

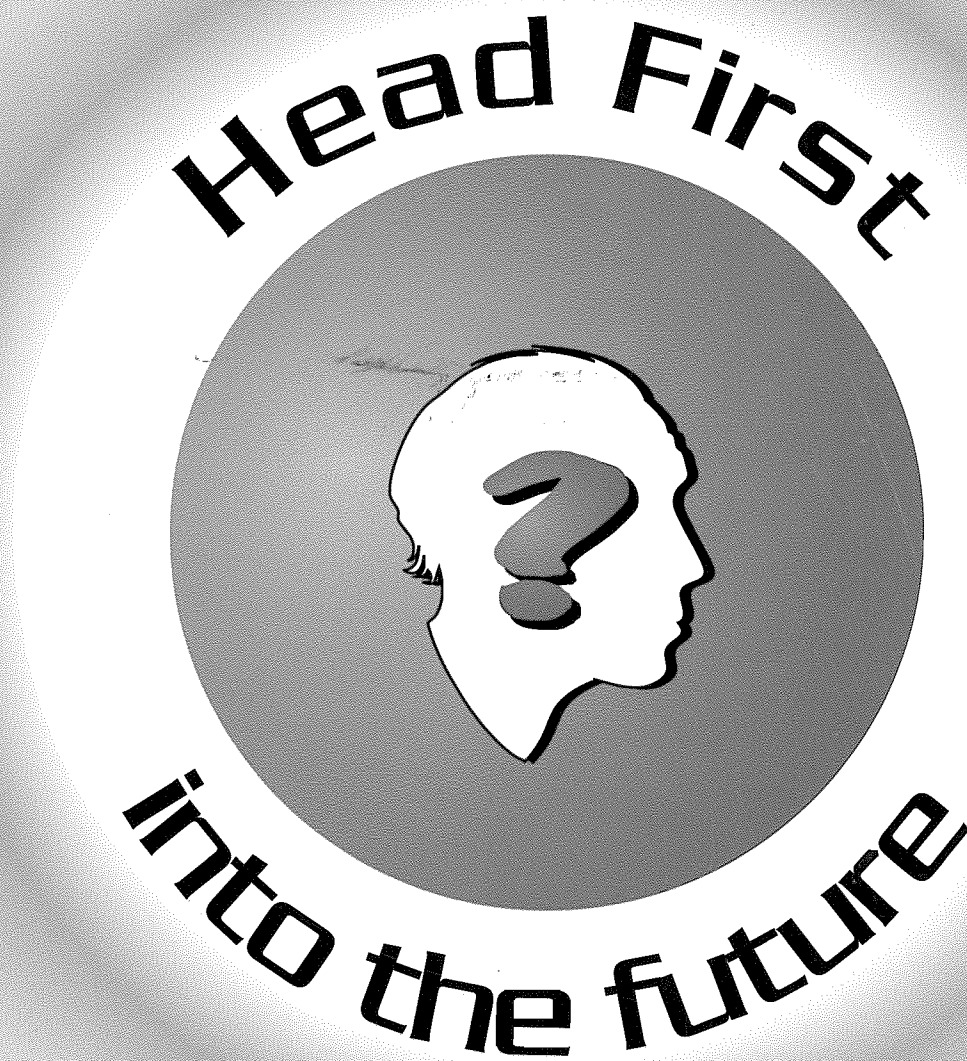
CRYONICS

3rd Qtr. 1995

A PUBLICATION OF THE ALCOR LIFE EXTENSION FOUNDATION

Volume 16:3

Why are so many people going



Steve Bridge examines the rationale of "Neurosuspension"

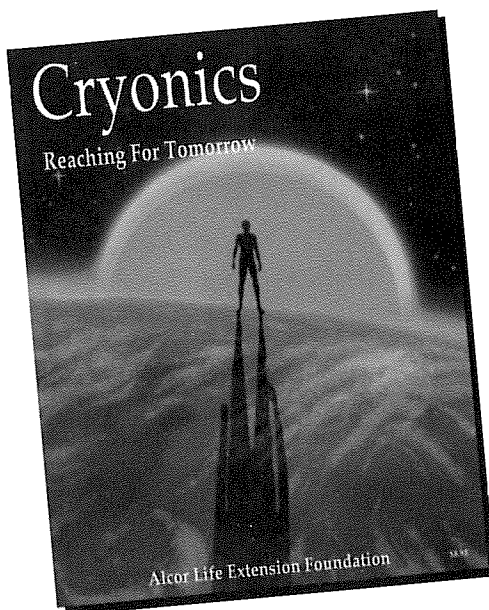
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\$4.50

“What is cryonics?”

Cryonics is the ultra-low-temperature preservation (biostasis) of terminal patients. The goal of biostasis and the technology of cryonics is the transport of today's terminal patients to a time in the future when cell and tissue repair technology will be available, and restoration to full function and health will be possible.

As human knowledge and medical technology continue to expand in scope, people considered beyond hope of restoration (by today's medical standards) will be restored to health. (This historical trend is very clear.) The coming control over living systems should allow fabrication of new organisms and sub-cell-sized devices. These molecular repair devices should be able to eliminate virtually all of today's diseases, including aging, and should allow for repair and revival of patients waiting in cryonic suspension. The challenge for cryonicists today is to devise techniques that will ensure the patients' survival.



“How do I find out more?”

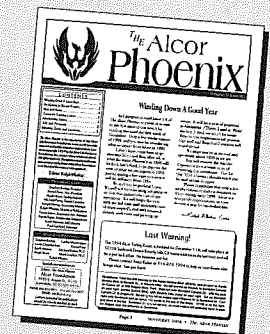
The best source of detailed introductory information about cryonics is *Cryonics: Reaching For Tomorrow*. Over 100 pages long, *Reaching For Tomorrow* presents a sweeping examination of the social, practical, and scientific arguments that support the continuing refinement of today's imperfect cryonic suspension techniques, in pursuit of a perfected “suspended animation” technology.

This new edition features an updated and lengthened chapter on revival, as well as the appendices “The Cryobiological Case for Cryonics” and “Suspension Pricing and the Cost of Patient Care.” Order your copy for \$7.95, or receive it FREE when you subscribe to *Cryonics* magazine for the first time. (See the Order Form on page 40 of this issue.)

For those considering Alcor Membership. . .

If you're intrigued enough with cryonics and Alcor that you're considering Membership, you might want to check out *The Alcor Phoenix*, Alcor's Membership newsletter. *The Phoenix* is a Membership benefit, so it's free to Members and Applicants, but anyone can receive it for \$20/year (\$25/year if you live overseas). It's released 8 times each year, on the “off months” of the quarterly *Cryonics* (February,

March, May, June, August, September, November, and December). *The Phoenix* is shorter than *Cryonics*, but appears twice as often and is mailed First Class. Being a Membership newsletter, *The Phoenix* focuses on Membership issues such as financing cryonics, staff and management matters, developments in Patient Care and Emergency Response, etc. These issues will impact you directly if you decide to become a Member, and may help you make a more informed decision in the meantime.



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ISSUE TOPRESS: August 29, 1995



LETTERS to the EDITOR

Dear Editor,

I have just read Dr. Merkle's article "Algorithmic Feasibility of Molecular Repair of the Brain". I shall try to explain my problem with it in simple words; the problem is critical but the point is actually very simple.

Ralph Merkle again comes up with partial answers to the major question of our reparability. They are partial because they omit one premise. He seems to do this consistently, which is one reason I have pursued this issue.

First, with regard to his original article in *Medical Hypotheses*, he claims that there is a limit to the amount of "analysis" required of the database we might produce (the molecular type and location of every molecule in a patient's brain). (His article also contains a slight misquotation, which I put down to a typo.) In doing so, he refers to work by Tad Hogg: "Many studies of constraint satisfaction problems have demonstrated... that easily computed structural parameters of these problems can predict on average how hard the problems are to solve by a variety of search methods." He then "interprets" this statement in terms of cryonics by saying that the computational problems of determining the healthy state are likely to remain tractable until

the damage approaches the point where actual information theoretic loss is sustained.

This is all very well. We take all the different problems out there and *assume* that the problem of revival will fall in the computationally tractable set. If Ralph wishes to do the required calculations to show that this problem of revival will be computationally tractable, he is very welcome to do so. I note, however, that he never actually does so.

To put the matter in a primitive form: a lot of reasoning consists of a major hypothesis, A, followed by a minor hypothesis, B, from which we derive a Conclusion. His major hypothesis is the one stated by Tad Hogg, and I have no problems with it at all. Where is his minor hypothesis, or any evidence for it? That minor hypothesis, of course, must grapple with the actual problem of revival of a biological brain damaged in many ways by suspension. He is welcome to try this on the basis of available information, but I personally doubt that he can reach more than a very fuzzy conclusion.

Then on the next page he states that cryptanalysis will allow us to decipher a message in an unknown language. Perhaps I didn't make my point as clearly as

I might have. The language in question is not French, or Latvian, or any language known by anyone now living. Let us suppose it is ancient Martian. I am sure that ancient Martian will show many statistical regularities. Whether these regularities will be sufficient to let us work out an English translation even with the most powerful cryptographic methods seems to me, at best, a rather open question. If we don't have enough texts, or texts of a sufficiently wide variety, or long enough texts, no amount of cryptography will help. (Even for statistics to be valid, we need sample sizes large enough. That sample size can vary depending a lot on just what statistics we are trying to get. But of course, if the messages are in ancient Martian we can do lots of statistics but still need correlations with the real world to understand them.) During WWII, the US Army employed American Indians to send messages by radio in their native language. No encoding was needed. The Germans had a severe problem. For that matter, if Ralph decodes a message in Tewa, will he then by virtue of that fact know what it is saying?

My problem here is again not with his major premise at all. But *all* methods of cryptanalysis require some information to work on, and if they don't have enough they cannot decode the message. Where is his *minor* premise, in which he shows that the problem of revival (a medical, biological problem again) fits the requirements for decoding? Once more it is lacking.

In his piece, Merkle quotes Tad Hogg as, first, claiming that "there is no reason to expect the enormous number of arrangements will require infeasibly enormous computations," and then goes on to discuss Hogg's work, which showed that many constraint satisfaction problems can be shown to be solvable or not with simple computations. The problem of the missing *minor premise* continues: if such computations have been done for the problem of reviving current suspension patients, where are they? If they have not been done, why doesn't Ralph do them? And then he goes on, basically, to lay out the issues: well, the computations "are likely to remain tractable until actual information theoretic loss is sustained."

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Letters not intended for publication should be clearly marked as such.

(Check out our home page on the web. . . <http://www.webcom.com/~alcor>)

I do not disagree with this, but still: to show that current suspension patients are revivable we must show that we are *not* in that range of "actual information theoretic loss." No amount of waffle about theories of computation will do that. Nor is it valid to simply take an average over "lots of problems"; to do so leaves us up in the air about where we stand in that series. (And as a side issue, NP-completeness has no practical bearing on our problem: it's easy to think of theoretically tractable problems which are so enormous that we would need a computer as large as the galaxy to solve them).

It is this *minor premise* that we need research to obtain. And if we seriously want to use cryonics as a means for our own survival, then I would hope that cryonicists will rise to the task. I notice, from Ralph's latest message, that he too agrees that current research into suspension methods would be a *good thing*. I am adding that it is important not just to convince others, but because there still remain wide gaps in our own knowledge—too wide, as yet, to let us come to any comfortable conclusions about our revivability. If Ralph actually provides donations to support such research, or helps it in other concrete ways, then he may believe what he wants. Yet I remain bothered by the tenor of his arguments, which seem always to omit that *minor premise* as if it need not be mentioned since it is a foregone conclusion. When Ralph can show not only his *major premise* (which I have never questioned) but his *minor premise* too, then I too will be happy with the state of our knowledge of suspension.

Regards,

Thomas Donaldson

UP FRONT

BY RALPH WHELAN, EDITOR

If this issue of *Cryonics* seems to be coming right on the heels of the last one, that's probably because it is. Serious technical difficulties delayed the second quarter issue many weeks, but we're back on track now.

And busy. We had two suspensions over the Summer, one of which was too recent for a detailed report to be in this issue. (See "Alcor Member Mona Dick Suspended" by Tanya Jones, page 11.) The other took place in June, and there is a detailed account beginning on page 8 of this issue.

Part I of our interview with "The Father of Cryonics," Robert Ettinger, begins on page 12. Alcor Membership Administrator Derek Ryan conducted this interview as one of his last acts as an Alcor employee, and was assisted by his successor Brian Shock. We'd like to thank Derek for his three years of conscientious work signing up new Members, conducting tours and interviews, participating in suspensions, and writing articles for *Cryonics*. Derek has "retired" to pursue a medical degree.

Now we welcome Brian to the Alcor Team. Brian has been an active Alcor Member for many years, writing articles for *Cryonics*, taking the Alcor Transport Training Course, and even re-entering by hand many of the early issues of *Cryonics* as part of a project to put all of the back issues on disk. We're sad to see Derek go, but very happy that someone as reputable and hard-working as Brian was available to take his place.

Lastly, we're gearing up once again for the Annual Alcor Turkey Roast, scheduled (as usual) for the first Sunday in December (the 3rd). This event is not just for members. Rather, it is an excellent opportunity for prospective members to mix with Alcor Members and employees in an informal, festive setting. Check out the 4th quarter issue for the location and directions to the event, or just call Alcor.

PUBLICATION NOTES

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About the Cover

The cover of this issue was designed by Ralph Whelan, using Aldus Freehand™, Aldus Pagemaker™, and Corel Gallery™.



Neurosuspension: Head First into the Future

At the conclusion of most tours here at Alcor, I end up in the Patient Care Bay with an awestruck visitor staring at the 9-foot tall Bigfoot dewars. They really are an inspiring sight—both a non-final resting place for some of the smartest people on the planet and an audacious symbol of what might be the most optimistic idea in human history. Many of these

visitors come to Alcor with little knowledge of cryonics, or even of life extension, aging reversal, nanotechnology or any of the other wonders we envision. By the time we get to the big climax of the tour, their minds are spinning. Then they ask, "Wait a minute, I thought there were twenty-nine patients. But you said there are only eleven in these big cylinders. Where are the others?"

I then point at the two huge concrete vaults on the opposite wall. "Well, you see, 18 of our patients chose to have only their heads frozen. We call this *neurosuspension*."

The most common reaction is a stunned pause with eyes growing to the size of saucers. For them, the entire building has just melted into surreality, like Salvador Dali's clocks sculpted in

ice. A few people laugh in surprise or nervousness. A small number look queasy or disgusted. And occasionally, if I have done my job well and set up the visitor with descriptions of the repairs that will be possible in the future, the visitor will say, "Oh, that makes sense. You can just grow a new body for the brain."

Our readers' reactions are probably very similar. Some of you may be reading an issue of Cryonics for the first time; you may be reading in detail about cryonics itself for the first time. But even for people who have been involved in cryonics for many years, the issue of "how much should you freeze" can be disconcerting. It certainly took me a couple of years before I could easily throw off my instinctive reactions and appreciate the idea that the brain is the

most important part (and perhaps the only necessary part) to preserve.

The most basic step in understanding neurosuspension is one on which we can all agree: our memories, personalities, and most of the other critical parts of our *identities* are in our brains. People can have heart and lung transplants and still be the "same person." Even someone paralyzed from the neck down thinks of himself as having the same identity. On the other hand, someone else who has lost her memory may *look* like the same person, and we may even use the same name for her; but clearly her identity is missing.

The primary keys are our own unique experiences, which create in us memories different from anyone else's. Each individual in a set of identical twins has

the same genetic makeup and similar birth environment; but from birth on they are separate beings which experience life and acquire memories from their own unique perspectives.

There is no such thing as a "brain transplant;" a brain transferred into a new body would be a "body transplant." We are our brains.

This same understanding means that freezing the body of a patient whose brain had been removed and destroyed, or destroyed within the skull by disease or injury, would *not* save the identity of that person. With only the physical information in the rest of the body available, we could possibly use the DNA and chemical information to create a clone (an identical twin) with, in effect, total amnesia; but we couldn't reproduce the original memories and identity. We *might* be able to recreate many of those memories from the writings of that person and from memories of experiences which might be shared with family and friends; but that would be more a *new creation* than a "re-creation."

