Cryonics

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REBIRTH OF THE PHOENIX

On our cover this month is the Phoenix, a symbol well known to most old time cryonicists and one that has fallen out of favor in recent years. In the early days the Phoenix was the universal symbol for cryonics. It was initially selected by the Cryonics Society of New York and later was adopted by all the cryonics groups. Over the years, with the constant searching for more viable identities and the emergence of "second generation" cryonics organizations anxious to create a brand new image for themselves, the Phoenix largely died as a cryonics symbol.

In the 1970's the byword was projecting an air of technical competence (as we strove desperately to develop it) and the organizational letterheads of the various cryonics groups reflected this. The bold slanted "A" of the ALCOR letterhead and the stark red and black highlights of the Trans Time logo are cases in point. Those were necessary transitions, as those of us who lived through them can attest.

ALCOR has come a long way since then. In large measure we have reached the basic technological milestones that seemed so far away in 1972 when we were founded. It is time now to reconsider our roots and to reflect on our past inspiration.

As part of a gradual but carefully-planned effort ALCOR is step-by-step revitalizing its public interface. And now that we are settled into our new quarters, we are turning a larger fraction of our energy on marketing. It will be a slow transformation, but, we feel, a powerful and worthwhile one. We have returned to the Phoenix because it exemplifies our quest for life and elegantly symbolizes the historical longing people have felt for it.

The tale of the Phoenix is an old one — dating back to one of the earliest civilizations -- Old Kingdom Egypt. The Phoenix, we are told, was a bird of incredible beauty, a creature the size of an eagle with iridescent plumage of scarlet and gold. Its cry was melodious and beautiful, and its lifespan was 500 years or more. And most amazingly, there was only **one** Phoenix. As the end of its life approached, as its beauty faded and its cry grew weak, the Phoenix would use the last of its resources to construct a nest for itself of aromatic boughs, gums, and spices. It would then set the nest ablaze and be consumed in the flames.

But the story didn't end there. For no sooner had the fire begun to cool than the bird, youthful and intact, would spring up from the ashes to resume life once again.

Even to those of us who believe in cryonics, the prospect it offers seems no less miraculous than the rebirth of the Phoenix. Anyone who has seen the ravages of old age and appreciated the degree to which the flames of time may consume us must, at some point, be struck dumb by the magnitude of the task we have set for ourselves.

The old CSNY Phoenix, copied from the logo of the City of Phoenix by Curtis Henderson.

The Phoenix symbolizes both the enormity and the beauty of that task well. It is an old dream, the dream of rebirth and immortality in this life here on earth. It is a noble quest to be as the Phoenix. May the legend of the Phoenix guide us toward the realization of our dreams so that we too rise from our ashes to resume life, vibrant and whole.

The ALCOR Phoenix was designed by Jerry Leaf, Judy Cloyd, and Mike Darwin.

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Beyond Recall

by Mike Darwin

On a Saturday evening in mid-April, a 23-year-old ALCOR Suspension Member took his own life by a self-inflicted shotgun wound to the head. This young man had no prior history of serious depression, and the circumstances and events which precipitated this terrible tragedy are not yet clear.

While the magnitude of such a tragedy in and of itself is almost unimaginable, what happened after this young man lost perspective on his life and committed suicide is, in some ways, an even more incomprehensible tragedy.

The story that has unfolded over the following weeks is one we here at ALCOR are very anxious to fully understand for a whole host of reasons. To the extent we understand what happened and what went wrong in this case we will share it with you, in the hopes that this can be prevented from ever happening again. The background on this tragedy is outlined below.

Several years ago an entire family signed up with ALCOR. The leader in the effort to get suspension protection for his family was a highly intelligent, extremely responsible man who had been involved with cryonics for many years and was thoroughly familiar with its philosophy and even with its "brass tacks" procedures. He was an individual who acted very responsibly and efficiently in making suspension arrangements for his family and who was in not infrequent contact with leaders of several cryonics and life extension groups. While he was the one who initiated making suspension arrangements, he was by no means unsupported by his family. In particular his son (then 21 years old), who was

later to commit suicide, was very enthusiastic about being signed up -- and had long been an ardent advocate of immortalism.

This background is provided in order to put the events which followed the young man's death in perspective. After the father was notified that his son was dead, he did not call ALCOR. Instead, he allowed his son to be autopsied without any intervention by ALCOR, made arrangements for pickup of his son's remains by a mortician who was a friend of the family, and had his son's remains cremated. ALCOR did not find out about the death of this Suspension Member, whose arrangements were in full force, until nearly 4 days after his death, and then only indirectly, when the father called another ALCOR member to inform him of his son's suicide!

For the first time in our history one of our Suspension Members has been lost beyond recall. Several things need to be made clear here. First of all, the Cryonic Suspension Agreement between the son and ALCOR specified that any decision **not** to proceed with suspension should be on the basis of a decision made by ALCOR. The father had also signed and properly executed a Relative's Affidavit stating in part that he would "...immediately notify ALCOR by the fastest means available when I become aware that the Patient is afflicted with any life-threatening illness or injury and/or upon the death of the Patient.", and to "...grant over to ALCOR, without reservation, any and all interests and rights pertaining to the human remains of the Patient..."

