purpose. (Ettinger, 1965: 142−143)

Although Ettinger asserted the illusory nature of the self, he also passionately felt the desire to persist in the illusion of continuous personal existence. As a consequence he proposed freezing the body, and more to the point, the brain, of people right after their death. If the freezing preserved enough identity−critical neural information, some future technology might be able to repair the tissue damage and make the frozen live again. Ettinger, and subsequent cryonicists, have argued that the frozen are not dead, but should be seen as living patients waiting for their treatment. Currently about 100 "patients" are "cryonically suspended" around the United States, and cryonics organizations are growing in North America and Europe. About a thousand Americans have signed with one cryonics organization or another to be suspended upon their death. Money has been raised to build a cryonics facility to hold 900 frozen bodies and/or heads.

Cryonicists have faced many challenges in establishing their field. State governments and physicians have treated them with open contempt and derision, dismissing their ideas as crackpot or worse. The public generally rejects the supposed ghoulishness of "corpsicles," while many scientists and physicians who have looked into the field have decided the tissue damage from ice crystal formation will have destroyed far too many cells to make the body or brain recoverable. Cryonicist researchers have been slowly perfecting less destructive methods of freezing, and cryoprotectant substances that are expected to preserve brain tissue are being developed.

The real breakthrough for the acceptance of cryonics came with the publication of Eric Drexler's (1986) plan for nanotechnology, *Engines of Creation*. Drexler, himself a cryonicist, sandwiched a discussion of the feasibility of nanotechnological repair of a frozen ice−damaged tissue into his text. Subsequently he, and other prominent proponents of nanotechnology associated with the Foresight Institute, have provided solid scientific

grounds for claims that those frozen using current techniques may be revivable in thirty to seventy years.

In this paper I discuss whether the expected changes in our definition of death are likely to bear out the cryonicists' belief that the frozen will come to be seen as very sick people waiting for therapy, rather than as "dead." The definition of death is rapidly changing as the technology for the maintenance and repair of the brain injured has advanced. Leading theorists of brain death have recently concluded that the effort to define a final standard of death should be abandoned in favor of a more pragmatic set of questions (Arnold and Youngner, 1993; Halevy and Brody, 1993; Emanuel, 1995; Truog, 1997): how dead is "dead enough" to end life support, transplant organs, put wills into effect, and bury bodies? This reexamination has been motivated in part by innovations which hold much relevance for cryonics, such as the declaration of death for non−heart−beating donor cadavers (NHBDs), for whom the irreversibility criteria of death have been radically reinterpreted.

The advance of critical care technology is also challenging irreversibility. The current definitions of brain death are predicated on the belief that brain dead patients cannot persist in physical life, but this is now shown to be untrue (Shewmon, 1998a, 1998b, 1999). Emerging technologies for remediating brain injuries are certain to deepen the dilemma for the current law and practice around the declaration of brain death. Conditions previously considered death will eventually be reversible, requiring the articulation of new laws, definitions and practices around dying.

In this paper I want to address four questions. First, how will current bioethical, legal and technological trends likely effect the definition of death and personal continuity? Second, given these changes, will the cryonically suspended always be considered dead, or will society eventually see the suspended body as a living, but very sick, patient?

Third, given these trends, will cryonicists always have to wait until they are dead to get frozen?

Fourth, I want to examine the question of who the re−animated person is likely to be thought to be. Although most re−animation scenarios assume perfect re−integration of the previous personality, there are likely to be serious dilemmas about the identity and status of partially recovered personalities.

Finally, I will discuss the cultural and bioethical Singularity that will occur when technologies call into question any meaningful definition of individuality, personhood, and citizenship.

The Final Stage of Enlightenment Ethics: Consciousness−Centered Rights

Individuality is the same thing with development, and it is only the cultivation of individuality which produces, or can produce, well−developed human beings...what more can be said of any condition of human affairs, than that it brings human beings themselves nearer to the best thing they can be? or what worse can be said of any obstruction to good, than that it prevents this? (Mill, *On Liberty*, 1859)

Within the next few decades the humanistic Enlightenment, and its ethical framework, liberal individualism, will reach their telos, their logical and final formulation (Gaus, 2000). Liberal individualism asks why a sovereign, rational person should submit to authority, and it sees the development of the faculties of sovereign, rational persons as the highest good and end. For our ethical tradition subjective personhood is the beginning and the end. The expansion of suffrage and equal rights has involved the slow clarification that rights adhere to subjective persons, not to races, sexes or property.

We have been slowly constructing a global consensus that each subjective person should be as free and equal as possible. The growing percent of the world governed by electoral democracies and liberal democratic principles is the most tangible evidence of this trend (Sen, 1999). Although all democracies are flawed, and vary from liberal, market−oriented regimes to corporatist social democracies, they share common political assumptions: that all citizens should be equal before the law, and as free as possible from coercion. The manifest goal of democratic social policy is, fundamentally, to maximize the utility and capabilities of subjective persons, rather than to fulfill divine dictates or natural law (Sen, 2000). The partisans of various brands of democracy are as unanimous in this basic goal as they are divided by their programs for reaching it. Libertarians work towards this goal by maximizing market freedom and freedom from coercive state power, and minimizing inequality before the law, while social democrats work to maximize civil liberties, and minimize the coercion of sex, race and class inequality.

Liberal democratic humanists have turned from subject to subject, acknowledging the subjectivity of women, children, animals, the sick and disabled. While we value subjectivity when we find it, liberal humanism also removes ethical significance from things that had formally been seen as having it, such as flags, fetuses and the brain dead.