So, are we planning to revive neurosuspension patients as "heads on a plate," with tubing and wires sticking out? No, of course, not. Neurosuspension patients will be revived with a full body, young and healthy, just like the whole body patients. Actually, I used to say that no one would *want* to be "just a head;" but the variety of human existence is such that almost certainly someone will eventually think that a bodiless existence sounds deeply fulfilling. Not me, thanks.

"Young and healthy"—think about that. Many of Alcor's whole body patients were age 65 or older when they were placed into cryonic suspension. They had cancer, heart disease, and considerable problems from basic *aging*. There is no point in reviving people and curing their cancer but not curing their aging. I don't want to be both near-immortal and painfully aged anymore

than I want to be a head-on-a-plate. So, if cryonics works at all, aging will be reversed.

Sound difficult? Perhaps, but no more difficult than the basic concept of cryonics repair itself. If a technology can be developed to repair the injuries added to patients by our imperfect freezing

"The most common reaction is a stunned pause with eyes growing to the size of saucers. For them, the entire building has just melted into surreality, like Salvador Dali's clocks, sculpted in ice."

processes, it will most likely have to work by making at least some repairs *cell-by-cell*. Aging is not magical; it involves misarrangement of molecules, just like everything else that can go wrong with us. If we can repair cancer and heart disease in the cells of these frozen patients, we can surely learn to make *all* their cells healthy again. And healthy equals *young*, for all practical purposes.

It may turn out that growing new bodies for whole-body patients is even simpler than repairing them cell by cell. Look at what our bodies can do already. We can all grow skin over a cut. Our bodies can recover from the massive trauma of heart bypass surgery. Young children can often regrow a fingertip severed in a car door. The repairs possible in the future will be more extensive, because the field of medicine is putting a tremendous emphasis on accomplishing them. For instance, within 25 years, spinal injuries may not be paralyzing or fatal. Researchers are making steady progress in regrowing the connections in crushed or severed spinal cords.

Our understanding of how cells operate and grow is expanding rapidly. Someday we will learn *why* the child can regrow that fingertip and use that knowledge to regrow entire missing limbs. At

that point, we won't need organ transplants from deceased donors—we will simply have new copies of our own hearts or livers grown for us, with genetic flaws eliminated. Eventually physicians may develop such fine control that they can spot the damage early on and renovate the injured organs from the inside out, with no replacement necessary.

We all grew a body once. One tiny cell's molecular machinery and DNA instructions combined the chemicals available (supplied at first by the mother's womb and later by the grocery store) and eventually assembled them into us big

people. These instructions are not lost when we become adults; the DNA is still there. Considering this everyday miracle, growing a new, improved copy of your body for your brain (i.e., *you*) to occupy seems almost easy.

So if the final outcome will be the same, what are the advantages and disadvantages of neurosuspension vs. whole body suspension?

Let's start with the easy one: **cost**. Alcor requires a minimum suspension funding donation of \$120,000 for whole body suspension and only \$50,000 for neurosuspension. (Each option carries a \$10,000 surcharge for members outside the United States.) That's a pretty large difference for most people. Even if you are funding your suspension with life insurance, the premiums are obviously higher for the larger policy.

Why the difference in cost? The upfront expenses of both types of suspensions are similar. Even in a neurosuspension we need the complete circulatory system so we may perfuse the patient's brain with chemicals to protect the cells from cooling and freezing damage. The head and the body are not separated until after the glycerol perfusion has been completed. We do save some expense on a neurosuspension by clamping off the circulation to the lower

How Neuropatients are Cooled

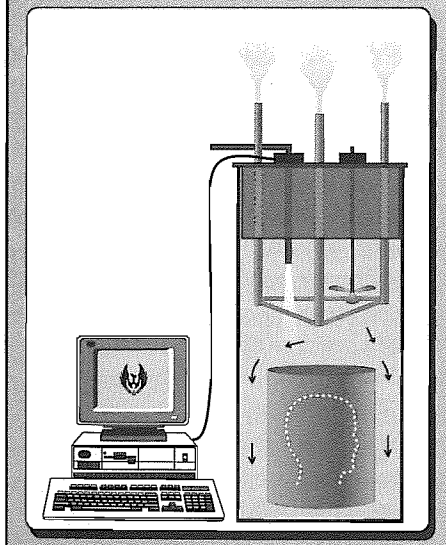
Adapted from "Cooling Down" by
Hugh Hixon, Cryonics 15:3.

Alcor purchased its first microprocessor-controlled scanning thermocouple in 1990. It had 12 thermocouple inputs, an internal elapsed-time clock, thermocouple compensation, alarms, limited external programming, and a serial printer port. Jerry Leaf bought the first one for Cryovita Labs, to monitor and print out temperatures during a suspension. Alcor got one to monitor patient storage. Alcor now has three.

In 1992, Alcor Director Keith Henson took on the cooldown problem. He modified the computer program that came with the scanning thermocouple to provide a simple control loop, and he built a breadboard neuropreservation cooldown system in a box for the descent to dry ice temperature. Later, Alcor Engineer Hugh Hixon built another neuro cooldown unit, avoiding a lot of problems by carefully evaluating Keith's prototype.

Staff members Scott Herman and Mike Perry undertook to complete the programming part of the project, as well as building the relay box that interfaces between the computer and the physical part of the system, and an adaptive, fuzzy logic subroutine to determine the switch-on interval.

In the suspension of April of 1993, they made their first live run, as the computer controlled the descent to dry ice temperature. Further work before and after Alcor's move to the Phoenix area positioned them for a mad sprint to a functional system at the suspension that Alcor performed in April of last year.



body, so we require less total solution.

The real difference is in storage costs. All of the patients are stored in liquid nitrogen at -320°F . No matter how well insulated, liquid nitrogen is constantly evaporating and returning to the air; we have to add more nitrogen to the dewars each week. Alcor has to pay a local supplier for this liquid. One of our steel Bigfoot dewars boils off about 12-15 liters of nitrogen per day, whether it contains one whole body patient or the maximum of four. Each neurosuspension dewar (inside a concrete vault) holds nine patients and loses nitrogen at only half the rate of the whole-body units. This means the nitrogen cost per neuropatient is only about one-ninth of the cost per whole-body patient.

There are many other factors in the storage costs that are more evenly divided between neuro and whole-body patients, so the total difference is not 1/9; but it is still large. To ensure enough principal in the Patient Care Fund so that the earnings can cover expenses, we invest \$70,000 (at least) of the suspension funding for whole body patients. We only have to invest about \$17,000 to achieve the same result for neuropatients.

Neuropatients are also easier to transport in an emergency. The Bigfoot units are about nine feet tall, weigh almost 2.5 tons, and take several people to move. However, we can quickly move the neuropatients to small, individual dewars that can be placed in the back of a van or pick-up truck and handled easily by two people. You might not at first think of that as an advantage, since taking care of the patients is a rather passive activity. However, we were certainly glad that Dora Kent was a neuropatient in 1988 when the Riverside Coroner wanted to autopsy her already frozen head. She was out of the building when the Coroner's deputies arrived. (Alcor later obtained an injunction against the Coroner to protect Mrs. Kent and to prevent future attempts to seize patients.) You can imagine your own paranoid scenarios about possible legal problems or natural disasters in the future when the neuropatients might have a transport advantage (except it's not "paranoid" on the days when they really are out to get you).

There may be at least one repair advantage to having a complete body to work with. Certainly a whole body patient takes more total information along into the future, although it is still hard to say how significant the added information is. For some people, the pattern of nerve growth development in the body may be very important to their identity—for a dancer or musician, for instance. On the other hand, enough of that information may be encoded in brain development that the same result can be achieved either way. We don't know yet; so we can't say for sure if you are risking anything by leaving your body behind.

Neurosuspension may convey a significant upfront biological advantage, however. If the cryonic suspension team can concentrate on just the brain, and not worry about the best suspension methods for the liver, muscles, and intestines, more sophisticated techniques may eventually be developed that result in a higher level of brain preservation. Certainly, a tight focus on the brain today results in shorter perfusion times; and once the freezing process begins, the smaller package of the head can be more rapidly cooled to temperatures where the biological and chemical activity are halted.

One important consideration for cryonicists is which method will result in less time in suspension. Suspension patients can no longer make their own decisions. Their vulnerability means that time in suspension is time at risk. But I can see nothing credible which convinces me that one method will result in resuscitation sooner than the other. In fact, my personal guess is that the technology to repair a body cell by cell and the technology to grow a new body will occur at about the same time and involve nearly the same processes. Besides, in both cases the most important limiting factor will be the same and will be the hardest task by far: the *brain* must be restored to proper function and consciousness.

Finally, there are the possible social disadvantages of having only your head frozen. No, I don't mean that telling people of the future you were once a neuropatient will get you fewer dates. "I was always a head of my time" will still

be a good way to start a conversation. The problems may occur with your less imaginative friends and relatives *today*. Let's face it: no matter how logical I make neurosuspension sound and how many advantages it may have, we've all seen too many movies about the French Revolution and other kinds of sharp-edged activities which made it pretty clear that a head without a body had no future at all. The concept of cryonics is hard enough to explain and sell to most people on its own, even *without* explaining how the missing bodies will be replaced.

So you have to decide what's important to you. If you can afford whole body suspension, and you feel it is either a truly better option, and you just can't deal with the alternative—or you can't deal with *telling* people about the alternative, then your choice is easy. However, if you cannot afford \$120,000 in cash or life insurance, then you have to start working on that old logic circuit in your brain. Start talking with your family and friends about cryonics and cell repair right away so they get used to the basic concept. Then when you spring frozen heads on them later, they may not see it as such a strange idea.

Either way, you cannot totally avoid the idea of neurosuspension. You see, we at Alcor long ago decided that no matter which method was truly the best, burial was infinitely worse than either. So we have this important clause in our *Cryonic Suspension Agreement*—"Emergency Conversion to Neurosuspension." Basically, this says that if the economy totally collapses or the legal climate turns against cryonics or some other calamity occurs so that we can only save or afford to maintain the neuropatients—*then everyone will become neuropatients*. All Alcor suspension members have to agree to this in their Suspension Agreements. We're adamant about maintaining whole body patients in whole body suspension and we'll do everything we can to meet that obligation. But if the choice is between burial/cremation or switching everyone to head-only, there is no doubt in our mind what we will do. We haven't spent all of these years protecting our patients just to surrender when the going

gets tough.

So how do you choose which kind of suspension you want now, and how do you keep your future options open? You must compare your definition of "ideal" with what you can afford. One of the biggest unknowns in the future is how much the true cost of cryonics will be as it becomes more popular. Some things will grow more expensive, some probably less. But the strength and continuation of your cryonics organization will be one of the most critical factors, and possibly the true key, as to whether or not you stay in suspension. Doing the minimum possible as a member is not a survival characteristic.

I recommend you consider the solution I have chosen myself. At least for the next ten years, in these early days of cryonics, if you can afford \$120,000 in insurance or other funds, then plan for that amount but *choose neurosuspension*. If it happens that you need to be suspended in the next decade, instead of spending money on keeping all of that extra mass frozen, let those extra funds go toward research, marketing, legal funds, and otherwise making sure your organization can thrive. If you're still kicking up your heels in ten years, and Alcor is so rich and powerful that your measly extra thousands won't make a bit of difference, then you can reconsider. If it won't harm your organization, you could switch your choice to whole body and take the extra information along. If you want whole body suspension today, I recommend funding it at a level of \$200,000, for the same reasons. For insurance, the difference in premiums won't be that much; and it could make all the difference in the world to your cryonics group—which could mean all the time in the world to you.



"Umm, I was wondering. . ."

The two questions that everyone wants answered but that they really don't want to ask:

1. *So, umm, how do you, uh, you know. . . remove the head?*

Actually, we think of it as *removing the body*. And you already know the answer. Since evolution and genetic technology have failed to come up with neck zippers, pop tops, or screw-off heads, we have to use a scalpel and a surgical saw, just as a surgeon would use for amputating a leg. No way around it.

2. *What do you feel like when you do that?*

Perhaps the most important thing that all medical and emergency workers must learn is that one often has to do unpleasant procedures to save someone's life. A surgeon does not enjoy removing a child's leg which has been mangled in an accident; but the surgeon knows his level of technology is not good enough to save the leg—only to save the life. To do nothing would certainly condemn the child to death. So the surgeon does what he has to do and knows it is the only choice he has.

It is not much harder emotionally to perform a neurosuspension than a whole body suspension. We don't know if cryonics will work in general or if it will work for the particular acquaintance, friend, or relative we are trying to save today. But like the emergency workers and the surgeon, we know that not to act at all means sure failure. We do the best we can for our patients, even if that rescue work requires that we perform emotionally difficult tasks. We do this because we care about them and want to see them alive and healthy again someday. And we do it because we want that same attitude to be present if *our own* turn for suspension should come.

Alcor Member Anatole Epstein Suspended

by Alcor Suspension Services Manager

Tanya L. Jones

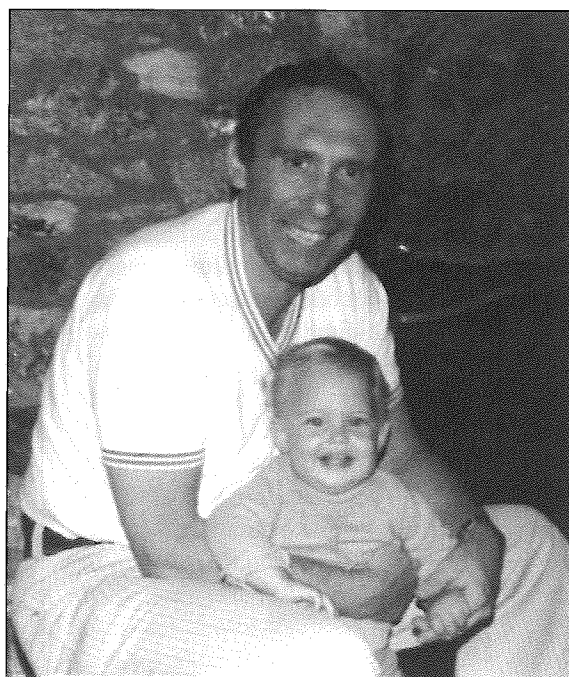
On the evening of June 12, 1995, Anatole ("Andy") Epstein's daughter Joanna held in her hand a card with the words "Urgent Instructions Inside" written on one side. Her father lay in a New York City hospital battling pneumonia, and the card was his. Upon opening it, she found instructions to contact Alcor in the event of a medical emergency. With her father desperately ill, and despite being only slightly acquainted with cryonics, she called the number listed.

So began another unusual transport. Andy Epstein was a 66-year-old, retired history professor from New York City. He'd been an Alcor Suspension Member for about one year. His application disclosed that he suffered from brain cancer. He completed his arrangements quickly, but of his family, he only informed his wife of his decision to be frozen. His daughter found out during this latest hospitalization, and when she called Alcor, she immediately wanted to know what she could do to help.

At 6:05pm (Arizona time), Derek Ryan answered the phone. A moment later, he walked into Steve Bridge's office to inform him of the possible suspension. When Steve got on the line, Andy's daughter informed him

that her father had been hospitalized in critical condition. He had brain cancer and phlebitis, but the immediate threat was caused by either pneumonia or another unidentified infection. Andy's temperature was 105°F, and hospital staff had him covered in cooling blankets to

been released after a few weeks and had been undergoing physical therapy when the infection struck. He'd been in the hospital for a week before his family notified Alcor of his condition. As soon as we heard, we began making arrangements for a New York transport.



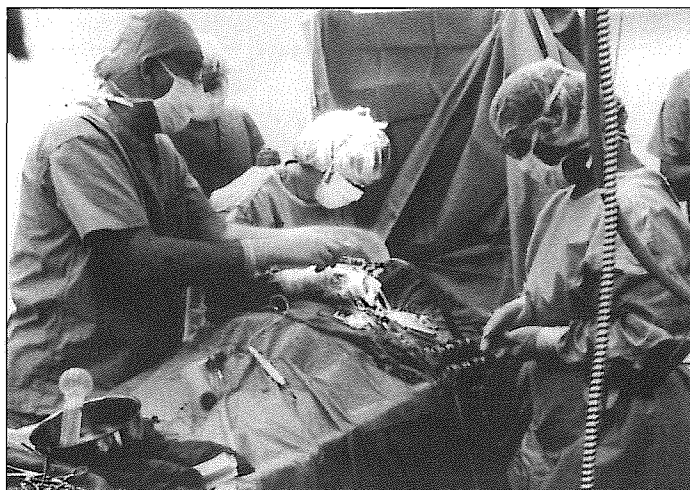
Andy Epstein in 1975 with his daughter Joanna.

force his temperature down. He wasn't expected to survive the night.

