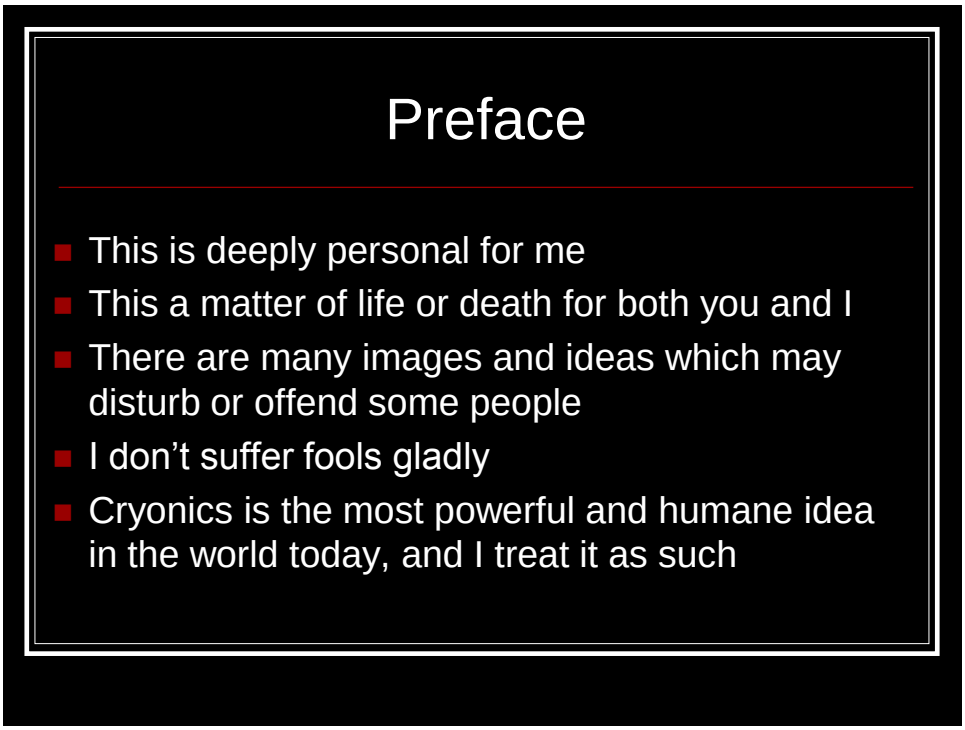
Cryonics: An Historical Failure Analysis

Part I: Preface and Initialization Failure

Mike Darwin

1964-1972

PREFACE



SLIDE 1

Before I begin the formal, structured part of this presentation, a few words are in order to put it into context. We live in an age where passion and strong emotion have been largely removed from daily discourse and are now considered acceptable only in the realm of fiction; in movies and video games. Characters there are free to speak in extremes and to speak passionately; not so those of us who inhabit the real world. I will be breaking that taboo today because what I am going to talk about is a life or death issue for you, for me, and for the 7 billion or so other human beings on this planet. My life matters to me a great deal, and I'm not ashamed to admit it.

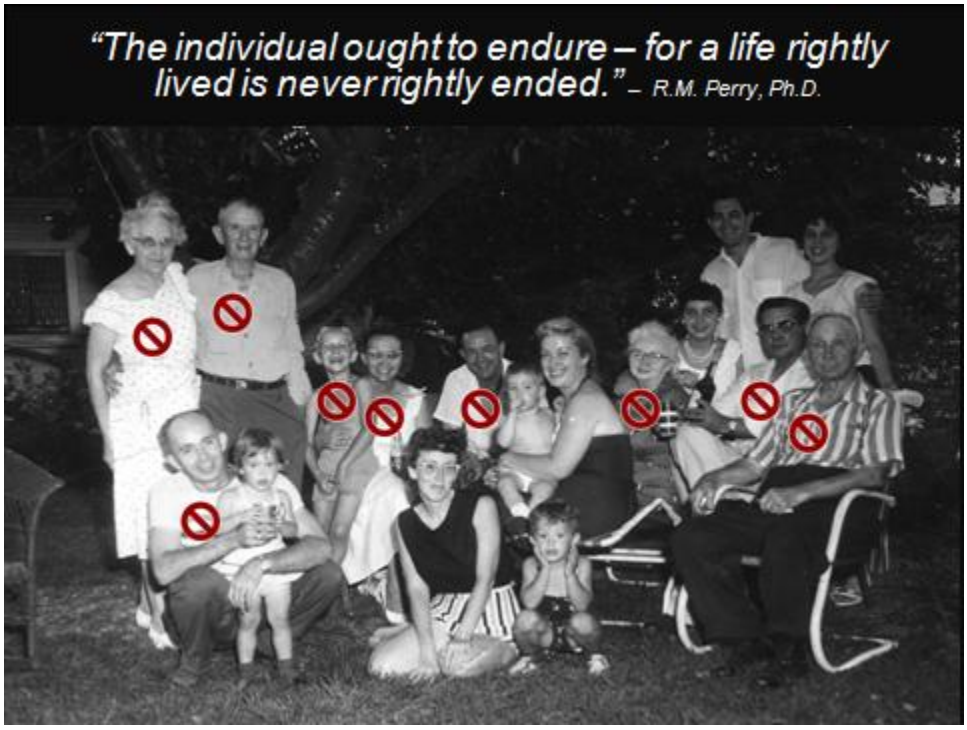
Most of the people on this planet get through life on a daily basis by being carefully shielded from certain images and ideas which they find uniquely disturbing and destabilizing. Of course, if they were, in fact, immortal supermen, these images and ideas would have a very different effect. But, they aren't immortal supermen; and neither are we.

So, some of the images you will see in this presentation, should you choose to stay, may be unsettling or even frightening. I do not apologize for this; I believe they are essential to communicate understanding and are, in fact, the only way to communicate that understanding effectively. So, if you are likely to be disturbed by images of death and decomposition, I suggest you make your exit now. You've been warned.

Finally, I want each of you to understand that I believe cryonics is the most powerful and humane idea in the world today, and I treat it as such. I don't ask you to do the same (yet), but I do ask you to understand and to respect that this is my perspective, and I have the floor. I do not suffer fools gladly and a good part of what I have to say today is the direct result of people tolerating fools and foolishness in cryonics.

SLIDE 2

It is impossible to understand what I have to say without understanding something of who I am and how I got to be that way. It has been said that a happy childhood is the worst possible preparation for life, and I can certainly attest to that. I grew up in a stable and secure environment; I lived in the house my grandfather had built and in which my mother had been born. While my parents were working class, they afforded me everything necessary for good intellectual and emotional development. As an only child in a loving extended family, necessities were assured and an enriched environment was a given.



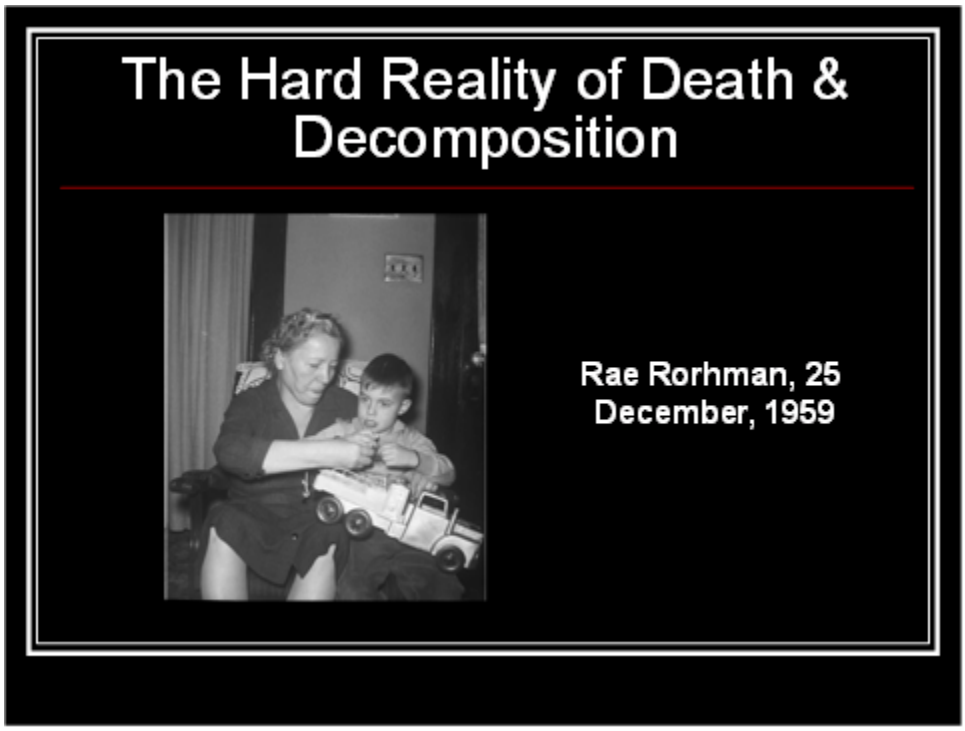
SLIDE 3

Unfortunately, the one thing my parents and extended family could not protect me from was the reality of the inevitability of disease and death. My parents were in their mid-30s when I was born, and a consequence of this was that my grandparents and aunts and uncles began to suffer age associated morbidity and mortality when I was still young and most of them had died by the time I was a pre-teen.

The red symbols above indicate people who are now dead, many long dead. I'm the babe in arms sucking his thumb. While my mother (holding me) and my father (who took the picture) are both still alive, my mother has descended into the dark hell of Alzheimer's disease. Several of the people still alive from the

day in 1956 when that photo was taken are in failing health and will soon be dead.

The impact of these lost lives on me as a child was immense and terrifying and I soon came to the conclusion that, as Mike Perry has so eloquently put it, “The individual ought to endure – for a life rightly lived is never rightly ended.”



SLIDE 4

A particularly traumatic event, and one that was to shape my life, occurred when I was ~ 8 years old. I discovered my maternal cousin, Rae Rorhman, with whom I was very close, dead in her home a few doors down the street from where we lived. Rae was a noncompliant diabetic who died suddenly

during the summer and was not discovered until I entered her home approximately a week after her death. She was in an advanced state of decomposition and there were none of the considerable resources or ‘contexting’ of the mortuary industry or the church to soften the hard reality of what death really is.

It is an ugly, destructive process and in confronting it I began to realize that the mystical explanations I was being given as to why it was both necessary and good were merely a coping mechanism adults used to stop themselves from going insane, a version of Santa Claus and the Tooth Fairy for grownups which someone, someone quite human, had made up to keep the world as barely sane and orderly as it was. It was crystal clear to me that no one in their right mind would want what I saw had happened to Rae, to happen to them.

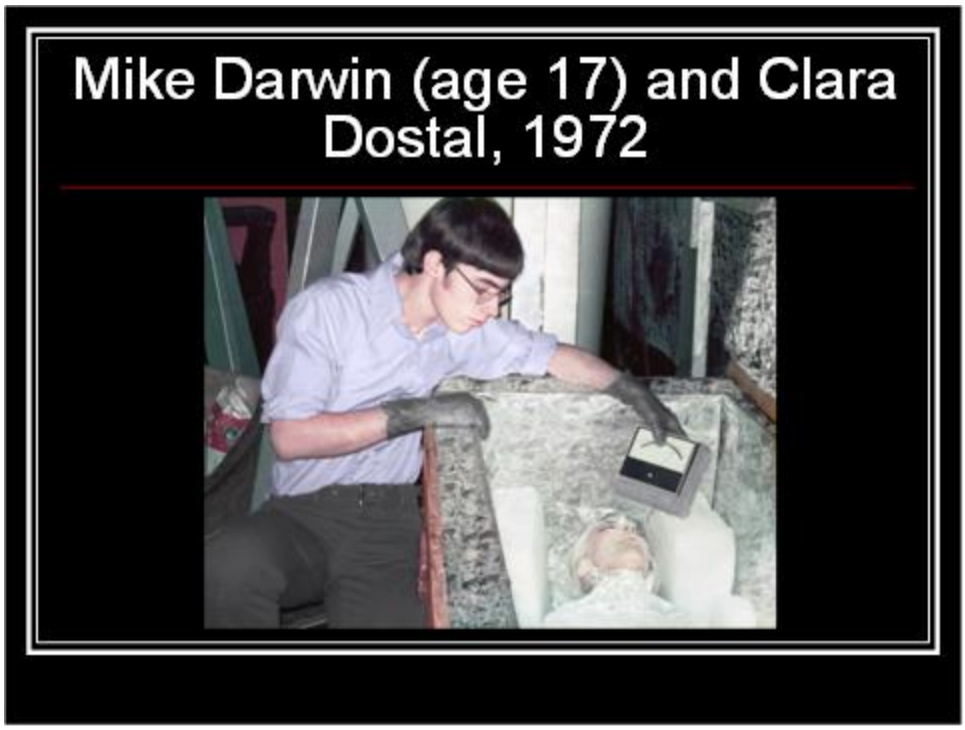
SLIDE 5

"That event and the deaths of others close to me, launched on me a quest to find a way to halt decomposition, and, shortly thereafter, to prevent death. I began experimenting with ways to interrupt and restart life processes in plants, insects and small vertebrates (red eared slider turtles) by cooling and freezing. In 1966 I was introduced to cryoprotectants and to tissue culture, and by 1968 I had amassed a substantial amount of experimental expertise and results. It was clear to me that cryopreservation offered the most likely path to achieving suspended animation.

With suspended animation would come two great boons: the ability to travel to distant star systems and explore the universe, and the ability to enter a state of indefinitely long waiting if death threatened. While I did not foresee reversal of

aging or the application of this technology after so-called death had occurred, I found it enormously reassuring that death and decomposition could be forestalled, essentially indefinitely, and that even if experiencing life was not possible forever, in theory, avoiding death was.

During the course of a science fair project in 1967 entitled, ‘Suspended Animation in Plants and Animals’ I was handed a newspaper clipping that introduced me to the idea of cryonics by telling the story of one Professor James Hiram Bedford who had been frozen after ‘death’ to await a cure for his cancer, as well as rejuvenation from old age, to a state of healthy vigor.



SLIDE 6

I promptly contacted the various cryonics organizations extant at that time, and quickly joined the Cryonics Society of New York (CSNY) as a suspension member, taking jobs mowing lawns and doing yard work to pay for my life insurance. In 1972, while visiting CSNY on my secondary school holiday, I was asked, along with a young graduate student in Pharmacology and Cryobiology at the Medical College of Georgia, Greg Fahy, to perfuse and freeze a CSNY member, Clara Dostal, who had been pronounced legally dead a few hours earlier.

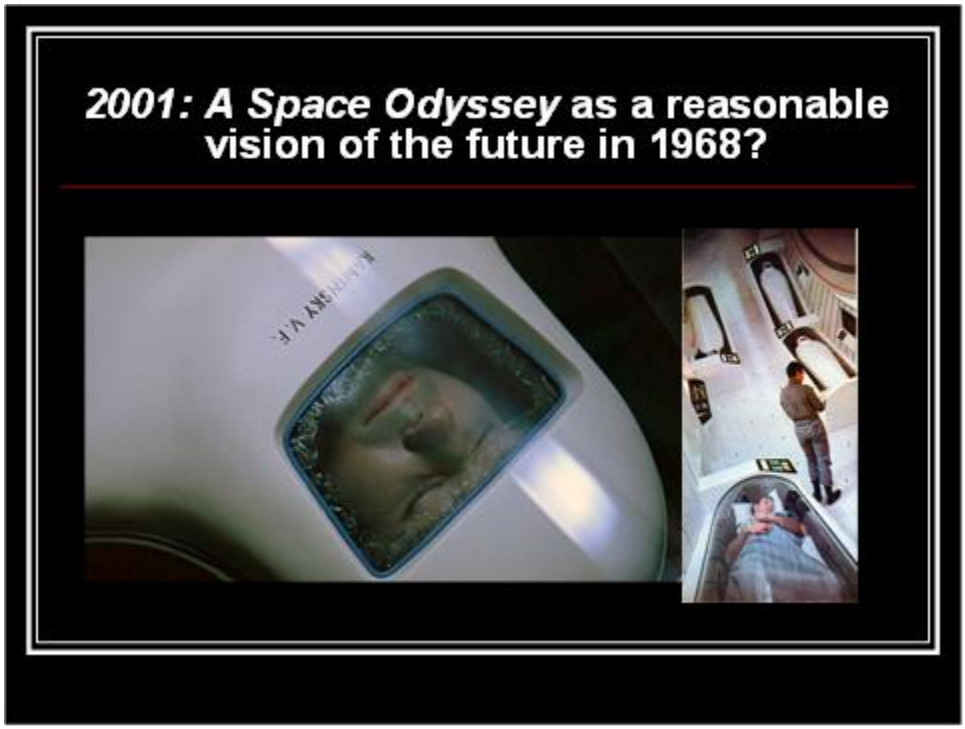
I was 17 at the time and had already amassed a considerable amount of hands-on experience in cryonics. This

event, as you shall see a bit later, also had a profound emotional and intellectual effect upon me.

THE PROBLEM OF PARADIGM CHANGING IDEAS

SLIDE 7

The beginning of cryonics is probably best dated to the publication of Robert Ettinger's The Prospect of Immortality in 1964. This date is important because it provides context for much that was to adversely affect cryonics, so you should keep it in mind as we proceed.



SLIDE 8

I did not live in a vacuum, and my interests in science and coming developments in technology was keen. I was an avid reader of classic 1950s-60s science fiction as well as popular and ‘hard’ science publications and books. In 1968 my country was the richest and most technologically sophisticated in the world, and it was about to land a man on the moon, and return him safely to earth.

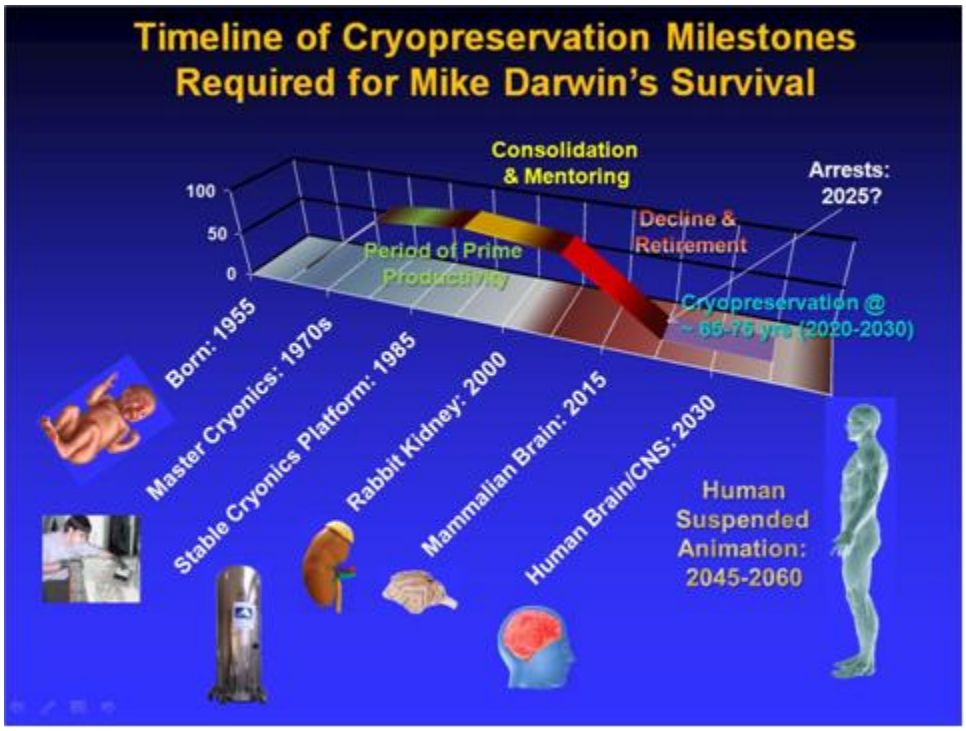
In fact, it was about to land a number of men on the moon and recover them *all* safely. At that time, the United States (US) Federal Government was funding the National Aeronautics and Space Administration to an unprecedented degree. Not since the

Manhattan Project had so much money and effort been expended upon a scientific undertaking.

A world view emerged from this effort, and it was a world view promulgated, endorsed by, and made completely credible to the populace by the US government. That world view was one that posited as inevitable the construction of a large, orbiting space station, the establishment of a permanent lunar base, and the beginning of the expansion of humanity into the solar system – and more speculatively, beyond.

This worldview is best summarized and most accessible today in the first half of the film *2001: A Space Odyssey* which premiered in 1968, the year I was becoming deeply involved in cryonics. While the film was undeniably science fiction in its premise of encountering extraterrestrial life, it's technological predictions of what life would be like at the turn of century were universally considered completely reasonable by far sighted and respected scientists and futurists – even conservative ones such Dandridge Cole and Isaac Asimov.

That world, 33 years in the future, became my model, and the model for millions of other thinking people, young and old alike, for how the future would be. It was a world where space colonization was underway, life spans had been modestly extended, human hibernation was a reality and solid state organ cryopreservation was in use for storing transplanted organs. It was a reassuring view of the future, and in particular of *my* future, if I didn't die before getting there.



SLIDE 9

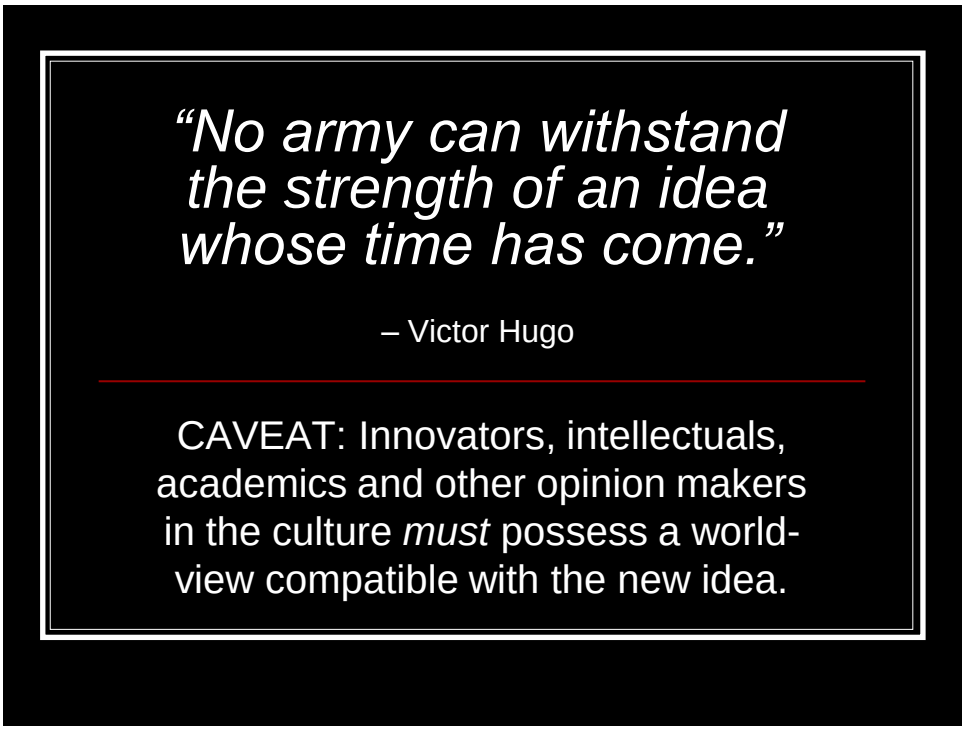
By 1976 I was becoming uncomfortably aware that the future I expected was not materializing at a rate consistent with the worldview in *2001*. Organ cryopreservation programs had been abandoned in all but one facility in world, the US manned space program was doomed, and interest in serious, interventive gerontology, let alone meaningful research, was nil.