We are currently in the final phase of the liberal democratic tradition's working out of its own internal ethical logic of making subjective personhood the key to life, personal identity and citizenship. Biotech is forcing Western societies to finally discard outmoded pre−modern ideas about the body and humanness, and to consistently accord gradations of rights and value to gradations of consciousness, not just to all breathing human beings (Perring, 1997).

The impetus to junk the binary "dead or alive" ethics for a graduated continuum of rights, keyed to neurological status, will be getting an even stronger push in the coming decades from at least three directions. First, the ability to gestate fetuses outside the womb will spur a redefinition of the beginning of life. Second, the ability to repair brain damage, and even brain death, will spur a redefinition of the end of life. Third, the mixing of species boundaries, through transgenic technologies, will spur a redefinition of the boundaries of humanness.

Neo−natal ethics beyond viability

Advancing reproductive technology is deconstructing parenthood and the status of the fetus (Stanworth, 1988). Current American law, codified in the 1973 Roe v. Wade decision, asserts two criteria for determining the ethical and legal boundaries of perinatal rights: the viability of the fetus, and the right of the mother to control her own body. The Court ruled that the fetus is not a person under the 14 th amendment, but that once a fetus is capable of surviving outside the womb, i.e. "viability," it had claim to interests to be protected by the state. The Court, conservatively, set six months of gestation as the dividing line between non−viable and viable fetuses. Before the point of viability abortion could only be regulated to protect the health of the mother, but could not be banned. After viability, at six months, the moral claims of the fetus on society were sufficient to allow states to restrict abortion to only cases that threatened mothers' health or life, if they chose, on the grounds of the "potentiality of human life." At the time, Justice Blackmun acknowledged in internal memos that this line was arbitrary, and technology has made the viability line more arbitrary since.

Justice O'Connor put her finger on its contingent nature in a 1983 dissent:

The Roe framework…is clearly on a collision course with itself…As medical science becomes better able to provide for the separate existence of the fetus, the point of viability is moved further back toward conception. ... The Roe framework is inherently tied to the state of medical technology that exists whenever particular litigation ensues." [462 U.S. 416, 458 (1983) (O'Connor, J., dissenting).]

Today, using the rapidly advancing techniques of the neo−natal intensive care unit, the threshold of potential extra−uterine viability has been pushed back to 20 weeks, or five months, gestation. Research is being conducted around the world to develop artificial amniotic fluid and methods for extra−uterine gestation. Within the next decade it is likely that the threshold for viability outside the mother's womb will be pushed back many more weeks, and possibly within fifteen years, that the entire process of fertilization and gestation can occur in an artificial environment (Brink, 1998; Unno, 1993, 1999; Powledge, 1999).

This option will not be attractive for ordinary parents for many more decades. Nonetheless, as these the techniques are perfected and outcomes studied with non−human animals, the ability to rescue a first trimester miscarriage will make the Court's viability reasoning irrelevant. What if a mother has a difficult pregnancy decanted to an artificial womb, and decides in the fifth month to dispose of the perfectly healthy, and arguably sentient, fetus. The claim of bodily autonomy and personal privacy is much more tenuous now, since the fetus is not in her body. Does the fetus now have independent interests? On what grounds and with what timetable does the fetus develop these interests?

The only coherent framework in Western thought for according gradations of rights to feti incubated outside women's bodies is to assign increasing rights as fetal neural maturation suggest thresholds of cognitive development. When fetuses are able to experience pain, at some point in the second trimester, the state has an interest in ensuring that they do not suffer, although not yet in interfering with the ownership rights of the parents to determine whether to continue or stop the fetal development. As the fetus and newborn evolve closer to self−aware personhood, so also do their moral status. At some point between six months and twelve months after conception Western law will recognize fetuses as having passed a neurological threshold to become human beings with a right to life. Perinatal technology does not create this moral status but will disentangle it from the rights of the mother to control her own body.

The erosion of death

It is an insult not only to the specific individual, but to human beings in general, to confuse someone who is deceased with a living individual. (Veatch 1992)

Soon after the proposal of a brain death standard of death (Beecher 1968), sides formed to debate how much of the brain must be destroyed for a patient to be declared dead. Veatch (1975) opened the debate by arguing that human beings should be declared dead once they had lost the ability to meaningfully interact with others. Veatch was soon joined by a small, vocal group of "neo−corticalists" (Green and Wikler 1980; Youngner and Bartlett 1983; Gervais 1986; Cranford and Smith 1987). The neo−corticalists argued that the legal boundary of death should be the state of permanent unconsciousness, which marks the death of the person.

Wouldn't it be more appropriate to say that, even though (the permanently vegetative body) is still alive, this patient is no longer a person, having lost, when her cortex stopped functioning, the physiological base of what is crucial to personhood? (Brody 1988)

In response, "whole−brainers" (Black 1978a; Black 1978b; Bernat 1989) have defended a standard requiring complete brain death. This standard was eventually endorsed by the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research in their report *Defining Death* (1981), and written into the Uniform Declaration of Death Act, which has been enacted in 36 states. Those laws declare:

Any individual who has sustained either irreversible cessation of circulatory and respiratory functions, or irreversible cessation of all functions of the entire brain, including the brain stem, is dead. [National Conference of Commissioners of Uniform State Laws, 1980]

The debate in the 1970s and 1980s made clear that the advantage of the whole brain standard was not ethical coherence but pragmatism. The whole brain standard was easier to operationalize, conservatively erred on the side of life, and was seen as the most radical change that the public would tolerate. The whole brain definition was at the outset a compromise between those who preferred a neocortical definition, and those who preferred the somatic definition. As Botkin and Post (1992) put it:

It is our own conviction that the whole brain death standard probably best balances the conflicting needs within our society, despite the confusion it generates. This is based largely on utilitarian considerations. (Botkin and Post 1992)

The whole brain standard was adopted as a compromise between the three camps – body death, whole brain death, and neo−cortical death. The whole brain death standard was presented to the neo−corticalists as a conservative version of their standard: if the entire brain was dead, there could be no possibility of recovery of consciousness. For the body death advocates, it was argued that the death of the whole brain destroyed autonomic processes, and would lead inexorably to cessation of respiration and circulation: whole brain death was simply an extension of the prior standard.