Steve was also told that Andy had been in the hospital a month earlier to have part of his tumor removed. He'd

It was late for flights to New York. Steve found that the next available flights were leaving Phoenix around midnight and wouldn't land in New York until morning. With the little information we had on Mr. Epstein's condition, we weren't sure that the transport equipment would arrive in time. Steve looked into shipping the Viaspan stored in Florida to the mortician, but found that even the next East Coast flights weren't scheduled until morning. After asking the travel agent assisting him to keep looking for an alternative, Steve called our contract mortician in New York to inform him of the impending suspension.

Meanwhile, I was talking with Mr. Epstein's daughter—answering her questions about cryonics and emergency transport procedures, getting an update on her father's condition, and asking for his attending physician. We were still talking when, at about 6:20, a nurse came in to check her father's vital signs. The nurse was



unable to find a pulse. I asked again that his doctor contact Alcor as soon as possible and got off the phone to rush our preparations as the hospital's resuscitation efforts began. Their attempts were unsuccessful, and Mr. Epstein was pronounced legally dead at 6:55pm (9:55, New York time). A few minutes later his doctor called Alcor.

After identifying herself, she both made a statement and asked a friendly question which left both myself and Steve momentarily stunned, "We've just pronounced the patient, and we are packing him in ice. What else would you like us to do?" Naturally, we had an answer prepared for just such an occasion, and had even used it a few times, but we so rarely receive a genuinely interested and concerned offer of assistance from a physician who has only *just* found out about her patient's ultimate anatomical donation, that it signified a promising beginning.

Later, Steve found out that the doctor had decisively done what she could to administer the care we requested. Most things she attended to personally. We asked for everything. Mr. Epstein was already partially packed in ice. We asked for more ice to cover the rest of his body. An IV line was still in place. The doctor administered heparin (used to prevent the formation of clots) and sodium bicarbonate (used to restore pH balance), and perhaps a few other medications. (We asked that additional medications be given, but are awaiting a copy of the medical records to verify this.) We later heard that the doctor, single-

handedly, performed the cardiac compressions needed to circulate the medications. We were also told that although there were no Ziploc™ bags available, the patient was packed in ice, because some enterprising person filled exam gloves with ice and knotted the ends. Mr. Epstein's doctor agreed to release him immediately upon the arrival of our mortician. Further, if the mortician hadn't arrived within an hour, she would have Mr. Epstein taken to the morgue refrigerator while still packed in ice.

With the patient being as well cared for as the circumstances allowed, Steve called the mortician and asked him to get to the hospital as quickly as he could. At the same time, Hugh Hixon called Transport Team member Gerry Arthus (who'd been put on alert earlier) and asked him to head directly to the mortuary, which he did, once he'd picked up the local transport kit and extra ice.

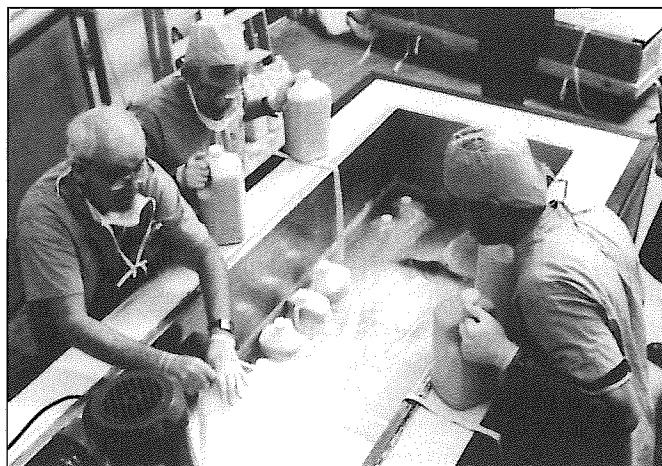
Gerry was assisted by Curtis Henderson, and they arrived in time to help with preparing the patient for shipment. The patient was wrapped in ice, two conventional body bags, and one sleeping bag (supplied by Gerry Arthus). These layers provided excellent insulation, and little ice had melted the next morning.

This transport was unusual in that Alcor was notified of the patient's illness less than an hour before pronouncement. Despite this lack of notification, the patient received some of the transport medications and was cooled with ice. Mr. Epstein's daughter, gracious and calm throughout, was in-

terested only in helping her father receive the best possible suspension. She kept Alcor informed. With her obvious support, the doctor also stepped forward to administer an abbreviated transport protocol. Rarely do physicians assist with this. (Best cases in the past have frequently involved the hospital personnel simply agreeing to release the patient immediately and to not interfere with any on-site Alcor personnel.) Due to the airline constraints, none of the primary staff/Transport Team members were in New York to help the local members and mortician. For me, this was the first time in a long while where I wasn't part of both the transport and the cryoprotective perfusion.

Hugh Hixon and I were able to stay in Phoenix and begin preparing for the cryoprotective perfusion and deep cooling phases of the suspension. Derek Ryan tackled the involved task of mixing perfusate while Hugh and I organized the operating room and cooling area. We wanted everything to be ready by the anticipated landing of the patient at Sky Harbor airport. To a large degree, we succeeded. We were even able to get a fair amount of sleep before the patient arrived the next morning.

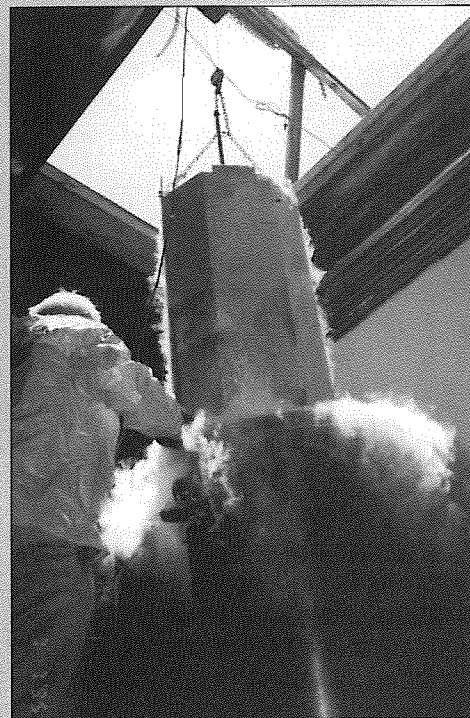
At 11:19am, Steve Bridge and Scott Herman arrived with Mr. Epstein after a smooth pick-up at the airport. Mr. Epstein's temperature was 4°C, and he'd suffered 17 hours of cool ischemia. We were uncertain how well the much-abbreviated protocol would work and concerned about the traumatic effects that a lengthy ischemic period could produce, despite medication and surface cooling.





Cooling to -196°C (-320°F)

Cooling a patient to liquid nitrogen temperature is accomplished in stages. In the first, Mr. Epstein was cooled to -79°C using a horizontal cooling bath. The second stage involved removing him from the cooling bath, securing him in a permanent dewar pod, and lowering him into a two-person dewar for gradual cooling to -196°C (see photo at left). Cooling takes place over the course of a week, and the entire temperature descent is computer controlled, recorded, and monitored with alarms. Once the descent was complete, Mr. Epstein was transferred to a "Bigfoot" dewar for long-term storage (see photo at right).



Within minutes, the patient was on the operating table, surrounded in ice. Dr. McEachern began drilling a burrhole for each hemisphere of the brain. The left proceeded without incident. On the right side, however, an incision was made at the site of a previous surgical wound. The skin flap and skull were lifted easily aside to expose the brain. It proved a useful window through which to observe the effects of the cryoprotective perfusion.

Shortly after the burrholes were complete, the electrocautery and the operating room clock stopped working. A fuse had unexpectedly blown and had to be quickly replaced. Our patient's care was not seriously affected by this temporary power outage. Open heart surgery began at 12:24.

It was an uneventful surgery. The cannula and pressure monitoring line were placed quickly. A single delay was caused when Dr. McEachern found that the cannula and tubing connectors used to connect the bypass loop were incompatible. Additional connectors were found and applied.

At 13:23, Ralph Whelan began the cryoprotective perfusion, starting with

a 5% glycerol washout solution. From the moment washout began, we were looking for signs of trouble—edema, abdominal swelling, clotting, anything which would indicate that the patient was not being perfused. There were no clots. There was no edema. We then decided to increase the flow rate of the perfusion to increase the rate of glycerol uptake. Almost immediately, the arterial cannula slipped loose from its anchors, and the perfusion stopped. The surgical team was still at the table, and in under ten minutes, they had restored and resecured the cannula. The remainder of the washout was uneventful, and at the end, sampling revealed molar glycerol concentrations of 1.3 (arterial) and 1.2 (venous).

With the washout complete, the cryoprotective perfusion started at 13:59. At 14:15, Ralph discovered that his oxygenator was compromised. Air had entered the bypass loop during the restoration of the arterial cannula, and the oxygenator had to be replaced. Another was grabbed from the neighboring supply room, and Ralph was able to repair the circuit and restart perfusion within five minutes.

At 15:00, we began seeing abdominal swelling, indicating possible gastric hemorrhage. Shortly thereafter, we checked the burrholes for signs of cerebral edema. We found that the brain had swelled about 1.5mm beyond the original surface. Both eyelids were also swollen. Samples taken at this time showed molar glycerol concentrations of 6.4 (arterial) and 5.3 (venous). The increasing spread between these two values, the abdominal swelling, and the edema each indicated that the tissues had been damaged by the prolonged ischemic episode and were not absorbing the glycerol as efficiently as non-ischemic patients. Flow rates were reduced to compensate for the increasing arterial pressures.

For a while, careful monitoring and slight adjustments were sufficient to keep the perfusion proceeding smoothly. At 15:45, Ralph noticed his arterial pressures climbing for no apparent reason. This usually means that the perfusion is nearing completion. By 16:10, the final samples had been taken and the perfusion stopped for the last time. Final molar glycerol concentrations were 8.9 (arterial) and 7.4 (venous). A slightly

earlier (16:05) left burrhole sample yielded a molar glycerol concentration of 7.2.

Cooling to dry ice temperature (-79°C) was started shortly thereafter. This phase is automated, as is the gradual descent to liquid nitrogen temperatures (-196°C). Each of these went smoothly, and the final transfer of Anatole Epstein to a dewar for long-term care was completed without incident.

When Andy Epstein first called Alcor, he knew that he had cancer. He, as everyone does, was hoping to avoid cryonic suspension, but wanted it as a safety net in case his treatments failed. He spent many hours on the phone with Derek Ryan, Steve Bridge, and myself, discussing various hypothetical suspension scenarios. None of us suspected that Alcor

would have less than an hour's notice of his legal death. None of us expected that his attending physician would be a courageous individual, instrumental in administering cardiopulmonary support, medication, and cooling in addition to the prompt pronouncement and release of the patient.

In some ways, Andy Epstein was a fortunate man. His wife supported his choice to be cryonically suspended upon his legal death. His daughter also responded to this unconventional desire with grace and strength. (In the past, some other families of cryonic suspension patients have attempted to block the anatomical donation when they found out about the arrangements at the last minute.) Andy's family clearly loved and respected him enough to do

everything they could to carry out his wishes.

Would that we had known him better.



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Alcor Member Mona Dick Suspended

by Tanya Jones

On August 8th, 1995, Mona Dick's healthcare aide entered her Burbank, California apartment to find her lying on the floor in a corner. Mona's pulse was very slow, her breathing shallow, and she was unresponsive. The aide called Alcor immediately, and then dialed for the paramedics. Mona was taken to a local hospital, where she was pronounced legally dead at 12:21pm (local time).

The hospital personnel were familiar with Mona and her desire to be cryonically suspended upon her death. I'd spent several hours at the hospital earlier this year when Mona was admitted for emergency care. I'd been able to discuss cryonics with the emergency room physician who ultimately pronounced her death. At our request, the doctor administered heparin and sodium bicarbonate, provided cardiopulmonary support to circulate the medications, and packed her head in ice.

Local Transport Team members were notified, and Regina Pancake delivered the local emergency response kit to the hospital and packed the rest of the body in ice. A delivery service picked up the patient and the kit and delivered them to the mortuary.

Hugh Hixon and I flew to Los An-

geles to perform the blood replacement. This was accomplished late that evening, but due to bureaucratic delays (i.e., the Department of Health Services was closed until morning, and they must issue a Transit Permit before we can ship a patient across state lines). Mona didn't arrive at the Alcor facility until the following afternoon.

Her cryoprotective perfusion was uneventful, and the final Molar glycerol concentrations were high (5.49M burrhole sample taken 15 minutes before the end of perfusion, 7.51M arterial, and 6.01M venous) The cooldown to liquid nitrogen temperature was also without incident. Mona is Alcor's 30th patient.



The Prophet of Immortality

Derek Ryan interviews Robert Ettinger



Part I

Way back at the turn of the decade when I was first researching cryonics with an eye toward writing a comprehensive history, the name that kept coming up again and again was Robert Ettinger, the so-called "Father of Cryonics." A comfortable majority of my cryonicist acquaintances intimated that Ettinger's book *The Prospect of Immortality* had launched them on their endless trek into the future. My interest properly piqued, I purchased a copy of *Prospect* from Alcor and scorched through it in a single sitting. Although the logic of cryonics had already made me a believer, the cogency and completeness of Ettinger's arguments astounded me. The pages of *Prospect* held ideas that seemed just as fresh in 1990 as they must have been in 1964 when the book was first published. If I intended to record the history of cryonics, clearly I had to contact this man.

And so I wrote Robert Ettinger an honestly complimentary letter, asking for any help he might care to offer on my project. He replied in less than a month, sending me copies of *The Immortalist* and a rather crusty note informing me that since so many other people had requested the same thing from him over the last two decades, he saw no particular reason to help *me*. Of course he did offer to sit still for a brief telephone interview, but by then I was sufficiently disappointed to lose most of my interest in what he had to say. I guess it's never easy when your hero treats you like just another face in the crowd.

Fast forward a few years to 1995. I'd just started to take over the Alcor Membership Administrator position from Derek Ryan. Ralph Whelan (the editor of this magazine) suggested that either Derek or I interview Robert Ettinger. I quickly begged off this task in favor of Derek, citing his greater experience with such matters. In fact, I was still miffed at Bob Ettinger and I preferred not to accidentally step on the toes of the "Father of Cryonics" this early in my new career.

I did participate in the interview process as far as brainstorming questions with Derek and Steve Bridge, but the fine results were all Derek's, due in large part to his personable manner and crisp approach. Listening to Bob Ettinger's answers as I transcribed this interview, I heard a man who was not at all "crusty," a pleasant, earthy conversationalist with inexhaustible self confidence and easy wit. At the same time, I also heard the weariness of a very sensitive, intelligent man who had spent the last half of his life facing down humanity's incomprehensible acceptance of death.

I doubt that even after all these years Bob Ettinger really understands why more people haven't embraced the simple logic he presented in *The Prospect of Immortality*. I know that I don't understand it either.

Brian Shock

Cryonics: During your talk at the 1994 Venturist Festival, you said quite casually, and I'll quote this, "I grew up with the understanding that obviously we would one day conquer aging and would be immortal. And then of course I looked around and it was apparent that we wouldn't be immortal anytime soon but I never did lose confidence that it would happen one day." This to me is amazing for a number of reasons. A standard question when interviewing cryonicists is what got them involved in the first place, and (as I'm sure you're aware), one of the most common answers we hear, especially from people who've been

involved since the early days, is that they were convinced after reading *The Prospect Of Immortality*. Obviously that's not your answer to the question. So I'm wondering, who was your Bob Ettinger? How did you become an immortalist so early?

Bob: Well, I think I did mention that sometime in the twenties—1927 or thereabouts—Hugo Gernsback's *Amazing Stories* was published, which my father bought. Of course, at that time I was what... 8, 8 or 9, something like that. . . and those stories, many of them, were written with the assumption that we would make progress in all areas, and that, in

particular, senescence would become preventable and reversible. That made sense to me.