The money and intellectual resources required to achieve these goals had been redirected to an endless series of wars, first in Vietnam and later in the Middle East and East, as well as a succession of botched and unsuccessful programs to end poverty

in the US (the Great Society), cure cancer, and deal with longstanding mishandling of the environment. The spending spree of the latter days of the Cold War bankrupted the Soviet Union and, in truth, bankrupted the West, as well. The focus of the planet's population was on protecting itself against bogeymen of its own making and it spent and spent maniacally to create weapons systems of vast lethality and ever increasing complexity.

So, sometime in late in 1976 I wrote out a timeline of milestones that I thought would be necessary if I were to survive. This was a simple list of critical achievements with the dates by which they must be accomplished alongside them. It took a conservative and probably all too unfortunately realistic prediction, of the likely arc of my productive life.

While it has proved a more accurate road map than my naive first imaginings of my future, it too has fallen short and has proven flawed, perhaps fatally flawed. Since I was not then, nor am I now, either poorly informed about cryonics or lacking in real world experience in its practice, I suggest you might want to pay careful attention to what went wrong with this very conservative timeline, because it very likely has important implications for your future as well."

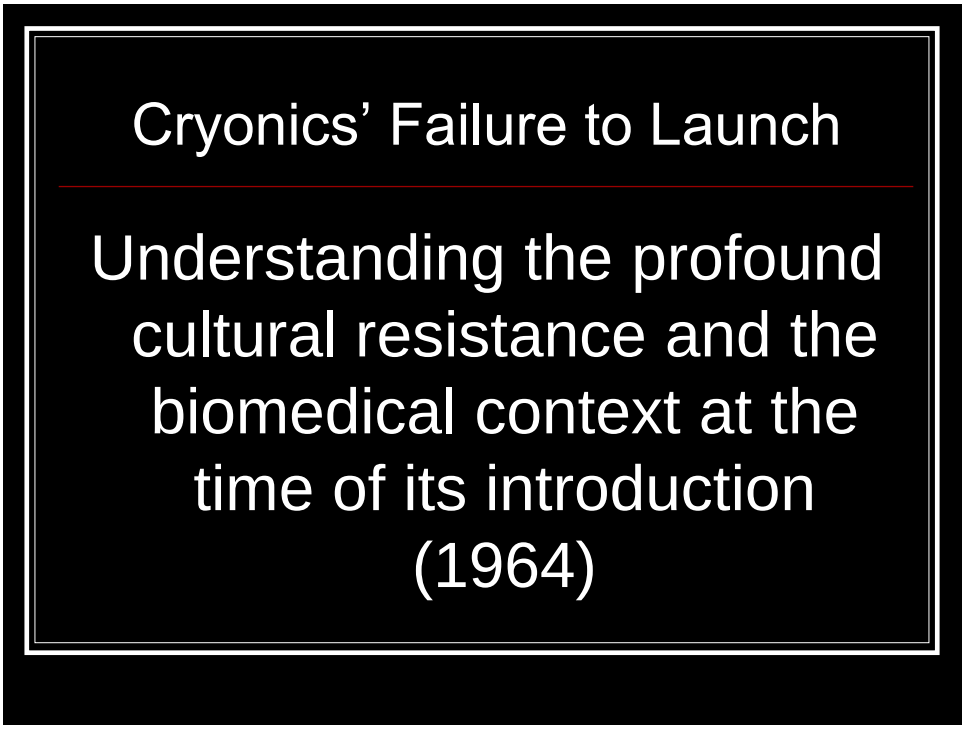


SLIDE 10

This quote, suggested by Robert Ettinger for the opening of Robert Nelson's book We Froze the First Man, was meant to imply that the success of cryonics was inevitable meant to imply that the success of cryonics was inevitable - that it was an idea whose time had come. Victor Hugo was an idealist, and a man who had the good fortune to live in an age where the time had indeed come for most of the ideas he cared passionately about and championed.

Overlooked by Ettinger was that powerful, paradigm disrupting and socially inflammable ideas require careful preparation of the culture before they can flourish. No thinking person would imagine it possible to arrive in a Stone Age culture, such as the Pirotribe, in the Amazon basin, and begin

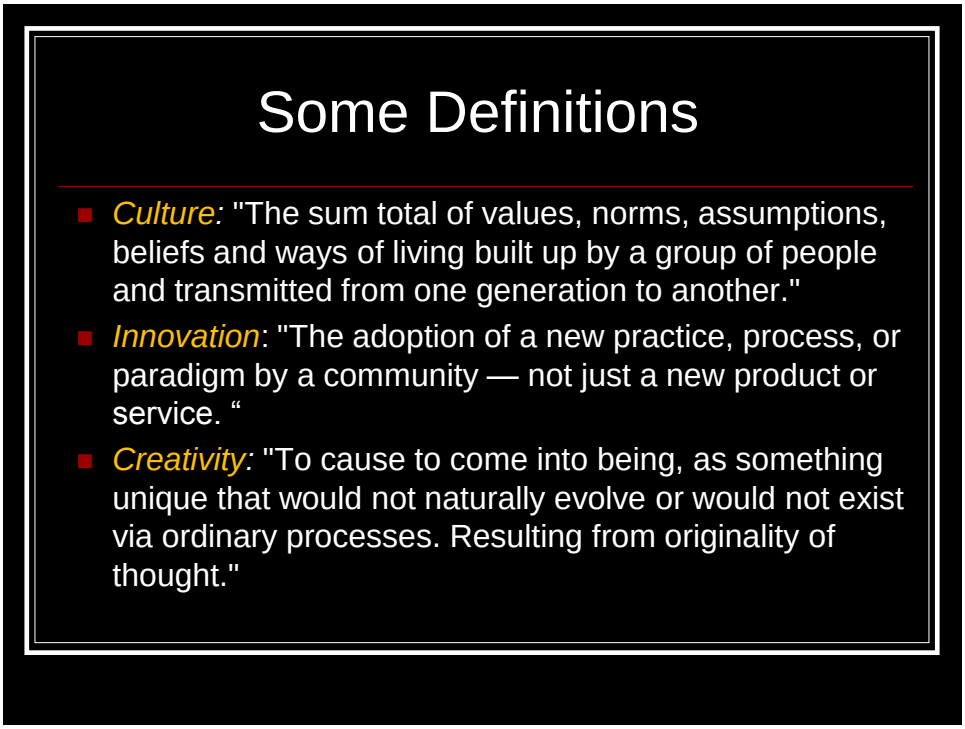
discoursing successfully on Quantum Electrodynamics or Natural Selection. The dismal experience of Western Christian missionaries (and of their ‘flocks’) with African and Polynesian cultures similarly points to the futility of attempting to convert an unprepared culture to ethical or ideological standards that are alien to their environment and destructive to their culture and their entire way of life.



SLIDE 11

While applied engineering and electronics were undergoing explosive advances in 1964, the biological sciences lagged far behind. In the medical, biomedical and cultural context of 1964, the year Ettinger’s The Prospect of Immortality was published, the discovery of the structure of DNA was only 11-years old,

CPR was only 4-years old, the Uniform Determination of Death Act would be not be passed until 1978 (14-years later), the first heart transplant was 3-years in the future (1967), and most of the United States had no emergency medical system (EMS): ambulances were hearses driven by Funeral Directors.

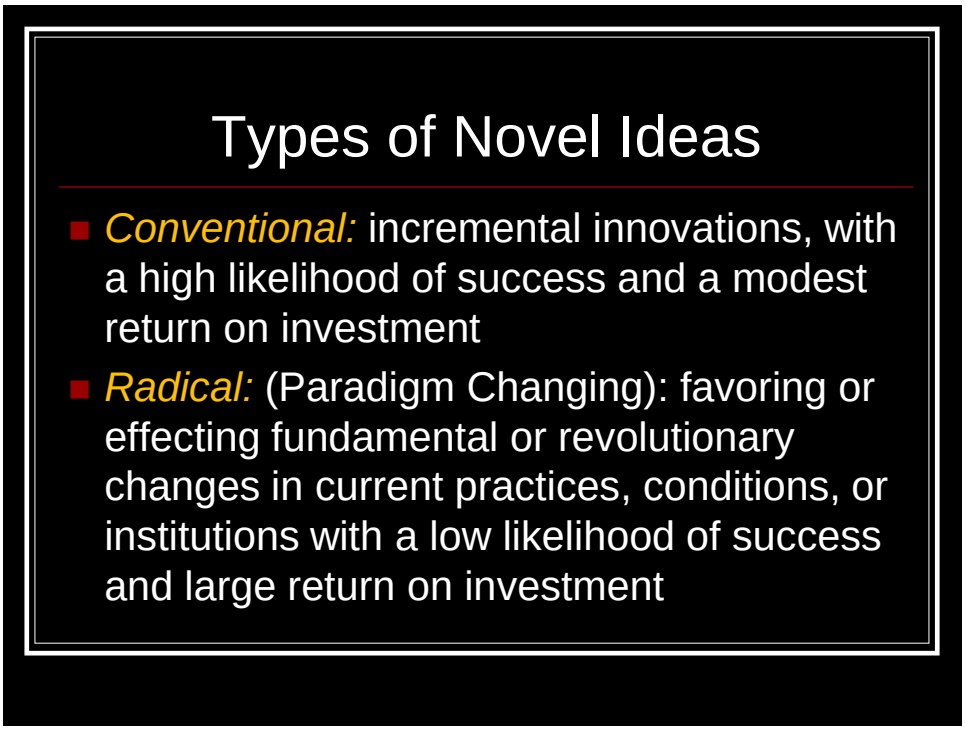


SLIDE 12

To understand the impact this primitive state of affairs in the life sciences was to have on the launch of cryonics, it is first necessary to examine the way scientific advancement proceeds in a culture, and in order to do that we must define some key concepts. *Culture:* “The sum total of values, norms, assumptions, beliefs and ways of living built up by a group of people and transmitted from one generation to another.”

Innovation: "The adoption of a new practice, process, or paradigm by a community — not just a new product or service."

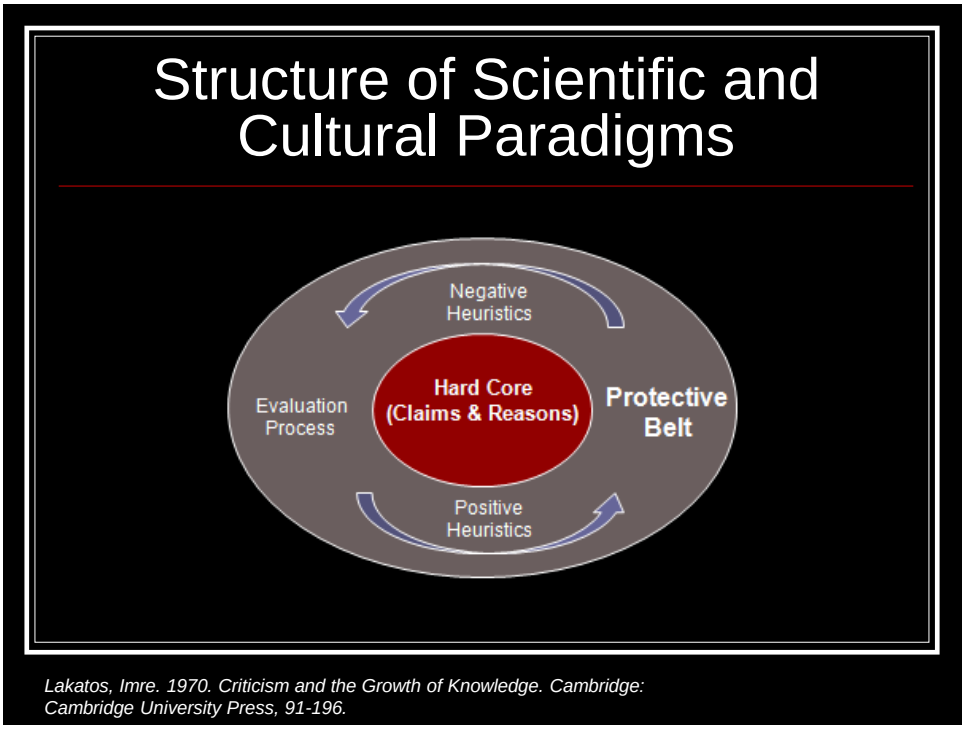
Creativity: "To cause to come into being, as something unique that would not naturally evolve or would not exist via ordinary processes and resulting from originality of thought."



SLIDE 13

There are, fundamentally, two types of new ideas: *Conventional:* incremental innovations, with a high likelihood of success and a modest return on investment and *Radical:* (Paradigm Changing): favoring or effecting fundamental or revolutionary changes in current practices, conditions, or

institutions with a low likelihood of success and a large return on investment.



SLIDE 14

In the early 1970s, again well after cryonics had attempted to launch, the philosopher and historian of science Imre Lakatos created a new model for how scientific change occurs. He posited that scientific advance proceeds on two fundamental and very different levels. Most of scientific and technological progress is incremental; it involves testing and validation or invalidation of the dominant scientific paradigm of the age.

For instance, in a world where the earth is presumed to be the center of the universe, all astronomical work will consist of

the careful accumulation of information designed to support this view and to reconcile observed phenomenon with the core tenet that the sun, and other heavenly bodies, revolve around the earth.

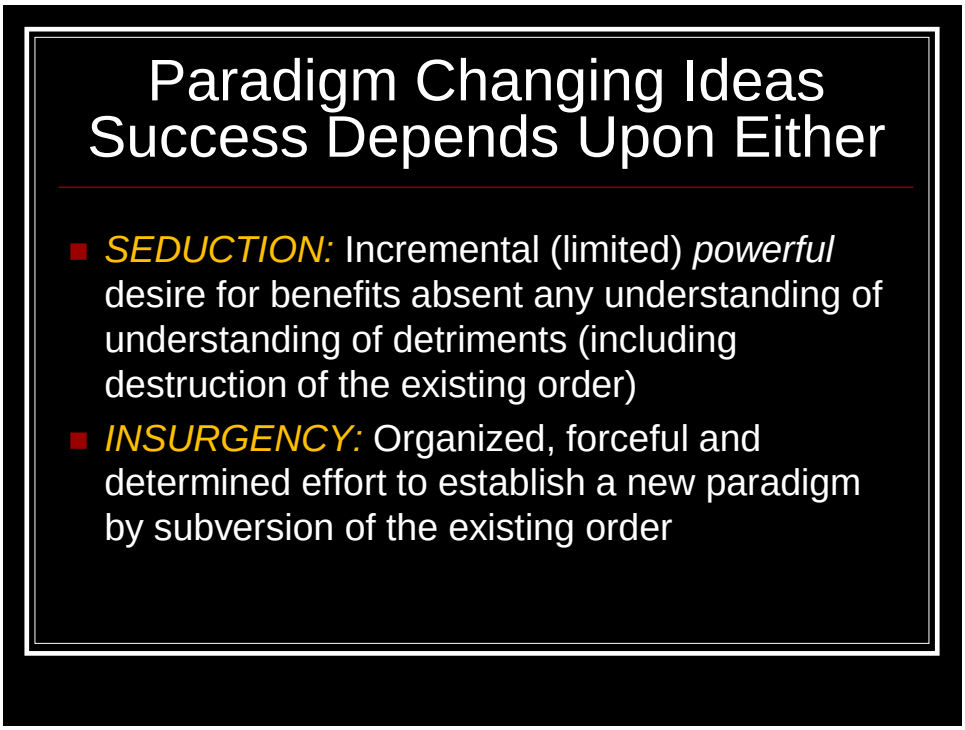
At some point, discontinuities in the observed data may lead to an alternative paradigm; one completely add odds with, and antithetical to, the accepted explanation (theory) of how the universe works. This second type of progress is not incremental, but rather is revolutionary: it overturns the entire structure of the previous paradigm. It penetrates the protective belt of gentle scientific inquiry and smashes the hard core of the existing paradigm.

We tend to forget that scientific ideas do not exist in a moral, social or philosophical vacuum – or in a political one, for that matter. Scientific theories such as how the solar system is organized, how old the universe is, and how life arose and became diversified, inform human beliefs about their purpose and their place in the universe. And, they impact the complex web of powerful social institutions that create and enforce philosophical and behavioral norms.

The Copernican theory gutted the authority of the Catholic Church and, to a significant extent, of the Christian religion, because it challenged the veracity of these institutions' teachings – teachings which, in order to hold moral authority, had to be absolute and infallible.

SLIDE 15

So, the success of novel ideas depends upon more than their being provable by observation or demonstration; they must also have compatibility with fundamental philosophical, moral, ethical, social, and political paradigms of the culture, and, of course, be technologically and economically feasible. They must also, critically, have credible, articulate and aggressive advocates.



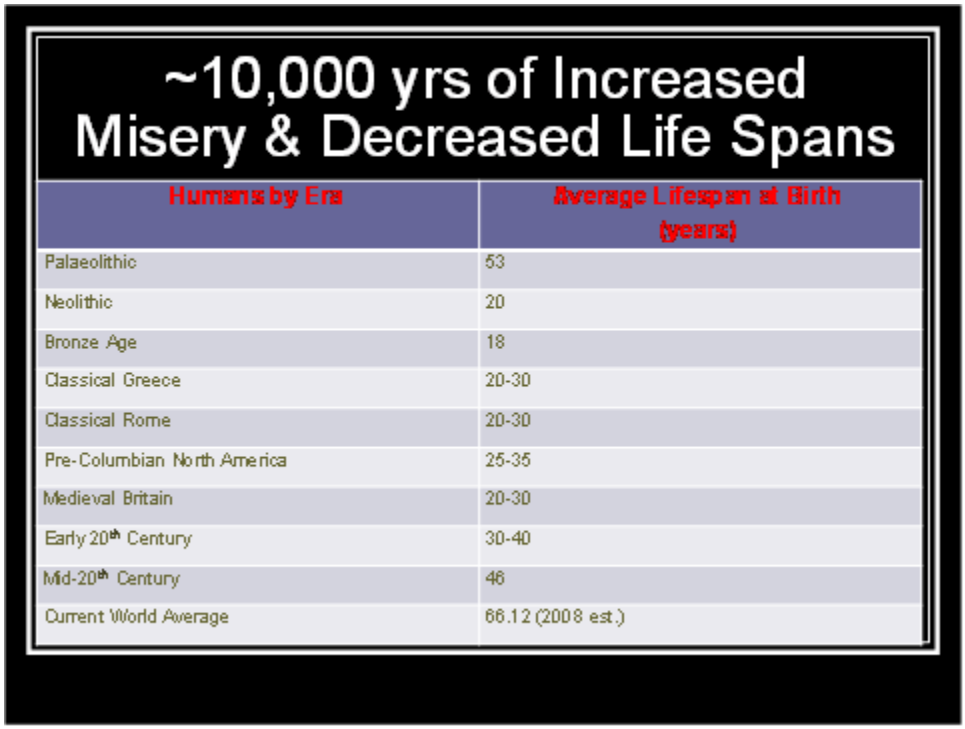
SLIDE 16

As it turns out, there are, very broadly, two ways that paradigm changing ideas can be introduced into cultures. The first and easiest is by *SEDUCTION:* Incremental (limited) *powerful* desire for benefits absent any understanding of understanding of detriments (including destruction of the existing order). The second way is by *INSURGENCY:* Organized, forceful and determined effort to establish a new paradigm by subversion of the existing order.

SLIDE 17

Perhaps the best example of introduction of an idea by seduction is that of agriculture. Sometime between 100,000 and 80,000 years ago, humans began to make the transition from a hunter-gather life-style to agriculture. Today, we take agriculture for granted and we by and large uncritically accept it as an unblemished good.

However, the goodness or desirability of agriculture is hardly the picture of universal plenty that comes to mind when the word is uttered today, 100 or so millennia after agriculture was invented. In the context of hunter-gather society, agriculture was an unmitigated disaster that completely destroyed their culture, religion, way of life, and ultimately, much of their health and well being.



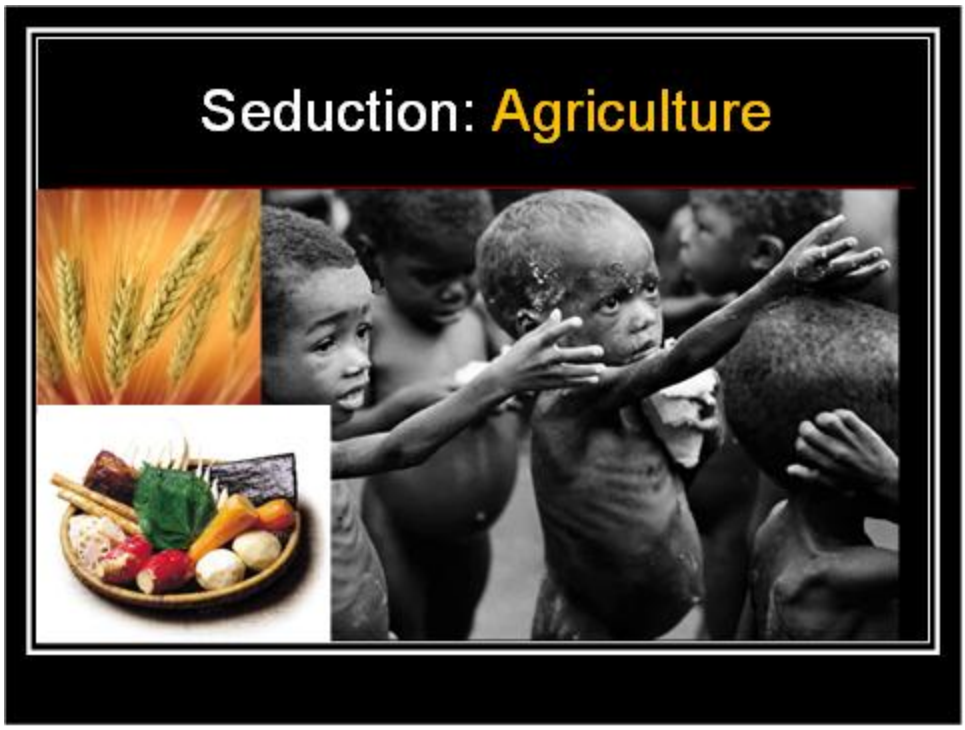
SLIDE 18

Hunter-gatherers controlled their population size, lived in small intimate groups, and were constantly on the move. Because they moved frequently they did not ingest or come into contact with their own wastes, or the wastes of the animals they fed from. They lived their entire lives in the open air under uncrowded conditions, and they ate a nutritionally diverse diet that was almost completely devoid of empty calories. As a result, they had little or no communicable infectious disease: no typhoid, cholera, or other water borne illnesses that result from fecal contamination of the drinking water supply.

In addition, group size was far too small to sustain communicable epidemic diseases such as smallpox, measles,

mumps and tuberculosis (TB). TB, in particular, is an urban disease that requires close quarters and poor ventilation to be self sustaining and epidemic. It is also a zoonotic disease: one acquired from living commensally with animals – a necessary facet of agricultural life.

The quality and quantity of the hunter-gatherer life was thus both surprisingly high and long. Paleolithic man appears to have had a mean lifespan of between 45 and 53 years. Morbidity was brief and death came suddenly from misadventure or homicide. With the advent of agriculture during the Neolithic, life spans plummeted and remained well below hunter-gatherer levels until the first decade of 20th century in the US, and not until mid-century, globally.



SLIDE19

The toll exacted by agriculture in terms of human suffering was immense. Agriculture allowed for a rapid expansion in the number of humans at the cost of hunger, starvation and an almost unimaginable disease burden. Cities became not only possible, but necessary, and up until the 19th century they were veritable killing machines which sucked in the surplus population generated by satellite farming communities and killed them off with infectious disease and dangerous working conditions. Cities did not become self sustaining in terms of population until late in the 18th century!

It seems clear that if our hunter-gatherer ancestors understood that agriculture would virtually exterminate their way of life, and create millions and even billions of starving and

dispossessed people, they would have fled from it and burned the first would-be farmers alive. This didn't happen because the immediate benefits of agriculture were so overwhelming: the ability to create a steady, seemingly reliable supply of food in superabundance was incredibly seductive.