In the 1990s however, there has been an erosion of the whole brain position, at least in the rarefied circles in which it is debated. The erosion stemmed from a variety of growing problems. One challenge came to the concept of reversibility as a criterion for death. For decades it has been clear that some patients have been declared dead because they, their decision−makers and physicians did not want to revive them, even when they could have been resuscitated. This acknowledgement has been codified in the Do Not Resuscitate order or DNR.

But it took surgeons at the University of Pittsburgh to take the next logical step. In 1992, the University of Pittsburgh Medical Center approved a policy allowing terminally ill, brain injured patients to be enrolled to become “non−heart−beating donors” (NHBDs) if their illness allowed the use of their organs. The patients do not meet brain death criteria, but have brain injuries that make them ventilator−dependent. The procedure involves wheeling them into an operating theater, turning off their respirator, waiting two minutes, and then beginning procedures to preserve and remove their organs. As with the DNR, death is not declared because it is technically irreversible, but because the patient or their decision−makers decide not to reverse it.

The NHBD procedure has spread to dozens of other hospitals, and debate has predictably raged about its ethical acceptability. The National Academy of Sciences, for instance, has published a volume[1] on the controversy [Herdman, 1997] and the Kennedy Institute of Ethics Journal has devoted a special issue to it.

In response to the NHBD issue, some ethicists central to the brain death debate have shifted to the position that death has become irrelevant (Fost, 1999; Arnold and Youngner, 1993, 1999; Halevy and Brody, 1993; Emmanuel, 1995). Notably, bioethicists Robert Arnold and Stuart Youngner (1993) have argued that the dead donor rule should be put aside. Wikler (Wikler 1988), for instance, points out that the circularity of defining those bodies as “dead” which we wish to withhold treatment from, and then withholding treatment from the “dead.” The Pittsburgh protocol stretches the current definition of death because vital organs are only permissibly removed from dead donors – we are not allowed to “kill” a patient in order to save another.

Linda Emanuel (1995), the top ethics attorney at the American Medical Association, has proposed that the law be redefined to recognize a “dying zone” between permanent unconsciousness and the cessation of respiration. Within that zone we would allow people to set their own definitions of death, allowing termination of care and organ removal up to permanent unconsciousness. No one should be euthanized who is above the zone, and no one should be buried or cremated until they have stopped breathing.

Another line of challenge to the whole brain position has come from defenders of the circulation and respiration standard for death. For instance, Dr. Alan Shewmon (1998), a neurologist at UCLA, has demonstrated that patients have survived more than ten years after being diagnosed as “brain dead.” Shewmon’s research demonstrates that there is nothing essential about the brain for the regulation and

maintenance of the body. Whole brain advocates argued that the whole brain standard was closely wedded to somatic death, since whole brain death would lead inevitably to somatic death. This link is now revealed to be specious. If the severing of the brain from its role in somatic integrity were the equivalent of death, Shewmon argues, conditions such as "cervicomedullary junction transection plus vagotomy," involving the complete severing of the brain from the spinal column, would also be equivalent to death, although the patient remains conscious and the body continues functioning.

Emerging neuroremediation technologies will soon bring the unhappy whole brain death standard into full crisis. Stem cell research has demonstrated that the brain has the capacity to generate new pluripotent cells to repair brain damage, and that these cells migrate to damaged areas and take up necessary functions (Snyder et al., 1997; Yandava, 1999). Adenoviral vectors have been successfully used to introduce nerve growth factors, and stimulate nerve growth in damaged areas (Boulis et al., 1999). Parallel research has succeeded in blocking the chemical pathways that ordinarily suppress neural regeneration in the central nervous system.

Research is also being conducted on the use of open lattice silicon chips for creating direct communication between the brain and electronics. The NIH has a program on Neural Prostheses[2] coordinating work ranging from interfaces with the optic and aural nerves, to peripheral and spinal nerve interfaces, to interfaces deep in the brain. For instance, Dr. Brinton and her colleagues at the University of Southern California (Krieger, 1999) are working on the implanting of electronic prostheses to replace the functions of destroyed parts of the brain. They are using VLSI chips that generate neural network software models, are built in an open lattice structure, and treated with neurotrophic substrates to encourage the adherence of discrete neural connections.

Using a similar technique, Roy Bakay at Emory has implanted a chip and radio transmitter in the motor region of a completely paralyzed patient, and taught him to control a computer cursor by thinking about motor actions. The neural messages are transmitted to a radio receiver cap worn by the patient, and then to the computer (Kennedy and Bakay 1998; Kennedy, Bakay, et al., 2000).

Within a decade we should see basic neuronal prostheses able to assume the functions of damaged neural tissue. The development of computing devices using biological materials, and software developed on biological models, suggests further future convergence between organic computing, neural network software, and neural−computer interfaces.

Eventually victims of devastating neurological damage, who would previously have been declared hopeless or even dead, will be seen as still potentially living patients deserving of a trial of reparative therapy, unless portions of the brain holding identity−critical structures are demonstrably and thoroughly destroyed. If the restoration is unsuccessful, the patient may then be allowed to completely die.