I had a mechanistic outlook. I'm not sure exactly where it came from. I guess it came simply from being exposed to the world without ever being indoctrinated with any ideology or any religion. My family had been without religion for several generations, and consequently nobody told me what I had to believe, so I formed my beliefs based on what I observed and on what I wanted to believe, no doubt. And what I observed was progress and increasing understanding of the processes of nature, and both that and

my own desires pointed toward the eventual conquest of senescence and all diseases and that seemed the natural way to go.

Cryonics: *It's funny. When you or I (or most other cryonicists) talk about it, it certainly seems like the most natural thing in the world. People who are first getting involved in cryonics, especially, tend to ask themselves, "Why doesn't everybody see this? It seems so perfectly obvious to me." Yet we know from experience that the inevitability of radical life extension is not perfectly obvious to everyone. At this point, I know literally hundreds of friends and associates who are interested in cryonics and so I have at least some support in thinking it might work. But you were standing out*

there virtually alone in that regard when you started thinking about cryonics. Did you know anybody who agreed with much of what you thought? How did you stick to your guns with no support whatsoever?

Bob: No, I didn't know others who felt that way. If I want to indulge in a little psychoanalysis I suppose I should bring Mae into this. I'm not really very good at assigning motives and motivations. But now that you mention it, I do speculate that perhaps part of the reason was my parents' influence on me. They were very proud when I did anything meritorious and very censorious when I did anything worthy of blame. And so I guess I grew up with a tendency to feel very guilty when I did something wrong

and a tendency to feel very proud when I did something right, and that developed a certain kind of independence.

My father, in particular, was a very self-confident, arrogant sort of fellow. His family came from Germany. If they hadn't been Jewish they would've been Nazis, probably. So they had the old Prussian mentality—full of self-confidence verging on arrogance—and he passed that on to me to a certain extent. At least to the extent that whenever I decided I had good reason to think something, I thought it, and wasn't going to be budged by anybody's alleged authority or anything less than argument that I could see the rationale behind. So I did develop this tendency toward confidence; maybe overconfidence.

I've noticed this is a characteristic (and obviously this by definition almost has to be) of many people involved in cryonics. They have to have an unusual degree of self-confidence because they're

bucking tradition and the establishment to a certain extent. You have to have an unusual degree of self-confidence—well placed or not—to maintain that kind of viewpoint in the face of the kind of criticism we get. Most people, of course, respect authority, and respect for authority in many cases is reasonable, but most people carry respect for authority to the degree where they will allow a committee of alleged experts to vote them into the grave. And people who came to be attracted to cryonics are not the type to allow themselves to be voted into the grave.

Cryonics: *So I guess after the war, when you were in the hospital, you decided you wanted to get something going about this "freezing business," (as you put it in your talk.) That's when you decided to write a science fiction story: "The Penultimate Trump" in Startling Stories. Was it difficult to get that published? Were you already a writer, doing other things, or did you just decide to be a writer to get this done?*

Bob: Well, I think I got published through connection rather than merit. I had an aunt who knew somebody, either the publisher or somebody related to the publisher or editor or whatever. In any event, there was an "in" of some kind, I recall. I can't say for sure that's what did it, but there was that connection, so I don't know if it was published on merit or not. But it was published anyhow.

Cryonics: *And you said it didn't cause a ripple. You mean that nobody ever talked to you about this and said, "Hey, great idea!"*

Bob: No reaction whatever, as far as I was aware.

Cryonics: *It's kind of interesting in hindsight that the book that launched the cryonics movement, The Prospect of Immortality, never used the word "cryonics" (which was coined by Karl Werner in 1965). How did you feel about that word when it first started being used, and how do you feel about it now?*

Bob: Well, I didn't care too much for it originally. Of course now it's just become a matter of course and I'm comfortable enough with it.

Cryonics: *What did you call it before you called it cryonics?*

Membership Status

Alcor has 372 Suspension Members, 608 Associate Members (includes 62 in the process of becoming Suspension Members), and 30 patients in suspension. These numbers are broken down by country below.



Country	Members	Applicants	Subscribers	Country	Members	Applicants	Subscribers
Andorra	0	0	1	Italy	0	2	3
Argentina	1	0	1	Japan	0	0	3
Austria	1	1	0	Lithuania	0	0	2
Australia	12	1	7	New Zealand	0	0	2
Canada	11	1	38	Russia	0	0	5
Costa Rica	0	0	1	Spain	6	0	0
Denmark	0	0	1	Sri Lanka	0	0	1
Estonia	0	0	1	Sweden	0	0	5
Finland	0	0	2	Switzerland	0	0	1
France	0	0	2	Taiwan	0	1	0
Germany	1	2	1	Thailand	0	0	1
Holland	0	0	1	U.K.	17	4	11
Ireland	0	1	2	U.S.A.	323	49	411
Israel	0	0	1	Ukraine	0	0	1
				TOTALS	372	62	505

Bob: I don't think we had a well-established single-word term for it. Sometimes we'd call it "cryogenic interment," sometimes we called it simply "anabiosis," occasionally we called it "biostasis" or something of that sort. We had a number of different words for it. I guess "cryonics" was the one that caught on.

Cryonics: *I understand that Saul Kent and Curtis Henderson provided a little bit of impetus in originally getting CI started, a rather famous trip across the country in 1966. In fact, Mike Perry is writing an article about that trip in his For The Record column in the same issue that this interview will appear. It would be interesting to get your perspective on that event.*

Bob: The trip that Saul and Curtis made had some bearing, and certainly the formation of the Cryonics Society of New York had some bearing on the formation of the Cryonics Society of Michigan (CSM), which was later called the Cryonics Association and is now called the Immortalist Society. CSM was intended to be primarily an education and resource organization with a limited degree of physical services involved. Cryonics Institute was not formed until 1976...some of us here were not completely satisfied with the existing organizations and thought that possibly we might do a little better in some respects.

Cryonics: *Can you tell me a little bit about your TV appearances in the early days? I understand there were numerous appearances on Johnny Carson, Steve Allen...*

Bob: Yeah, there were quite a lot of them — most of the major talk shows of that era. Johnny Carson two or three times, I guess. Mike Douglas, two or three times.

Cryonics: *In particular, I'm wondering how seriously the topic was treated. I haven't seen any cryonicist on a talk show like that recently, and I know that those shows are more about comedy than they are about learning.*

Bob: The Tonight Show has changed

since the 60's. Now if you watch *The Tonight Show*, it's strictly entertainment. In the early days of Carson (I never saw many of his later days) they almost always, near the end of the show, had someone with a serious topic — some author or someone with a political background, something of that sort. They discussed a basically serious topic, although they often tried to give a little comedic twist to it. Those things were all pretty much cut and dried. Those television journalists, like most journalists, have extremely short attention spans, and their only thought is how to improve their ratings and make the show more enter-



Bob Ettinger In CI's new facility in Clinton, Michigan.

taining. They haven't the slightest degree of personal interest in anything they talk about. They don't remember it from one day to the next either. But there were quite a lot of those [shows].

Cryonics: *Are you aware of any copies or recordings of those early shows anywhere? Has anyone preserved those?*

Bob: We may have; I'm not sure whether we have or not. We have a whole bunch of videos (some of them pretty old) that Rich Davis has now, that he's been working on. Rich Davis is one of our directors and his interest is a company that does video work. Last year we sent him a whole bunch of stuff which he and his associates have been in the process of working on and editing down. We figure

it's going to take another year before it's all finally wrapped up. They are preparing one or more long videos which will incorporate this old stuff as well as a lot more recent stuff. In the meantime, we're also preparing some shorter videos for interim use. To get at the original question, no, at the moment it's not clear in my mind which if any of those old shows are in our possession now.

Cryonics: *Was your mother's suspension the first that you actually worked on in a hands-on capacity? Did you perform that suspension?*

Bob: Yes, we did that. That was the first one that we did. In Bedford's case, I was out there [in California], but I didn't take part in the actual suspension. I was out there the next day, I think.

Cryonics: *Did you ever happen to talk to James Bedford before he was frozen?*

Bob: I talked to him on the telephone and I corresponded with him...but I had never met him in person. Then there was a case in Iowa where Bob Nelson asked me to bring out some solutions — DMSO, I guess it was. (It wasn't that I preferred DMSO, because I didn't. I always thought we should stick with glycerine because of the Suda work. But Bob wanted some DMSO, so I brought him some DMSO.) I watched them but I didn't personally take part in the suspension.

Cryonics: *Your mother's suspension was both CI's and your first. How well were you prepared for that?*

Bob: We were not well prepared, compared to what we are now and what we're going to be later. But we were prepared to some degree. Unfortunately, Walter Runkel, who had built the perfusion machine, was out of town and not available at the time. Mike Darwin came in to help, but the perfusion machine broke down and Walt wasn't there to help us with it. We did the best we could. It was far from ideal, but we did the best we could.

Cryonics: *That was '76?*

Bob: That was '77, I believe.

Cryonics: *When was your first wife,*

Elaine, suspended?

Bob: '87.

Cryonics: *Have you thought much about what will happen when you and Elaine and your current wife, Mae, are revived somewhere on the other end?*

Bob: I've thought about it a little bit. Not a lot, for the obvious reason that it's premature, really. My usual response is that we'll cross that bridge when we come to it. Sometimes I add that we don't know what will happen—maybe neither one of them will want me. People have different reactions from moment to moment. A woman one time asked me if her husband would be revived with her. I said "yes," and she said, "Well, in that case, count me out." People will do what they do. We don't know what the circumstances will be. We don't know what the mores will be at the time. There are too many things we don't know. The only thing we do know is that our choices then will be a lot wider and more varied.

Cryonics: *What interests me a little more is how you deal with that now. Certainly cryonics opens up a whole new field of psychology. Death and dying psychology is fairly well developed at this point, but cryonics has the problem of not exactly achieving closure for people who have placed spouses and loved ones in suspension.*

Bob: Different people react differently. I don't know if you've heard about Kastenbaum or not. He's currently at the University of Arizona, Tempe, I think, and he's in the psychology department or maybe the communications department now. For many years he's been a death specialist and an editor of a periodical called *Omega*. (I think he used to call it *Thanatology* or something like that). He recently featured an interview with me in one of their issues. They worry about things like that, but I don't. I'm not sure to what degree the people who try to analyze and categorize those situations are right or have any realistic or useful foundation. As far as I'm concerned, it's just a common sense thing. There is some

degree of closure, in that as far as interacting with my mother or Elaine on a personal basis — interacting with them as live people — that's over and done with for the foreseeable future. So we have to do our mourning and make our closure to that degree even with cryonics. Nevertheless, they do have their chance. They're not rotten and forgotten. They're not gone forever. They will possibly, and in my opinion, probably, live again at some time in the future. I will see them again. We'll all be the same to some degree, no doubt, and different to some degree. But if one could speculate about reunions and things of that sort, I think...

Cryonics: *We'll find out when we get there.*

Bob: Yeah. We'll find out when we get there. I do know that it does not eliminate



the sting of death, but it greatly alleviates it.

Cryonics: *One interesting thing about Prospect is that even after all these years there are a lot of things that are prescient. If you could rewrite the book from scratch with the way things have changed—with current advancements in technology—what sorts of things do you think would update or change or add? What sorts of things are you proud of having gotten right the first time?*

Bob: As far as I'm aware, there's nothing in there that's been definitely proven wrong...except my calculations on insulation. Those were not exactly right because I used Newton's heat conduction equation in my insulation calculation. That's a linear equation, which is incor-

rect, and so my insulation calculations were wrong on the optimistic side. But that was not really a material mistake, because we do have adequate insulation. It would've been material if we'd gone to liquid helium insulation. I considered the possibility of using liquid helium insulation, and my insulation calculation equations in relation to that would've been rather badly off. Other than that, I'm not aware of any material errors in what I wrote.

I did make a goof in saying that although we expected giant machines that would be able to make repairs on a cell-by-cell or even a molecule-by-molecule basis. For some reason I assumed that the various aspects of the machinery other than the actual working parts would have to be rather large in order to accommodate all the computation.

Of course I was wrong about all of that. In view of the work of Drexler and many others—especially in view of the many advances in electronics and computing—it turns out that the supporting machinery as well as the working parts will probably be very small. But other than that, I can't think of anything that was very wrong.

I guess if I had it to do over again, I would try to reach the emotions more and rely less on the appeal to reason. But whether I could do that suc-

cessfully or not is still open to question. Obviously people have been trying to do that for many years, and as far as I know, no one has come up with a very good answer yet.

Cryonics: *You've mentioned this before. "People believe what they want to believe." Once they want cryonics, they'll all start jumping on the bandwagon. The hard part is getting them to want it first. And with most people, that's not something you get to with logic and reason and a well thought-out outline proving point by point why it is that they need to sign up. There are much simpler methods for getting people to want something that have been around for years, such as social gatherings and camaraderie and a community of people with which they will*

want to identify themselves.

The catch-22 for current cryonicists is that most of us were and are convinced of things like this by logic and reason. And now we're trying to take an idea which appeals mainly to this small set of rationalists, and make it appealing to a much wider audience on the basis of feeling and emotion. But, almost by definition, we're not the most qualified to do that, because that's not the way most of us work.

Bob: Well, the way you can meld those two facts, I think, is already being done to a certain extent (in Alcor primarily, perhaps). You have this nucleus of people who themselves were convinced on the basis of logic and scientific evidence, but these people have lots of friends and relatives who are less amenable to persuasion by logic and evidence and more amenable to persuasion by emotion and camaraderie and that sort of thing. If you can provide opportunity for fellowship and such among those people, then you'll be accomplishing something.

In Alcor in particular, I actually think you have succeeded to some extent in doing that. For one reason or another, here in the Detroit area we're not socializing. We're going to remedy that in the future, but so far, we haven't done much of that. As I say, if we can get some reasonably well organized customary repetitive social gatherings and so on, and if the people who have been convinced by logic can then use this improved atmosphere to bring in their loved ones and relatives, I think that would provide a bridge between logic and emotion. We'll have working for us the automatic processes of success: Success breeds success. As we grow, it will become gradually easier to recruit people and at some point there'll be some kind of critical mass and [then] there'll be a big flood.

Another angle I've talked about before, [though] I've never emphasized it to any great extent perhaps, is that the Cryonics Institute in particular is working with funeral directors. Of course I know that Alcor and CryoCare don't think that's the best approach. Nevertheless, the point is getting cryonics more widely accepted more rapidly. From that

standpoint, I think drawing in funeral directors will be very helpful. In England, as you know, Barry Albin, who's the head of a 200-year-old funeral firm, has already begun a national campaign of public relations to funeral directors. We expect to do that domestically in the United States soon also. We also intend to run a continuing series of advertisements in the Detroit area.

Cryonics: *I (and most others in Alcor, I expect) agree with you that we want to take all reasonable paths to growth. Alcor has a relationship now with a new company here called All Related Extended Care Services (ARXCS). What they do is provide end-of-life services for people. They make funeral arrangements and they contact morticians. They exist to save families money by taking care of the many different tasks that must be completed when a loved one dies, by getting them the best, cheapest service providers who do what the family wants.*

Bob: Well, that's interesting. In other words, you're saying this is something that was budding independently of cryonics.

Cryonics: *Yeah. This is a new idea for a company. It's entrepreneurial. Lucinda Torres, who started this company, is trying to fill a new niche that she saw. In pursuing the different ways she can build her business, she started offering cryonic suspension as an option to her clients.*

Bob: Well, that's fine. What we hope to do, of course, is to get a great many funeral directors eventually.

Cryonics: *So they start asking whether you want cremation, or burial, or cryonics, and everybody gets asked that.*

Bob: We hope to have a great many funeral directors with our brochures available in their offices for people to pick up along with other things, so that this will become known as an ordinary option. In fact, we expect to run some advertisements. I'm not sure whether newspapers will accept them or not, but if they will accept them, I'd like to run some advertisements on the obituary page that would simply say, "Cryonics: ask your funeral director." Nothing else.

Cryonics: *It's a catch-22 again. We're trying to get across the point that cryonics is not about death — it's about life, it's*

about preserving life. When you go with funeral directors, you risk losing a little bit of that message, but of course you gain the legitimization.