Clearly none of these actions was taken and the agreement with the member was not respected. The only thing the father did was to have the mortician take a few scrapings of brain tissue from the empty skull (the coroner had removed the remainder of the brain during autopsy) and collect some fragments of muscle. These tissues were then frozen in a mechanical freezer at about -20°C, where they were stored for nearly a week before being shipped to ALCOR on dry ice. At the time of the son's death, his suspension arrangements were in full force and we had received no prior notice of any kind to cease coverage. Our understanding at this point of the conditions of his remains is incomplete, but a preliminary investigation has revealed that a great deal more brain tissue than the small fragments we received were present after death and were placed in the viscera bag with the rest of the autopsy material -- and cremated.

ALCOR does not consider suicide any kind of cancellation of suspension arrangements. Suicide (of the irrational, "emotional kind" -- not the kind where someone is faced with no other rational means of escape -- such as the terminally ill who are in agony or suffer from loss of quality of life) is an **illness.** It is usually caused by a temporary loss of perspective on life's problems and is invariably related to depression, often with an organic root. ALCOR regards such suicides as merely another of the many possible hazards members may experience, and our action is as vigorous in such situations as it would be if someone had committed suicide say, by smoking cigarettes or overeating -- where there was even more time for a "rational" consideration of the self-destructive aspects of the life-ending action.

Several things **are** painfully clear:

First, it was and is ALCOR's sole and absolute prerogative in this situation to objectively assess the patient's condition, act promptly and

conservatively to stabilize it, and then decide to proceed or not to proceed with the suspension.

Second, despite all the good intentions in the world, no relative or friend is able to be even remotely objective when a loved one is killed or dies suddenly. ALCOR should have been called **immediately** so that qualified personnel could have been dispatched to the scene to make a full examination of the member's remains and to promptly arrange for cryoprotection and freezing of remaining brain tissue so that no more damage occurred until there was time to more calmly and thoroughly evaluate the situation.

Third, neither on the basis of the Cryonic Suspension Agreement nor any other basis: rational, moral, or otherwise, did the next of kin have the right to act independently without calling in qualified, outside, and more **objective** help.

Fourth, there is also the issue of potential conflict of interests in situations like this. This member's arrangements call for a pour-over of assets set aside for suspension purposes in the event the suspension is not possible -- such pour-over in this case is to his parents -- the individuals who were responsible for his cremation.

This entire tragic situation has implications on a number of levels for ALCOR and cryonics. Obviously one of the most pressing issues is "How can we prevent this from happening again or at least greatly reduce the chances?" A corollary of this is: "Why did it happen?" What caused a long-time cryonicist to suffer such a lapse in judgement and to derail the carefully woven system of rescue and notification that had been put in place?

While we can speculate endlessly about the possible reasons for this failure, it would be more appropriate find out why it happened. To this end ALCOR will be carefully evaluating the situation and speaking to those involved. A routine investigation will be carried out to rule out malice or malfeasance and a clear message will be sent that **no one** no matter how well meaning or well informed, has the right or the authority to destroy the "remains" of a Suspension Member or to otherwise make decisions for him or her without direct and unequivocal authorization from ALCOR.

On a practical note there will now be an immediate modification to all new Cryonic Suspension Agreements prohibiting pour-over of funds to any individual or organization whose actions, intentional or otherwise, result in nonsuspension and loss of the member. Those of our Suspension Members who want a similar rider drafted onto their Agreements should contact us, and we'll send it off to you.

We are stunned by the cremation of this Suspension Member and we feel accountable to all of those who will follow to do everything in our power to understand what happened and to take every appropriate action to see to it that it doesn't happen again. We will provide more information on this case as it becomes available.

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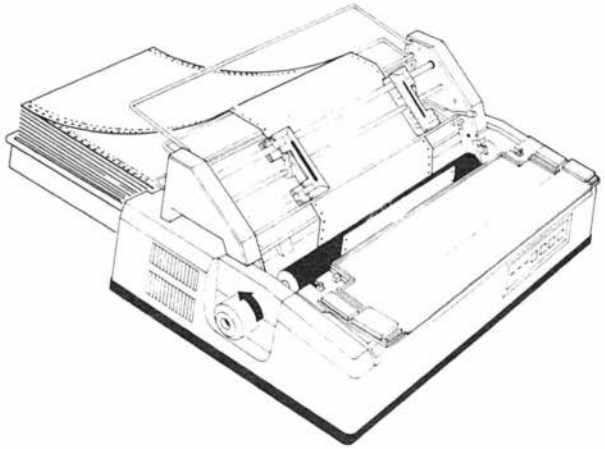
WHAT NEXT?

About a year ago the ALCOR C.Itoh printer (on which **CRYONICS** and most other ALCOR literature is generated) began to suffer symptoms of a disturbing neurological disease -- a kind of silicon chip Alzheimer's. It would occasionally lose track of what it was doing and drop margins or insert letters into words where they didn't belong. Sometimes it would just type a letter or two on its own for no particular reason, at least not for any reason we gave it. The handwriting was on the wall; brain death could not be far off.

On the evening of April 24, the inevitable happened and our printer's tiny mind fell silent — the reliable old workhorse deanimated. We had been saving some money for a new printer, but the move into our new building left us deluged with unexpected expenses. Nothing massive, mind you, just little nickel-and-dime things that added up to some belt-tightening. Our little printer fund was not enough. The new printer cost $835 and it had to be purchased immediately. Not just so that the magazine could be put out, but so that we would be able to respond in an emergency to the endless stream of word-processed documents that are needed in such a situation!