Beyond anthropocentrism

In June 1999, the U.S. patent office rejected a patent for a human−animal hybrid or "chimera" that had been filed by anti−biotech activist Jeremy Rifkin and a colleague. In rejecting the patent, the U.S. Patent Office acknowledged that, although it has permitted the extensive patenting of biotech−engineered life forms and human DNA, the 13th Amendment forbids the ownership, and therefore patenting, of human beings. Since the Supreme Court, Congress and Patent Office have never defined what a human being is, they rejected a patent on a transgenic half−human/half−animal which they considered to be too close to the line.

Transgenics will force the U.S. and world to define humanness in the coming decade. If not in the first cut, then eventually, working from liberal democratic principles, the definition of humanness must focus on cognitive capabilities, subjectivity and self−awareness as the basis of citizenship rather than the specious, and disappearing, species boundary. For instance, bioethicist Peter Singer and an international group of activists have organized around the Great Ape Project. Their proposition is that we should extend the boundaries of

rights first and most extensively to great apes, since we have the best evidence that they share our capacities for self−awareness. They propose that great apes should have the same rights as human children: either we should not allow children and apes to be killed, tortured or imprisoned, or we should allow cruelty toward both children and apes. At the urging of the Great Ape Project, New Zealand has banned medical experimentation on great apes. Singer (1990) has extended the argument to a critique of factory farming by arguing that infant humans and livestock animals have roughly the same mental capacities, and should therefore be treated equally under the law.

It seems unlikely that meat−eating will be banned in the near future, or that we will be allowed to eat babies. But it appears likely that the trends toward increasing protection of animals' interests will continue. Similarly biotech will continue to create various kinds of chimera, and experiment with enhancing the intelligence of animals, in ways that will force a consciousness−centered ethic to supplant anthropocentrism. The first cognitively enhanced animals that can express themselves unambiguously will cause a dramatic shift in thinking about the rights of living things.

Rights−bearing contingent on level of consciousness

These changes will not come easily, and they will be one of the fundamental political divisions in coming years, that between biofundamentalism and transhumanism. On the one side, the biofundamentalists will insist on rights for all humans, conscious or not, and will condemn and attempt to ban reproductive technologies, transgenic blurring of species boundaries, and blurring of the definition of death. On the other hand, the emergent transhumanist worldview will embrace technological transgression, and keep focused on the cognitive abilities of the various kinds of life. In other words, transhumanists will be the agents of this final clarification of liberal democratic laws and ethics.

The controversy now swirling around Peter Singer's (1993, 1995a, 1995b, 2000) consistent utilitarian ethic of life is a harbinger of the struggle to come. Liberal application of a consistent consciousness−based standard of rights can certainly allow some consequences that many consider "yucky," such as the creation of headless or anencephalic clones for transplant, euthanasia of newborns (Tooley, 1983) and the severely demented, and more rights for some animals than for some humans, as Singer proposes (Singer, 1995a; Kuhse and Singer, 1985). But the tangible benefits of the new standard, even more than its consistency with Western thought, will provide enormous incentives for its adoption. Few among us will be willing to want to refuse the potential benefits of medical science on inconsistent yuck−based "moral" grounds. The struggle over the use of fetal stem cells is an example of this conflict, and the vast majority of Americans favor using fetal stem cells if it will treat illness.

Table 1 arranges various kinds of humans and animals on a linear scale of self−awareness and cognitive complexity, tiered with the rights accorded to them by the Singerian liberal democratic worldview I have described above.

At the top of this continuum I have inserted "cognitively enhanced posthumans," people who are smarter and faster than Human 1.0. These posthumans may not agree that they should be in the same ethical category with mere humans. Biofundamentalists will certainly that the enhanced are equal to or less than human. The struggle to defend transhuman solidarity and liberal tolerance between humans and posthumans will undoubtedly be a core part of the transhumanist agenda.

Table 1: The Future Continuum of Consciousness and Rights

Types of Life	Consciousness	Rights/Value

Cognitively Enhanced Posthumans		
	Mature Personhood	**Right to Vote, Make Contracts**
Adult Humans		
Children		
Adult Apes	**Personhood**	**Right to Life**
Severely Retarded Adults		
Some Mammals Infants		
Severely Demented Adults	**Sentience**	**Right Not to Suffer Unnecessarily**
Fish		
Late Fetuses Permanently Unconscious		
Embryos and Early Fetuses		
	Non−Sentient	No Rights: Property of Family
Brain Dead		
Anencephalic Newborns		
Headless Clones		
Plants		

The Brain Dead and Frozen: Living, Dead, or Missing?

Do We Really Want the Frozen to be Living?

If a consciousness−based ethical standard was institutionalized in the coming decades, it is unlikely to have any immediate impact on the cryonically preserved. In 1965 Ettinger argued that the frozen should be reclassified as living citizens: “The frozen… will be property owners and tax payers” (Ettinger, 1965: 102). Similarly, Alcor, the largest cryonics organization in the world, has argued that cryonics patients should be considered alive on the basis of potential from revival.

Stephen Bridge (1994) and Alcor (2000) have summarized the legal advantages and disadvantages of the cryonics patient being considered dead or alive. If the cryonaut is dead, she can legally donate her body to Alcor for storage under the laws governing anatomic gifts. But she could decide to be “treated” at Alcor if she were considered alive. If the cryonaut is dead she can use life insurance policies to fund her suspension, and estate mechanisms to leave money for maintaining herself in cryostasis and providing for herself after

reanimation. But if she was “alive” she could also leave her money in trusteeship.