Bob: That's possible, of course, but it seems to us the more likely thing that those who view it primarily as a chance of life will be the only ones to try it anyhow. We think it's almost all upside. If we have funeral directors offering this option routinely, it means additional points of contact, but it also creates an impression that this is an accepted and routine thing. It shifts the whole point of view from bucking the establishment to working with the establishment. In one stroke you practically instantly eliminate all the problems of legality and bureaucracy and regulation and all that sort of thing, because it just fits into an established niche and no one questions it. So I think there are a lot of advantages.

Of course we could talk for a long time about how well the funeral directors can provide the actual physical services. I won't go on and on about that. I'll just say very briefly, as I've said before, that in my opinion, regardless of how complex our procedures become, (and I'm willing to grant that very likely they will become more complex), funeral directors are capable of performing any specific procedure that an MD surgeon can, and do it a whole lot more economically. We think that's going to be the way to go, and there are other obvious advantages. You have a virtually infinite network of local, available people. You don't have to depend on anyone flying from distant parts of the country or distant parts of the world to do the work.

End Part I

Defining the Cryonics Institution

By

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*As Presented at the Cryonics & Life Extension
Conference, Ontario, California, November 5th, 1994*

Introduction

For persons entering cryonic suspension in the twentieth century, and for some decades beyond, the success of their venture will be determined primarily by two¹ contingent future circumstances: the development of repair technologies; and the survival of the organizational vehicle which they selected to transport them into the future when those technologies will exist. It is the latter of these factors over which all consumers of cryonic suspension services have some degree of choice and control, and with which this paper is concerned.

There are some very optimistic cryonicists who foresee the arrival of "full-blown" nanotechnology (or perhaps more appropriately, Nanotechnology) very possibly within the time they have left before cryonics becomes a personal necessity. I am not among them. I believe that it may very well take centuries—a multiple of maximum human lifespans—before anyone suspended with the best of current methods will be repaired and

revived. And notwithstanding the accuracy of this assumption, it is still the wisest course of action to plan and proceed as if it were a given. The creation of organizational vehicles that will survive us and our immediate successors is thus an imperative.

We are seeking not just to establish a successful business enterprise, but rather an institution. An institution that will survive with its vision and purposes intact, one that will always value the potential lives of its charges and never lose focus on its mission of restoring those lives. Yet it must be an institution that will be flexible enough to make adaptations appropriate to evolving human society. And it must be an institution strong enough to withstand trials that we cannot, at the moment, foresee.

Historical Examples

An often heard objection by those considering cryonics for the first time is that very few non-governmental organizations endure for centuries. True, but

there are some. The oldest of these is, of course, the Roman Catholic Church (though for over half its history it functioned as a government). There are a few robust universities that were chartered over a thousand years ago, and many that are at least three hundred years old. And there are scores of hospitals, special interest societies, and charitable foundations that have also made it past the three hundred year mark. In Europe there is no small number of profit making businesses that are equally old. One will not find a structural, i.e. constitutional, arrangement common to all the examples listed above. They do, however, share one important common feature: a sense of "apartness" (in some cases alienation) from the environment in which they exist, and even from the communities they service. This comes from a shared belief in, and enthusiasm for, the purpose and/or mission of the organization on the part of its human controllers. There may be myriad psychological factors which maintain this attitude (religious fervor,

¹ For purposes of this discussion we must assume that "information death" has not occurred in those patients cryonically suspended prior to the development of reversible brain preservation.

egotistical elitism, family loyalty, etc.), but fortunately, finding this focused, single-minded sense of purpose in cryonics is not a problem if our priorities are set starting with our longest range problem.

Competing Interests

In addition to the far-in-the-future organizational goal of restoring suspended patients to life and health, the cryonics consumer must also consider the issue of his/her own entry into cryonic suspension. In the past two years, there's been much discussion in the "cryonics media" of the apparent or potential dissonance between the interests of those who are already in cryonic suspension and interests of those who have arranged for that eventuality. It's been often repeated that "members" and "patients" necessarily have differing priorities.

The obvious point most often made is that an organization that holds as its first and absolute priority the long-term care and survival of its suspended patients must, by definition, give "only" second priority to its ability to serve its animate members. Leaving aside the mundane and day to day services of providing information, publications, and adequate legal preparation, just what exactly is the "service" that a member expects?

Barring a case of sudden deanimation, we expect that our bodies will be promptly, competently, and with the best available technology, be prepared for our descent to a cryogenic temperature that will, with any luck, seem like only a long sleep. And because state of the art cryonics technology is a long way from anything any of us would call "perfected," we also anxiously expect progress in this area. It is here that competing interests are perceived.

This perceived competition is not so much for resources, time or attention: these are priorities that each of us as free-acting individuals can directly affect regardless of the structures of the organization(s) with which we have con-

tracted. Rather it is the assumption that there will occasionally be available courses of action expected to benefit the about to be or newly deanimated patient, and that these actions may not be in the best interests of "older" patients. Conversely, it has been postulated that enormous funds held as capital needed to indefinitely maintain patients could be managed so as to benefit animate members as the expense of patient safety.

Existing Organizations

So far, all organizations which are accepting legal and (in most cases) financial responsibility for the long-term care of patients have incorporated themselves as "non-profits" or "not-for-profits"² for two obvious reasons. First, the English speaking world (where both the idea and practice of cryonics originated) has had an old and firmly established body of legal tradition which recognizes these forms of incorporation. Second, the profit motive, while respected by nearly all cryonicists, only serves to create an efficient market when checked by the free ability of consumers to withhold or change their patronage, and frozen patients are by definition helpless wards. At times there have been close associations between these organizations and for-profit business that provided various degrees of service.

A brief summary of extant variations will provide context, before attempting to analyze options:

- The American Cryonics Society (formerly the Bay Area Cryonics Society) had for most of its history contracted with TransTime, Inc., a publicly held profit making corporation, for essentially all of the physical actions needed to provide cryonic suspension: transport, cryoprotective perfusion, and long-term patient storage. Recently, ACS has sought out alternative service providers and has begun acquiring the capacity to perform some of these functions on its own behalf.

- The Cryonics Institute, has provided all services internally. Recently, it is contemplating acting as a contracted service-provider itself, in the area of long-term patient care.
- The Alcor Foundation, for many years contracted with privately held Cryovita Laboratories, Inc., for transport and cryoprotective perfusion, while performing the long-term patient care functions itself. Lately, Alcor provides all the essential services internally.
- CryoCare, the newest organization, expecting someday to assume legal responsibility for suspended patients, will provide no service itself, contracting with other organizations or companies for all aspects of cryonics. The stated objective being to provide maximum choice to the consumer, who will eventually have a "Chinese menu" of service providers, though few choices are currently available.

The discussion of organizational models has been revolving around the classifications of "full-service" versus "unbundled." This division, while having the virtue of being an easily understood absolute, is a gross over-simplification. Any organization that so much as purchases chemical supplies from outside vendors is not completely vertically integrated³. And one can also apply that reduction to the unbundled mode. Further, the concept of an independent service contractor includes both providers selected and employed by the cryonics organization, and those that might be selected and employed directly by the client: a distinction that becomes important as we proceed.

Service Options

Following the typical (and admittedly idealized) course of actions and events which comprise the cryonics concept will reveal all the points at which the use of an unbundled service provider might be proposed.

²"Non-Profit" connotes that the corporation has been granted "501(c)3" status by the United States Internal Revenue Service, has charitable purposes as defined by them, and consequently contributions to the organization may be deducted from the contributor's income for federal tax purposes. The non-profit corporation's income itself is not taxable. "Not-for-Profit" means that the corporation or association is not earning net income which will accrue to the benefit of any person, and it is therefore immune from paying federal taxes on its income, though because its purpose is not recognized as "charitable," contributions are not "deductible."

³Completely self-sufficient "manor houses" of the middle ages were vertically integrated. The only modern day example that comes to mind is the Dearborn plant of the Ford Motor Company of the 1920s, where iron ore came in one end and a car came out the other.

"By accepting responsibility in perpetuity for the care of the patient, the cryonics organization has, at the very least, created an implied degree of warranted competence and expertise. Thus a fatal error at this point in the cryonics process not only rests on the shoulders of the cryonics organization, but also potentially effects all other patients and clients of that organization."

• **Marketing:** Exclusivity not being the goal of any organization, marketing or some sort of public relations function is needed to attract members or clients. At a minimum, organizations wishing to keep their existing supporters produce regular publications. Beyond that, selling efforts can run from the extreme of avoiding all publicity (as Alcor did prior to 1988) to outright nationwide advertising (as Alcor does now). Contractors can be used to provide this service, and when economically feasible it makes sense that organizations would make the ordinary business decision of either using them or hiring professionals as employees, or both. My opinion is that there is no rationale for putting this decision into the hands of organizational supporters, except insofar as they may occasionally make a directed contribution or take action independently on behalf of their organization.

• **Legal Arrangements:** A person arranging their own cryonic suspension, having selected an organization, must complete legal paperwork. Every organization currently handles this task internally, though it is perhaps one of the jobs most easily assumed by a contractor⁴. Aside from the issue of cost to the member, the cryonics organization must consider the quality and honesty of the sales efforts that contractors employ. This would at the outset place a limitation on the client's choice of providers since no organization (or so I would hope) would want to accept members whose understanding of cryonics had been mainly supplied by a questionable marketer.

• **Financing:** In tandem with doing the

paperwork, financial provision must also be made. Since no cryonics organization has seen fit, as yet, to provide a life insurance product, all consumers who use this overwhelmingly popular form of funding have many options. The potential economic and administrative advantages to offering a life insurance product are great, however. I have no doubt that once the risk factors can be affordably dealt with, this facility will be integrated into an existing organization's services.

• **Emergency Response Capability** is much more interesting. Given the geographic dispersion of cryonicists, this is the one task for which independent contractors would be most useful. Unfortunately, the most likely candidates to take on this job are existing paramedic and emergency room networks—no help there. . . yet. Very likely the first truly capable providers of this service will evolve from regionally defined groupings of cryonicists (there some evidence for this already). There is no apparent reason for cryonics organizations not to encourage the establishment of independent emergency service providers, giving the widest possible selection to the consumer. It's just that the same economic constraints that prevent the cryonics organization itself from building widely dispersed emergency capabilities will also inhibit their independent formation for some time to come. But progress is inevitable.

Since emergency response is considered the "riskiest" stage of the suspension process, both legally and logistically, some advocate that the cryonics organization should accommodate any emergency response selection made by the

client. The organization that does so should be cognizant of the fact that such acceptance is an implied and explicit endorsement: The "client" can only be legally touched by a human actuator from the emergency service provider upon legal death. At that point, the client is a patient of the cryonics organization into whose legal custody his/her body has been entrusted. *Whether or not the provider is somehow affiliated with the cryonics organization, or is as distanced as legal machinations can make it, has no impact on the responsibilities of patient care.*

The argument that only the individual patient would be affected by the selection of an embalmer, or untrained volunteer, or psychopathically reckless emergency response provider is a fallacy. By accepting responsibility *in perpetuity* for the care of the patient, the cryonics organization has, at the very least, created an implied degree of warranted competence and expertise. Thus a fatal error at this point in the cryonics process not only rests on the shoulders of the cryonics organization, but also potentially effects all other patients and clients of that organization.

Should a brilliant legal mind at some time in the future succeed in fully insulating the cryonics organization from all possible consequences of unendorsed selections in this area, the idea then fails because other clients of the independent provider are potentially "naked" once an irresponsible or incompetent provider collapses⁵.

Finally, the strongest argument *in favor* of the use of internal, affiliated, or

⁴In the 1980s, Rand and Ruggerio were insurance agents who offered this service. They were relatively very expensive, and did not meet with much success.

"Even in well established trust law, there is no guarantee of perpetuating one's wishes beyond very near-term and specific directions. To expect that successive generations will continue to have an interest, let alone make decisions as we would, is hopelessly optimistic."

endorsed emergency response providers is that they do and would bring with them the support of the cryonics organization (the issue of cost to the cryonics organization is addressed below). This support could make the difference between life and death for the individual patient. As a positive factor, this argument also applies to the next phase of the suspension process.

- *Cryoprotective Perfusion* doesn't carry the legal risk of emergency response; however it is as logistically complex, and it necessitates a level of expert skill that is much harder to come by. Here, the need for multiple and geographically dispersed providers is minimal. Having a redundantly equipped perfusion capability in at least one location and another in a location distant from the first would suffice to meet all but the most unlikely contingencies. Given the capital required to establish this capability, multiple choices aren't on the horizon in the near future. But we can expect the availability of more providers in the future. In contrast to the probable evolution of some local groups into emergency response providers, we are more apt to find established medical facilities interested in providing perfusion service. Unlike medical emergency response systems, some hospitals with perfusion capability have the economic problem of under-utilized capacity, a problem that can be addressed within the financial limits of a cryonic suspension to mutual benefit. While growth and acceptance of cryonics will make the use of such providers possible, all the considerations applied above to emergency response are

equally valid here. Ideally, cryonics organizations will continue to provide for cryoprotective perfusion services on behalf of their members as they do now, either internally, or by using contractors, or both.

- *Long-term Storage and Care* providers as menu options available to members of the cryonics organization is even more problematic. The first obvious pitfall is the question of how a frozen person can make these choices. Scenarios for addressing the problem involve a series of "patient representatives" appointed by the member prior to deanimation. Even in well established trust law, there is no guarantee of perpetuating one's wishes beyond very near-term and specific directions. To expect that successive generations will continue to have an interest, let alone make decisions as we would, is hopelessly optimistic. These scenarios multiply the essence of the problem that is the focus of this paper by the number of people going into suspension!

Less problematic is the possibility that the cryonics organization, as legal custodian, would entrust the physical storage of patients to a contractor. But by doing so, the organization becomes disconnected from the reality of having that day to day responsibility and that disconnection would very likely lead to a bureaucratic attitude of administration that comes with having authority without responsibility. Not unlike people who produce offspring, but only see them for a few minutes a day—after the nanny has cleaned them, fed them, dressed them up, and brought them downstairs for a ritual peck on the cheek.

Finally, assuming that the contractor is a profit-making firm, there is the constant pressure to contain costs. Thinking that oversight provisions could safeguard against any wrongdoing here is recklessly naive. And even if this were not a worry, the spectacle of a caring storage contractor going hat in hand to the cryonics organization for necessary, but extraordinary funds, or worse yet, having to go to the money-managing contractor (more on that below) is no less distressing. It is best that those who are supposed to care *about* you are also caring *for* you.

- *Financial Fiduciary Responsibility* is the most intellectually challenging and time consuming duty of patient care (provisioning liquid nitrogen and physical security are relatively straightforward). Clearly, use of professional investment managers is a good idea. But for reasons alluded to above, turning over *control and decision-making power* to such professionals is unacceptably risky. Indifference, bureaucratic delay, or just plain lack of understanding is easy to imagine as a cause of problems. This does not preclude the use of legal instruments, such as trusts, to insulate and protect patient care funds from exposure to the risks of litigation or insolvency. Using any available legal mechanism for the protection of these funds would be prudent, as long as such mechanisms do not vitiate the actual mission of patient care.

- *Research* that is relevant to cryonics can be targeted toward reduction of ischemic injury, development of reversible suspended animation, improved storage technology, incremental advances in these

⁵With enough of a market, alternate emergency coverage might someday be easily and quickly obtained, however, even with 100,000 cryonicists scattered about the world, there wouldn't be sufficient economy to support multiple professional level teams in most areas. And so far, we are less than *one percent* of that figure!

areas, and eventually revival technology. In all these cases, it makes little difference what organization does the work, or how it is funded. Although cryonics will themselves provide the funds and impetus for research that is directly pertinent, an enormous volume of discovery and innovation has, will, and continues to be generated by "mainstream" investigators with no interest in cryonics. Only the prioritization of avenues of research brings moderate controversy within the cryonics community. The resolution to such disagreement is, as it should be, in the marketplace.

- *Revival* (the physical act of, as opposed to the research leading to its possibility) is the reason for being of the cryonics organization that will have legal responsibility for suspended patients. This may seem axiomatic, but it isn't (at least not for some people). I have heard of some individuals developing schemes and putting substantial resources into attempts at personal control and/or influence. These schemes range from the potentially useful creation of supplementary financial trusts or auxiliary organizations (such as the Reanimation Foundation) to the idiotic (testamentary establishment of "the committee to reanimate Melvin York", the members of which are enticed with monetary rewards for success).