Fortunately, Pat Heller and the Church of Eternal Life and Liberty had contributed $1,000 to ALCOR research at this time, and that money was borrowed from for the purposes of purchasing a printer.

We'd like to replace the money that Pat contributed to the Research Fund ASAP and we are asking for your help in doing that. If you can spare a little cash for the new printer, please let us know. We can use it!

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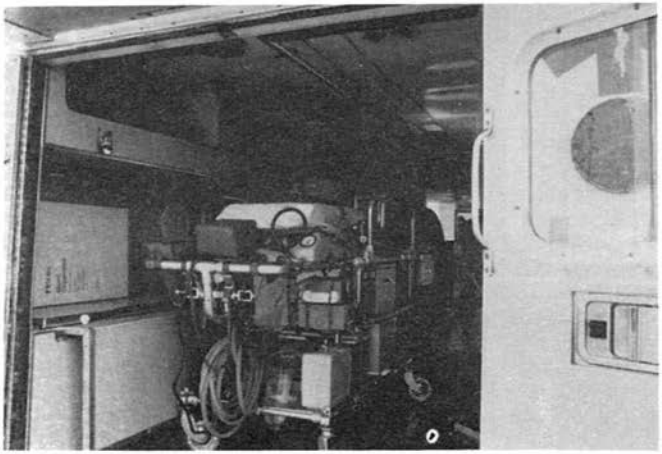
THE ALCOR AMBULANCE

As regular readers of CRYONICS will probably remember, ALCOR suffered a significant loss during our move due to an accident involving the Cryovita van (which ALCOR was relying on for emergency transportation of suspension patients). The van had become increasingly critical to our emergency response capability as we upgraded our response technology. With the development and deployment of the Mobile Advanced Life Support System (MALSS: a heart-lung machine and portable "operating room" mounted on a standard ambulance cart) we were no longer able to rely on a standard ambulance or mortuary vehicle for transporting equipment and patients. The van had become indespensible.

But, truth to tell, the Cryovita van was far from ideal for use of the MALSS. It was designed for hauling "freight" (including **normally** functioning human "cargo") and it lacked the interior room and cabinetry which was rapidly being seen as essential for properly supporting not only the MALSS, but any quality transport of patients, including heart-lung resuscitator transport. Thus, the loss of the Cryovita van was more or less the last straw that motivated some bold action.

What we did was to go out and buy a used modular-type ambulance. Modular ambulances are the large, boxy-looking ambulances used by paramedics and they are practically an emergency room on wheels. The new ALCOR ambulance has a Gross Vehicle Weight of 10,400 pounds, internal power, air conditioning, wall oxygen, and suction. It was recently repainted and is gleaming white and green. It is in excellent condition.

Shortly after we purchased the vehicle it was inspected by ALCOR Suspension Team member Scott Greene. Scott is an Emergency Medical Technician (and a 3rd year nursing student) who drives ambulances for a living. Scott pronounced the vehicle a stunningly good deal and noted that it was in far better condition than half the ambulances he drove!



We have now completed our reoutfitting of the vehicle for cryonics rescue purposes. The MALSS is mounted securely in place with cot rails which allow for quick dismount, the numerous cupboards and cabinets have been stocked, and the oxygen compartment has been loaded with a 220 cubic foot capacity cylinder.

The ambulance is currently undergoing some mechanical repairs for a leaking power steering fluid seal and a few minor transmission leaks — but otherwise runs well. It is stored indoors in the vehicle bay of the new facility, safe from the sun, rain, and intense heat that filters into Riverside from the neighboring Mojave Desert.

Once the vehicle has been put in tip-top condition mechanically, it should be reliable enough to support very high quality remote standby (including total body washout and deep cooling of patients) in the neighboring states, greatly expanding the territorial range to which ALCOR can deliver Advanced Life Support service.

The ambulance has picked up the name "Millenium Falcon" — and this seems appropriate given that it is "used" and given its job of streaking across time and space to life-or-death battles. Jerry Leaf has taken the role as Han Solo (commander) and ALCOR's young physician has accepted a position as Luke Skywalker. (Mike Darwin has been nominated to serve as Wookie because of his expertise at moaning and groaning).

All humor aside, we're glad to have the Millenium Falcon and it represents a tremendous improvement in our capability to respond to emergencies and deliver the very highest quality care.