The principal reason cryonicists are concerned about the definition of their status is because many would like to get frozen before they are legally dead, and to be treated as patients facing emergent care rather than as corpses. Not only must they wait until disease has potentially ravaged their brains, but “after death” they can be subjected to delays in freezing, and even autopsies, which make successful conservation of neural information impossible.

Thomas Donaldson has most recently made the case for premortem freezing. Donaldson has an inoperable brain tumor which is currently in remission, but which he believed was life threatening in the late 80s. He sued the state of California for the right to have his cryonics provider, Alcor, be protected from murder or assisted suicide charges for assisting in having his head removed and frozen. The California courts rejected his suit on appeal.

How likely then are cryonauts to be redefined as “living enough” to have rights, such as the right to be frozen without a declaration of death?

When are Non−Persons Treated as Actual Persons?

Continuing to care for a patient with an uncertain prognosis is the morally and ethically correct thing to do. Many patients that we would call “dead” today are likely to be reclassified as “seriously ill, but treatable” in the future.

Cryocare

When should *potential* persons be treated as *actual* persons? An embryo encodes the information for a potential future self−aware person, just as frozen brain tissue does. Of course, the embryo does not contain a pattern of self−aware personhood, while the frozen adult brain does potentially contain that pattern. But is that enough to treat the frozen adult brain as “alive?” Clearly the frozen do not meet a consciousness−based definition of life based on continuous, waking sentience, much less self−aware personhood. On the other hand, if such a standard is applied too rigidly, people who are in deep sleep, who are hypothermically suspended but revivable[3], or who have been placed in temporary therapeutic states of arrest, would also be dead. We want to continue to treat some non−sentient potential persons as “alive,” so which ones?

In my Buddhist/Parfitian ontology “living” and “dead” cannot be defined absolutely, but only for a specific historical context. So, rather than asking which people are really alive or dead, the question resolves to the conditions under which Alcor’s definition of the frozen as alive might be accepted by law and public opinion. The key factor in social and legal decisions to treat potential persons as actual persons is the likelihood that the potential will be actualized: how likely is it that the potential person will become a real person? Sleeping or temporarily comatose people are likely enough to return to conscious personhood to continue to possess their rights as living persons. Adopting the Alcor definition of life would mean that the persistence of information encoding memory and personality inside the frozen brain should be considered life, even if that information will *never* be re−animated into self−awareness. But if a frozen person is sent to float eternally in space, what is the point of considering that a state of “life?”

The likelihood of becoming a person, or returning to personhood, is actually a product of two factors: the ability of the non−persons to become a person again, and the intention of socially legitimated decision−makers to return non−persons to personhood. The NHBD controversy has made explicit what was implicit with DNRs; the intention to resuscitate a heart/breathing−arrested person partly determines when in the dying process a person is declared dead. People in cardiac arrest are treated as living persons to be revived if they are otherwise healthy and revivable. But if they are sick and will never return to consciousness, or they and their decision−makers don’t want them revived, they are treated as if dead. The decision−maker has

to have social sanction; if a nurse decides not to resuscitate someone in arrest, they can be charged with murder. New Jersey's brain death law, under pressure from Orthodox Jews who do not accept brain death as a death, allows a religious exception to the brain death statute. In other words, the brain dead are dead in New Jersey unless their relatives, who are part of a powerful religious lobby, don't want them to be. A fetus is treated as a patient if its mother intends to bring it to term, or if the state has enacted fetal protection legislation to protect fetuses from drugs or violence. But it is not treated as a patient if it is so disabled that it will not survive, or it is to be aborted.

Presumably the custodians of cryonauts will always desire their eventual reanimation, but they will always be a vanishingly small proportion of the population. So the changing social status of the frozen will be determined by changing evaluations of the likelihood that the frozen can be successfully reanimated. In effect, although the frozen have been pragmatically classified as dead because they have gone missing from the world of the living, they might be reinstated to the world of the living if there is evidence they were just on a long journey.

There are several other circumstances in which the status of a person as dead or alive is determined by the statistical likelihood of their return. For instance, the classification of someone as "permanently vegetative," rather than as simply temporarily comatose, is a matter of statistical probability. American practice is based on the recommendations of the Multi−Society Task Force on the Permanent Vegetative State (1994) that patients should be considered permanently unconscious if unaware for three months after non−traumatic injury (such as chemical overdose) or 12 months after a traumatic brain injury. Once classified as permanently vegetative, caregivers and physicians are given much more latitude for conservative treatment, often in effect allowing death to "take its course."

Another cognate situation is the missing person. When someone goes missing on the high seas, or doesn't return from war, common law has long held that these missing persons be declared dead for practical reasons. If the circumstance of the missing person's death is uncertain, and there is some possibility they have been shipwrecked, or taken hostage in a secret Vietnamese prison camp, or are simply on the lamb to avoid child support payments, the court imposes a waiting period of some years before death may be declared. The Uniform Probate Code, adopted by 18 states and more or less in effect in the rest, declares death to have occurred after a five year waiting period. If there continues to be strong evidence that the missing person may be living, judges may put off declaring death even after this waiting period. Once the absentee is declared dead, most states protect the heirs and those who declared the person dead from liability for wrongly distributing their property, and otherwise harming their interests.

In some sense, although we know the whereabouts of their body, the cryonically suspended person is a missing person. They are in a condition from which they may or may not return. Even as technology begins to convince the public and the courts that the suspended could theoretically be restored, there is the possibility that they have suffered information loss beyond the ability of technology to restore. The courts are very likely to continue to declare them dead, out of pragmatism, in order that their affairs and their heirs not be left in limbo awaiting their eventual potential reanimation. For the frozen to be declared alive again will, like the soldier returning from twenty years in the jungle, await the successful reanimation of at least one cryonaut, thereby establishing that the probability of return is greater than 0.