- *Organizational Evaluation*, or the provision of objective consumer information is heretofore unknown in cryonics. And it is *the* most appropriate area for independent endeavor. Too bad there won't be enough of a market to support such an effort for some time. In the meanwhile, the would-be consumers of cryonic suspension services will have to fend for themselves by carefully reading each organization's literature, inspecting its facilities, and interviewing its personnel.

Constitution

In the case of independent service providers, the profit-making model of organization is most likely to provide optimum economic and operating result. With the possible exception of an entity whose mission will be to provide objective consumer information, capitalism engenders ever improving quality of

goods and services. The survival of particular service-providing companies is of far less concern than that of the ideal cryonics institution.

As for the cryonics organization itself, the major constitutional dividing line is whether control should be held by animate members or by a self-perpetuating governing body. Phrasing the choice as one between "democracy" and lack thereof, is misleading, since both forms are democratic. I addressed this issue once before in *Cryonics*, and to date have seen no effort anywhere to refute the arguments I made then. (An edited version of that article is reproduced in the box at right.)

The arguments of that article still hold, and there are others. Having a single vote only creates an illusion of control. Even in an organization where control theoretically resides in the collective hands of the animate membership, the reality is that it is the activists who run the show. And the danger remains that as the economic stakes get higher, resourceful villains can be counted upon to gather lots of votes. In the absence of such a blatant horror, a "democratically" controlled institution, unless it adopts the corrupt customs of the United States Congress, will experience frequent turnover in control. If we figure that the average governor would be elected for no more than five successive two year terms, the organization will have one hundred percent management turnover every ten years! Hardly conducive to stability of purpose or retention of institutional memory when we are looking at a multigenerational time frame.

Economically, an institution dedicated to its own survival—for the sake of its patients' lives and the lives of its members—will have the benefits of being able to draw on its membership's support, but only to the extent that the membership shares a mutual self interest with the institution. Ideally, members derive greater security from being on a lifeboat that is becoming stronger and larger with time. To the extent that the organization having responsibility for patients is perceived as an island, with groups of members paddling toward it in uncertain craft, their immediate concerns

will quite naturally overshadow the need to bolster that organization. The institutional lifeboat also has the advantages of one set of administrative overhead costs, versus several unbundled overheads. And the institution can optimally use the widest spectrum of volunteer labor skills. These economies more than compensate for the additional cost of "downward support" when a transport or suspension team is in need of assistance.

Conclusions

Any perceived differences in interests between the patients and the members of a cryonics organization are just that: perceptions. By virtue of having been born mortal, every member is a patient from the day he or she signs up. As harsh as it may seem, those members who fail to see themselves as patients, and whose decision making is negatively affected as a consequence, will find themselves on the losing end of the process of natural selection.

Much of the debate over organizational structure and control and over the canard of "membership choice" is rooted in the understandable need to feel some influence over one's own future. I submit that it is much more psychologically satisfying and *safer* to actually participate in the design of one's destiny, and that is an option which is only available (*and has always been and will be available*) by providing personal effort, regardless of the organization one chooses.



Why Alcor is Not a Democracy

By Carlos Mondragon, originally in *Cryonics* April, 1992

"Democracy is that form of government where everybody gets what the majority deserves."

—James Dale Davidson

Alcor, by the deliberate intent of its founders, and reinforced by the continuous intent of its Board of Directors, is non-democratic. Like most non-profit institutions, new directors are elected by the existing board.

As we get more optimistic over the question of whether or not cryonic suspension will be clinically successful, i.e., the eventual development of technology capable of reanimating suspension patients, the issue of organizational survival gets increasing priority. Repair technology won't do any of us any good if the organization that froze us collapses financially, or dissolves into a mess of litigation or divisive infighting.

Often our structure has been defended on the grounds that it gives inherent stability. That's true; historically there are plenty of examples of institutions (universities, churches, hospitals) with self-perpetuating governing bodies that have lasted centuries with their fundamental purposes and values intact. When considered along with the inherent problems of popular democracy, this argument seems to be especially powerful as applied to cryonics. Mike Darwin, in the April, 1987 issue of *Cryonics* (the context was a comparison of Alcor and the democratically structured American Cryonics Society), laid it out quite well:

"... We have compared our structure to the College of Cardinals of the Roman Catholic Church. It is a structure which has in part resulted in the preservation of the church as a functioning entity for nearly 2,000 years. It works by allowing the seasoned leadership to select individuals to replace themselves who have risen through the ranks and who are intimately familiar with the operation of the organization and who are intellectually and ideologically sound. How much do you know about cryonics or ACS? Both ACS and Alcor are faced with a situation where most of our members are geographically scattered. Most are not interested in being full time cryonicists or even becoming closely involved in the day-to-day decisions and issues which are involved in running a cryonics organiza-

tion. As this letter illustrates, the issues are complex and subtle. You would not want to have the chief of the medical staff at a hospital selected by ballots from patients in any political sense! And yet, the ballots are cast, just as they are cast for Alcor's leadership. How? By people deciding to join the organization and utilize its services. People who are members of Alcor (or who go to a physician, or a grocery store for that matter) are free to vote too: with their feet. . . .

"... Alcor is undemocratic. . . we do not select our leadership on the basis of a popularity contest. What we do not want, and will not do, is to subject Alcor to a public relations contest, where people are selecting "leaders" on the basis of an image or a line of hype. . . . As it is, our board meetings are open to our members and many of our decisions are vigorously discussed by members attending the session with the not infrequent result being a modification or reversal of a proposed course of action.

"I would go further still and point out that virtually all successful, growing for-profit or nonprofit corporations are *not* democratic and their boards are not elected by members' votes. Even the government of the United States is *not* democratic in the strict sense, but rather is republican with a lot of selection of successors by responsible and knowledgeable "insiders". It is unfortunate, but true, that most of our government's failures have been in areas where 'mutual consensus' decision making is employed, or where selection of a job candidate has degenerated into a public relations contest with generous dollops of mudslinging tossed in."

This attitude still prevails among Alcor's board. New members of the board have been chosen over the past few years based on their technical skills, their understanding of how cryonics works and issues it must face, their history of work and commitment, and their personal values. Politicians, "great communicators", and "image makers" need not apply. [In addition to these criteria, I've also preferred new directors who have had a mea-

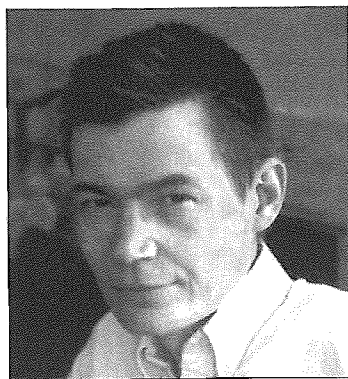
sure of success and achievement in their personal, professional and economic lives.]

As persuasive as this point of view is pragmatically, it doesn't quite answer the issue of why individual suspension members should not have direct influence (by vote) over their chosen suspension organization as a matter of principle. It is, after all, your life. And if, perchance, an evil or just plain inept form of demagoguery prevails, then market forces still apply: you can take your membership elsewhere. True enough—for animate cryonicists.

When I signed up with Alcor, I had utterly no influence over its policies. (I switched to Alcor from the Cryonics Institute in October, 1982; was elected to Alcor's Board of Directors as Treasurer in April, 1987; served as Chief Executive from January, 1988 to February, 1993; and I am presently a Director.) But I was convinced that every one of Alcor's board members held the conviction that their first and absolute priority was to guard the interests of *deanimate members*. This is still the case today.

This attitude is not based on altruism. It is an unusual example of long-range rational self-interest that we can visualize that we ourselves will one day be in a helpless condition, our only chance of resuming our lives dependent on the organization we selected. Until that situation obtains, each of us individually has a plethora of options: everything from persuasion to resignation. But once you can no longer exercise these options, do you want your survival to be in the hands of a popular democracy for an indeterminate amount of time?

Cryonic suspension patients can't vote, or even lobby on specific issues. With that in mind, Alcor's dedication to its members in suspension is extraordinary. And our well deserved reputation in that area has been a magnet for persons with their own self-interest in mind. (How many organizations can get and keep a highly individualistic membership as Alcor has?) I have yet to hear any reasoned argument for fixing what isn't broken.



For the Record by R. Michael Perry, Ph.D.

The First Cross-Country Cryotrip

By late 1966 the infant cryonics movement had been widely published, and there were signs that it might soon develop into a major industry. . . . Times were right for such a journey as Curtis and Saul undertook. . . .

Cross-country trips do not necessarily figure prominently in the history of a movement. However, one such journey with special significance was undertaken in 1966 by Curtis Henderson, President of Cryonics Society of New York, and Saul Kent, the Corresponding Secretary. (Other such trips would also be made by them in coming years.) This overland car journey was important for helping get some cryonics groups organized, and for what it showed about the activities of certain people.

The first public organization advocating freezing the newly deceased for eventual revival was the Life Extension Society, started by Evan Cooper in December 1963. Curtis, Saul, and others in the New York City area had formed Cryonics Society of New York in August 1965, after misgivings about the prospects that LES would be able to actually freeze and store people (and in fact it never was able to do this, despite heroic efforts by Cooper to acquire land and complete the necessary construction and other tasks). The name "Cryonics" would soon be borrowed by other similar organizations, and would also become the generic term for the practice of freezing for later revival.

By late 1966 the infant cryonics movement had been widely publicized,

and there were signs that it might soon develop into a major industry. Only one person had actually been frozen; she was being maintained at the only operating storage facility, Ed Hope's Cryo-Care Equipment Corp. in Phoenix, Arizona. (This freezing of an embalmed body, on April 22, 1966, occurred after about two months' storage at above-freezing temperature. Thus by reasonable standards it was not a true cryonic suspension, unlike that of James Bedford the following January. It was terminated by relatives around the time that Bedford was frozen.) Several other groups were said to be planning to offer suspension services, however, and there were numerous rank-and-file enthusiasts and organizers scattered around the country. Times were right for such a journey as Curtis and Saul undertook, which started from Long Island, New York on Sep. 27. Highlights of this trip were reported in the CSNY newsletter, *Cryonics Reports*, Oct. and Nov. 1966. In the following summary I've drawn on this source plus some unpublished notes, all written by Saul. (I thank Curtis for making the available the CSNY archives containing this and other material, which he has also given kind permission to publish.)

Sep. 28, Philadelphia, Pennsylvania. Meeting with Leonard Kushnier, an en-



Curtis Henderson

gineer, who discussed the development of a "super-insulation" for cryogenic containers by Linde Division of Union Carbide Corp. (Similar work was being done elsewhere, e.g. at Hope's facility; super-insulation, made of layers of highly reflective material placed inside the vacuum jacket of a dewar, gave superior performance and would figure prominently in the technology used to store cryonics patients.)

Oct. 2, Oak Park, Michigan. A meeting at the home of Robert Ettinger of twelve people "interested in cryogenic interment." Two weeks later they would form the Cryonics Society of Michigan, with one of them, Ettinger, as President.

Oct. 3, Detroit, Michigan. Curtis and Saul appear on the Bob Hynes Morning Show, WXYZ-TV, Detroit, along with Ettinger. Ettinger demonstrated the Westinghouse Iron Heart, useful in perfusions.

Oct. 4, Springfield, Ohio. There was an attempt to contact Juno, Inc., "a purported manufacturer of cryogenic interment equipment." In May 1965 there had been an attempt to freeze a woman in this area, which had been called off at the last minute. Juno was to have furnished the container for cryogenic storage. An investigation now showed, however, that

the company was bankrupt.

Oct. 6, Kansas City, Missouri. Another investigation. Cryo-life, which turned out to be "an offshoot of. . . a funeral home operating from a beautiful new building on the outskirts of town," professes interest in the cryonics idea, but shows no evidence of activity. (And they never would.)

Oct. 9-12, Phoenix, Arizona. Meetings with Ed Hope of Cryo-Care Equipment Corp., then the only manufacturer of cryogenic storage capsule suitable for human use, and also housing the only human being yet frozen to liquid nitrogen tem-

perature. Purchase of a capsule from Hope is negotiated.

Oct. 13, Woodland Hills, California. Meeting with Robert Nelson. The following day Nelson's group decides to form the Cryonics Society of California.

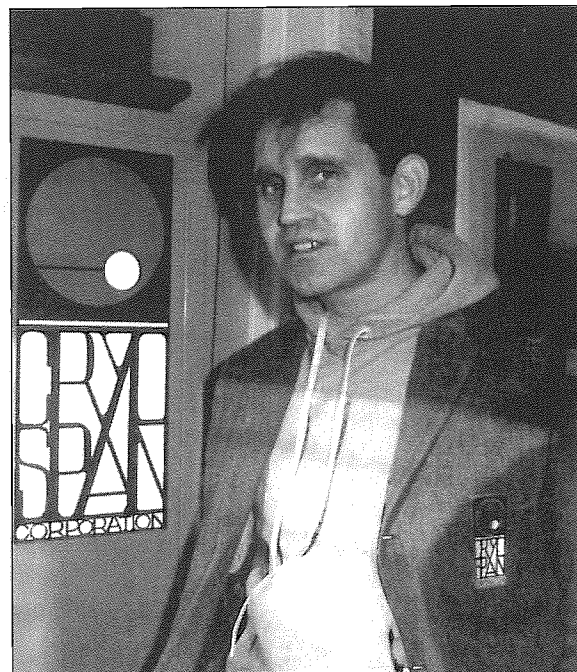
Oct. 16, Berkeley, California. "We visited the Berkeley campus and thoroughly perfused it with literature."

Oct. 18, Woodland Hills, California. Meeting with Robert Nelson and Robert Prehoda. Prehoda contends that Ettinger has alienated the scientific community, particularly pioneer cryobiologist Audrey Smith. Prehoda estimates the odds against reviving a person frozen down to liquid nitrogen temperature as "about a trillion to one." He strongly favors "supercooling" (vitrification) to prevent damage from crystallization. Nelson says well-known comedian Steve Allen is "still hooked on the idea" of cryonics despite some mispromotion by one Mr. Milgrim.

Oct. 19, Las Vegas, Nevada. An attempt to locate and meet Tom Tierney. In 1964 Tierney

had organized the Immortality Research Compilation Association (IRCA) in Panorama City, California, as an offshoot and rival of LES, but the organization disbanded the following year. Nelson had never met the man but had spoken by phone and "was impressed by his enthusiasm." Ettinger had said Tierney also made "nudie films." Curtis and Saul tried the business address, then the home address that Nelson had given them, where they found someone who said "Tierney had been expecting them," but no Tierney. They then went to a movie, followed by a steak dinner at a gambling casino, the *Golden Nugget*. There they were arrested by two plain-clothes detectives, and asked by one what their connection was with Tom Tierney, "counterfeiting or guns?" "Neither, Officer," the two replied, "we are interested in freezing dead bodies." After a half hour of interrogation, having their car searched, and none-too-successful attempts on their part to arouse some interest in cryonics, Curtis and Saul were released. Tierney, the detectives alluded, was involved in some kind of trouble involving the Secret Service and the FBI—they didn't elaborate.