Seeing the downsides was a virtual impossibility for people in those circumstances who lacked the scientific method, lacked the written word, and had little experience with new ideas or rapid change.

SLIDE 20

A similar state of affairs pertained in the late 18th and early 19th centuries when the Industrial Revolution began. The

Industrial Revolution allowed for the prodigious production of high quality goods on a scale previously unimaginable. It created a cornucopia of wealth allowing the average man, and even the poor man, to enjoy goods and services that previously royalty, or the richest of the elite, could not have purchased at any price. The human cost of this was, again, very high: child labor, dangerous working conditions that crippled and maimed, and a reduction in air and water quality that killed thousands at a time often in the space of few days.

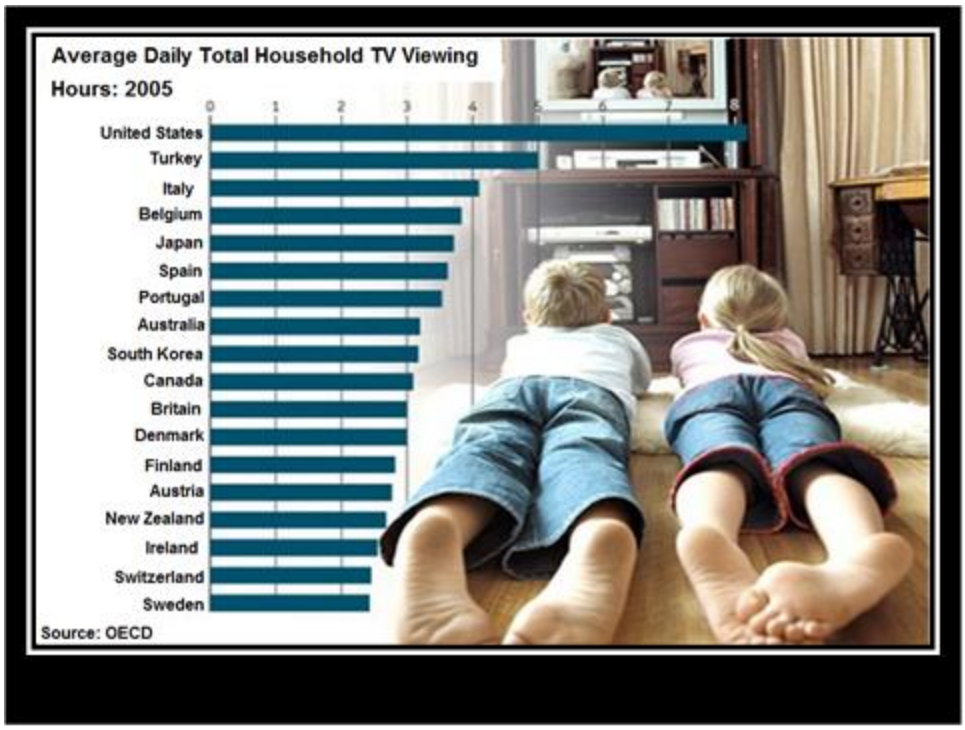
SLIDE 21

And again, as with agriculture, the Industrial Revolution was a fiat accompli before our species began to understand the adverse global environmental impact and come to the realization

that the whole foundation of technological civilization was not sustainable. Hunter-gatherers lived in ecological balance with their environment; technological man cannot. To sustain ever advancing technology man must expand his environmental horizons into the solar system, and beyond.

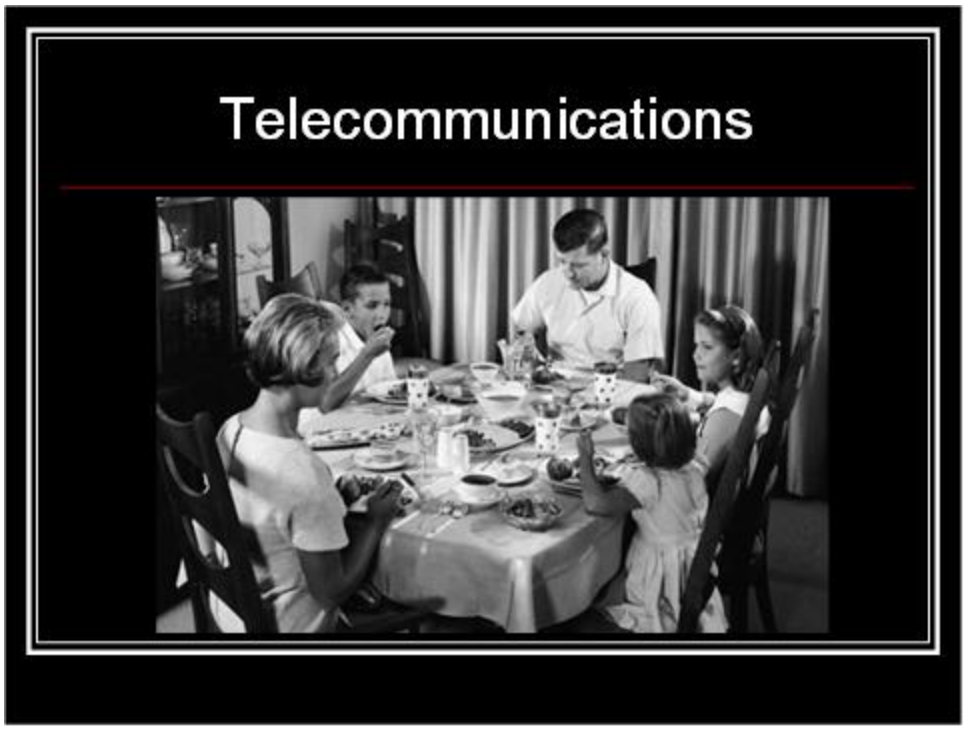
SLIDE 22

Finally, telecommunications are an example of paradigm changing scientific advance operating via seduction.



SLIDE 23

Within my lifetime TV, mobile phones, and the Internet have transformed the culture and degraded or destroyed some of its more cherished institutions.

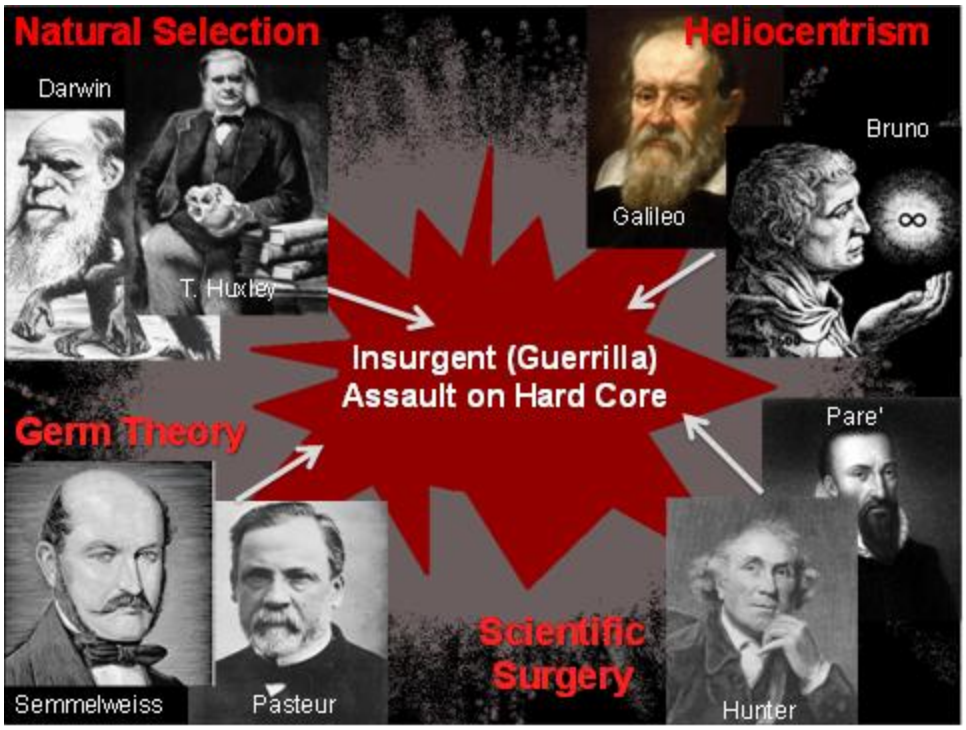


SLIDE 24

This tableau is how I grew up: the evening family meal taken in a stereotypical fashion with lots of opportunity to talk and socially interact with both my parents, and with members of my extended family. It was not understood by any of the participants to be a critical element in a cohesive and functional family life – it was just something everyone did and took for granted. But, in fact, it was (and is) a critical tool for facilitating communication, and allowing time and the proper conditions, to reflect on the day's events and consider what was necessary to be done tomorrow.

SLIDE 25

This slide lists but a few of the social and cultural sea changes caused by telecommunications with a high profile casualty being that family meal together, where people with comparatively uniform values and experiences communed with each other.



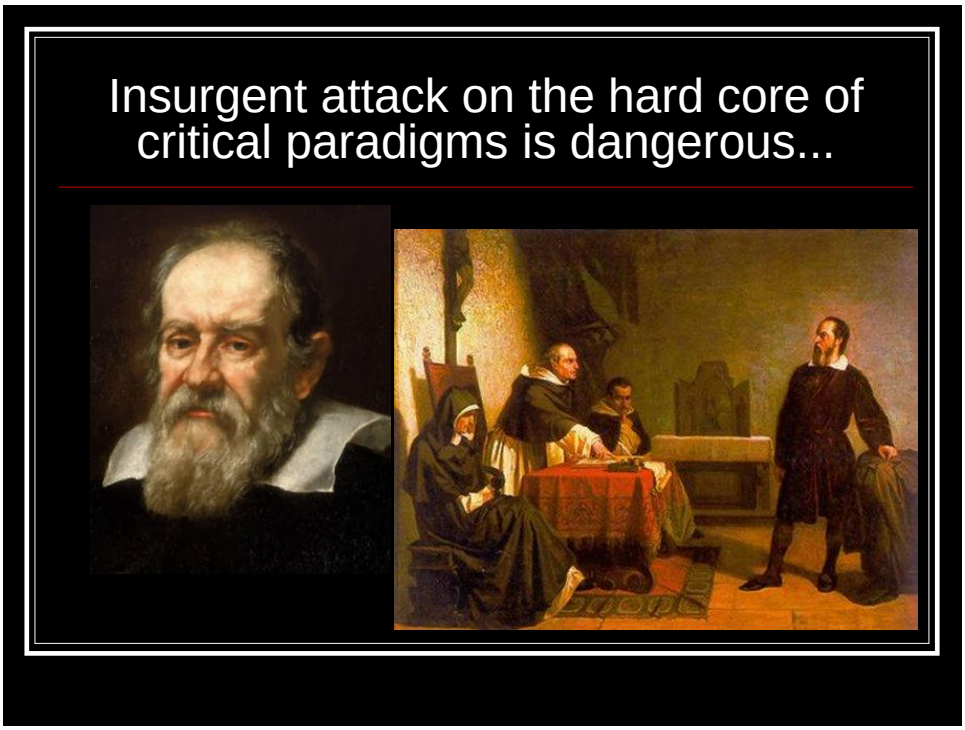
SLIDE 26

Not all novel paradigm changing ideas are seductive. Many are immediately and rightly perceived by the culture to be dangerous to the established order; ideas which can overturn political and social control mechanisms and completely disenfranchise, or even destroy bedrock institutions.

Because ideas about biology and medicine impinge upon the territory of religion in explaining man's purpose in the universe, and also on providing comfort and succor to the sick and dying, they are particularly scrutinized areas in terms of their compatibility with the hard core of the existing scientific paradigm – a paradigm in which the culture and its most powerful institutions are heavily invested.

Natural Selection, Germ Theory and Scientific Surgery created serious threats to the existing order that were immediately appreciated.

All of these ideas challenged the traditional view of Vitalism, and were steps towards ‘reducing’ man, and indeed all living things, to the status of mechanisms: clockworks that could be rationally explained, understood and eventually manipulated at will. These novel ideas had the power, at least in theory, to confer on men the knowledge and ability formerly reserved only for god. If life was a natural phenomenon governed by the same physical laws that enabled the construction of timepieces, factories, bridges and manufacturing machines, what was to stop man from creating life itself and, in essence, usurping the role of god?



SLIDE 27

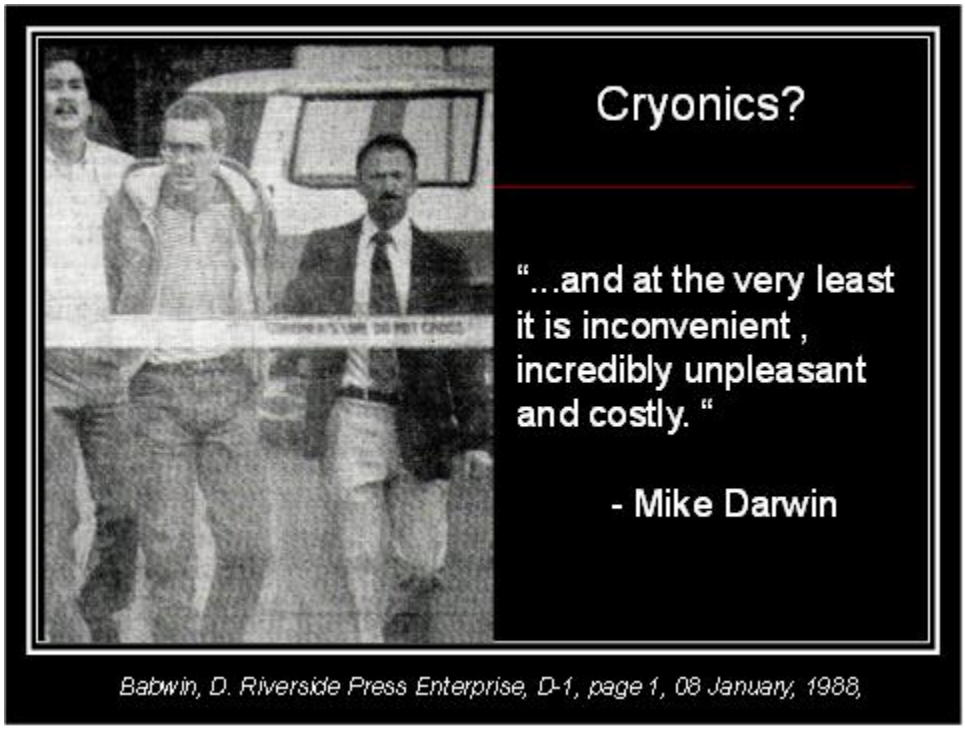
The culture quite rapidly comes to understand that such ideas are exceedingly dangerous and almost invariably takes extra-scientific steps – social, political and economic – to protect the existing paradigm and defend its hard core at almost any cost. The fate of Galileo for promulgating Heliocentrism is a classic case in point. And Galileo was lucky – extremely lucky. His fate was to be forced to recant his heretical ideas and spend the remaining years of his life under house arrest.

SLIDE 28

By contrast, consider the fate of Giordano Bruno, the Italian Dominican friar, philosopher, mathematician and astronomer, who is best known as a proponent of the infinity of the universe (his cosmological theories went beyond the Copernican model in identifying the Sun as just one of an infinite number of independently moving heavenly bodies: he is the first European man to have conceptualized the universe as a continuum where the stars we see at night are identical in nature to the Sun).

He was burned at the stake by the authorities in 1600, after the Roman Inquisition found him guilty of heresy. Challenging the hard core of critical scientific (and thus social, cultural and political) paradigms is dangerous and often deadly…

THE INHERENTLY DISRUPTIVE CHARACTER OF CRYONICS

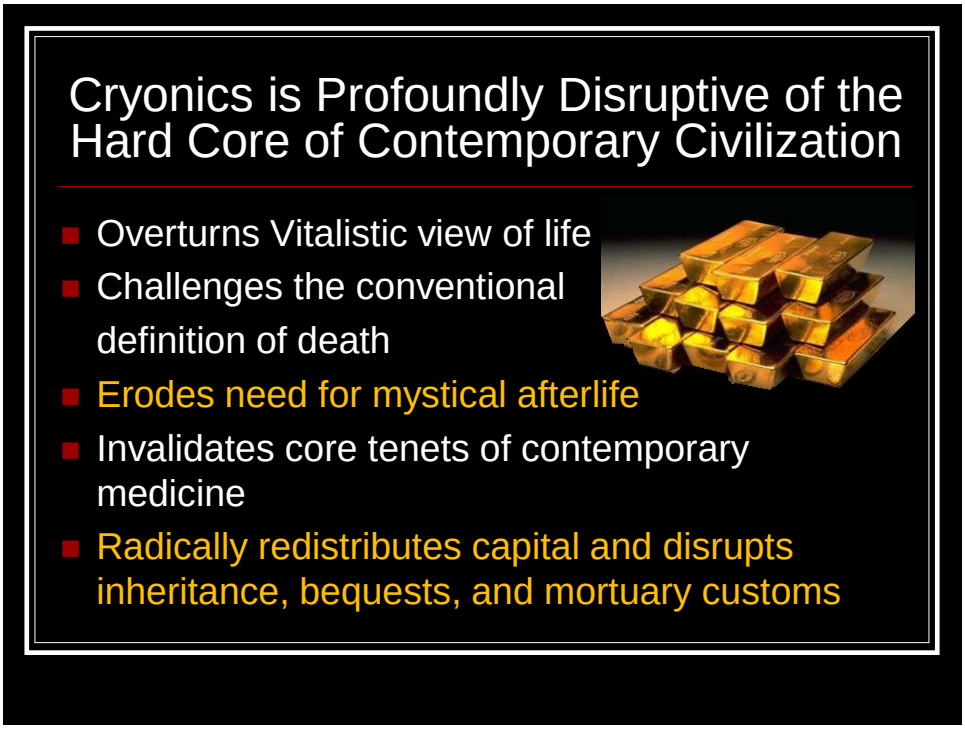


SLIDE 29

...and at the very least it is inconvenient, incredibly unpleasant, and costly.

The real reason the Dora Kent drama played out was that cryonics, practiced well (optimally) caused extreme cognitive dissonance in the medical and legal authorities in the community in which we were operating. Over and over again they kept badgering me with the statement that, "Two minutes was NOT long enough to wait after cardiac arrest before starting cryonics procedures." To which I responded repeatedly, "Well then how

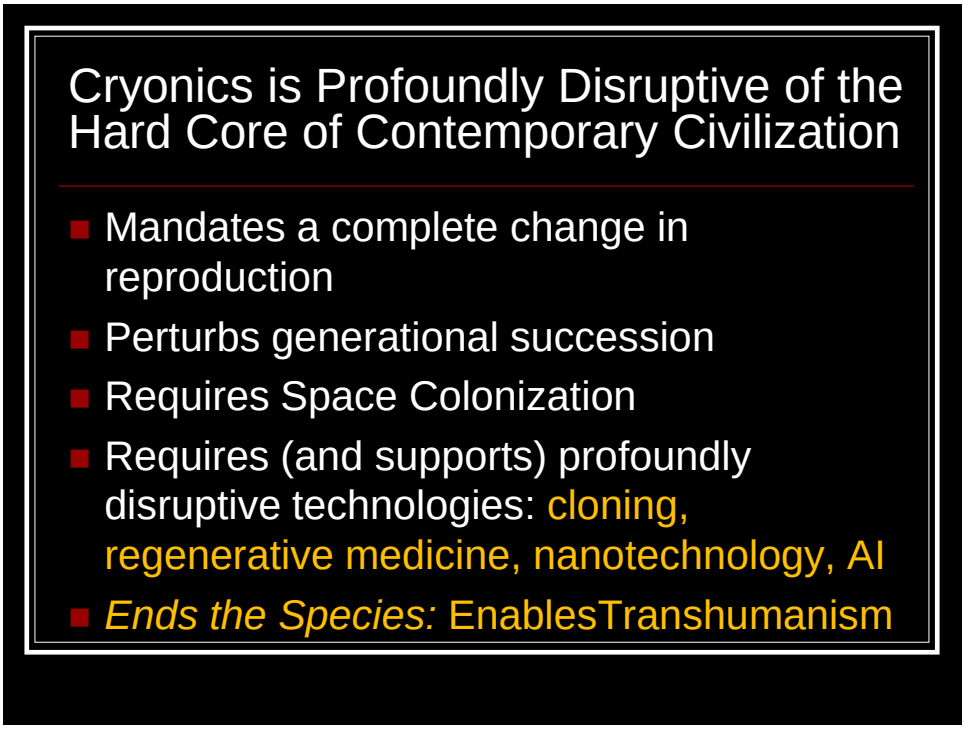
long is long enough? How dead does someone have to be before it is OK to start working on them? You define death as when cardiorespiratory arrest occurs; you say nothing about what can or should be done afterwards." They found that enormously disconcerting and it made them angry, *really angry.*



SLIDE 30

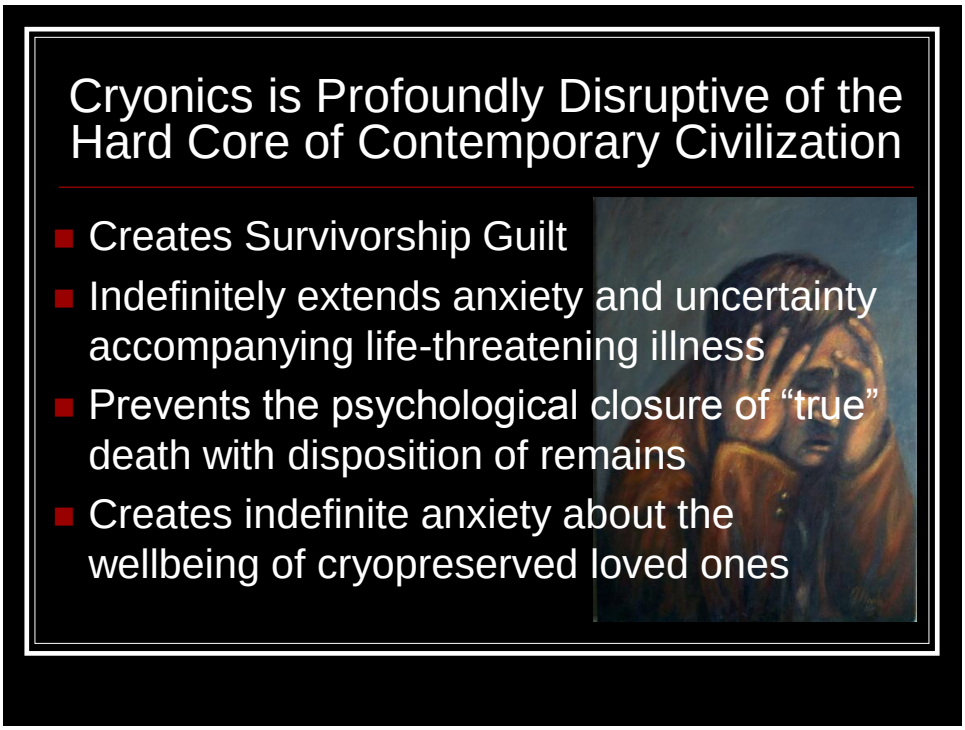
So, if we look at cryonics objectively and in the context of this culture and this civilization at this time, then cryonics is just about the most disruptive and threatening idea that has ever come along. Unlike Natural Selection or Germ Theory, or even Heliocentrism, cryonics will inevitably overturn the Vitalistic view of life, challenge the conventional definition of death, erode the need for a mystical afterlife, invalidate the core tenets

of contemporary medicine, and radically redistribute capital and disrupt inheritance, bequests, and mortuary customs!