Cryonics Patients in the Post−Neuro−Remediation Era

Alcor points out that the current definition of death is simply a confession of the lack of scope of current medicine.

The pronouncement of death is thus an arbitrary (if admittedly very practical) medical and legal construct, which amounts to a statement saying in effect: “Your affliction has exceeded our current level of medical skill and we are currently powerless to restore you to function; therefore we give up.” (Alcor 2000)

As technology erodes the brain death standard, the future operational definition of “dead enough” will become something more like: “The patient cannot be revived to self−awareness, with continuity of previous memories and personality, because they have irretrievably lost that information, or we are unable to recover them, or they or their guardians do not wish them to be revived.”

Once there is successful reanimation, or there is substantial proof of revivability from animal experimentation, the status and rights of the cryo−suspended will gradually increase. Halperin (1998) in *The First Immortal* depicts this quite well – people may not be charged with murder for malicious thawing, but it will become an increasingly serious offense, keyed to the likelihood that the person could have been retrieved. Ettinger had proposed in 1965 that

Perhaps the law will come to recognize three classes of people…those in suspended animation, those frozen after death, and those who are thoroughly dead because they were burned up, well rotted, lost at sea, or otherwise considered poor bets. (Ettinger, 1965: 94)

Halperin took up Ettinger’s proposal and extended it, suggesting a legal code that recognizes four categories of the dead, with increasing rights:

(1) the irrevocably dead, that is, cremated, lost at sea, et al. (2) Persons frozen or otherwise DNA−preserved, but with hopelessly irreparable brain damage. (3) Persons frozen after death with brain tissue arguably saved. (4) Persons in suspended animation, frozen prior to death and any material brain decay. (Halperin, 1998: 208).

Halperin’s fourth category returns again to the real issue in the debate over the status of the frozen; will it ever be legal to get frozen before a declaration of death, ensuring the greatest possible preservation of neural information?

Will We Always Have to be Legally Dead to Get Frozen?

Current legal and medical criteria for pronouncing death are usually irrelevant to the patient’s ultimate prognosis if cryonic suspension is begun promptly and premortem conditions (multi−infarct brain disease, respirator brain, etc.) have not obliterated brain structure. However, in practice the necessity to wait until such criteria are met may result in serious or even irreversible injury in specific cases. (Alcor, 2000)

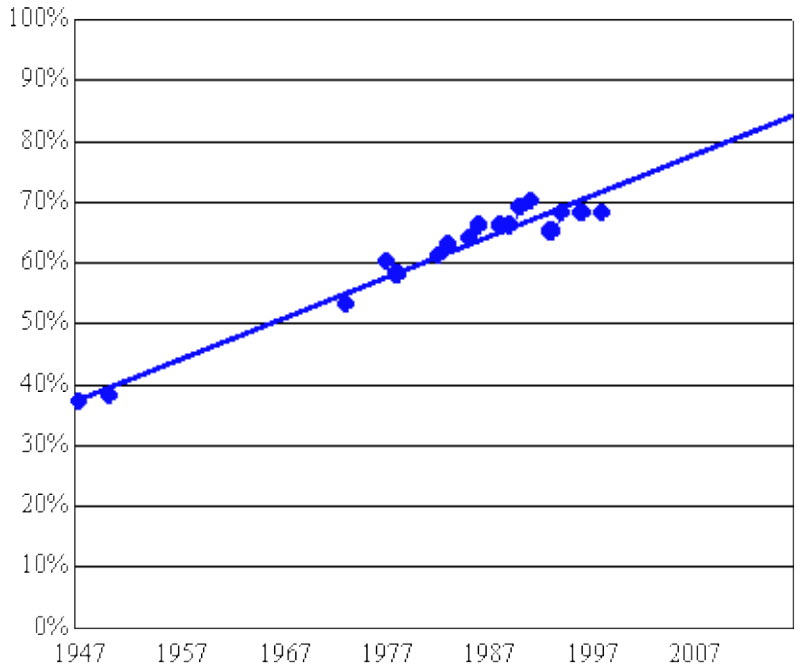
The principal reason cryonicists are concerned about the definition of their status is because many would like to get frozen before they are legally dead, and to be treated as patients facing emergent care rather than as corpses.

So will people always have to be dead to get frozen? Maybe not. So long as being frozen is considered ‘dead,” helping to freeze someone not already dead will be considered murder or “assisted suicide.” When Thomas Donaldson fought the California courts unsuccessfully in the early 1990s for the right to have his head removed and frozen the California Supreme Court ruled that, even though suicide was legal, Donaldson had no right to “state assistance” in suicide, and that the “assistance” of the cryonics team could be charged as murder. So the ability to freeze people before they are dead will depend on legalizing a very liberal set of

acceptable modes of assisted suicide.

The majority of Americans have supported and continue to support a right to assisted suicide. People with higher education are more secular, and support greater personal freedom, and an ever increasing proportion of Americans have subjected themselves to higher education. The long−term prospects for liberalized assisted suicide, and many other personal freedoms, appear to be rosy. This graph shows support for the statement "When a person has a disease that cannot be cured, do you think doctors should be allowed by law to end the patient's life by some painless means if the patient and his family request it?" A majority of Americans have said yes for twenty−five years, and that support should grow stronger in the coming decades.

Figure 1: Percent of Americans saying "yes" to "When a person has a disease that cannot be cured, do you think doctors should be allowed by law to end the patient's life by some painless means if the patient and his family request it?"