Not wanting to give up just yet, Curtis and Saul then called Tierney's home; a woman who answered didn't

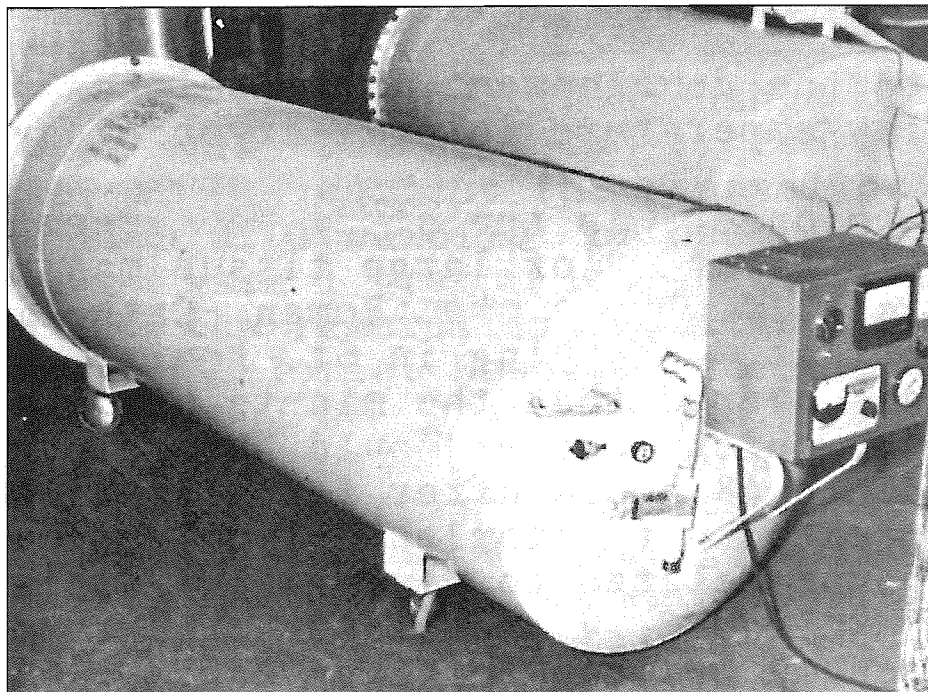


Saul Kent (Cryospans was the sister organization that stored CSNY's patients.)

know when he'd be back, she said. They then planned to head back to Phoenix, and call Tierney from there. But, ten minutes into the journey, they were stopped by the Las Vegas Police, taken into custody, and again met by the two detectives, who questioned them further; in all they were detained another two hours. This time a little more information emerged. "Tierney was believed to be the head of a counterfeiting ring, as well as the perpetrator of numerous frauds, including the selling of rifles, machine guns, and jeeps through a mail order address in Rio de Janeiro." He was now in jail, and a story about him was on the front page of the local paper. It took more convincing this time, but they were finally released, after being fingerprinted and photographed. They then headed on to Phoenix.

Oct. 20-24, Phoenix, Arizona. (Anticlimactic bliss after the tangle over Tierney!) More meetings with the Cryo-Care people. Successful testing of the just-purchased capsule; finishing work continued, Curtis and Saul assisting. They then returned to Long Island.

(Comments.) This trip was significant for several reasons. First, it helped get some cryonics groups organized, specifically those in Michigan and California. In the glaring light of hindsight we



At the Hope facility. The capsule in the background held the frozen woman; the one in the foreground was an improved model, similar to Dr. Bedford's first capsule.

know this proved a mixed blessing (the California group would terminate in the notorious Chatsworth disaster some 15 years later, with patients lost and the leader Robert Nelson convicted of fraud). Early mistakes, however, are an often unavoidable prelude to later successes. Second, it helped clarify who was actually making the equipment that would be

needed to make cryonics succeed. Third, in the melodramatic affair of Mr. Tierney, it showed that the new field was not immune to invasion from con artists who must be watched for.

CSNY itself, after freezing several patients, would ultimately fail, though without the legal recriminations that attended the California group's collapse. (Relatives had control of the CSNY patients, and decided to discontinue the suspensions.) Bitter lessons would have to be learned to make cryonics organizations stable and viable. Cryonics has been fortunate, however, in that no major criminal element along the lines of Mr. Tierney has yet endangered the movement. Today we live in a more optimistic age, but we are still fighting a battle for survival, and we must not slip into a false complacency. Success will not be easy, and it calls for our utmost efforts.

Alcor Cryonics Technology Festival

February 16-18, 1996

The Alcor Foundation is sponsoring a cryonics technology festival next February in Scottsdale, Arizona. Confirmed speakers for the festival include Ralph Merkle, Ph.D. (Report on Fourth Foresight Conference on Molecular Nanotechnology), Mark Voelker, Ph.D. (Alcor Research), "Father of Cryonics" Robert Ettinger (Cryonics Institute Research), Alcor President Stephen Bridge (Alcor current activity and future plans), Ben Best (Structure and Function of the Human Brain, and its Relevance to Cryonics), Paul Segall, Ph.D. (Normothermic and Hypothermic Blood Substitutes), and Hal Sternberg, Ph.D. (Cryogenic Preservation).

Registration is \$55 before December 1, \$75 after that (including at the door). The registration fee includes some meals and all events, but does not include lodging. For more detailed information and a registration form, contact Alcor at 1-800-367-2228.



Book Notes...

by Steve Bridge

BECOMING IMMORTAL

Nanotechnology, You, and
the Demise of Death



Wesley M. Du Charme, Ph.D.

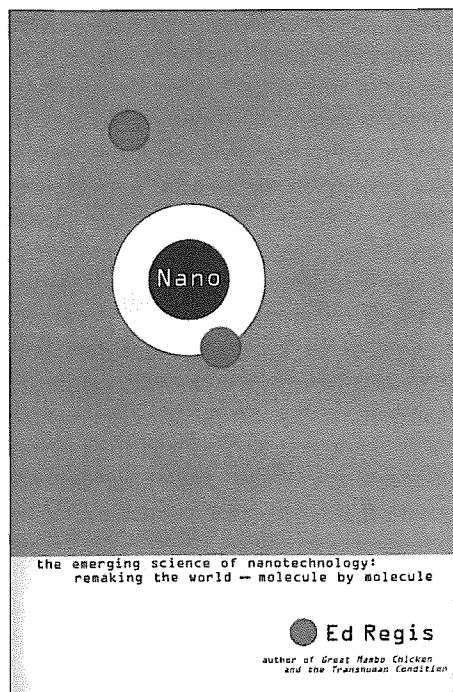
This month we feature new books dealing mostly with nanotechnology and life extension. Only one has much to do with cryonics, but that one is important.

BECOMING IMMORTAL: *Nanotechnology, You, and the Demise of Death.* By Wesley M. Du Charme, Ph.D. (Blue Creek Ventures, 1995). \$25.00.

One of the things cryonics has needed for the past several years is a new popular book which explains the basics of cryonics and nanotechnology, includes many good reasons why living a very long time (up to and including *Forever*) is a great idea, and does it all in a way accessible to people who are not hard-core computer wizards, scientists, engineers, or hooked on space flight. We want a book we can give to our family and to our neighbors. Here is that book.

Becoming Immortal is written in a humorous, pleasant style which just might open a lot of people's eyes to the future we are trying so hard to create. Du Charme begins with a tongue-in-cheek dialogue called "Top Ten Reasons Not to Read this Book," and spends the following 100 pages or so knocking apart the usual arguments against living forever. You've heard these, all the variations on: "It's a bad idea;" "The government won't allow it;" "It'll cost too much;" "There will be too many people;" "I won't like the future;" "The future won't like me;" and "It's impossible anyway." But you aren't likely to find such good counters anywhere else (without spending a few days at Alcor!).

Along the way, Du Charme talks about future medical technologies in plausible terms, and introduces cryonics as a way to get there from here. Most of the cryonics examples (paperwork requirements, procedures, etc.)



in the book are drawn from Alcor materials; but detailed information for all the cryonics organizations is given in the appendix.

It's hard for me to imagine that someone could read this entire book and not be convinced that cryonics is a good idea — although I confess my imagination may have some holes in it. After eighteen years in cryonics, I am still amazed every day at how many bright people fail to see the point. Maybe this book is the one that will help us get over the hump.

While most of this material in *Becoming Immortal* won't be new to experienced cryonicists, I think it is an excellent and persuasive introduction to cryonics, nanotechnology, and immortalism for people who have had less exposure to these ideas. It would be a fine gift for your parents, your brother-in-law, your boss, your local newspaper or library, your local state representative, or just a close friend you think would appreciate a new set of ideas. It would also be a good introduction for the students and more casually interested people who write to Alcor for information.

I would REALLY like to see this book in as many homes and libraries as possible (along with our own book, *Cryonics — Reaching for Tomorrow*, of course). Many of our most supportive

suspension members in Alcor are people from "the mainstream" of American life. In addition, we need encouragement and tolerance from the politicians, bureaucrats, and business people with whom we have to interact, even if they don't sign up for cryonics themselves. I strongly encourage the readers of *Cryonics* to purchase at least copies for their local public libraries. If you want more people to understand this idea and to become cryonicists themselves (because a strong, large cryonics organization is more likely to save YOUR life), then you want as many people as possible to read books like this.

Alcor is offering *Becoming Immortal* for sale at the special rate of \$20.00 (postage included), discounted from the full price of \$25.00. If you would like to order a copy (or several copies!), please send a check or money order to Alcor, or, for credit card purchases, you can call us at our office.

Nano: The emerging science of nanotechnology: remaking the world — molecule by molecule. By Ed Regis. Little, Brown, 1995. \$23.95.

Regis is the author of the highly entertaining *Great Mambo Chicken and the Transhuman Condition*, and *Nano* is just as clever and insightful. Regis's newest work is not so much an explanation of nanotechnology as it is a *biography of an idea*. He writes of how K. Eric Drexler got the notion to build machines which could work directly with atoms and molecules — an idea which eventually became *Engines of Creation* (still available through Alcor).

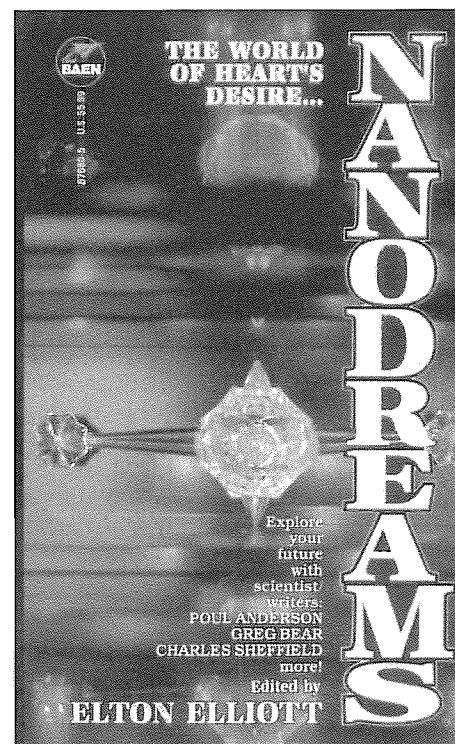
While Regis's primary emphasis is on the life of Eric Drexler and the development of nanotechnology, in alternating sections he also looks at the history of observing and controlling atoms, all the way back to 1827. 1827 is a seminal year in the development of molecular control, because that is when Richard Brown first observed "Brownian motion," the tendency of particles in liquid to be in constant motion. Einstein later theorized that the motion was a result of the jostling

of atoms, in turn caused by thermal energy of the atoms.

Regis includes the discoveries of scientists and engineers that I (a failure on my part, no doubt) had not heard of — Jean Perrin observing the existence of atoms in 1908; Max von Laue photographing them with X-rays in 1912; Erwin Müller visualizing them with a field ion microscope in 1955; and the big jumps in scanning tunneling microscopy in the late 1980s and early 1990s. He also includes a large section on the ideas of super-physicist and all-round cool guy, Richard Feynman, who laid out the basic questions of molecular control in his seminal 1959 lecture, "There's Plenty of Room at the Bottom."

Regis is excellent at popular explanations of complex ideas; but his real genius is at capturing the character and enthusiasm of the people who do science and engineering. Some of the most fascinating people you'll ever meet inhabit the pages of this book — fascinating because they are filled with big ideas about the universe and about the human ability to control it. Few other writers make learning half this much fun.

Nanodreams edited by Elton Elliott. Baen



Books, 1995. \$5.99 (pb).

This is a fine anthology of stories and articles on nanotechnology-related themes. It includes some of the better short science fiction on this subject, such as Greg Bear's original version of "Blood Music," Poul Anderson's "Statesmen," Charles Sheffield's "Deep Safari," and Mark Stiegler's "The Gentle Seduction." Elliott has also persuaded Gregory Benford and Arlan Andrews to write thoughtful essays especially for the book, and Eric Drexler provides an introduction. *Nanodreams* is an entertaining collection, and it's useful to have all of these items under one cover.

Nagata, Linda. *The Bohr Maker*. Bantam Books, 1995. \$4.99 (pb)

In this SF novel, the government has enforced limited access to uncontrolled nanotechnology, ostensibly to protect civilization from runaway disaster. Not coincidentally, this keeps the power in the hands of certain governing officials. A scientist named Bohr has invented an especially clever and powerful "maker" (read: "assembler") which could provide health and intelligence for anyone using

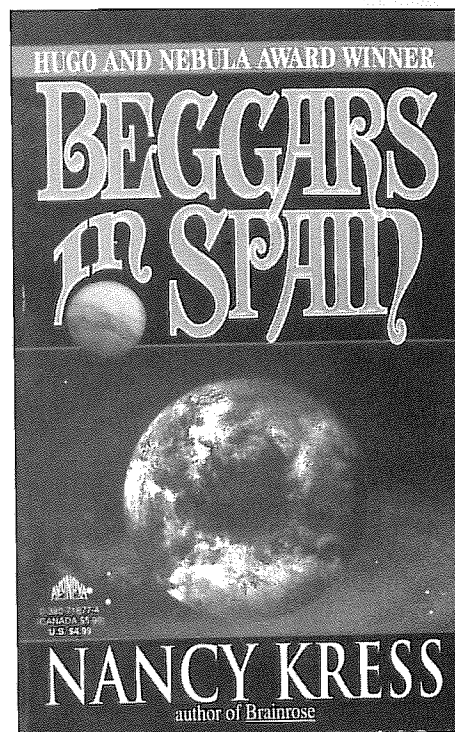
it; but its release has been prohibited. When the Bohr Maker is stolen from the government, then stolen from the thief, and ends up in the hands of a young woman in the slums of Asia, a lot of very unpredictable hell breaks loose.

Nagata is a talented writer and this tense and deeply imaginative adventure is likely to receive award consideration this year. It is amazingly good for a first novel, and I eagerly await her next work, due out in December of this year. The second book is *Tech-Heaven*, a nearer-future story with a strong thread of cryonics. Nagata read Alcor's material and spoke with several of us; so I expect the cryonics portrayal to be positive.

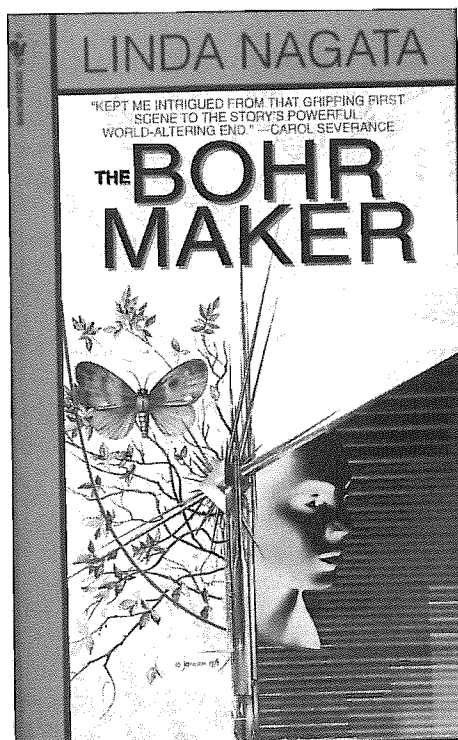
Kress, Nancy. *Beggars in Spain*. Morrow/AvoNova hardcover, 1993. AvoNova pb, 1994, \$4.99.

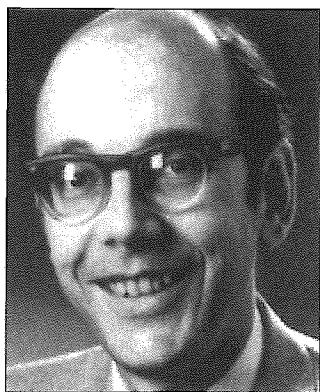
In 2008 parents are able to choose for their unborn children numerous genetic modifications for health, intelligence, beauty, etc. More controversial is a new modification which allows the child never to require sleep. Combined with intelligence enhancement, this gives each affected child more time to learn, so they develop much faster. Over the next twenty years the Sleepless become an elite class which eventually takes over a significant fraction of the world's economy.

This success arouses serious prejudice against the Sleepless, which is accentuated when it is discovered that a side effect of the Sleepless genomod is essentially *no aging*—the Sleepless will be nearly immortal. Prejudice turns into violence and most of the Sleepless eventually retreat to a compound in New York and then over the years to a space colony they call Sanctuary. One of the few who stay on Earth is the lead character, Leisha Camden, a Sleepless attorney who firmly believes that all kinds of humans need to stay together. As the Sleepless on Sanctuary have children themselves, they genomod them to be sort of Supersleepless (even higher and more unpredictable intelligence). Eventually they begin to fear their children the same way the Sleepless had originally been feared.