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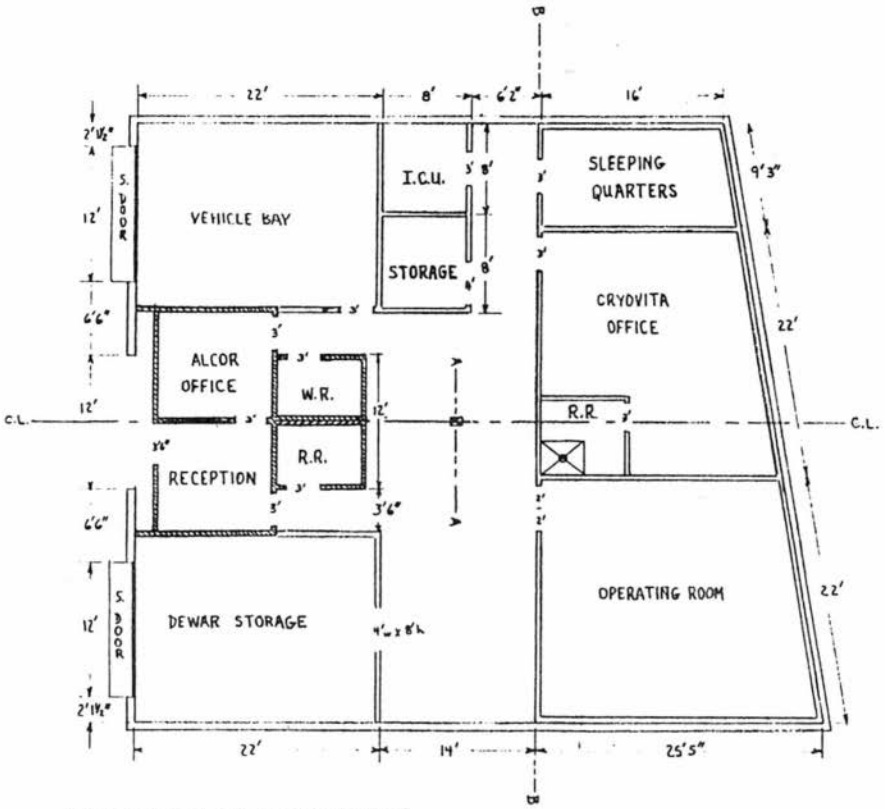
A Photographic Tour Of The New ALCOR Facility

Staff

Not everyone will have been able to make it to the ALCOR Facility Grand Opening to be held a little later this month (May 22-25). In particular there are overseas ALCOR Associate and Suspension Members (some of whom have provided generous financial support for the new facility) who will not be able to attend the open house, or even visit the U.S. to see the facility any time soon.

Thus, we have tried to do the next best thing: give you a remote tour of our new quarters with a series of photographs. But we should warn you at the start that pictures cannot and do not do justice to the reality. They can only provide a sort of peephole perspective on what is really there. To appreciate it you need **see** it, and you also need something that we just can't give you: perspective on just how far we've come. Old-timers in cryonics will especially appreciate the photos that follow.

For the record, the new ALCOR Facility is a tilt-up type steel reinforced industrial building. The building covers about 3,200 square feet and has two stories for a total interior area of of about 5,000 square feet. It is located

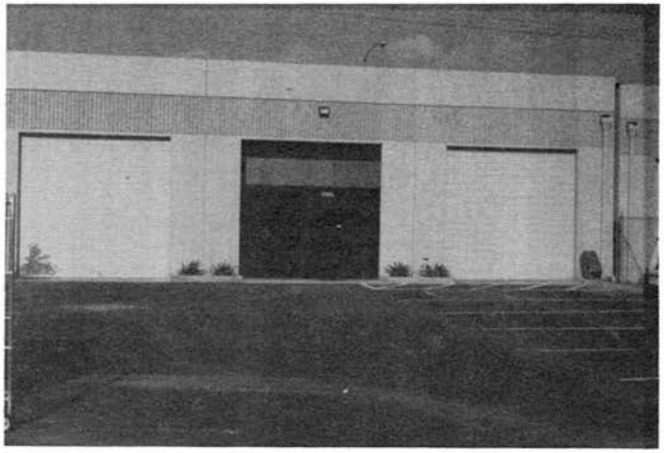


Construction drawings by Jerry Leaf

in an industrial development on a 9,000 square foot lot in a very pleasant industrial/residential section in Riverside, California. Riverside is a rapidly growing community of 180,000 people nestled in the foothills of the San Bernardino Mountains. A group of ALCOR Suspension Members, in cooperation with ALCOR, own the facility. We have an outstanding mortgage of about $22,000 with about $170,000 worth of equity in the structure. That is currently the only long term debt that either ALCOR or the Symbex Property Group (which purchased the building) owes.

The picture essay on the following pages does not tell the whole story. Due to low light levels (and absence of sophisticated equipment) we were unable to successfully photograph any of the offices or the conference or equipment storage area upstairs. So you'll only be seeing the ground floor level of the facility -- and not all of that either, since some areas, such as the Cryovita office, are currently unavailable for photography. The pictures that follow thus cover about 1/2 of the facility. They are, however, the "working core" of the operation and the parts that members should be most concerned about. We wish the quality of the reproduction were higher, but the constraints of quick printing and the reduced format of the magazine work against high quality reproduction in pictures. Hugh Hixon deserves special thanks for his effort of a couple of (frustrating) days duration in shooting these pictures.

Now that all the technical details are out of the way we will, without further ado, start our tour-at-a-distance. We provided a floor map on the opposite page to guide you through the labyrinth of pictures.



1

(1) The first stop on the tour is the building itself. It's desert tan in color and looks an unprepossessing part of the California landscape. It is part of a nine-building development, and one of the few less than desirable aspects of the site is the closeness of neighboring structures (although our neighbors are all pleasant people). The building has two roll-up steel doors and looks very unprepossessing from the outside.

2

(2) When you walk through the personnel door into the reception area you encounter a pleasant, warm environment with overstuffed furniture, pictures on the wall (including Ansel Adams and Escher prints) and an aquarium with tropical fish. The reception area also has a "coffee cart" with microwave and water cooler.