SLIDE 31

What's more, it mandates a complete change in reproduction, perturbs generational succession, requires space colonization, requires (and supports) profoundly disruptive technologies such as cloning, regenerative medicine, nanotechnology, and AI, and most frighteningly of all, it *Ends the Species and enables Transhumanism.*



SLIDE 32

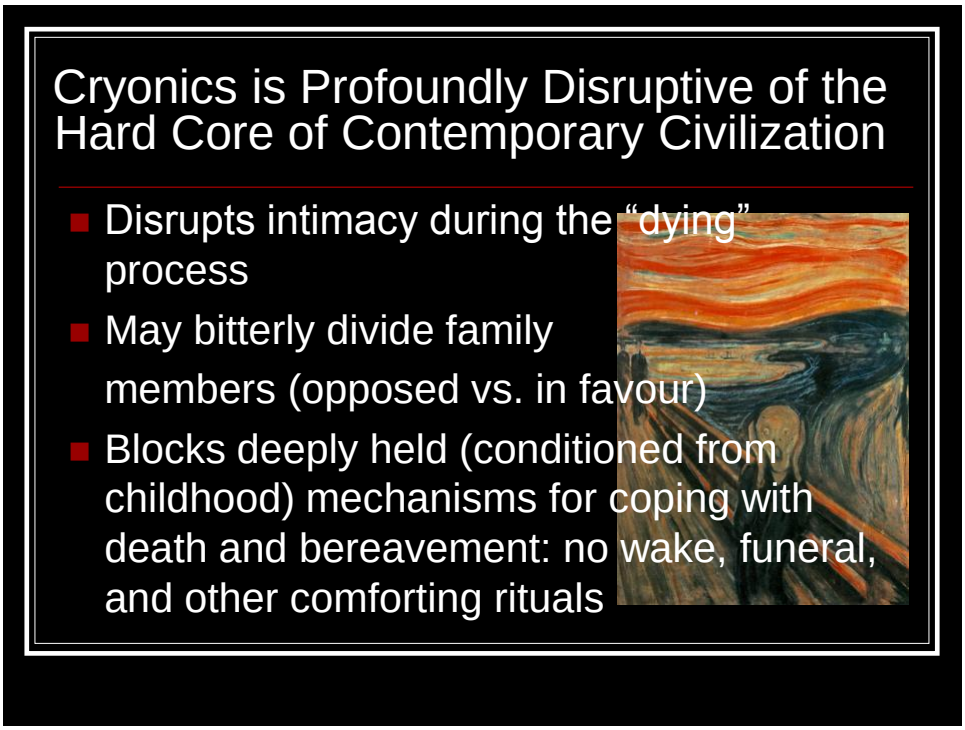
Beyond these inevitable long term effects, cryonics has a number of poorly appreciated (by cryonicists) severely psychologically damaging adverse effects. As Curtis Henderson observed, "All biographies end in tragedy; everybody dies. Always." A consequence of this is that no one need feel guilty about living – in the end we all end up dead – there *are* no survivors.

Cryonics changes that, because people now living have an opportunity to possibly 'cheat' death, and that means that if they choose to do so and succeed, they will have to face the prospect that they did not act quickly enough, or aggressively enough, to save the lives of all their other loved ones who have died or will die and not be cryopreserved. This survivorship guilt can be

crippling, and in some cases all consuming – but at the very least, it is *always* painful.

One of the few advantages of death is that it is *final*. It puts an end to the suffering and anxious uncertainty that must inevitably accompany life threatening illness. Anyone who has agonized over the fate of a loved one in the Intensive Treatment Unit (ITU) can at least begin to understand the psychological impact of stretching out that period of uncertainty over a lifetime, and beyond.

The devastating effects of this kind of limbo are often seen in cases where children are abducted and not found, or soldiers are lost in battle, but no remains are recovered. Cryopreservation prevents the psychological closure of ‘true’ death with disposition of remains and creates indefinite anxiety about the wellbeing of cryopreserved loved ones. Cryopreserved people are not put away in a cemetery where no further harm can come to them. Rather, they require INDEFINITE care, vigilance and protection. This is often a source of extreme anxiety in survivors.

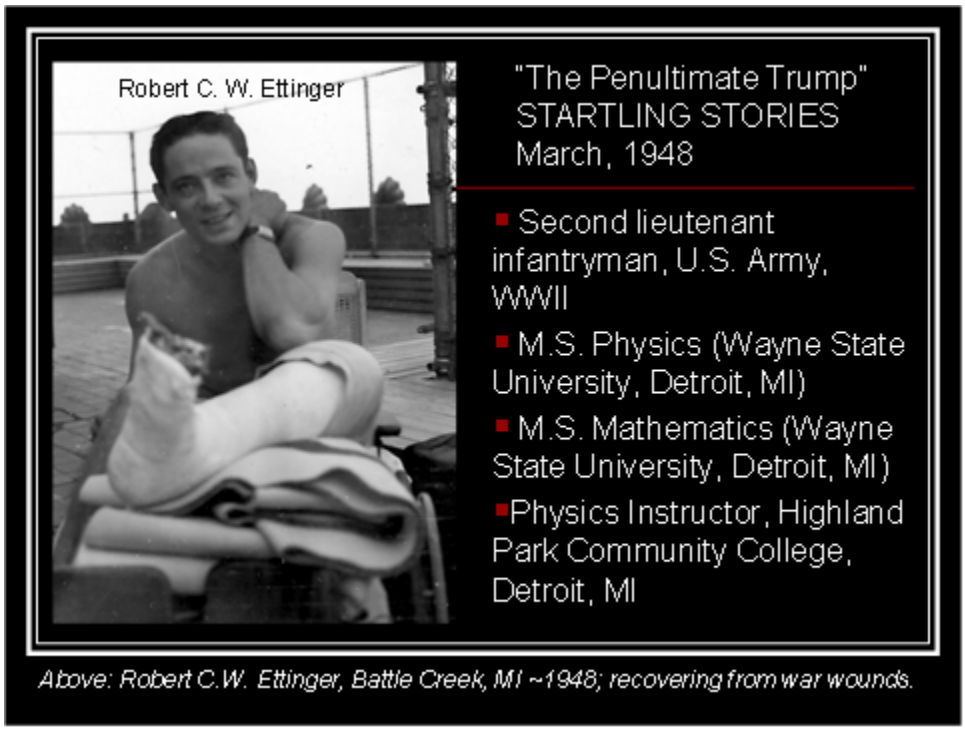


SLIDE 33

These immediate detrimental effects of cryonics become intensified during the terminal phase of a cryonics patient's life. The presence of the Standby/Stabilization team and their equipment and supplies disrupts intimacy during the 'dying' process, may bitterly divide family members (those opposed vs. those in favour), and block deeply held (conditioned from childhood) mechanisms for coping with death and bereavement: no wake, funeral, and other comforting rituals.

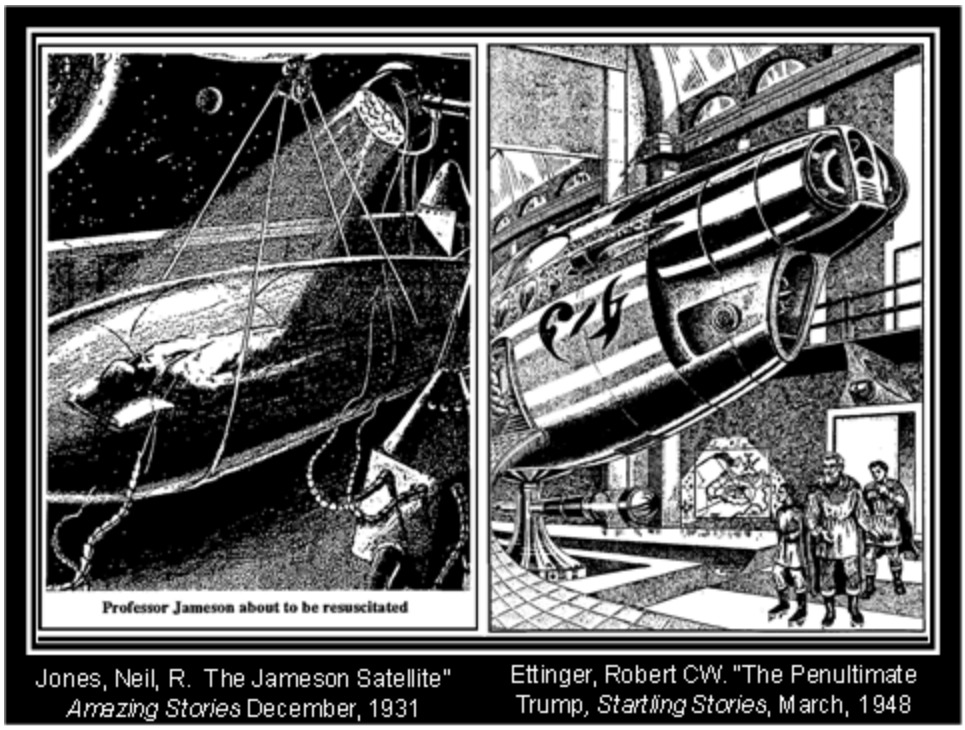
With the understanding of these general and largely unavoidable obstacles, we are now prepared to examine in greater detail the specifics of why cryonics failed to launch in 1964.

FAILURE OF HUSBANDRY



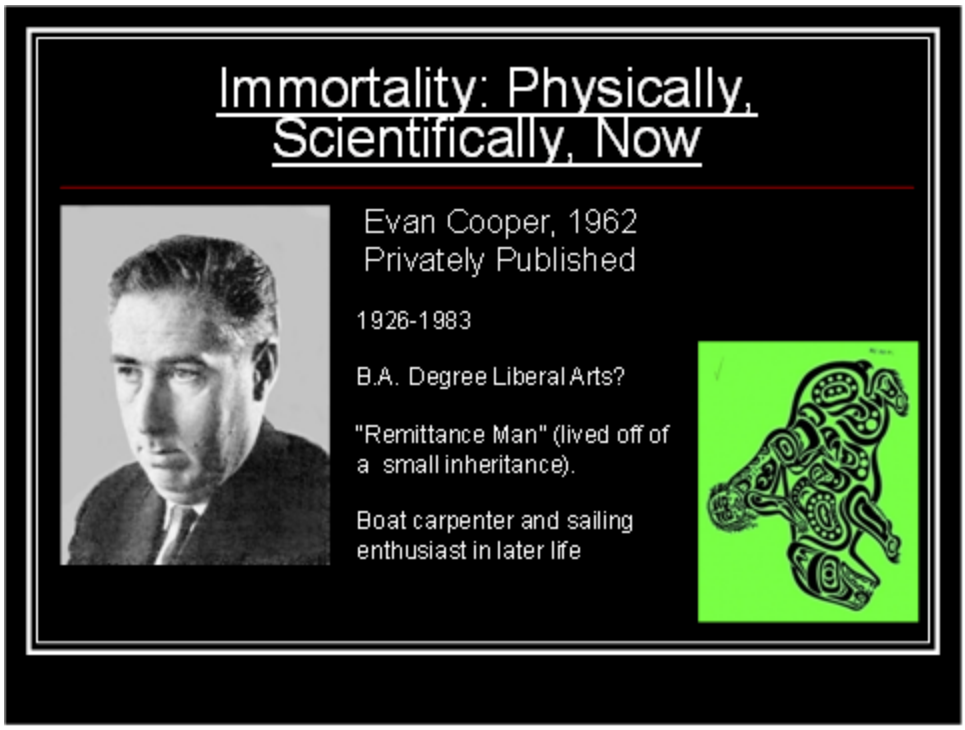
SLIDE 34

The core ideas of cryonics, that death is a function of remaining biological structure (information), technological sophistication, and that deep cooling can arrest decay and preserve structure indefinitely to await resurrection by a more sophisticated future medical technology were first promulgated by Robert Chester Wilson Ettinger in a science fiction story, *The Penultimate Trump*, in 1948.



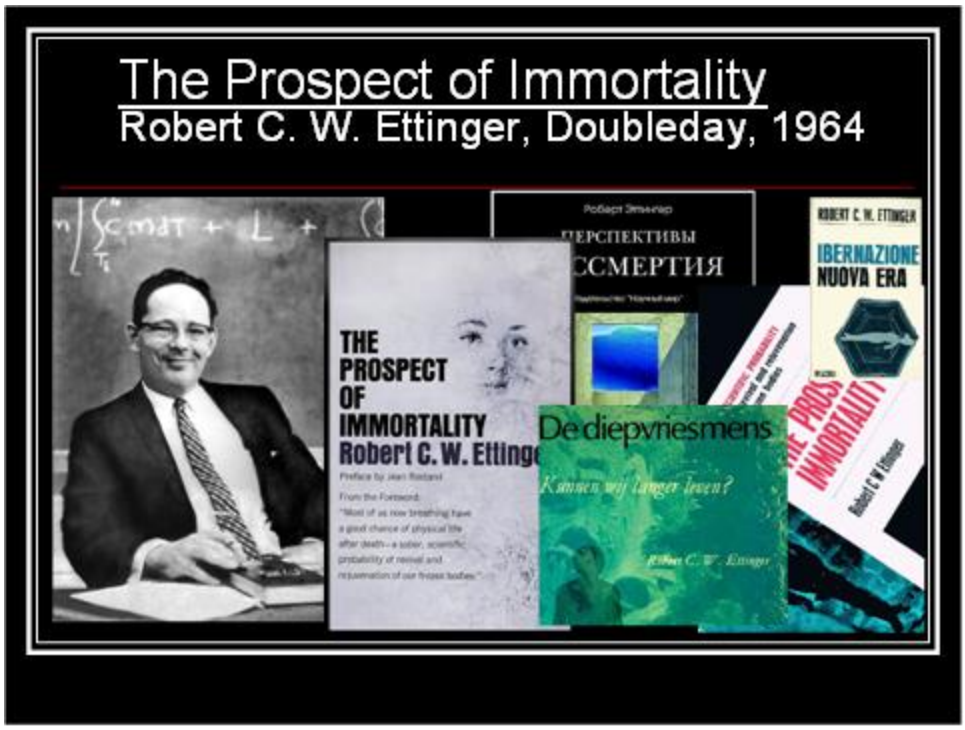
SLIDE 35

Ettinger did nothing beyond laying the idea out in his story until 1962, at which time he began to be concerned that no one else had come to the same conclusions he had. It occurred to him that if he did not act to at least inject the idea into the culture, he might not benefit from it himself. Ettinger, in turn, had been inspired to create cryonics based on a 1931 science fiction story by Neil R. Jones, in which one Professor Jameson has his body rocketed into orbit following his death where he remains, frozen, until many millennia later his brain is removed and repaired by aliens, the Zoromes, who place him in a robotic body and allow him to accompany them on their romps around the galaxy.



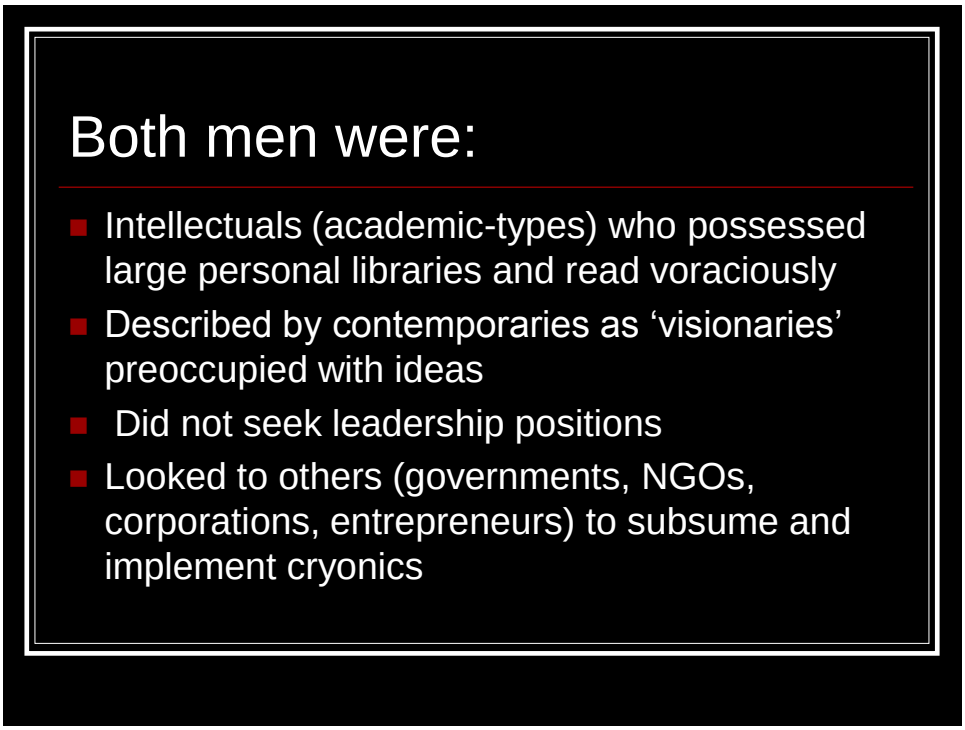
SLIDE 36

At about the same time, an intellectual and remittance man named Evan (Ev) Cooper had come to the same conclusions as had Ettinger and he privately published a manuscript that proposed a ‘freezer program.’ Cooper, unlike Ettinger, had no scientific training and his proposals for using arctic or Antarctic storage lacked scientific rigor.



SLIDE 37

In 1964 Ettinger published The Prospect of Immortality after it passed scientific review by universally respected experts at the time, such as Isaac Asimov and the maverick heart surgeon and cryobiologist Richard Lillihei.



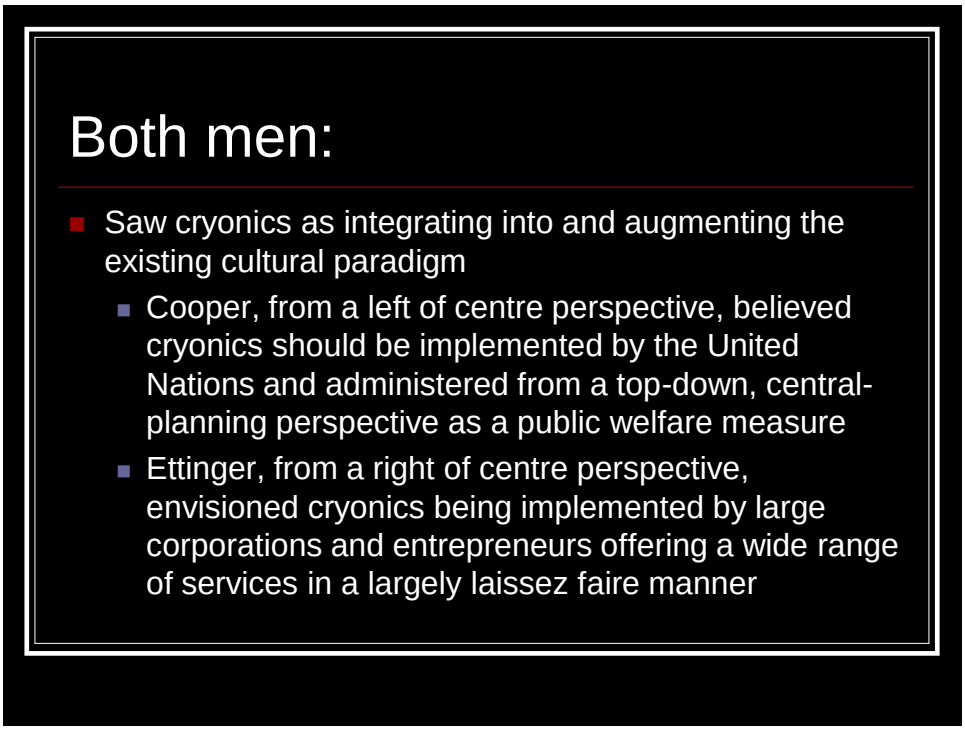
SLIDE 38

Aside from the idea of cryonics, Cooper and Ettinger had a number of other things in common. Both men were intellectuals (academic-types) who possessed large personal libraries, read voraciously and were described by their contemporaries as ‘visionaries’ preoccupied with ideas. Both men sought leadership positions, and both men looked to others (governments, NGOs, corporations, entrepreneurs) to subsume and implement cryonics.

Extroverts	Introverts
Expressive	Quiet
Outgoing	Shy
Energized by action, people, things	Energized by ideas, feelings, impressions
Speak before they think	Think before they speak
Share personal information easily	Reluctant to share personal information
Prefer to be in the company of others	Prefer to be left alone
Distracted easily	Can concentrate well
Have a lot of friends	Small, close group of friends
Uninhibited	Inhibited
Like working in teams	Would rather work alone
Approachable, open with strangers	Stand off-ish, keeps to themselves
Like meeting new people	Prefer a small group of people they already know
Develop ideas through discussion	Ideas come from thinking alone
Manager, salesperson, customer service rep.	Librarian, mechanic, legal secretary
Party animal, social butterfly	Wallflower

SLIDE 39

Their personalities were those of the classic introvert. I want to be at pains to point out that this is in no way a criticism of either man. In general, we do not get to pick our personalities or temperaments, and these men were what they were: there is no fault or blame involved in being either an extrovert or an introvert.

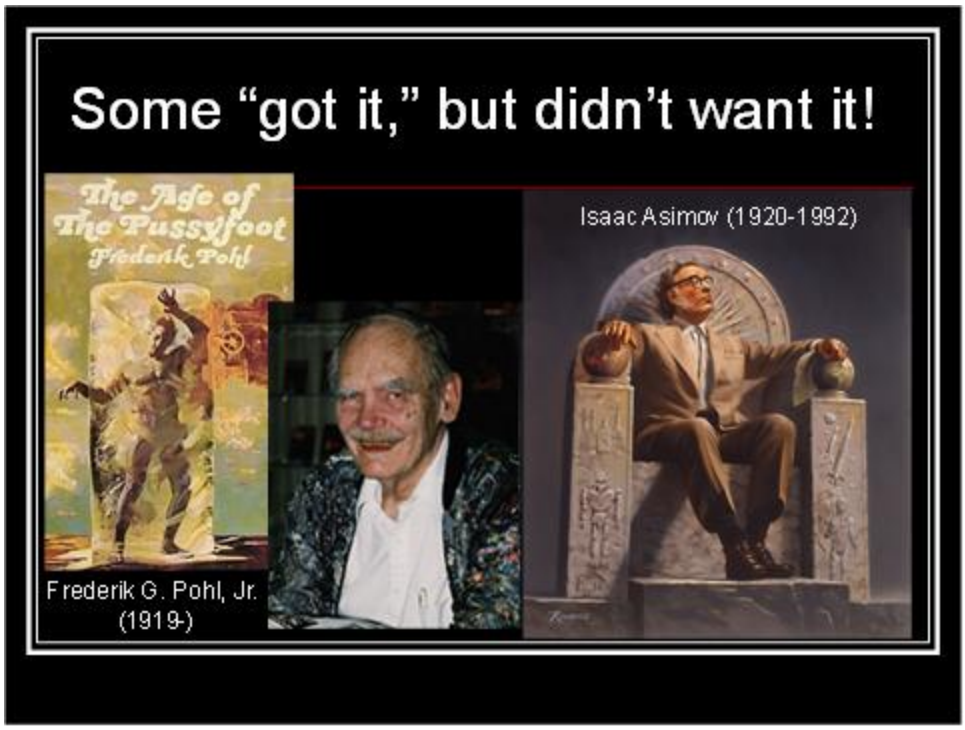


SLIDE 40

Both men saw cryonics as integrating into and augmenting the existing cultural paradigm; Cooper, from a left of centre perspective, believed cryonics should be implemented by the United Nations and administered from a top-down, central-planning perspective as a public welfare measure, while Ettinger, from a right of centre perspective, envisioned cryonics being implemented by large corporations and entrepreneurs offering a wide range of services in a largely laissez faire manner.