The short version of *Beggars in Spain* won the Hugo and Nebula Awards for best novella. While the novel sags a bit in the middle (a common hazard of expanding a short story), it is basically well done, with many speculations on life extension, intelligence, and the nature of humanness that will fire the imaginations of readers. Perhaps the most central theme is one which I believe is the essential conflict of being human—the conflict between individuality and the community. As we create our own communities on the Net, within cryonics, or perhaps someday of different branches of altered humanity, we can never forget that both community and individuality may be necessary for physical and emotional survival.





That Other Damage

By now this question has come up several times on the Net. It remains a very important (though distasteful) question to cryonicists as a whole, and therefore to members of Alcor, too. The question is: what kinds of damage are suffered by patients before their suspension begins?

Other than a few very brief mentions of it (in the context of a discussion of "death" compared with "permanent destruction of information"), Alcor's present main introduction to cryonics, *Cryonics: Reaching For Tomorrow*, gives it very little hearing. Sure, it contains quite detailed discussions of the damage caused by suspension. We would expect such a discussion. Yet discussion of that other damage caused by the (still too frequent) delays of suspension does not appear. And as we have seen, no amount of technology can save us against permanent destruction of information. Yet in response to *Reaching For Tomorrow*, naive questioners might (and have) asked: how do we know that "permanent destruction of information" doesn't happen right after "death"?

Just as in the general question of whether we can be revived, paeons to technology (nano, Nano, or other) do not give an answer. We must at some point describe what neuroscientists know about that damage. And for such damage there is an extra irony: many neuroscientists studying that problem would agree that we know much more about it than we know about how our brains store memories.

I cannot, in this column alone, give a complete summary, but for those who may doubt that much is known, a description of some major papers and reports might help.

The most pathbreaking of them all was published in 1970 by K.A. Hosmann and K. Sato in *Science* (168(1970) 375-376). In it they described how they were able to revive a cat's brain after keeping it

at normal temperature (37°C) for 1 full hour. The cat's brain had been separated from the cat and made into a special preparation. At the time of this paper, almost every neuroscientist believed that complete destruction followed the 5 minute limit. This experiment, more than any other, raised serious questions about just what could be done to revive people after prolonged lack of blood flow, something which heart attacks or accidents can often cause.

Since that time both neuroscientists and neurologists (doctors concerned with brain conditions) have all agreed that something can indeed be done. The number of papers about reviving brains from total or partial lack of blood flow increased a lot, and this work still goes on. Finding the right treatments for use in a clinical setting, however, has proven difficult. Yet even within a medical setting, some points have become clear. In 1976, A.L. Bleyaert published his experiments on monkeys (in *Critical Care Medicine*, 4(2)(1976) 130). He could revive them after 16 minutes without blood flow. In this case, he worked on whole monkeys, not brain preparations. The monkeys survived longterm with no obvious brain failures. Among neurologists who study this subject, in some cases, the limit of restoration has gone almost as far in human beings.

Scientists have also looked at the train of events following loss of blood flow to our brains. One major result from such studies (though it makes medical use of these techniques harder) is that total cessation of blood flow has very different effects even from cases in which blood flow is very small. In the first case, comparatively little damaging lactic acid forms in the brain, while in the second, even if the blood does not bring oxygen it brings glucose, leading to much higher amounts of lactic acid. Levels of calcium inside the cells, and seizure activity by our neurons, will also cause lots of destruction. By now some neurologists have learned to use several drugs (nimodipine, naloxone,

pentobarbital) to lessen these effects.

Even before Hossmann, some scientists examined the events due to lack of oxygen or blood flow in brains. (One major purpose of this activity came from a desire to take samples of such brains for study. How well do these tissues represent the condition of normal brain tissue?). In general, cell structures remain close to normal for as long as an hour, and remain recognizable in all respects after as long as 6 hours. (At 6 hours some signs of *incomplete* breakdown of membranes and some rearrangement of mitochondria and nuclei appear). Our lysosomes, full of destructive enzymes, do *not* show any widespread release of their contents even at 6 hours. One scientist studying these tissue changes suggests that most of these changes occur because of membrane swelling rather than any damage which the cells cannot reverse themselves under proper treatment.

For us, one very interesting fact about total lack of blood flow is that necrosis and degeneration of neurons only develops *after* circulation returns. For someone focusing not on current abilities but on future ones, that fact is very hopeful. If we learn enough about those events causing later brain destruction, we might easily learn to stop them entirely.

And, as most readers have guessed, lowering the temperature significantly slows down all of these changes. Yes, Alcor makes intensive efforts to reach its patients while they are dying but not yet dead. However, if we read accounts of suspensions we learn that even now, despite such intense efforts by the suspension team, they frequently cannot quite reach the patient in time. Yet very substantial structure remains in our brains even after as long as 6 hours *at room temperature*. Facts such as these tell us that there is a very real distinction between "death" as now defined and "permanent destruction of information" in our (cryonicists') terms. They still deserve inclusion in the next edition and in Alcor literature in general.

Scientific Literacy and the Myth of the Scientific Method

By H.H. Bauer

University of Illinois Press, 1992

Reviewed by Thomas Donaldson

Nowadays most people believe in the merits of scientific research and the scientific method, at least in a general way. However there has been a problem for at least 30 years. This problem has been used by various people to quite seriously argue against science. It has also led to lots of philosophical writing. The interest of the book I review here is that it presents some ideas about this problem by a scientist, a chem-

ist who, in his elder years, has taken up the study of relations between science and society. He writes his book out of a love and respect for science, not as an attempt to denigrate it. At the end of his book, he has a chapter of praise about the merits of science.

The fundamental philosophical problem in understanding science was laid out several decades ago by Thomas Kuhn, in *The Structure of Scientific Revolutions*. Bauer actually amplifies the problem by discussing his own experience in chemistry. (Kuhn's book remains interesting for anyone interested in how science works.) The problem may be stated simply: there is no such thing as a or the scientific method. What's more, it is very difficult to believe, if we seriously consider the history of science, that science in any clear way comes to approximate truth more and more... or for that matter, that there exists a truth that can somehow be approximated. (I will add myself that Kuhn's book first pointed out this problem to me when it came out, and it led me to think a lot about these issues at that time).

The point about "scientific method" becomes very clear when we consider what scientists of many different kinds actually do. Astronomers are not known for performing experiments, let alone controlled ones. Botanists may scrutinize plants carefully, and try to understand how they live and the different factors involved in their survival, but botany isn't known as an experimental discipline either. Biochemists are not known for quantitative predictions of the chemical behavior of cells or even solutions in a test-tube. . . and so on. Many people may think of physics as the science which gives a pattern on which all scientific explorations should model themselves, but none of the above sciences easily fit into a physics model.

And as for science somehow moving toward an approximation of truth, to make such a statement we would somehow need some way to measure the extent to which General Relativity approximated "truth" better than does Newtonian Theory, and that better than Ptolemaic Theory. All are so widely different that no measure looks possible; nor would a simple

examination of these two theories give us any idea of just what the real truth was about motion of heavenly bodies. (Sure, if we knew already what the truth was we could measure the approximation. But history shows that established theories somehow cease to be so established over time).

Bauer's opinion on this issue is that, first, science requires scientists, and their behavior is critical. For some reason, every one of the disciplines agreed to be a science has produced a form of argument and debate in which final agreement among almost all participants will occur. Bauer points out, for instance, that whether a science is observational (like astronomy or botany) or experimental (as in medical science), participants eventually agree on what was observed and/or the results of experiments. He contrasts this with sociology, political science, and other bodies of ideas in which no basic agreement ever seems to occur on anything. . . even when some people in these fields try their hardest to do controlled experiments, etc, etc. Once such an agreement is reached, a choice among theories available at that time becomes fairly easy. (Note that he does not say that this agreement remains permanent; we've already seen over centuries that it is not).

Such agreements, of course, lead to behavior which does not follow any rigid scientific method. Some observations are ignored simply because they are thought, at that time, to present problems too hard for solution. Some beliefs are also thought to be true because existing theories strongly imply that they should be; this particularly happens when tests of these beliefs become very difficult with the experimental technology of the time. Eventually, of course, observations ignored come back to bite us, and with time yet one more scientific revolution occurs. It remains true that always, somewhere in the neglected corners, genuinely new ideas wait to be commonly seen.

I myself have lived through at least two scientific revolutions. The first happened in geology, when geologists came to agree that plate tectonics explained the geology they saw much better than their former ideas (I can remember reading geological arguments that the coincidence between the shape of Africa and South America was just that: coincidence, and then later reading of all these geologists eagerly working out explanations for geological formations using plate tectonics). The other revolution is closer to home, occurring when neurologists, neurophysiologists, and others changed their ideas completely about the possibility of repairing damaged nervous systems. We may see yet another revolution in cosmology within a few years, too.

ogy within a few years, too.

In my own opinion, Bauer seems a little too lenient toward the idea that the *Consensus of Practitioners* is the basis of science. Even if we decide that the entire notion of "truth" (as of something permanent that we seek to know) must be abandoned, that does not imply that either collectively or individually we have complete control over our perceptions and feelings*. When science becomes experimental, it also comes close to engineering, and the ability to do new things never before seen or done is fundamental to scientific exploration. And theories do play a critical role, both in choice and method for experiments and in design of devices** in engineering. Rather than truth, could we focus on these new things rather than on the theories which acted as props for our mind in devising them?

Besides its interest for anyone who thinks about science itself, this book says something to us as cryonicists. First, on the simplest level it suggests that we ourselves are also inside yet another scientific revolution: for it is ideas about life and death which play a fundamental role in many medical issues. The refusal to listen or understand is typical of that encountered by those who question some notion fundamental to the entire world-view of a group. But there are other relations too: even if our suspension lasts for only 100 years, we can expect to awaken in a world where some significant scientific ideas which we too as members of "modern society" accept without thinking, will be forgotten in favor of something else. Imagine the response of someone from Roman Classical times to the scientific ideas of today. The planets, even the Moon, weren't even thought of as bodies which could be visited and walked on. This may have particular bite for cryonicists who may have even contributed to some of today's scientific theories, and achieved a little fame as a result. We may awaken to find our proudest contribution thought of as one more epicycle in a failed theory.

And finally, no amount of mere argument will change the general opinion. To do so we must do our own research into life and death, and explicate the merits of cryonics by improving both our understanding of suspension and our technical ability to perform it.

* Despite the attempts of politicians, journalists, propagandists, preachers, and others to control such things.

** For the sake of this discussion, a "device" is anything that we build or modify to our plans: animal, plant, mineral, etc.

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The Alcor Life Extension Foundation is a non-profit tax-exempt scientific and educational organization dedicated to advancing the science of cryonics and promoting it as a rational option. Alcor currently cares for 30 patients in cryonic suspension, and has hundreds of signed up Members. Being an Alcor Member means knowing that—should the worst happen—Alcor's Emergency Response Team is ready to respond for you, 24 hours a day and 365 days a year.

Alcor's Emergency Response capability includes equipment and trained technicians in Arizona, New York, Indiana, Northern California, Southern California, and England, and a cool-down and perfusion facility in Florida. Alcor's Arizona facility includes a full-time staff with employees present 24 hours a day. The facility also has a fully equipped research laboratory, an ambulance for local response, an operating room, and a patient care facility using state-of-the-art storage vessels.

Meetings

Board of Directors Meetings

Alcor business meetings are held on the first Sunday of every other month: January, March, May, July, September, and November. (The July and September meetings are on the second Sunday.) Guests are welcome. Meetings start at 1 PM. For more information, call Alcor at (602) 922-9013.

Sunday, September 10, 1995:

ALCOR

7895 East Acoma Dr., #110
Scottsdale, AZ 85260

Directions: Take the 10 to the 17 Northbound, exit Thunderbird Road heading East. Thunderbird will turn into Cactus St, stay on Cactus until you turn left on Tatum, and then right on Thunderbird (which will turn into Redfield in about 3 miles), then (after a quarter mile on Redfield) left on 76th Place. 76th Place turns into Acoma Drive; Alcor is on the right at 7895 Acoma Dr., Suite 110.

Bay Area

Alcor Northern California meetings: Potluck suppers to meet and socialize are held the second Sunday of the month beginning at 6:00 PM. All members and guests are welcome to attend. There is a business meeting before the potluck at 4:00. For meeting information, call Alcor at 1-602-922-9013

Southern California

The Southern California chapter of Alcor meets every month in an informal setting in one of our member's homes. Meetings are on the fourth Sunday of the month. For more information, call Michael Riskin at (714) 879-3994.

Midwest

Alcor Midwest is in full swing. It produces a monthly newsletter and holds monthly meetings. It has a state-of-the-art stabilization kit and responds to six states: MI, IL, OH, MO, IN, and WI. For meeting information or to receive the Alcor Midwest Newsletter, contact Brian Shock at (317) 769-4252, or 670 South State Road 421 North; Zionsville, IN 46077.

Boston

There is a cryonics discussion group in the Boston area meeting on the second Sunday each month. Further information may be obtained by contacting Tony Reno at (508) 433-5574 (home), (617) 345-2625 (work), 90 Harbor St., Pepperell, MA 01463, or reno@tfn.com (email). Information can also be obtained from David Greenstein at (508) 879-3234 or (617) 323-3338 or 71774.741@compuserve.com (email).

District of Columbia

Life Extension Society, Inc. is a new cryonics and life extension group with members from Washington, D.C., Virginia, and Maryland. Meetings are held monthly. The remaining 1994 meeting is scheduled for December 11. Call Mark Mugler at (703) 534-7277 (home), or write him at 990 N. Powhatan St.; Arlington, VA 22205.

Colorado

A cryonics group will be forming in Colorado. Further information may be obtained by contacting Walter Vannini at 111 East Drake Rd, Suite 7046, Fort Collins, CO 80525, or 71043.3514@compuserve.com (email).

England

There is an Alcor chapter in England, with a full suspension and laboratory facility south of London. Its members are working aggressively to build a solid emergency response, transport, and suspension capability. Meetings are held on the first Sunday of the month at the Alcor UK facility, and may include classes and tours. The meeting commences at 11:00 A.M., and ends late afternoon.

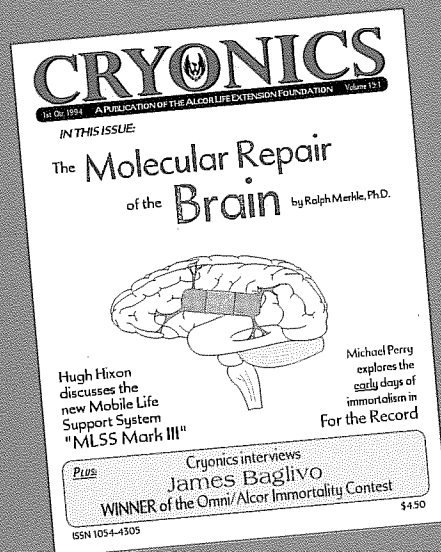
The address of the facility is:

Alcor UK
18 Potts Marsh Estate
Westham
East Sussex
Tel: 01323 460257

Directions: From Victoria Station, catch a train for Pevensey Westham railway station. When you arrive at Pevensey Westham turn left as you leave the station and the road crosses the railway track. Carry on down the road for a couple of hundred yards and Alcor UK is on the trading estate on your right.

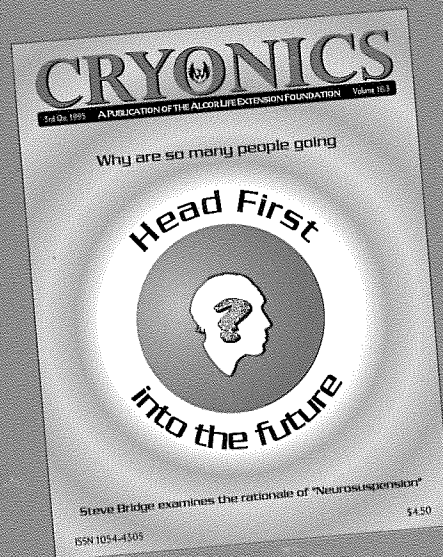
People coming for AUK meetings must phone ahead—or else you're on your own, the meeting may have been cancelled, moved, etc., etc. For this information, call Alan Sinclair at 01273 818558. Near metropolitan London, contact Garret Smyth at 0181 789 1045 or Garret@destiny.demon.co.uk, or Mike Price at 0181 845 0203 or price@price.demon.co.uk.

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