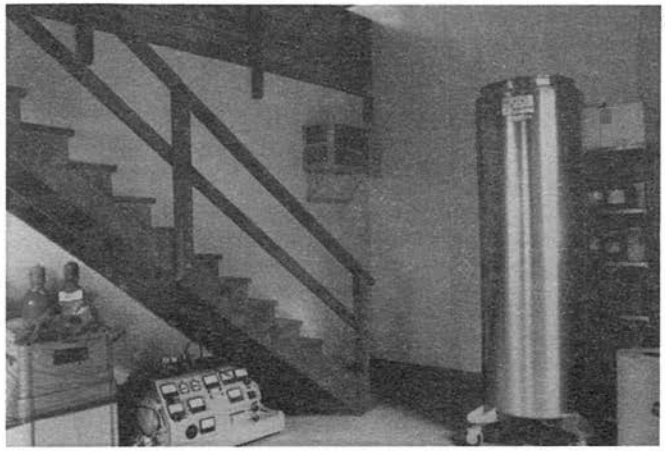
3

(3) If you **don't** walk through the open door in the reception area picture above, but instead make a left hand turn and walk in front of the water cooler, you find yourself in the office

— the administrative nerve center of ALCOR. The Kaypro Computer sitting on the computer desk adjacent to the printer is the workhorse that these words were written on. This is where CRYONICS magazine takes shape every month. The office also has another computer in it -- an MS-DOS machine which handles an increasing load of work.

4

(4) If you return to the reception area and walk through the beckoning open door in the photograph, you negotiate a short hallway. To your left is a restroom with a full-sized shower (not shown) and straight ahead is the central laboratory and work area. We had a rough time getting a good shot of this area, and we hope this communicates a sense of the space it has. Yes, folks, that's really all there! The laboratory area has two deep sinks, a distilled water outlet built right into the wall(!) and about 40 feet of counters (hallelujah!!!). This compares with 8 feet of counters in our previous quarters! This area also features extensive over- and under-counter cabinetry -- eliminating earthquake-susceptible shelving.



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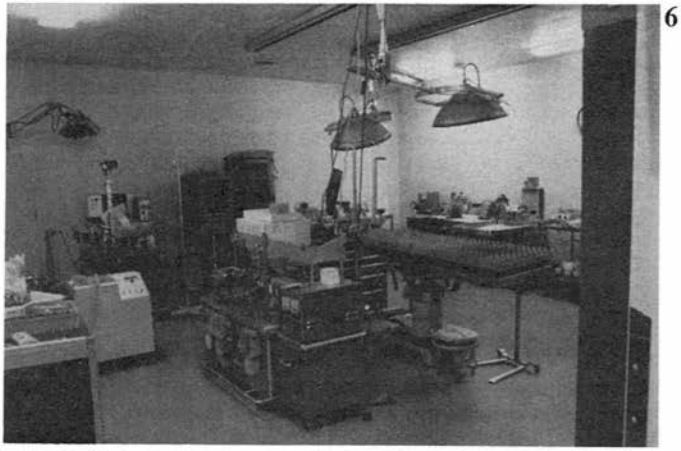
(5) Looking in the other direction you'll see the stairs leading to the upper level dining/conference/office and storage areas. The air conditioner in the picture is for the Operating Room (which is on the other side of the wall the stairs are mounted on). There is central oxygen/nitrous oxide delivery in the facility and the gas bottles which feed this system are secured to the wall under the stairs.

(6) If you turn your gaze from right to straight ahead and proceed forward you will enter the Operating Room (OR). Anyone who's been around in cryonics usually goes **Oooooh!** and/or **Aaaaaah!** at this point. The OR is BIG. In fact, it's bigger than the open heart surgery OR at UCLA. It was designed by people who worked in the OR in our previous facility. We needn't say anymore!



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(7) If you keep on going and walk to the back of the OR and turn around you see the cabinets full of sterile supplies (and the double doors leading to the central lab area). As both this picture and the preceding one show, we are very well equipped. The OR has a wide range of capabilities including state-of-the-art overhead track surgical lighting, heart-lung machine, cautery, pressure monitoring, pH and blood gas equipment, patient weighing scale, and anesthesia equipment for animal research.

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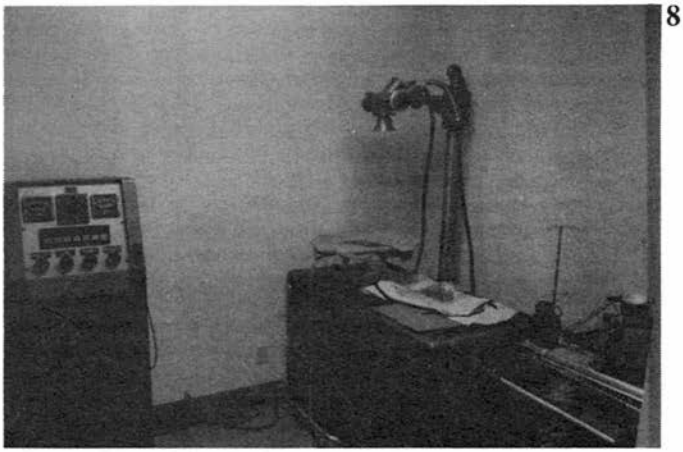