Benson (1999)

The influence of right−to−life Christian groups and conservative doctors is being fought by increasingly successful choice−in−dying organizations, who have succeeded in putting a number of assisted suicide laws on the ballot in a number of states, and of passing an assisted suicide law in Oregon. While the Supreme Court did not rule that assisted suicide is a constitutional right in 1997, it also ruled that states are free to legalize assisted suicide. The liberalization of assisted suicide may not have come as quickly as Halperin (1998) predicted in *The First Immortal*, in which President Gore celebrates Jack Kevorkian with a fireworks display sometime in 2001. But I think it is safe to predict that Boomers will be increasingly assertive about choice−in−dying in the next three decades.

After Proof of Reanimation: Suspension as an Experimental Treatment

The acceptability of an experimental procedure increases as the risk of mortality declines. Once there has been substantial proof that reanimation is possible, suspension will be seen as an experimental treatment option with a greater than 0 chance of success. Ralph Merkle made the argument for defining cryonic

suspension as a clinical trial in his widely read 1994 paper on “The Molecular Repair of the Brain.”

A new AIDS treatment might undergo clinical trials lasting a few years. The ethical dilemma posed by the terminally ill AIDS patient who might be assisted by the experimental treatment is well known. If the AIDS patient is given the treatment prior to completion of the clinical trials, it is possible that his situation could be made significantly worse. On the other hand, to deny a potentially life saving treatment to someone who will soon die anyway is ethically untenable. In the case of cryonics this is not an interim dilemma pending the (near term) outcome of clinical trials. It is a dilemma inherent in the nature of the proposal. (Merkle, 1994)

By the time the feasibility of reanimation has been demonstrated, and the risk of mortality from it minimized, medical technology will presumably be sufficiently developed that far fewer people will need to make use of such an extreme step. In other words, by the time the frozen are seen as living people undergoing an experimental procedure, no one will be getting frozen anymore.

Who Will the Reanimated Be?

As Ettinger and Halperin suggest, consistent with the consciousness−centered ethics articulated at the beginning of this article, the status of a reanimated person will be determined by how much of that person has survived. One of the key assessments that will need to be made about the status of every frozen brain is whether it is likely to have retained sufficient information to recover the person who was frozen. Long before society is faced with those decisions, however, the stage for them will be set by debates over the care and status of the brain injured. In an era of common neuro−remediation of severe brain injuries, we will be faced with the meaning of putting back together a living person who has lost all identity−critical information. Will we say that such a person is identical to the previous person, with their rights and obligations, or will they be considered a new person?

Alcor has already forewarned cryonauts of this possibility:

Severe brain injuries could result in varying degrees of amnesia and personality loss after repair...In particularly bad cases, cell and tissue repair technology might only result in revival of a biological twin of the suspended patient. (Alcor, 2000)

By the time we are able to reanimate the frozen, we will probably be able to predict the likelihood of recovering identity−critical information with some accuracy. In any case, making this prediction will be important for families who are considering attempting reanimation. If recovery is unlikely, the person’s advance directives or surrogate decision−makers should specify whether reanimation should be attempted, with the likely result of a new person. Once the person is revived, they will then need to be assessed for whether they do in fact meet the continuity requirement. If there is a new person, there will be a strong case for them to be considered a successor or relative of the deceased, but not the same person.

We might deal with such eventualities the way we deal with pregnant brain−dead women, whose bodies are also sometimes used to incubate their pregnancies to term. Some argue that the use of women’s bodies after brain death is a violation of their “human dignity,” while right−to−life groups have insisted on maintaining the pregnant brain−dead body as a baby incubator. But physicians and courts have generally deferred to husbands’ and relatives’ decisions, taking into account the dead woman’s prior expressed feelings about death, babies, biological motherhood and adoption. In the absence of binding instructions from the persons who had been suspended, their surrogates would have the right to make decisions about their reanimation. In

the case of the brain−dead body with likely erasure of personal identity, the patient's prior wishes and caregivers would likely be given weight in determining whether to attempt remediation.

Potential people such as a fetus or the person to be reanimated from damaged brain tissue don't have rights in themselves. But we do recognize the rights of the former person, the woman or the person who was suspended, to have some say over the disposition of their body, property and affairs.

The Bioethical Singularity: Beyond Personal Identity

Despite our every instinct to the contrary, there is one thing that consciousness is not: some entity deep inside the brain that corresponds to the 'self,' some kernel of awareness that runs the show, as the 'man behind the curtain' manipulated the illusion...in The Wizard of Oz. After more than a century of looking for it, brain researchers have long since concluded that there is no conceivable place for such a self to be located in the physical brain, and that it simply doesn't exist. (Nash, Park and Wilworth, 1995)

"…the notion of "identity" is likely to get very . . . *stretched*." (Burch, 1999)

Just as technology drives us to clarify that we value continuous, discrete self−aware persons, more than the platforms they come on, so it will also force us to acknowledge that those persons are fictions. Technology will eventually develop the capacity to translate human thought into alternative media (Kurzweil, 1999). Such a technology threatens the boundaries and continuity of the self (More, 1995; Sandberg, 2001), the autonomy of the individual and her decisions, and the useful fiction of social equality between persons.

When one can easily modify, borrow, or drop, merge with others, and separate, any of their external and internal features … there won't be distinct lines between individuals anymore. There is a good term "dividuals" for self−reconfigurable entities; also, there is the aspect of overlap between entities in a liquid functional ecology. Could you say whether forests, or patches of grass, are all equal? How about more structurally fluid things, like Internet communities, or ideas? Knowledge clusters will be more fluid and intermixed than anything we know, and the concept of equality would look to them as a memetic relic. (Alexander Chislenko, recorded by Dominguez, 1997)

Threats to the self will develop in many areas. Our control over the brain will slowly make clear that cognition, memory and personal identity are actually many processes that can be disaggregated. We will have increasing control over our own personalities and memories, and those of our children. Full nano−replication of the mental process opens the possibility of identity cloning, distributing one's identity over multiple platforms, sharing of mental components with others, and the merging of several individuals into one identity.