SLIDE 41

Nevertheless, these traits had consequences for cryonics that were, on balance, not conducive to its successful launch. Things might have been different if either man had had a Huxley to his Darwin – a vigorous, outspoken, charismatic, articulate and, above all, honest and well informed advocate of their ideas.



SLIDE 42

Precisely for the reasons outlined above, two highly influential men who understood cryonics, and believed in its technical feasibility, rejected it, one personally and privately, and the other vocally and publicly. The science fiction writer, savant and media darling Isaac Asimov, understood immediately that cryonics would up-end the existing order and ultimately lead to a fundamental transformation of mankind into something other than human. He found this extremely disturbing and ‘unnatural,’ and wrote and spoke extensively against cryonics on social, environmental and moral grounds.

The widely respected science fiction author and futurist Fred Pohl also understood the likely workability of cryonics and in fact wrote a very positive cryonics themed novel, The Age of

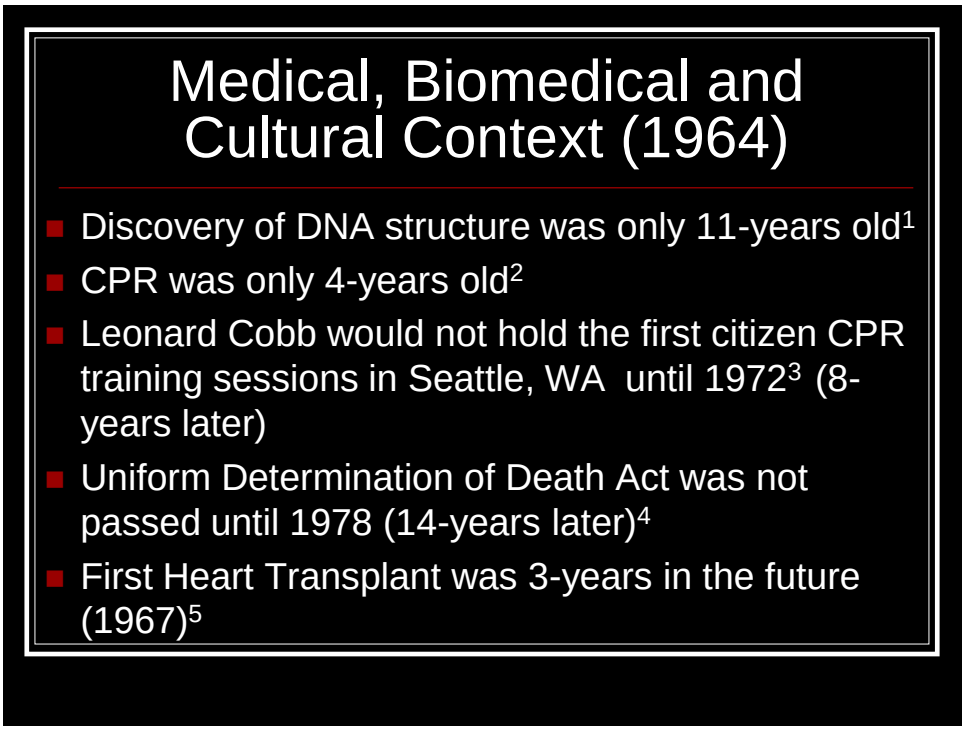
the Pussyfoot (first published in 1966). Pohl rejected cryonics exclusively on the basis of survivorship guilt and concern over his ability to adapt to a world transformed by technologies even he might not be able to imagine. Pohl actually turned down an offer for a no-cost cryopreservation from me and several others active in cryonics on September 1st, 1979, and he expressed his reasons for doing so pleasantly, articulately and in person.

FIRST ERA: 1964-1972

SLIDE 43

Despite these shortcomings and setbacks, cryonics was initially received fairly well in the US. There was enormous publicity and most of the initial newspaper, radio, magazine and

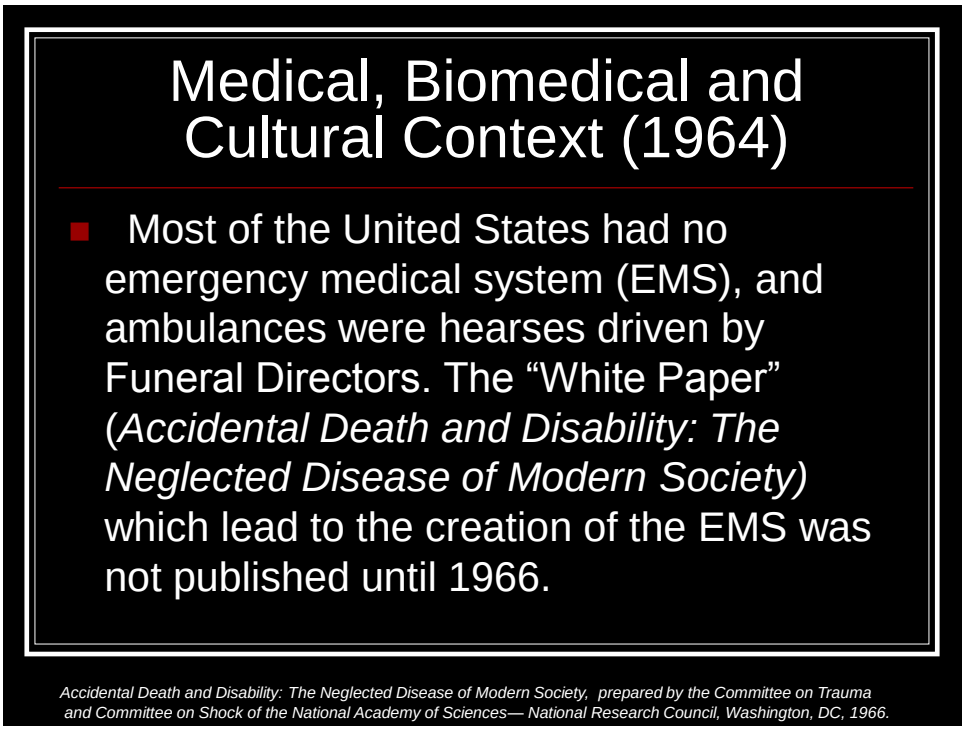
TV coverage was open minded, and not infrequently positive. There was a great deal of public interest, and media appearances by Ettinger, and others, typically resulted in hundreds of requests for information.



SLIDE 44

But the culture, both scientific and popular, was woefully unprepared for the idea. It is difficult, today, to communicate what the world was like in 1964. The discovery of the structure of DNA was only 11-years old, CPR was only 4-years old (Leonard Cobb would not hold the first citizen CPR training sessions in Seattle, WA until 1972 (8 years later), the Uniform Determination of Death Act was not passed until 1978 (14-years later) and the first heart transplant was 3-years in the future

(1967). People uniformly saw life and death as binary states and the idea that the soul, or some other mystical life force left the body at, or shortly after the moment of death, was nearly universal in the general population.



SLIDE 45

Recovery from apparent (clinical) death which, is now widely understood and taken for granted, was a new phenomenon in 1964, and the Emergency Medical System (EMS) as we understand it today, did not exist. In most communities the mortician's hearse doubled as the ambulance and the person most likely to transport you to the hospital if you were gravely ill or injured was your local Funeral Director, or one of his embalmer employees.

SLIDE 46

It is debatable whether these formidable cultural obstacles could have been overcome. But what is not in dispute is that overcoming them was hopeless in the absence of careful planning and entrepreneurship of the cryonics idea. Both Ettinger and Cooper abdicated any responsibility for implementation of cryonics to others, and neither made any real efforts at a first approximation of the technological specifications or necessary business planning.

In Ettinger's case, he uncritically and actively endorsed con men, frauds and the incompetent – actions that were to badly damage the credibility of cryonics with people of means and

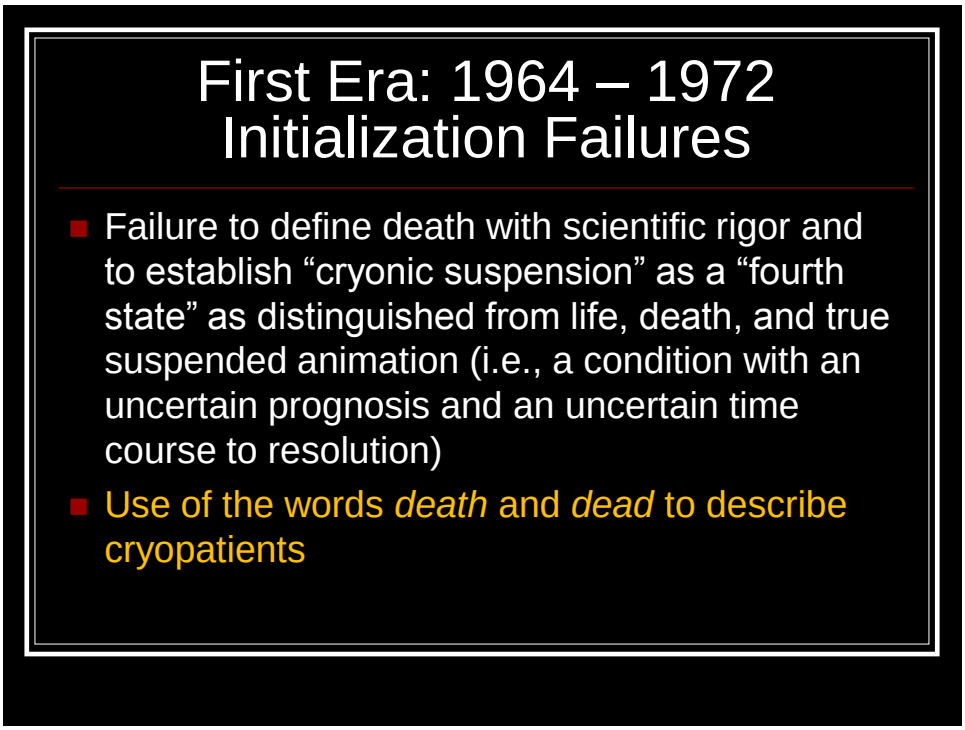
influence, as well as those in the scientific community and the professions.

SLIDE 47

Powerful, paradigm changing ideas require careful husbandry and meticulous planning. A good example of this that stands in sharp contrast to cryonics, is the idea of molecular nanotechnology, as first articulated and promulgated by Eric Drexler. Drexler understood not only the potential benefits of nanotechnology, but also its downsides: its nearly endless capacity for harm, ranging from mischief to catastrophe.

He also understood the need to back up general statements and assertions about the capabilities of nanotechnology with

detailed scientific analysis and modeling. He did not write Engines of Creation and stop there; he followed through with Nanosystems, and he surrounded himself with talented, honest, competent and articulate people who could and did promote his ideas in a responsible way – to extraordinarily favorable reception. It is worth noting that Drexler, like Ettinger and Cooper, is also an introvert who shares most of the same personality traits with both men.

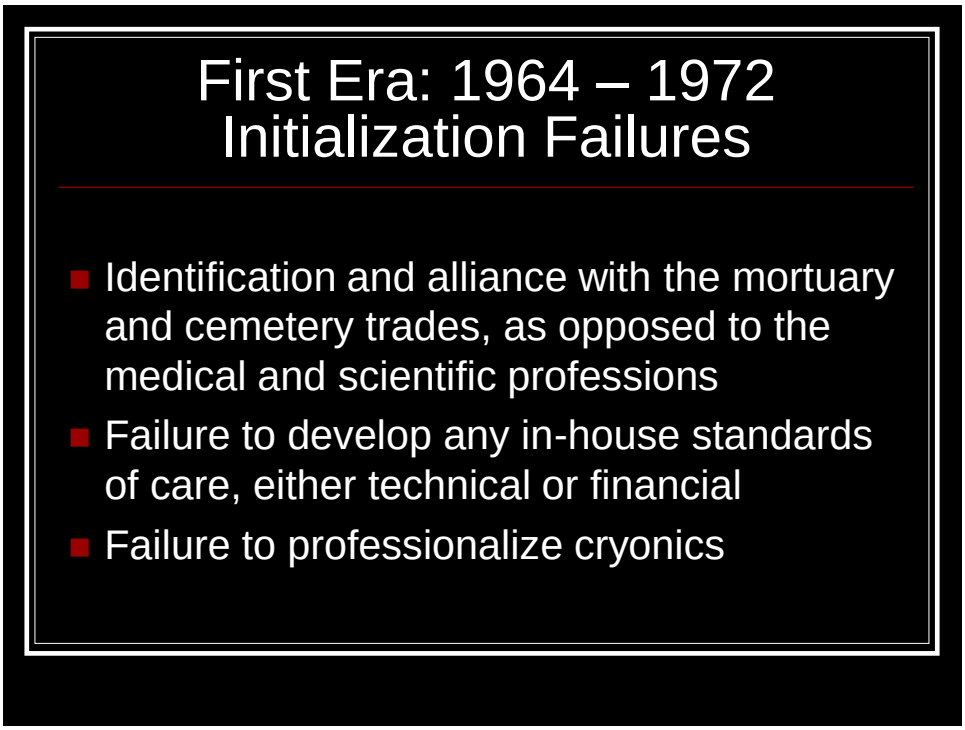


SLIDE 48

Drexler was both a scientist and an engineer, and he approached communication of his ideas to both the scientific community and the public, with care and precision. He clearly defined terms and, where necessary, created new language to

express ideas that could not be effectively communicated otherwise. By contrast, those promoting cryonics gave no thought to making important semantic distinctions, such as the difference between the sloppy and imprecise contemporary medico-legal definitions of death, and the new reality that cryonics implied.

Failure to define death with scientific rigor, and to establish ‘cryonic suspension’ as a ‘fourth state,’ as distinguished from life, death, and true suspended animation (i.e., a condition with an uncertain prognosis and an uncertain time course to resolution) and the use of the words *death* and *dead* to describe cryopatients lead to enormous confusion and, much more importantly, simply shut off consideration of the idea in most peoples’ minds: DEAD is DEAD and that was that. Failure to be precise, and to challenge the orthodox definition of death from the get-go, was nothing more or less than a public relations and communications disaster.

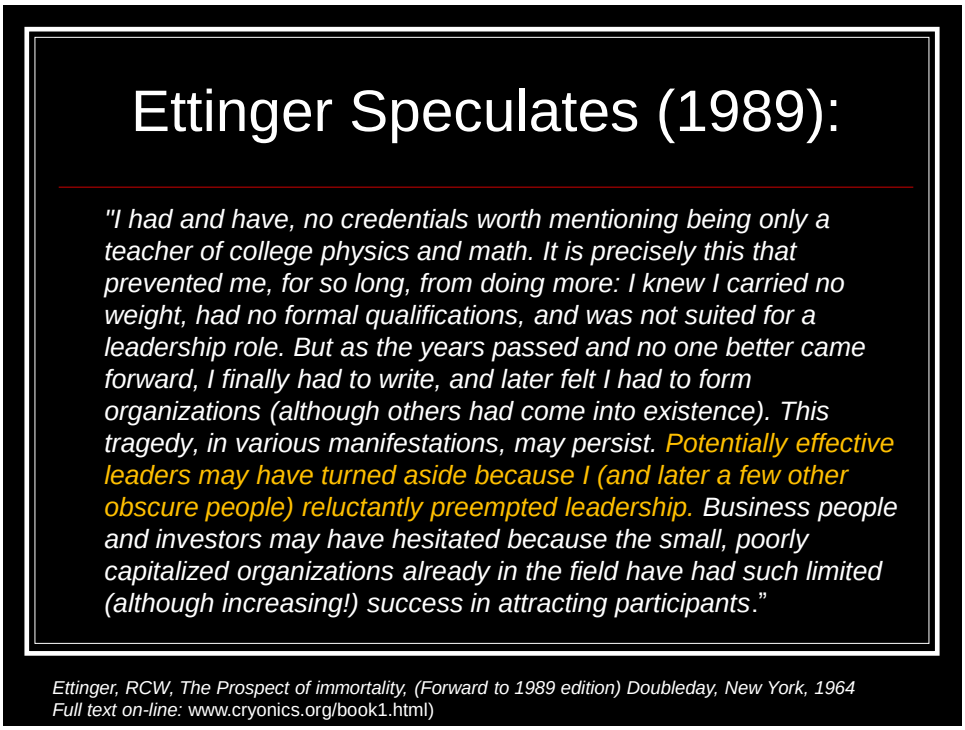


SLIDE 49

Similarly, identification and alliance of cryonics with the mortuary and cemetery trades (as opposed to the medical and scientific professions), and failure to develop any in-house standards of care; either technical or financial; lead to a total failure to professionalize cryonics.

SLIDE 50

This in turn led to the empowerment of amateurs and laypersons, usually with ‘outsider’ personalities, often with accompanying deficits in social and emotional intelligence. These people attracted dysfunctional and sometimes frankly sociopathic personalities as members (and sometimes as activists). The problem of sociopaths in positions of power and authority in cryonics is a serious one which I will return to in detail later in these lectures.

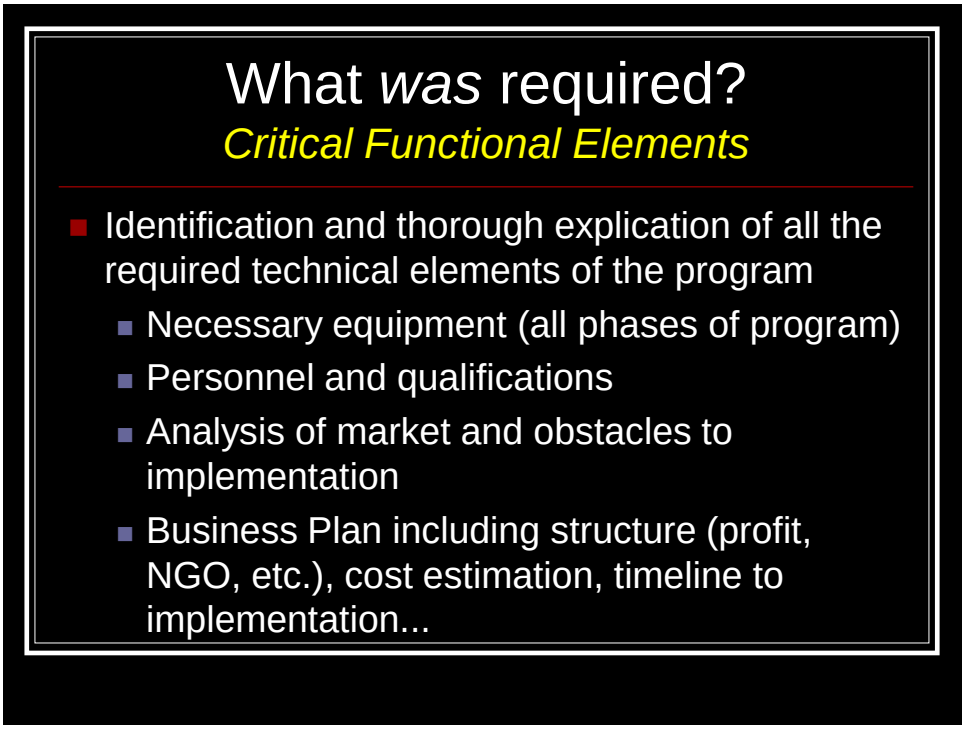


SLIDE 51

In a rare moment of candor, Ettinger came close to acknowledging this interpretation of the failure of cryonics to launch, as possibly being material to how things turned out, and implicit in this statement is the acknowledgement that cryonics 'failed,' that it did not succeed in either becoming a dominant force in the culture, or even in establishing itself as a respected (or feared) minority player. Consider, by contrast, the outcome for Scientology, a movement started by another of Ettinger's cohorts (fellow science fiction writer L. Ron Hubbard) 11 years earlier, in 1953.

Today Scientology is a multimillion dollar enterprise that makes or breaks legislation in the US, elects representatives to Congress, tell the IRS what to do, and has at least 50,000 hard

core adherents in the US alone. While it is a tiny entity, and has by no means come to dominate the culture, it has managed to survive withering attacks and to carve out a place of safe harbor and exert enormous political influence relative to its size. That happened because of careful planning and clever strategizing. It was no accident and it was by no means inevitable.



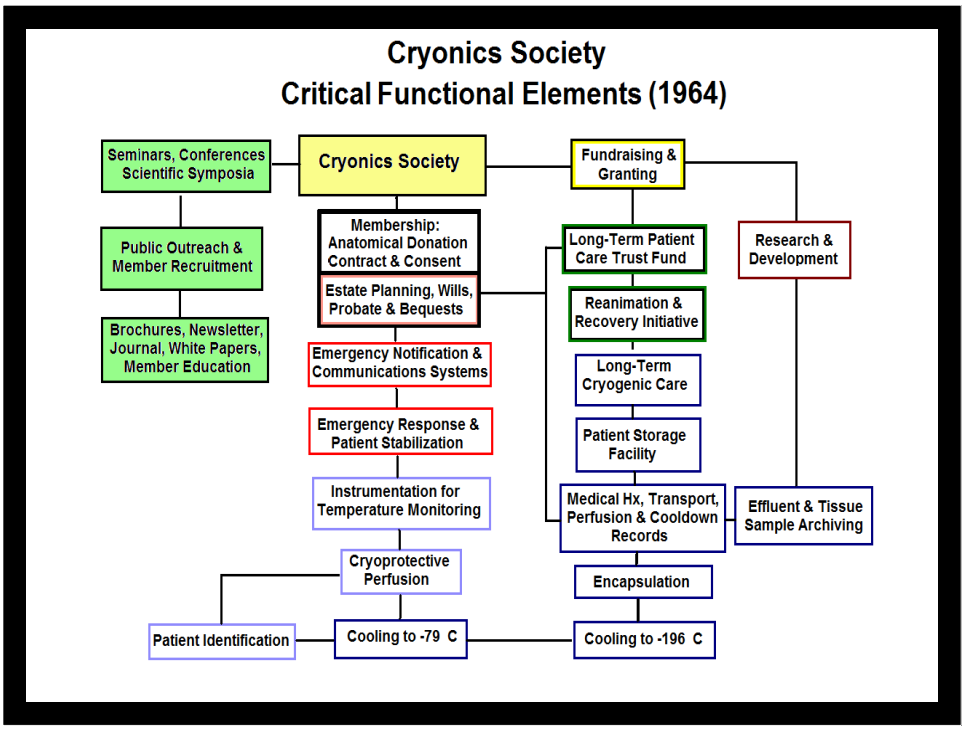
SLIDE 52

And this brings us to the all important question, "What was, at a minimum, required to launch cryonics successfully in 1964 - and perhaps more to the point, what are the implications for cryonics today; particularly as it is presented to new cultures that are effectively *tabula rasa* with respect to cryonics? The former

Soviet Union and China are two prime examples of places where cryonics has not penetrated the culture: or is just beginning to.