8

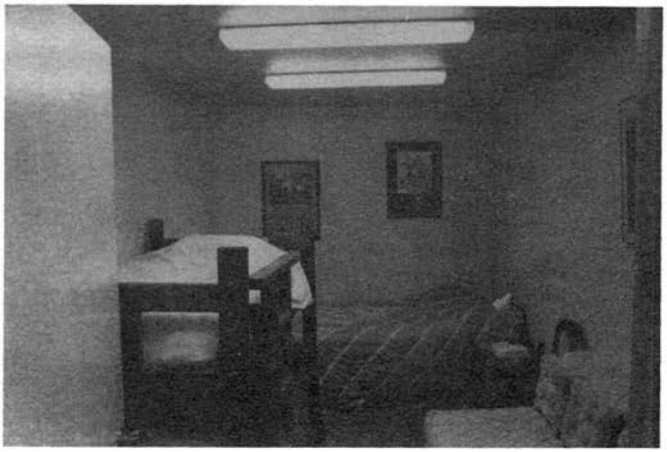
(8) If we walk out of the OR through the double doors at the right of the preceding photo and make a right hand turn and continue down the length of the laboratory area, we will come to a room with double doors on the left of the hallway. This room is an animal X-ray facility and it is also

used for storage of photographic equipment (although not film!). The X-ray unit is an old 75 ma machine, but it works and the development of new rare earth screens for X-ray film has made high quality chest X-rays readily achievable with as little as 15 ma of radiation -- a boon to technicians and beasts alike!

9

(9) The next room on the left is the animal lab/ICU. This room is for post-surgical care of research animals and also contains a lab bench for routine blood/urine analysis and for carrying out special procedures and preparing medications and IV's. The baby playpen barely visible to the right is used as an ICU bed for post-washout dogs. The ICU has oxygen outlets in the wall over the animal care area.

(10) Directly across the hall from the ICU is the "crew room". The crew room is a "crash room" for weary suspension personnel and also serves as a sleeping facility for volunteers who come in on weekends or weekdays to work for a prolonged stretch at ALCOR (and who live far enough away that a drive home at the end of the day isn't possible. The crew room can sleep 5 people (if two don't mind getting cosy) and is also used to handle occasional guests from out of town.



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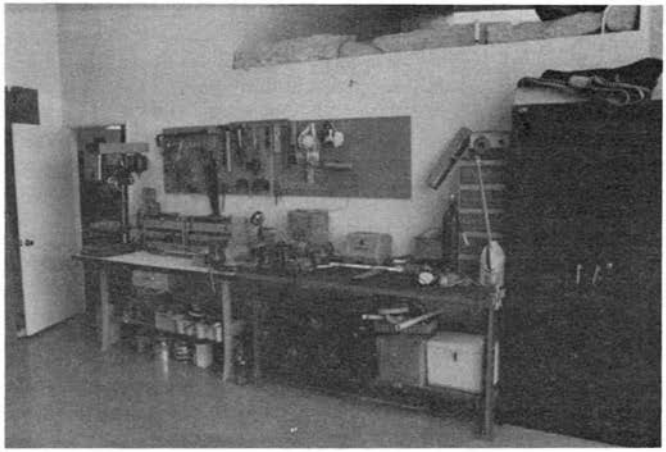

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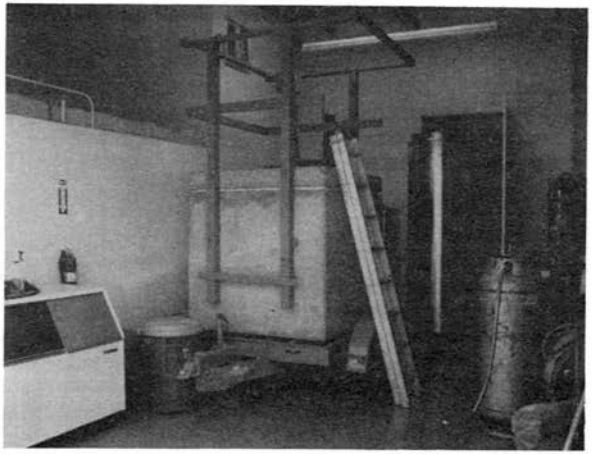
(11) If we turn around and walk back up from the end of the hall and make a hard right at the first opportunity, the next door we encounter is the entrance to the vehicle bay and shop. This picture shows the shop area (the ambulance is outside on the tarmac). The shop is pretty well equipped, although we could use a good lathe and a radial arm saw!

(12) Directly opposite the shop on the other side of the office and reception areas is the Patient Care Area (PCA). The PCA houses the vault for neuro patients, some heavy duty equipment we're not now using, and also features a 10 foot high door which upright MVE-type dewars can be rolled through. In fact, as you can see in this picture a dual patient dewar is sitting in the doorway.



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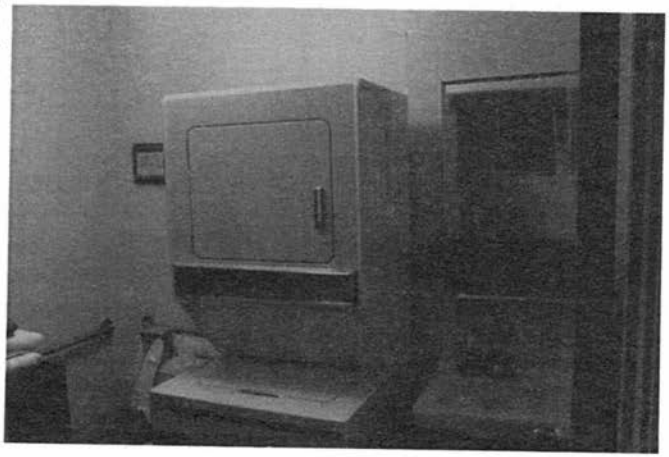
(13) Last but not least are our two watch dogs, Dixie and Slinky. Dixie is also a former washout dog and has spent over 4 bloodless hours at a few degrees above freezing. Dixie is getting on to middle age for a Shepherd (she's about four years old) but still feels her oats. If ALCOR worker Mike Perry seems to be standing a little at a distance from Dixie, it's because she had tangled with a skunk the week before. In our opinion, Dixie lost! Her luck hasn't been running real well lately; before she tangled with the skunk she was crying her eyes out at being deprived of her rightful stardom by Miles the beagle (we found a badly chewed copy of **People** magazine under her bed!)