Technological Threats to Liberal Individualistic Assumptions

Identity Malleability: Parental, social and personal control of memory, identity and personality

Posthuman Persons: Radically enhanced minds

Identity Sharing: Memories, thoughts and skills, sold or shared

Identity Cloning: Persons multiply copied into new media

Distributed Identity: Distinct persons distributed over, or sharing, a set of bodies and machines

Group Identity: Multiple bodies and machines integrated into a collective identity, without clear personal identity, e.g. Borg or "hive minds"

When we get to the point where neurological functions can be controlled, designed, cloned, shared, sold, and turned on and off, the illusion of continuous, autonomous self−identity will become more obvious. Once we cast off this fundamental predicate of Enlightenment ethics, the existence of an autonomous individual, we are beyond the ethical frameworks of liberal democratic law and bioethics. We have already begun exploring this territory in the law without realizing it. For instance, who is culpable in the case of multiple personality disorder (Braude, 1996)? Dilemmas of this sort are certain to multiply.

There are ethical worldviews that do not have the autonomous individual at their core, from theocracy to Communism. Let us hope that, if we begin to take these thought experiments serious now, we will have more satisfactory alternatives, built on liberal democracy rather than negating it, when the time comes.

Conclusion

The current definitions of death, worked out twenty years ago to address the technology of the respirator, are already falling apart. Some are suggesting we dispense with "death" as a unitary marker of human status, while others are pushing for the recognition of a neocortical standard. The twenty first century will begin to see a shift toward consciousness and personhood−centered ethics as a means of dealing not only with brain death, but also with extra−uterine feti, intelligent chimeras, human−machine cyborgs, and the other new forms of life that we will create with technology. The struggle between anthropocentrists and biofundamentalists, on the one hand, and transhumanists on the other, will be fierce. Each proposal for a means of extending human capabilities beyond our "natural" and "God−given" limitations, or blurring the boundaries of humanness, will be fought politically and in the courts. But in the end, because of increasing secularization, the tangible advantages of the new technologies, and the internal logic of Enlightenment values, I believe we will begin to develop a bioethics that accords meaning and rights to gradations of self−awareness, regardless of platform.

This transformation is unlikely to cause the cryonically suspended to be automatically reclassified as living however. For pragmatic reasons, and due to the uncertainty of information loss, the cryonically frozen are likely to remain dead until proven living. They will be in the status of the soldier missing in action, who has been thought dead, his wife remarried, his estate settled, who is suddenly rescued by some future nano−Rambo. Once there has been tangible proof that the prisoners are still in their camp, there will be a re−evaluation of the status of the frozen. Getting frozen will then come to be seen as a plausible alternative to death, rather than a bizarre way to preserve a corpse. By this point, however, few people will presumably need to make use of this option.

Since this change in the public perception of the status of the frozen is many decades off, and the frozen will be seen as "dead" in the meantime, cryonics organizations should focus more attention on collaborating with choice in dying organizations . Most proposed assisted suicide statues would not allow cryonic suspension as a method. But with secular trends that support further liberalization, and the growing organization of the majority in support of assisted suicide, it seems likely that the coming decades will see laws that allow cryonicists to choose suspension as a part of their "suicide" method.

The suggested shift toward a personhood standard for social policy would dramatically effect the reanimated. A personhood standard would open the possibility that the legal identity of a reanimated person would be contingent on their recovery of some threshold of their prior memory and personality. Advance

directives of the suspended should address the question of whether they are interested in repairing and reanimating their brain, even if nanoprobes or other diagnostic methods suggest that the resulting person will not be them, but some new person.

Finally, I have touched on the truly unpredictable, the equivalent of a bioethical, moral and legal Singularity: the fundamental problematizing of the self. Once technology has fully teased out the constituent processes and structures of memory, cognition and personality, and given us control over them; once we are able to share or sell our skills, personality traits and memories; once some individuals begin to abandon individuality for new forms of collective identity; then the edifice of Western ethical thought since the Enlightenment will be in terminal crisis. The political and ethical trends that are predictable now, as the Enlightenment works towards its telos, will become unpredictable. As transhumanists work to complete the project of the Enlightenment, the shift to a consciousness−based standard of law and ethics, we must also prepare political values and social ethics for the era beyond the discrete, autonomous individual.

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[1] An issue of some relevance to the cryonics community is premortem cannulation and administration of anticoagulants and vasodilators, which the National Academy report judged acceptable.

[2] http://www.ninds.nih.gov/npp/)

[3] Guidelines for the clinical determination of brain death call for patients in hypothermia to be rewarmed before diagnosis can be made. There are cases of victims of accidents in icy water being reanimated after several hours of hypothermia with negligable brain damage. Increasingly, research is being conducted into the therapeutic use of hypothermia during surgery, and after traumatic brain injuries. Dr. Peter Safar at Pittsburgh's Center for Resuscitation Research is pioneering short−term hypothermic suspension for the critical injured, who have not responded to CPR and meet the clinical criteria for death. Once they are transported to an emergency care unit, they are placed on a bypass machine and respirator, and can be re−animated and treated. The Center is also working on chemical and gene therapies of the prevention and treatment of brain damage from the suspension procedures (Tisherman, Rodriguez and Safar, 2000; Safar et al., 1999).