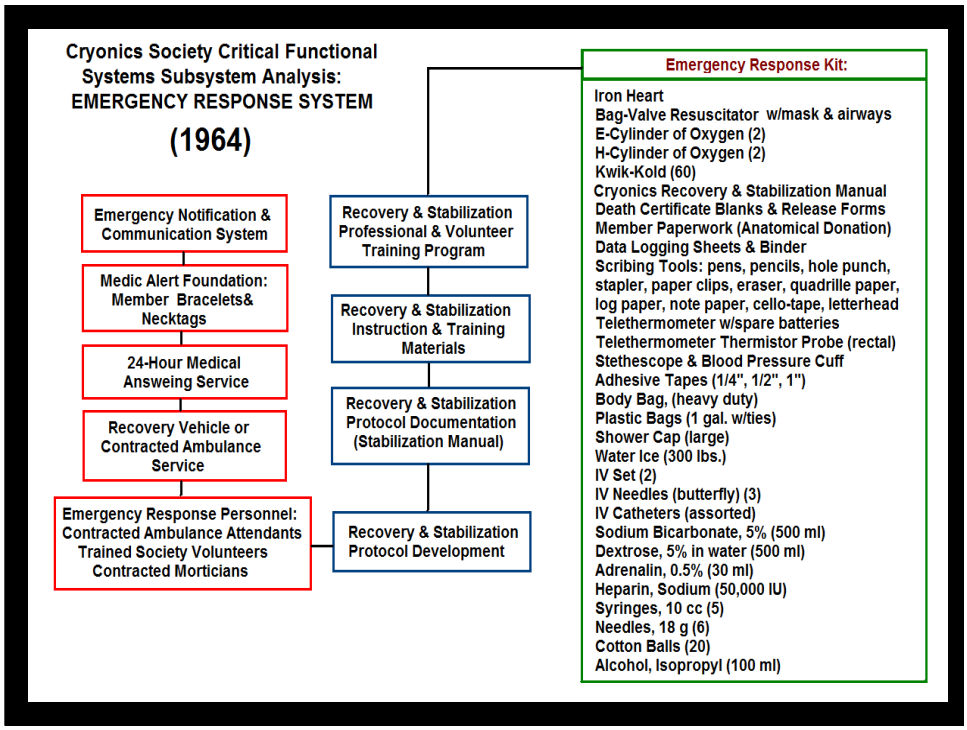
Are there lessons to be learned and mistakes to be avoided from the first period of failure in the US? Are the nascent cryonics groups in these ‘new markets’ behaving responsibly, are they repeating the mistakes made by those of us in the US from 1964 to 1972?

To answer that question it is necessary to spec out what should have happened in 1964. First, there needed to be a thorough explication of all the required technical elements of the program including necessary equipment (all phases of program), required personnel and their qualifications, an analysis of the market and obstacles to implementation of the proposed program. And, of course, essential to any complex enterprise, there needed to be a business plan including corporate structure (profit, NGO, etc.), cost estimation, timeline to implementation...and so on. None of his was done.



SLIDE 53

To make clear what I'm talking about here, I've created a block diagram of the vital elements of any cryonics operation, whether being created in 1964, or today. This is the bare minimum framework of functional elements required. Each of these, in turn, breaks down into supporting subsystems.



SLIDE 54

As an example, I've chosen the Emergency Response System (ERS) because it is the first link in the chain of member recovery in the event of life threatening illness or cardiac arrest. If the Cryonics Society (CS) can neither be reached nor respond when members or clients need them, then they have little to offer in the way of effective services, and certainly, they have nothing to offer in terms of confidence.

I've also listed every item, from cotton balls to capital equipment, required to undertake stabilization and transport based on what the technology available in 1964. These assets, both physical and organizational, may seem impossible to have achieved then, and may seem equally impossible to achieve

now, in places where cryonics is starting over, or starting out for the first time.

SLIDE 55

However, history shows this is not the case, and I am in the unique position of having been both a witness and a participant in events that prove that it *was* possible to put all of these critical elements in place using a handful of people and far less resources (dollars expended) than were brought to bear on the failed launch of cryonics during the first 8 years of its existence in the US.

This slide shows what was achieved by 4 activist individuals who were part of a group of less than 30 people.

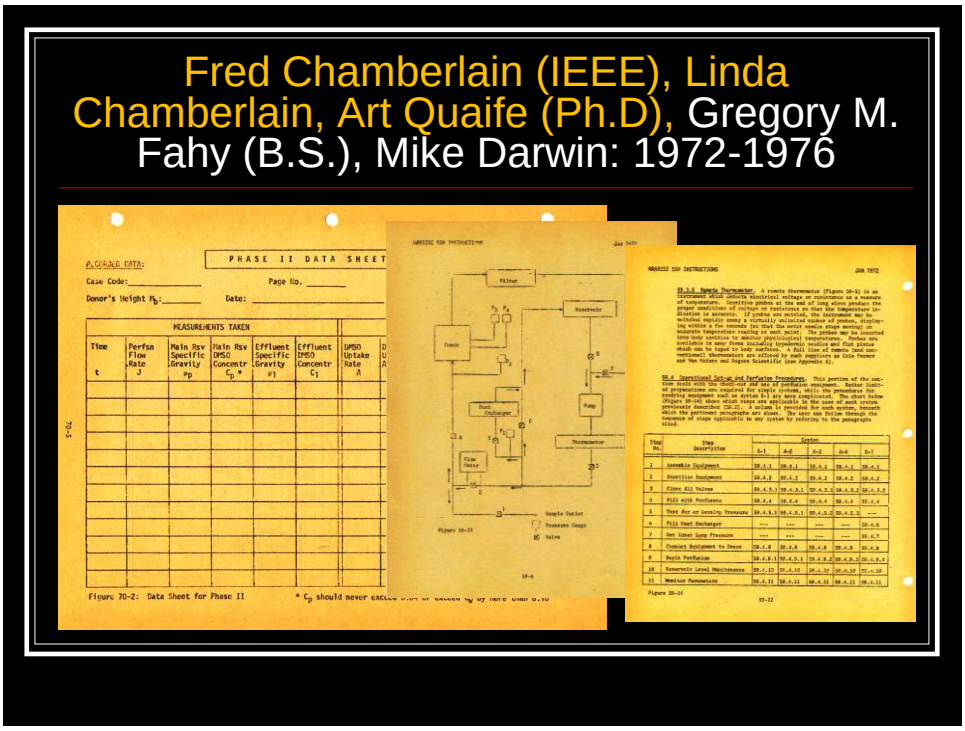
Beginning in 1972, Fred and Linda Chamberlain, Art Quaife, and later Greg Fahy and I, created all of the elements specified in the previous slide, ‘Critical Cryonics Society Functional Elements.’

Single-handedly, the Chamberlains wrote a comprehensive procedure manual and established best practices documentation (Standard Operating Procedures or ‘SOPs’ in the US and Canada) to support it. They detailed protocols for taking call (responding to an emergency when the Alcor pager went off), hired a medical answering service to field emergency calls, developed and deployed emergency response kits and trained volunteer staff to administer cryonics first aid: manual & mechanical CPR, external cooling, anticoagulation & buffer administration, and transportation of the patient.

They built and tested perfusion equipment, contracted with an ambulance company and mortuary for technical and transportation services and, finally, constructed a mobile perfusion facility where cryoprotective perfusion and freezing could be carried out.

In addition to all of this, they kept the books, put out a technical publication, *Manrise Technical Review*, and practiced and drilled relentlessly to hone their skills and familiarize themselves with the equipment they would be using. And before they did any of this, they created a business plan which was realistic and scaled to the (very small) market they estimated they would be servicing.

And, I should add, all of us were employed full time during this period at demanding jobs; Linda was an executive secretary, Fred was an IEEE at the Jet Propulsion Laboratories and I was a full time student putting in 30-40 hr/wk at McDonald's (literally making hamburgers). Total dollars expended (adjusted for inflation) = $350,000.



SLIDE 56

Data collection sheets, flow charts and thorough documentation on how to use equipment, prepare perfusate and carry out cryoprotective perfusion and freezing were all put in place and rigorously validated before the first Alcor patient presented for care in the summer of 1976. Our competence and attention to detail had the effect of quickly attracting the best

and brightest in cryonics to Alcor (and Trans Time) and our professionalism ultimately attracted and deeply involved medically competent individuals such as Allen McDaniels, M.D., Jerry Leaf, Virginia Jacobs, and others. To approach cryonics with anything less than this is not merely to invite disaster, it is to ensure it.

SLIDE 57

While this small corps of serious and honest people was hard at work trying to re-launch cryonics on a solid footing, the legacy of the first era of careless and irresponsible cryonics activity was maturing into what can only be described as a failure of truly catastrophic proportions.

SLIDE 58

As early as 1965 Ettinger had appeared on national television and, in effect, endorsed cryonics operations which were either outright frauds, or were operated by an incompetent sociopath. No effort was made to verify any claims made, and all attempts to establish minimum standards for financial and technical conduct were rebuffed.

SLIDE 59

Wealthy and influential individuals with a deep personal interest in cryonics were put in touch with charlatans and con men that took their money and promptly disappeared. The men who appear on this slide were giants in their respective fields of music, television and cardiothoracic surgery. All were soon alienated by con artists such as Milgram and Gold.

SLIDE 60

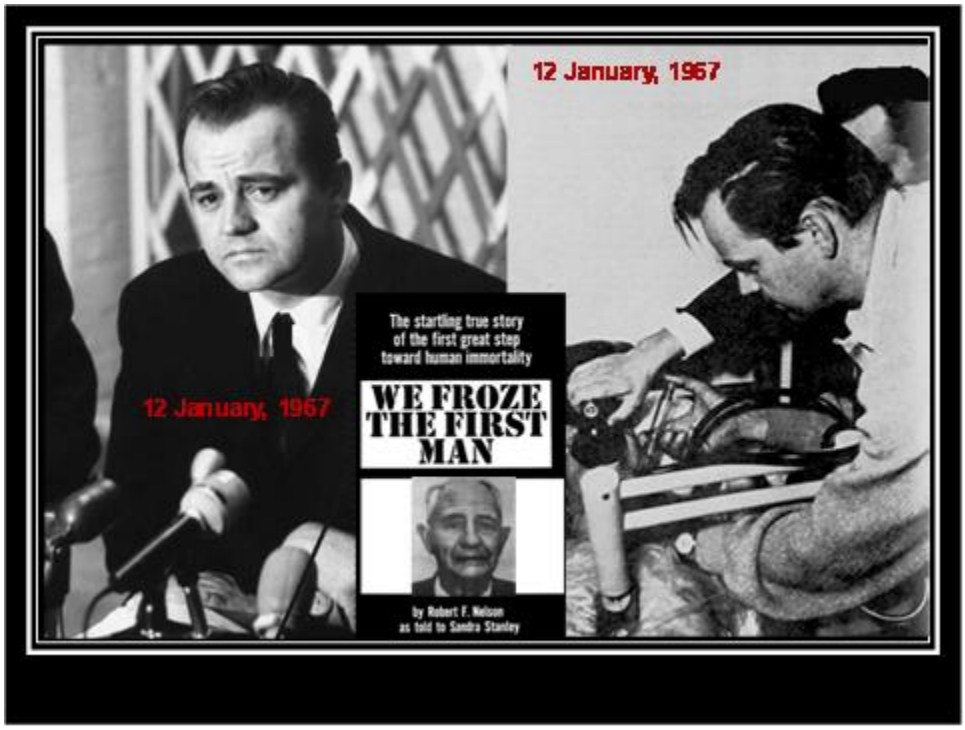
These internationally known and respected celebrities experienced similar mishandling, with similar results.

SLIDE 61

When the long awaited ‘freezing’ of the first man took place on 12 January, 1967, the man in charge was Robert F. Nelson, aka Frank Bucelli, a Santa Monica TV repairman. Bucelli was much more than a TV repairman; he was a convicted felon with a long criminal record beginning in his youth; including violent offenses such as assault and battery as well as numerous charges, and several convictions for fraud and theft.

This background had been uncovered in 1966 by CSNY President Curtis Henderson, who had commissioned an investigative report on Nelson/Bucelli by the Pinkerton Agency, the most respected private detective service in the US at that time. This report was forwarded to Ettinger – but no action was

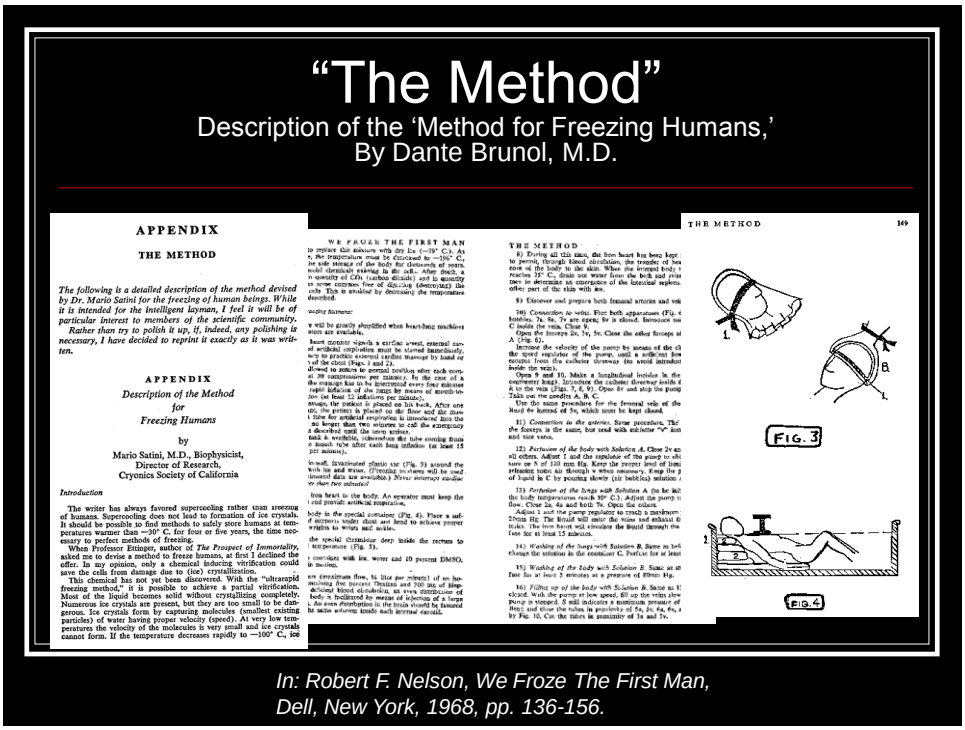
taken. Nelson ‘froze the first man,’ and in so doing he established the conditions under which cryonics would subsequently be practiced: lots of superficial media attention giving the appearance of openness and transparency, while at the same time operating in virtually complete secrecy from both the membership of his cryonics society (the Cryonics Society of California: CSC) as well as the press, the public and the regulatory authorities.



SLIDE 62

At the press conference CSC held following Dr. Bedford’s freezing, the media were told that the first man had been frozen under ‘controlled conditions.’ That a physician had been standing by with a mechanical CPR device (a Westinghouse

Iron Heart) and that CPR had been initiated as soon “as the patient’s heart stopped,” followed by immediate packing in ice and cryoprotective perfusion and cooling to dry ice temperature (~ -77˚C).



In: Robert F. Nelson, We Froze The First Man, Dell, New York, 1968, pp. 136-156.

SLIDE 63

Subsequently, an elaborate protocol that was purported to have been used called ‘The Method,’ was circulated to cryonics society officials across the US, and shortly thereafter published in a supposedly factual book about Dr. Bedford’s cryopreservation produced by Nelson in collaboration with a professional writer, Sandra Stanley (We Froze the First Man).

The Press Release: *"The first reported freezing of a human at death, under controlled conditions, occurred on Thursday, January 12, 1967."*

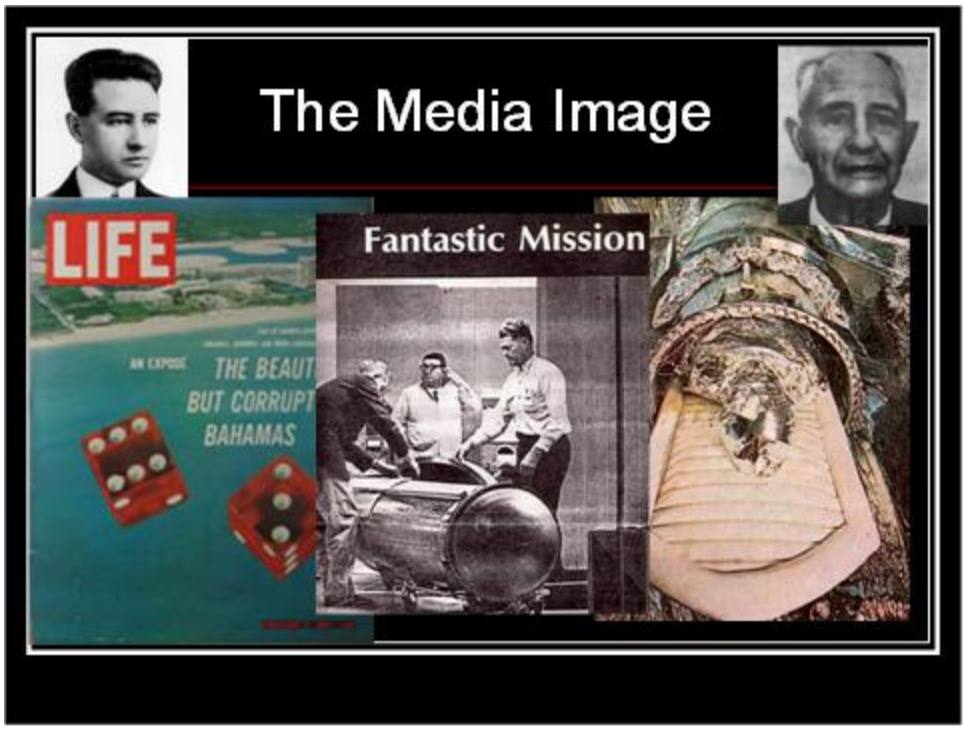
When clinical death occurred, Dr. Fox was present and at once began artificial respiration and external heart massage, to keep the brain alive while cooling the patient with ice. Heparin was injected to prevent coagulation of the blood.

Later, the team of Dr. Satini, Donald Bickerson and Robert Nelson perfused the body with a protective solution of DMSO (Dimethylsulfoxide) using a Westinghouse iron heart sent by the Cryonics Society of Michigan.

Robert F. Nelson, We Froze The First Man, Dell, New York, 1968, p. 72.

SLIDE 64

There has been a great deal of effort of late to portray Nelson as a victim of circumstance, as a well intentioned man who "got in over his head and handled it badly." Nothing could be further from the truth. As the press release quoted on this slide makes clear, Nelson lied, and he lied from the start. Dr. Bedford's cryopreservation in no way even remotely matched the brief description in the press release announcing his 'freezing.'



SLIDE 65

Nor was the reality of what had in fact happened in any way reflected in the myriad of subsequent media stories chronicling Dr. Bedford's cryopreservation. The media reported what they were told, principally that Dr. Bedford had received immediate post cardiac arrest cardiopulmonary support, cryoprotective perfusion with a DMSO-containing perfusate, and controlled cooling to dry ice temperature (~ -77°C).

SLIDE 66

This slide graphically documents what the cryonics community and the world were told had been done for Dr. Bedford. The Amtec roller pump pictured here is the very model that is said to have been used in ‘the method’ employed to cryoprotect and freeze Dr. Bedford. This newspaper article detailing his cryoprotective perfusion is the very article that caused me to become involved in cryonics in 1968.

SLIDE 67

It wasn't until the mid-1970s that I began to piece together a very different story of what had happened to Dr. Bedford on that January night in 1967. A picture began to emerge of negligence fused with gross incompetence. When Dr. Bedford was pronounced legally dead, Nelson was nowhere to be found. There was no answering service, no list of numbers where he might be reached, and no equipment or supplies assembled, tested and at the ready.

It was, in fact, hours before Nelson could be located. There was no oxygen to power the heart lung resuscitator. The Amtec pump was owned by CSNY, not CSC, and there was in fact no pump, no perfusion and not even a cooperating mortuary.

SLIDE 68

On 25 May, 1991, I at last had the opportunity to see for myself what Nelson and his cohorts had done to Dr. Bedford. On that sunny spring day we removed Dr. Bedford from his inefficient horizontal dewar to place him in an upright, 'bigfoot,' multi-patient storage vessel.

With careful preparation, this allowed us to examine Dr. Bedford externally, document his condition and take some (peripheral) tissue samples. We placed him in a large, foam insulated, open-topped tank of liquid nitrogen. This allowed us to examine him and evaluate his condition while keeping him continuously submerged in liquid nitrogen, thus precluding any danger of warming him.

SLIDE 69

This afforded us an opportunity to examine him for the first time in 24 years. Now, you too will have the same opportunity.

SLIDE 70

This is the reality of the ‘care’ that Nelson gave Dr. Bedford. He was not perfused, but rather pin-cushioned with syringes of either neat, or highly concentrated DMSO. The large areas of scalded looking skin are probably a result of the hemolytic action of the DMSO solution which was being injected into the vicinity of the carotid arteries in the neck.

The frozen bloody exudate from his mouth and nose is a result of incompetently performed manual chest compressions administered in an attempt to ‘circulate’ the DMSO to his brain and other vital organs.

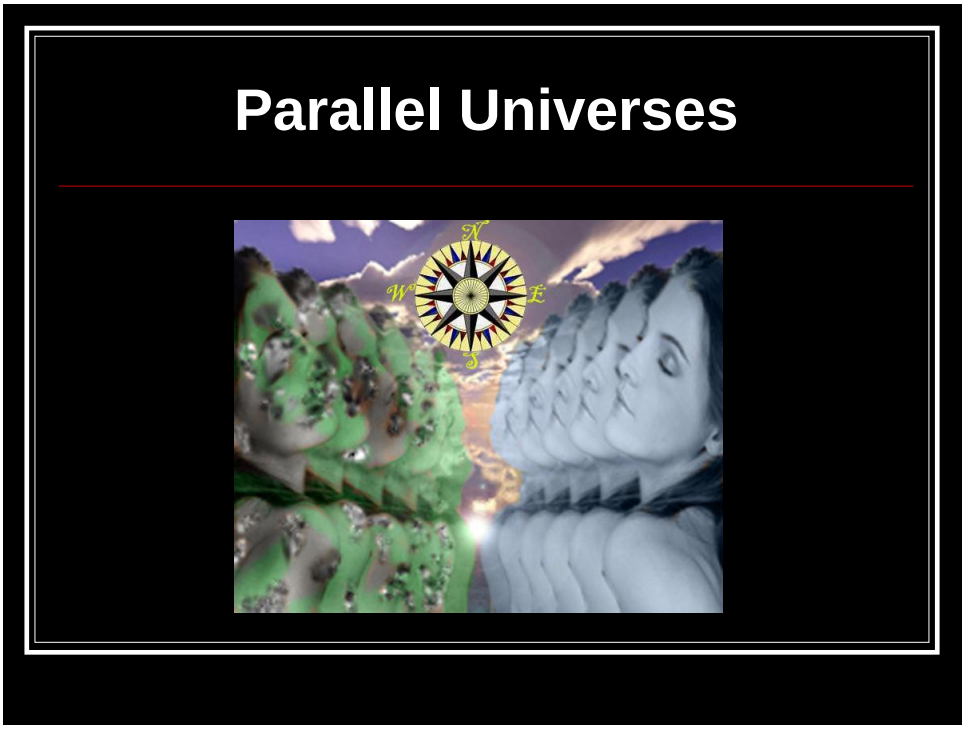
SLIDE 71

This deceit and evasiveness alienated competent individuals and caused a cascade of problems that made the environment for cryonics more hostile. This in turn contributed to the lack of adequate capitalization and denial of access to high quality profession and technical services such as physicians, cryobiologists, businessmen and cryogenic equipment manufacturers.

It also provoked intense hostility from the scientific community at large and last, but by no means least, it resulted in Chatsworth. Nelson's lies hadn't stopped with Bedford and they would not end until cryonics was nearly destroyed by his misconduct at Chatsworth where 9 people were found to have been allowed to thaw out (or in some cases had never been

frozen at all) and decompose under shocking conditions. Chatsworth resulted in a nearly decade long hiatus in progress in cryonics and the number of people cryopreserved dwindled to less than 1 per year during the interval of 1975 to 1987!