13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(14) Oh yes, we almost forgot to show the laundry room! Don't laugh, we're not near any laundromats and we've already had enough bad experiences taking blood-soaked linens into commercial laundromats! (I beg your pardon! The nerve of accusing me of being an ax murderer!).

So that's it folks. A "taste" anyway. And of course it goes without saying, come out and see us some time!

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"It is a mistake to believe that a science consists in nothing but conclusively proved propositions, and it is unjust to demand that it should. It is a demand only made by those who feel a craving for authority in some form and a need to replace the religious catechism by something else, even if it be a scientific one."

-- Sigmund Freud

Being There

Staff

We have received about an equal number of kudos and kicks for our coverage of the media event surrounding Dr. Paul Segall's announcement of a medical breakthrough in perfusion techniques, and the conflict between ACS and ALCOR. Half of the people calling up want us to go for blood, the other half say, "Ignore it, don't mention it and for heaven's sake don't say anything negative -- it will only create ill will and cost you members!" Still others say, "Hitch yourself to his star!, see if you can get some glory too!"

Right now, however, we are doing none of these things, just enjoying a little merriment. Yes, folks, we've gone from anger to deprression, to what might be called a state of amusement. The story, when you think about it, is not one to take too seriously, although there are some very serious issues at stake. Since the last edition of CRYONICS, the Segall media star has continued to rise to new and unbelievable heights. Dr. Segall and ACS Governor Dick Marsh were on the **Phil Donahue** show opposite a cryobiologist/Jesuit priest (and former editor **Cryobiology**) who seemed out of his element and was clearly outpointed as a debating opponent. Instead, the Donahue Show went very well for Dr. Segall and ACS, and its coverage was, on balance, pretty favorable towards cryonics. More importantly, ACS got the Cryonics Coordinators' toll-free number on the air and we understand this resulted in between 500 to 600 phone requests for information.

Beyond the Donahue Show we understand that Dr. Segall and colleagues have been invited to write a lay-level description of their protocol for the White House for evaluation in anticipation of a possible meeting with the Reagans (one can just see Dr. Segall with the Reagans patting Miles on the head in The Rose Garden!) All of this is simply too much! We have to laugh!

Now, as to those folks who are unhappy with us. Well, let's look at their objections with the **long view** in mind, rather than the hype and hoopla of the moment:

First, we want to address this notion that public relations is everything. Yes, we know about and we agree with the notion that discussion of negative issues will cost us members and may act as a "wet blanket" for some newcomers. Our response to this is "tough, those are the breaks." The leadership of ALCOR does not have as its sole criterion for success the number of new members that

we acquire. Growth is important, but it must be informed growth, **balanced against other important long-term considerations.**

We do not subscribe to the notion of selective filtering of information for public relations reasons. We believe that it is important for an organization to look good, to have a good image, and to have literature and people whose appearance represents it well, with balanced coverage of events. The key words here are "represents it well". We are not interested in creating plastic images for consumption by prospective members (or existing ones for that matter) which do not reflect what **is really there.** We would no more misdirect our members on critical issues which are considered sensitive and important by ALCOR leadership than we would misdirect them by showing photographs of nonexistent facilities or listing personnel on our suspension team who don't exist.

Yes, we know this could cost us some members. But we believe that's a worthwhile price to pay in the short run. Because in the long run, if our coverage of these issues is just, honest, and "on the money" we're going to be vindicated, and that, more than anything else we can do, will act to **improve** our credibility.

Second, we cannot "ignore" or "remain silent" about a major media ejaculation such has occurred in the case of Dr. Segall and Beagle Miles. Our members and prospective members need to know what's going on! In fact, several people have called to thank us for our forthright coverage of the dog work and hamster controversy long before it became a media focus — these people called to say that our coverage in the past had helped them to understand what was **really** happening and to put it into proper perspective.

Also, and very importantly, if and when reporters or others show up on our doorstep wishing to do an "exposé" on cryonics we want to be (and now are) in a position to point out the virtues of conservative, responsible representation of our achievements and capabilities. We have enough scientific and technical acumen to recognize when the real breakthroughs occur — the kind of advances that bring us closer to true suspended animation. And we have the wisdom to present our case fairly to the public.

Finally, as to the notion of hitching ourselves to Dr. Segall's star -- we have our own agenda and style, and "riding another's coattails" is not part of it. The votes aren't all in on what Dr. Segall has done with the cooperation of the media. He may sail smoothly through this — and he may not. We are of the opinion that "them wheels grind slow -- but they grind fine." Only time will tell.