ABSENCE OF PREPARATION AND PLANNING



SLIDE 72

While fraud and deceit drove the failure of cryonics on the West Coast of the US, other factors were in play on the East Coast. In contrast to CSC, CSNY was operated in an open, above board and honest manner. While CSC's patients were decomposing at Chatsworth, CSNY's patients were relatively

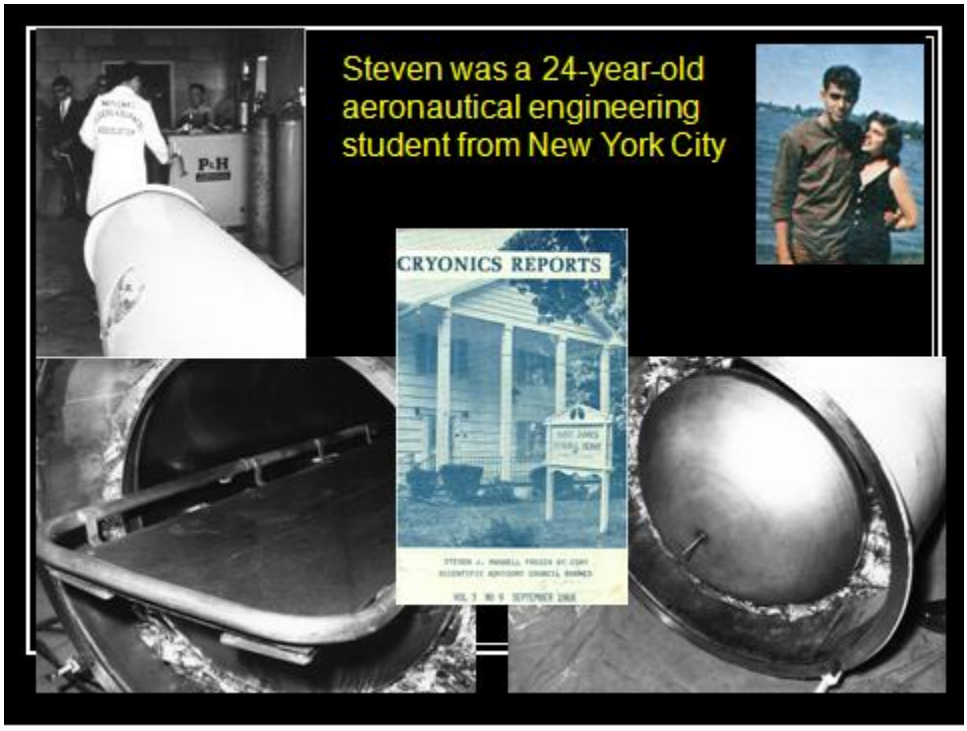
well cared for. In a sense, cryonics existed as two parallel universes a continent apart. This had a polarizing effect, dividing the few cryonics adherents who existed at that time (both the committed and the less so) into opposing camps; each suspicious of and unable to cooperate with the other.

SLIDE 73

On the East Coast, CSNY was making mistakes that would also prove damaging and eventually lethal. While fraud was not an element in these errors, lack of planning and foresight certainly contributed mightily. CSNY and its brother organization Cryo-Span, Inc. had no business plan, no protocols or procedures for delivering the technical aspects of care, and no emergency communication or response system. As CSNY's

President, Curtis Henderson was later to say, “We were just making it up as we went along.” On 28 July, 1968 CSNY cryopreserved its first member, Steven J. Mandel.

In the slides that follow I want to give you some visual images that will hopefully provide you with a feeling for what cryonics was like at that time, both in terms of its technology and in terms of its public image.



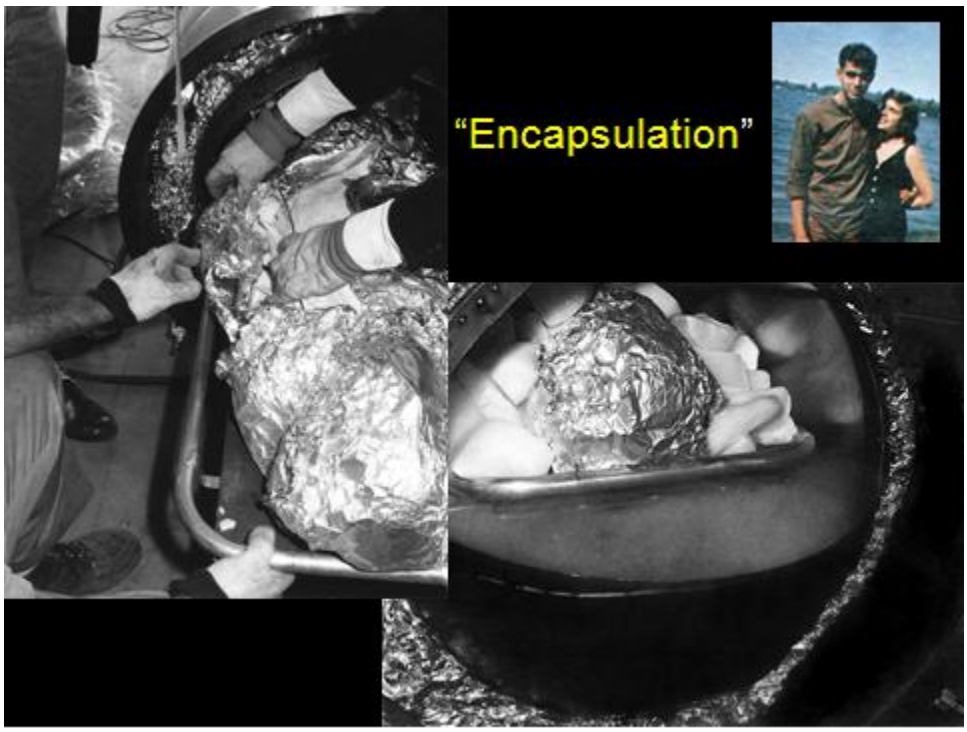
SLIDE 74

Steven was a 24-year-old aeronautical engineering student from New York City who was already gravely ill when he made arrangements with CSNY and purchased his life insurance. In fact, he was uninsurable, and experienced legal death well

before the non-contestability period of the policy had elapsed. There was no money to pay for the immediate expenses of perfusing and freezing him, let alone to cover the cost of indefinite storage in liquid nitrogen. This situation became known to the management of CSNY within days of Steven's cryopreservation.

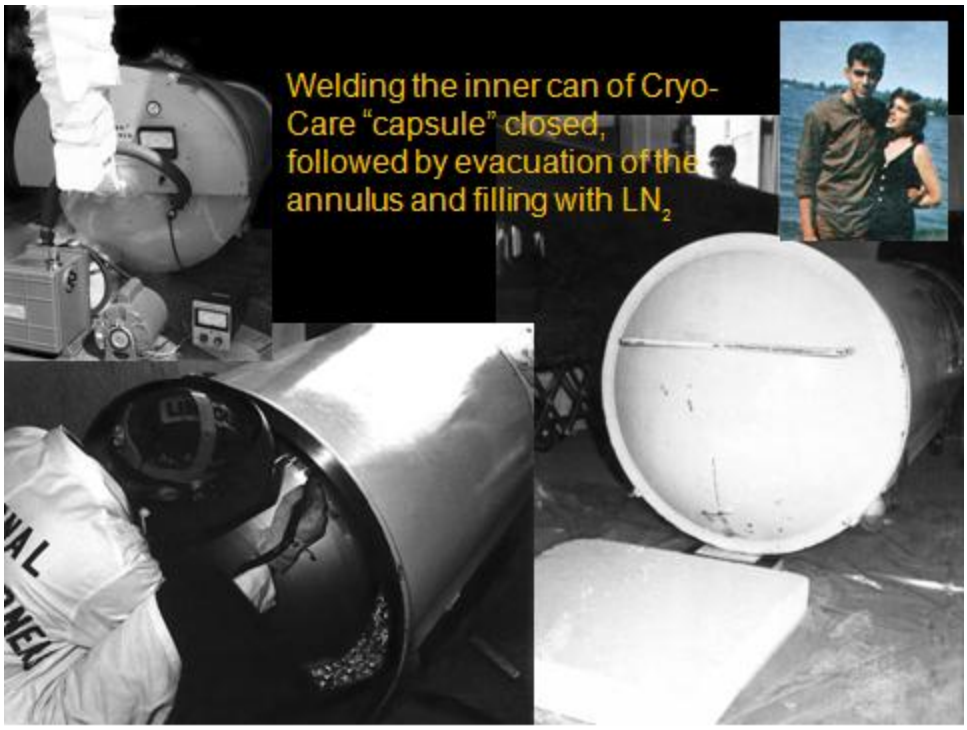
SLIDE 75

Despite the absence of funding, CSNY proceeded to place Steven into long term storage and rely upon promises from his mother, Pauline Mandel, to provide regular payments for his long term care.



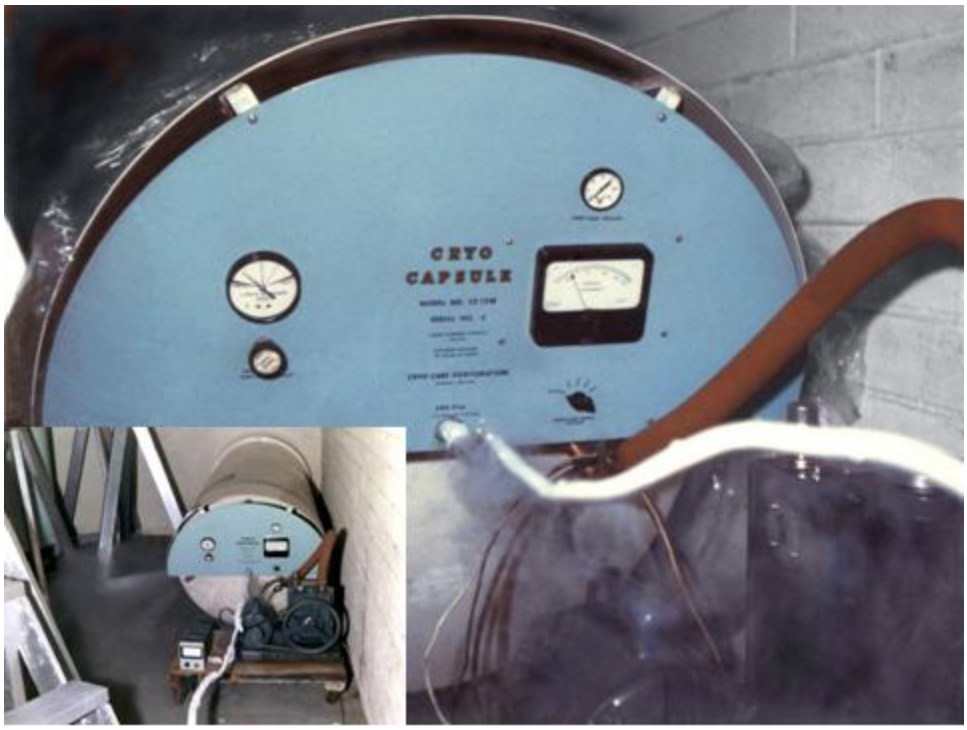
SLIDE 76

This decision was made for many reasons including lack of experience, naiveté, and a strong desire to 'keep up with the Nelsons' and garner media attention which it was believed would further the program and attract additional members and customers.



SLIDE 77

This decision depleted the organization of its capital equipment and cash and subjected it to the considerable expense in time and money of operating a storage facility for whole body patients. While in some ways this was beneficial in that it 'forced' these facilities into existence and also forced the principals of CSNY to confront the logistic, technical and business realities of actually delivering human cryopreservation services, it did not provide them with either the capital or human resources to do these things effectively.



SLIDE 78

Unlike Nelson, who was able to show impressive drawings of his non-existent facility, CSNY had to be content with exposing its modest, indeed crude appearing operation to public scrutiny. The rough nature of the operation, housed as it was in the groundskeepers' room of a Long Island cemetery did not inspire confidence in the public or in CSNY's own members.

SLIDE 79

Despite, and in large measure because of these difficult experiences, Curtis Henderson became focused on developing reliable cryogenic storage equipment, and one beneficial outcome of CSNY's efforts was the creation of the first reliable and cost-effective equipment for human cryogenic storage, the Minnesota Valley Engineering dual patient upright, Superinsulated™ high vacuum dewar.

The previous horizontal units manufactured by Cryo-Care Corporation of Phoenix, AZ were notoriously unreliable and very inefficient making long term care cost-prohibitive.

SLIDE 80

Because the patients accepted by CSNY were all third-party cases – situations where the relatives had either initiated cryopreservation or were expected to pay for it, decisions about how patient's were cared for became disconnected from rational, scientific or even simple and straightforward technical requirements. The relationship of the cryonics organization was *not* with the patient, but rather with his next-of-kin.

SLIDE 81

When the MVE dewars were first put into service in August of 1969, it was argued that for commonsense reasons of safety, patients should be racked in the dewar in a head down position. In the early 1970s I argued strenuously that in addition to providing extra protection in the event of vacuum failure, racking patients in a head-down position in the dewar would prevent the enormous thermal cycling that the head and brain were experiencing each time the unit was topped up with liquid nitrogen (i.e., quench cooling of the head from ~ -145^{o}C to -196^{o}C in a matter of minutes).

This proposal was met with fierce opposition by relatives, and (some) CSNY members, alike. Emotional and public relations considerations were paramount. I was told, “We can’t

have our patients in there upside down standing on their heads! People will really think we are crazy!" If you look carefully at the photo of the patient at the upper left of this slide, you can see a line demarking the liquid nitrogen level. Because liquid nitrogen is dispensed in 160 liter containers the liquid level after filling had to be allowed to fall to approximately mid-chest level, exposing the upper body to a continuous series of cycles of cooling and warming with a delta T of ~50^{o}C.

SLIDE 82

The third party problem was greatly exacerbated when CSNY cryopreserved Ann DeBlasio in January of 1969. Mrs. DeBlasio was the wife of a blustering and contentious New

York City police officer who often ended discussions by waving his firearm menacingly.

SLIDE 83

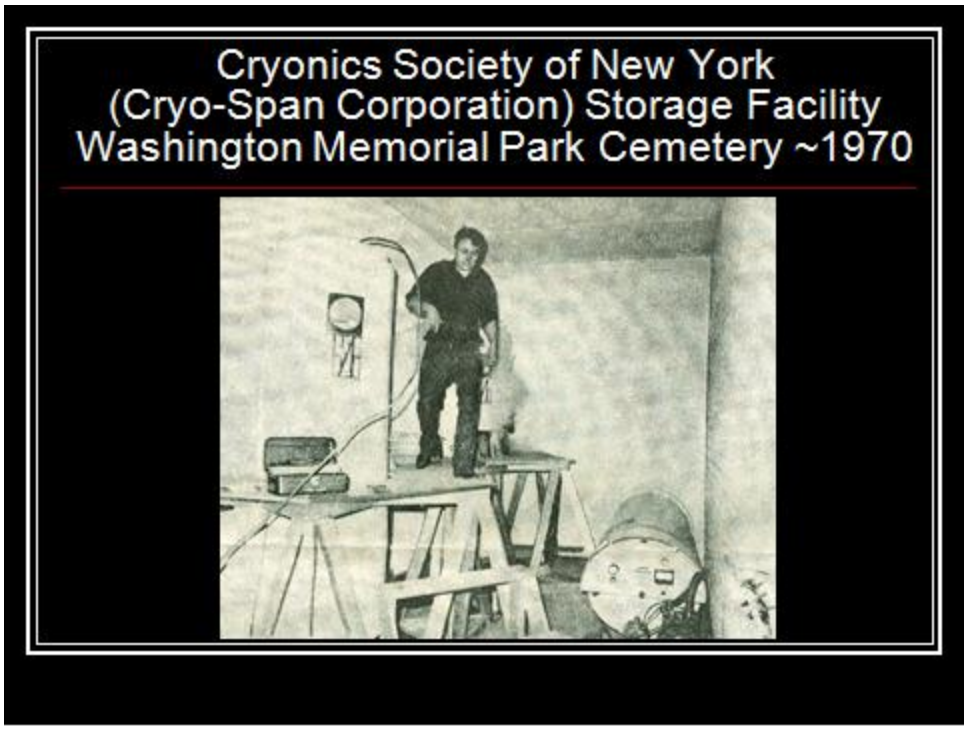
DeBlasio, seen looking in through the doorway as his wife's dewar is consecrated by the family priest, Rev. Severio Mattei, had no idea of what cryonics was really like.

Understandably, he expected a professional operation with a solid technical basis and, at least, a reasonable aesthetic front. What he was confronted with were a group of people who defied convention in almost every way and a primitive facility that could not even be locked and where groundskeepers tossed their

cigarette butts onto the floor and left the waste from their lunches on his wife's temporary storage container.

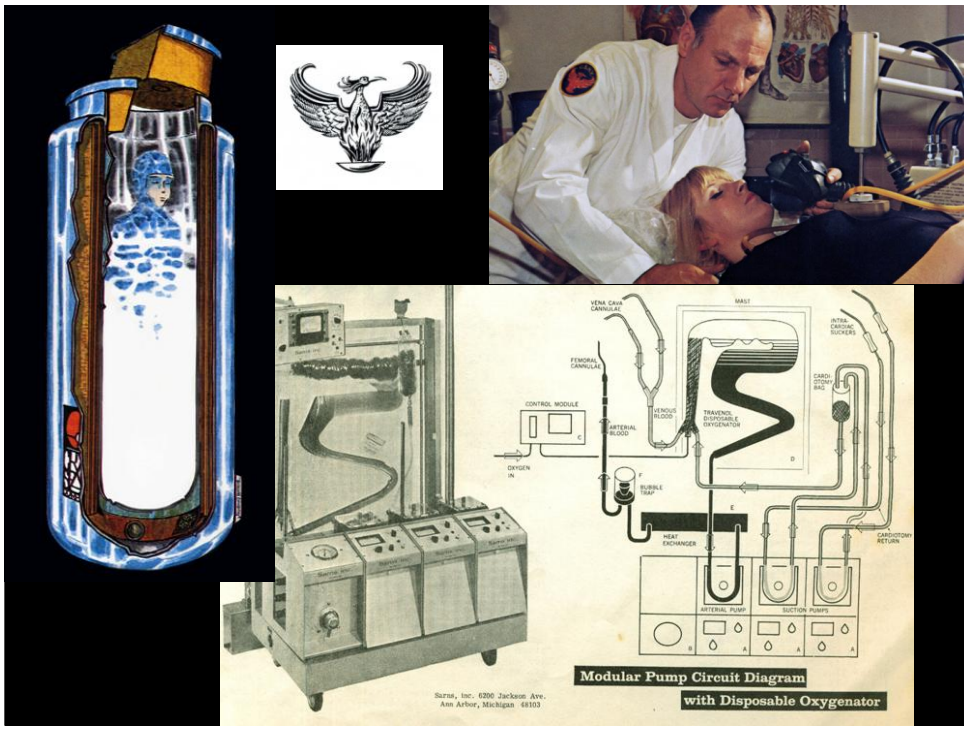
SLIDE 84

So, while Ann DeBlasio became CSNY's second patient in long term storage, the situation was not stable and there was dissatisfaction and unhappiness on all sides.



SLIDE 85

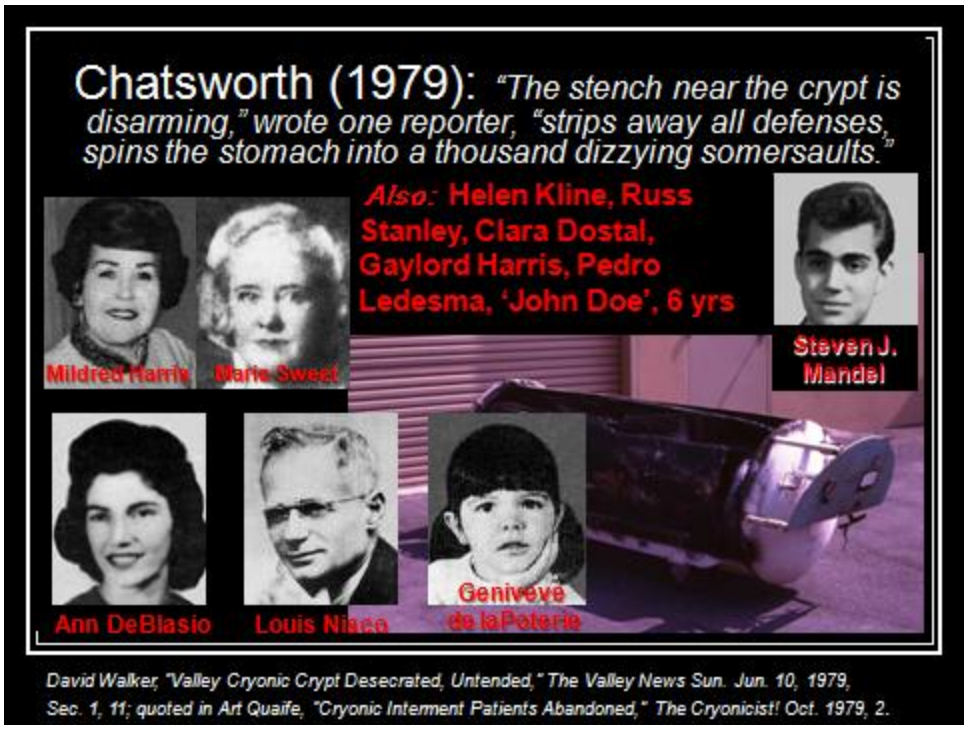
This cramped, crude CSNY facility, coupled with a lack of professionalism and the absence of a business-like approach crippled, and arguably destroyed CSNY – and did much to injury cryonics as a whole.



SLIDE 86

While the men who ran CSNY were honest and made no attempt to hide their shortcomings, they nevertheless projected, through their publications and literature, an image of competence and skill that was wholly lacking. In fairness, they understood much of what needed to be done, but having committed themselves to the formidable and unrelenting task of actually delivering cryogenic care (in the absence of adequate resources) it became virtually impossible for them to pursue the proper course of action.

THE NO FEEDBACK PROBLEM



SLIDE 87

How did these things happen? How did sincere, hard working, committed people who desperately wanted cryonics for themselves allow the situations I've just described – the woefully inadequate perfusion capabilities (or more properly, lack thereof) and the madness of racking patients head-up in their storage dewars?

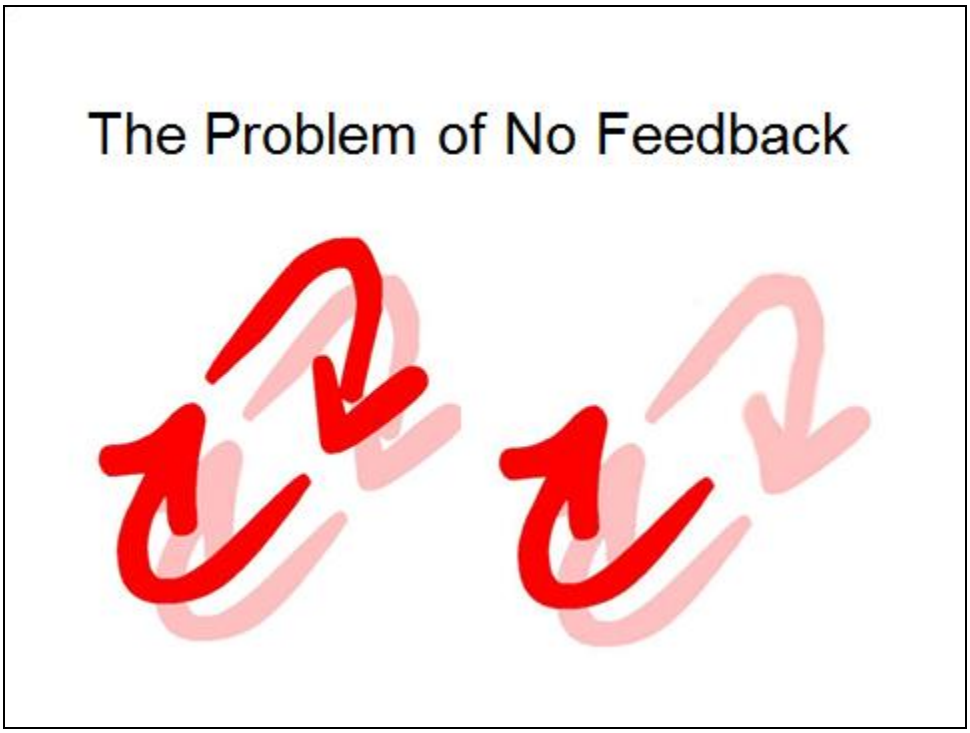
And what about Dr. Bedford? How was it possible for his care to have been so botched while the media, and the overwhelming majority of cryonicists, remained convinced that he had been cryopreserved under seemingly good conditions?

Even more incredibly, let's stop and reconsider Chatsworth with greater care. Yes, Robert Nelson was a fraud and sociopath – no question about that.

But the rest of CSC's membership was neither sociopathic nor fraudulent. They were very sincere and deeply committed cryonicists. Marie Sweet, Helen Kline, Russ Stanley, and the father of 8 year old Genivieve de la Poteri, were all CSC members who were involved with the organization for months or years before they themselves were cryopreserved and ended up as skeletal remains at Chatsworth.

Virtually all of the other CSC members were decent people. Several of them had put tens of thousands of (1968-9) dollars of their savings into the CSC facility. All of these people refused to believe that anything was amiss at the Chatsworth facility until the press broke the story in 1979! On average CSC members were intelligent professionals, entrepreneurs, small business people and, above all, independent thinkers. How was it possible that, even as evidence accumulated that 'things just didn't add up' with CSC's storage operation, they continued to have confidence in CSC?

In fact, of the 30 or so 'signed up' CSC members at the time, only two became suspicious, investigated, and left the organization; Fred and Linda Chamberlain. And in the cryonics community at large, only three people were likewise deeply suspicious (or virtually certain) that something was amiss with CSC: Curtis Henderson, Saul Kent and me.



SLIDE 88

In 1986 I wrote an article entitled the ‘Myth of the Golden Scalpel’ which first delineated the problem of ‘no feedback’ in cryonics. The article was a response to intense criticism of the application of an evidence based, medical model to cryonics and the associated increase in costs and, perhaps just as importantly, the accompanying disempowerment of ‘amateurs.’ Prior to the entry of professionals – or people working to create professionalism in cryonics – cryonics was a ‘do it yourself’

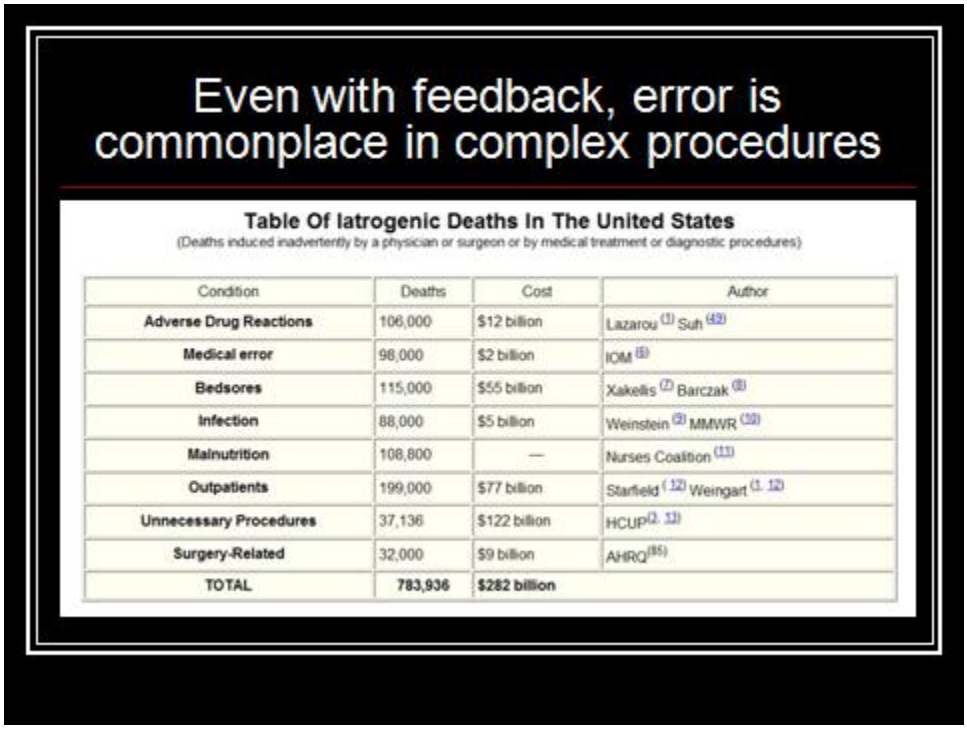
(DIY) undertaking and anybody could (and did) undertake to cryopreserve people. A corollary of this was that anyone's opinions about how cryonics should be practiced were as good and as valued as anyone else's. Much of this criticism came from members of the Bay Area Cryonics Society (BACS) and the Cryonics Institute (CI).

In the next part of this lecture, I will show you images of the cryoprotective perfusion of a CSNY patient from 1972. That is very close to how CI carried out their perfusions at that time, and indeed, it was not until Ben Best arrived at CI that even the simplest and most basic parameters of patient care were monitored or recorded. And even now, CPA perfusion at CI more closely resembles what you will see in the slides from 1972 than it does what you will see still later when the Chamberlains, Jerry Leaf and I began changing cryonics.

The kind of procedures being used before the application of an evidence based medical model to cryonics are best described as ritual, not science. There were no truly meaningful tests, measurements or evaluations performed to inform the people carrying out cryopreservation procedures whether things went poorly or well and whether the 'standard' procedure (or a modified one) was good or bad for a given patient.

For instance, should patients with long ischemic times get a different treatment than patients with short or very little ischemic times? Perhaps a more rapid increase in CPA concentration should be used, or even no CPA perfusion at all

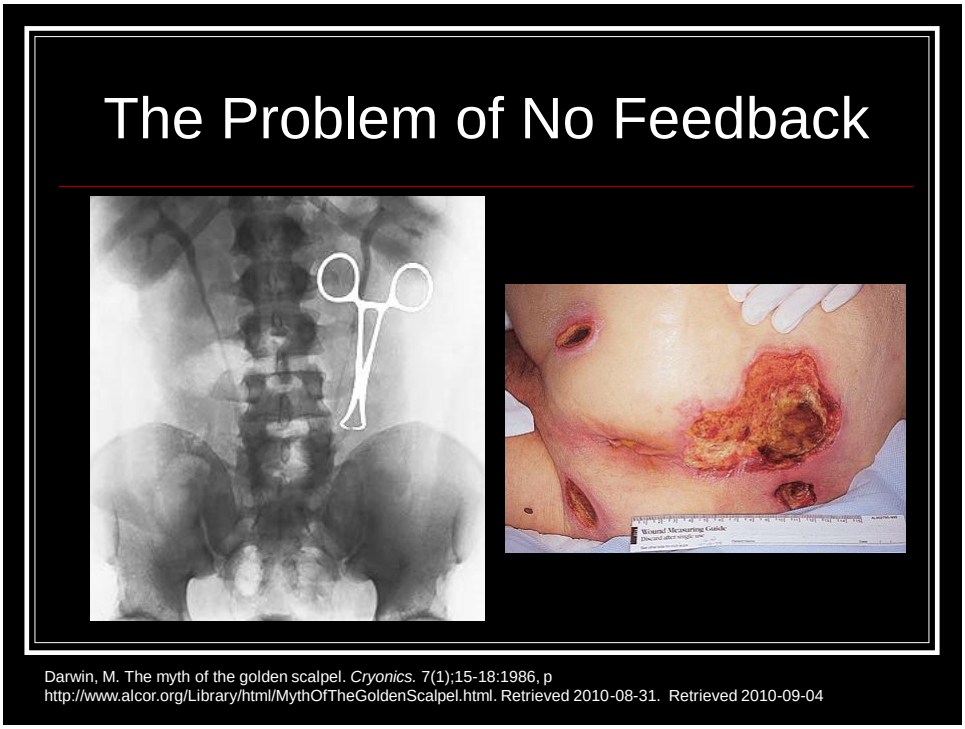
under some circumstances? How and why such decisions are to be made should be documented and have a scientific basis which is continually being informed by ongoing research.



SLIDE 89

In conventional medicine, where personnel at all levels are extensively trained, those who control the discipline are highly educated and skilled professionals; there is licensing and government oversight, and extensive documentation of procedures and record keeping. Lethal and morbid injuries are surprisingly common. As you can see, in the US alone, there are over three quarters of a million deaths each year due to medical error (iatrogenesis).

This is a staggering number of deaths and the associated cost is an estimated $282 billion! And keep in mind this does not include the patients who are injured and do not die, or the many patients whose death or injury is either not detected, or not reported.



SLIDE 90

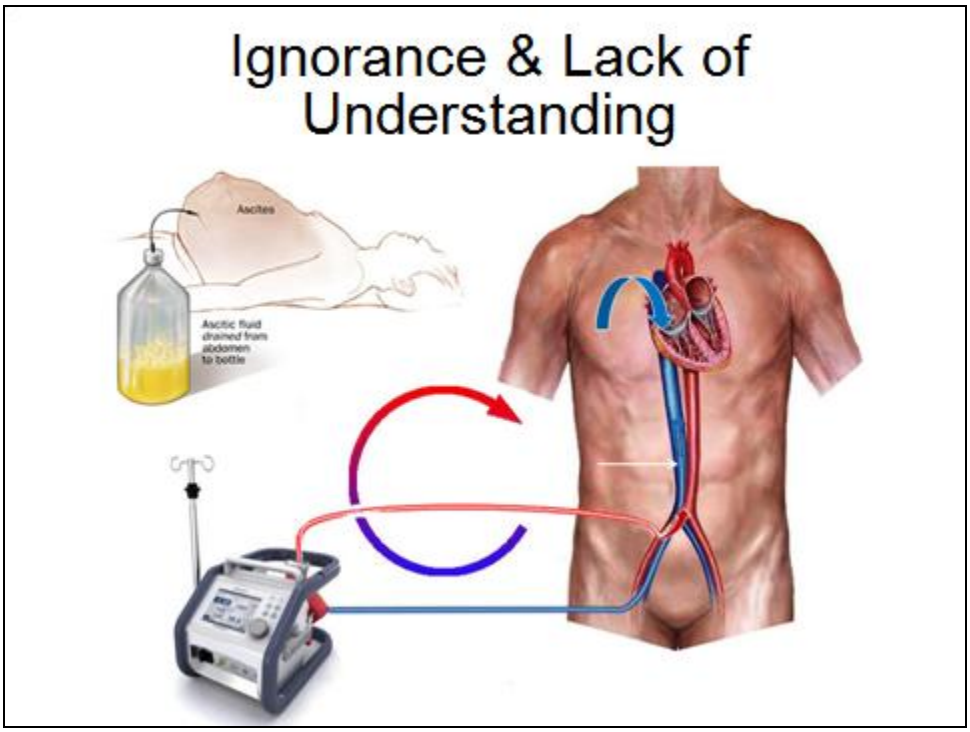
As bad as the problem is, it would be much worse if it were not for the fact that in medicine the patients being treated provide *feedback*. If you injure a patient delivering medical care, the odds are good that the patient will show both symptoms and signs of your error. He may suffer pain, become gravely ill, behave abnormally, lose sensory or motor function, be disfigured, or die.

The image at the right of this slide is of a decubitus ulcer – a bedsore or pressure sore, in common parlance – due to failure to properly position and turn the patient. Bedsores are surprisingly common because the patient does not feel the discomfort until after the injury at the pressure point(s) has occurred. Patients in extended care facilities are also often effectively ‘voiceless objects’ who are frequently demented and are often unable to speak articulately for themselves even when compos mente. All too often they are also being warehoused and cared for by under-trained or under-motivated personnel.

Medicine also benefits from diagnostic modalities, such as the x-ray image at right, which allows for errors to be uncovered more effectively – and thus be corrected or mitigated – where it’s possible to do so.

Unfortunately, the cryonics patient can provide none of the feedback a living patient does and as I have often said before, a patient who is straight frozen invariably looks far better and far more lifelike and at peace than a patient who has received the best available care.

LACK OF PROFESSIONALISM



SLIDE 91

If the cryonics patient was not in a bad enough position as a result of the no feedback problem, the situation becomes even worse when he is being cared for by personnel who have no extensive real-world experience in biomedicine (both in clinical and research environments) IN ADDITION to specialized training to integrate that experience into the context of *cryonics as medicine.*

Here I would like to use an example which is incredibly frustrating to me because it has recurred, even with people

delivering care to cryonics patients who have been told about this problem and given a clear explanation as to how to avoid it.

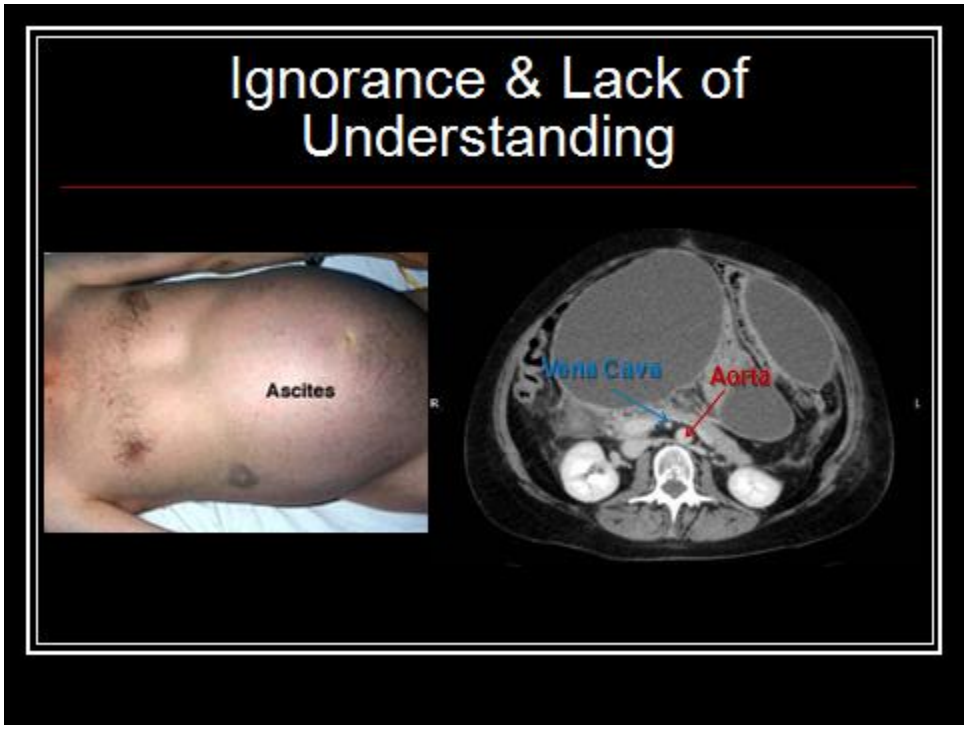
It's a 'mechanical' problem that I think is easily understood, so I'm using it as an example. There are many, many other more complex and subtle problems that would be much more difficult to communicate in the available time.

When blood washout and extracorporeal support are performed in the field it is necessary to access the circulatory system by cannulating the femoral artery and vein in the groin. When cardiopulmonary bypass (CPB) is carried out in this fashion the blood flows through the blood vessels in a retrograde fashion – in other words, in the opposite direction from which it normally flows.

Because the blood being pumped from the circuit into the patient is being pumped under pressure into the femoral artery, a short cannula of modest diameter may be used. However, the venous blood, flowing from the body and into the bypass circuit, is flowing at very low pressure, typically at 5-10 mm Hg and its flow into the circuit reservoir is due to gravity.

As a result, a larger diameter cannula which is much longer must be used. Ideally, we would like to position the tip of that cannula at the level of the right heart, where the blue arrow is on this schematic. However, that is not possible to do in the field without x-ray (fluoroscopic) assistance. Thus, the cannula tip is usually in the inferior vena cava somewhere below the level of

the diaphragm where the white arrow is pointing. This barely allows for enough venous blood flow out of the patient – even under the best conditions.



SLIDE 92

Now, if the patient has a large volume of fluid in his abdomen, a condition called ascites, or is very obese, what happens is that the pressure from all the fluid or fat compresses the very thin and flexible walls of the vena cava and prevents adequate venous return. In fact, it's a wonder that any flow can proceed under 'normal' circumstances.

The MRI at right shows a typical ascitic abdomen in cross section. Contrast media has been given intravenously so that the

blood vessels show up distinctly. You can see the aorta clearly, but the inferior vena cava, which is normally twice the diameter of the aorta, appears as a small white dot, compressed as it is by the large volume of intra-abdominal fluid.

Ascites is not uncommon in cryonics patients since it occurs in cases of liver failure, cancer which has invaded the liver, congestive heart failure, cirrhosis, ovarian cancer and a number of other conditions. If a cryopatient presents with ascites one of two things must be done before femoral-femoral CPB is undertaken. The ascites may be drained by the simple expedient of making a stab wound through the body wall and placing a drainage tube in the peritoneal cavity, or an alternative venous drainage site must be selected, such as the internal jugular vein.

Failure to do one or the other of these things will result in either no venous return, or inadequate venous return. In the latter case the effect will be the very rapid development of massive system and cerebral edema due to the increased pressure in the venous circulation.

SLIDE 93

This problem has occurred at least five times in cryonics cases that I know of, and in four of those five cases, it happened to personnel who had experienced the same problem before. And yet, the problem was not addressed and the same rote procedure was followed despite the fact that problems were evident. I *will* say that in the two cases where there was *no* venous return they did eventually stop perfusion because they realized that 'something was wrong.'

The solutions to this problem are not easy because they demand the acquisition of professionalism, knowledge, and skill *in the context of cryonics as medicine*. We came very close to doing that in the decade between 1981 and 1991. But we failed. Why we failed I'll discuss later. Suffice it to say that the

problem of maintaining professionalism is a nettlesome one in medicine, engineering and other demanding disciples, and there will be no quick fixes. In cryonics, where almost all the feedback we get from our patients must be artificially generated, the problem will be much more difficult to solve.

As we've already seen, patients can even have completely decomposed – and the cryonics organization can continue to operate, not just for weeks or months, but for years after this has occurred – all the while continuing to accept more patients!

I selected the image for this slide with special care, because it points up one of the many serious problems lack of professionalism in cryonics has caused. Repeatedly in the history of cryonics those in leadership positions within cryonics organizations have hired and placed in positions of power family members, close friends and cronies, with little (and usually no) respect to their qualifications. The most glaring recent example of this was when a former CEO of a cryonics organization hired his wife, his daughter and his son-in-law as paid full and part time staff. Professionalism is anathema to nepotism. Professionalism is first and foremost a meritocracy.

SLIDE 94

What is cryonics professionalism? The short answer is that it does not yet exist, *per se.* If and when it does, the short definition is that cryonics professionalism is adherence to a set of values comprising both a formally agreed-upon code of conduct and the informal expectations of colleagues, clients and the cryonics community.

The key values include acting in a patient's interest, striving to improve the quality and length of a patient's pre-cryopreservation life, and maintaining the highest standards of excellence in the practice of cryonics and in the generation and dissemination of knowledge. In addition to scientific, medical, technical knowledge and skills, cryonics professionals should present psychosocial and humane qualities such as caring,

empathy, humility and compassion, as well as deep commitment to assisting the individual patient and the community of cryonicists as a whole in their pursuit of indefinitely extended life and health. All these qualities are expected of members of highly trained cryonics professionals.

I believe that, at a minimum, these things must be present in the cryonics professional:

Professional Commitment to Patient Welfare constitutes the essence of professionalism and is based on the rule that the best interest of patients and not self-interest is the professional obligation.

Professional Accountability is an important element of professionalism which is required of cryonics professionals at several levels: to their patients for fulfilling the implied contract governing the patient/professional relationship, to the cryonics community for addressing their health needs, and to their profession for adhering to cryonics' ethical precepts.

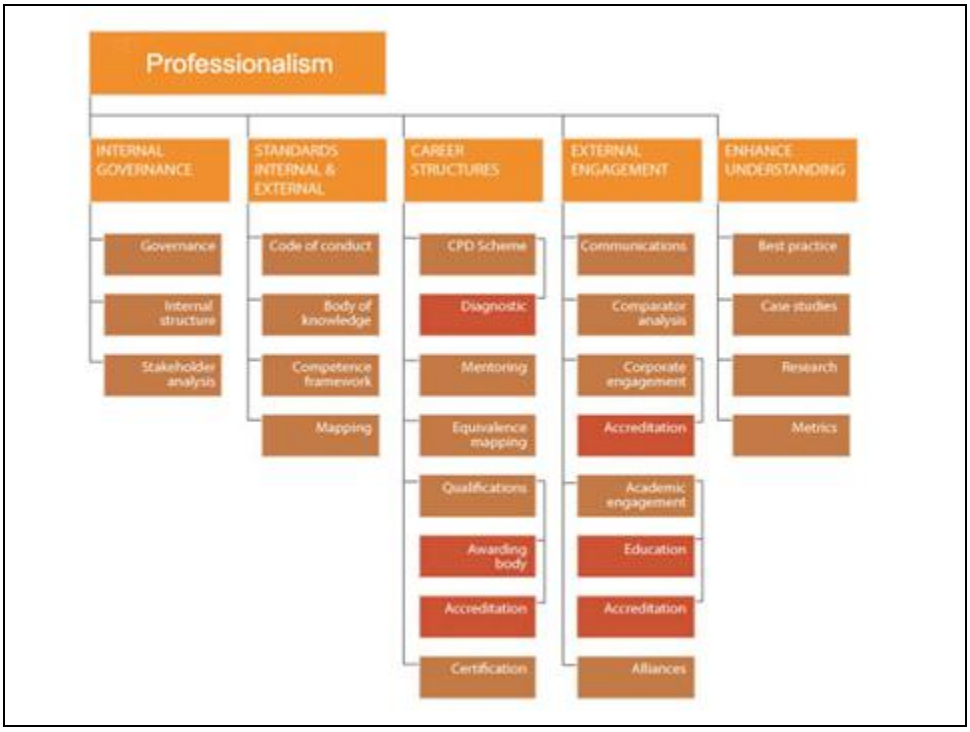
Professional Duty can be expressed by the free acceptance of a commitment to service, availability and responsiveness when "on call," accepting inconvenience to meet the needs of patients, by enduring unavoidable risks to oneself when a patient's welfare is at stake, and by advocating the best possible care regardless of the patient's ability to pay. It is a willingness

to seek an active role in professional organizations and volunteering ones skills and expertise for the welfare of cryonics as a discipline and a way of life, and of the cryonics community.

Professional Excellence entails a conscientious effort to exceed ordinary expectations. Commitment to excellence is an acknowledged goal for all cryonics professionals and includes a commitment to life-long learning.

Professional Honor and Integrity implies being fair, being truthful, keeping one's word, meeting commitments, and being straightforward. It also requires recognition of the possibility of conflict of interest and avoiding any situation in which the interest of the cryonics professional is placed above that of the patient or allowing personal gain to supersede the best interest of the patient. This is an integral part of professionalism. The importance of professionalism in the patient/cryonics professional relationship cannot be overstated.

Professional Respect for Others is reflected in the respect towards the patients and their families, other cryonics professionals and professional colleagues such as physicians, nurses, perfusionists, paramedics, and health sciences technicians and therapists. It is the essence of basic, decent conduct and is both central to professionalism and fundamental to enhancing collegiality among cryonics professionals.



SLIDE 95

Until a solid professional base is created in cryonics there can be no enduring success. What you see here are the elements of a mature professionalism, in this case in medicine. You will note that at the left that formal (written) standards and practices, a code of conduct and governance for implementing these things, are among the first elements of professionalism.

It is not necessary for cryonics, in its current microscopic and flawed implementation to create all of the elements shown here – nor is it possible. But what we must do is to begin at the beginning and create standards and practices for every element of the program and both follow and enforce them diligently.