So how are we going to deal with this? By going on and doing exactly what we've been doing all along — and doing it better. That means careful, responsible promotion of cryonics and education of the public. It means continuing to conduct good, basic research which has scientific

worth and thus potential human benefits. And it means continuing to do what we've done all along -- building our reputation as a reliable and responsible source of information about cryonics. A source of information whose bottom line is not "my God, what will the public think?" but, "is this the truth and will it best serve the long term interests of everyone concerned?"

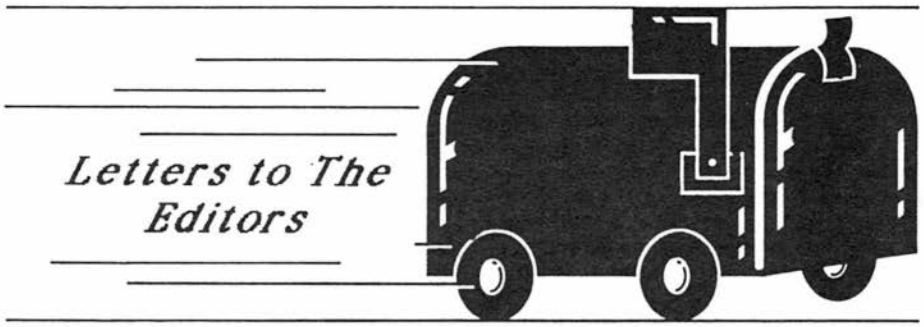
As we said a few months ago, the glamor acts will be here. And they are here. Their bottom line and their operating criteria will be different from ALCOR's. What we are saying is that we feel that in the long run, those who depend mainly on these tactics are going to lose.

Could we be wrong about this and the approach we are taking? Is the best route the one paved with media hype? In considering the Segall affair (White House and all!) we are reminded of the film **Being There**, which starred Peter Sellers as Chauncey Gardner, a man whose perception of reality was totally shaped by television. Chauncey Gardner was an affable, mildly retarded fellow who had worked as a gardener since childhood in an isolated home in Washington, D.C. His total perception of life was shaped by television -- which was almost his only human contact. When he is thrust out into the world in his mid-40's, he shortly goes from wandering the streets to shaping foreign policy and he becomes an unprecedented media sensation. Soon he is on the Johnny Carson Show, hobnobbing with heads of state, possibly even headed for the presidency. How does he manage it? Why, by saying exactly the kind of vacuous, nonspeak, hype-laden things he has heard on TV. In fact, there is no meaningful content **at all** to what he says.

The film closes with Chauncey strolling along the banks of (presumably) the Potomac. Quite naturally he makes a turn and, folded umbrella in hand, he calmly strolls out over the water. This ending to **Being There** upset a number of ALCOR people who saw the film some years ago. They were upset because they felt it detracted from the "reality" of the film. We have always felt that in fact these folks failed to get the take-home message in **Being There.** In the world today the media (at least in meaningful short term timescales -- like your lifetime and mine!) **can reshape reality.** They can, in many instances, seemingly rewrite the laws of the universe!

The point of this discussion is, "Yes, we could be wrong about our approach." The careful, realistic approach may not win instant popularity. But then, our criterion for success isn't instant popularity, but rather to get the job done well and to get where we're going.

It's a long road ahead. There will be many strategies proposed to negotiate the twists and turns we confront. Our approach, in a broad sense, is outlined above. It is up to each of you to decide if you think it worth betting your life on.



To the Editors:

Passage of the California Humane and Dignified Death Initiative (May CRYONICS) is of importance to everyone, but of critical importance to cryonicists. Everyone should support the Initiative because it gives control over our deaths to US, rather than to the State or the medical establishment. Cryonicists should support the Initiative because the alternative could be very bleak indeed.

What are the options, currently, if you are faced with an incurable condition that causes progressive deterioration of the brain -- something which cryonicists want to avoid at all costs? Current options are all bad. You can: (1) let them keep you alive while your brain gets destroyed; (2) withdraw all life sustaining procedures and/or passively starve yourself to death, or; (3) actively commit suicide.

The third alternative I prefer to call "rational" suicide because it is a thoughtful and reasoned response to an incurable situation, involving severe pain or disability, in which a person should have a clear right to say "enough." It is quite distinct from "irrational" suicide resulting from an emotional depression, which is potentially treatable and reversible.

Rational suicide may be an appropriate solution for many people, but it is fraught with peril for cryonicists. The Hemlock Society (PO Box 66218, Los Angeles, CA 90066) has published an excellent book ("Let Me Die Before I Wake" by Derek Humphry) which supports an individual's right to rational suicide. The book includes emotion-laden case histories as well as information on what drugs are most available and most effective. Possible effects of the drugs on the brain are not discussed, as the book is not written from a cryonics perspective.

Rational suicide has two main problems. The first problem is that people usually don't want to do it until they are no longer physically capable of doing so. People in this situation need help, which is currently illegal. The second problem is that the circumstances conducive to a well-planned rational suicide are definitely NOT conducive to a cryonic suspension. A successful rational suicide usually requires privacy -- one should never try it in a hospital, for example. Some people have left notes explaining their reasons, and threatening to file civil and criminal charges against anyone who interferes, but this still offers no guarantee that they would not be interfered with if discovered. For cryonic suspension, however, you do not want to be found hours later -- you want a cryonics team standing by.

The rub here is that if you wanted to commit rational suicide, you could not inform ALCOR of your decision. Although suicide is not illegal, aiding or abetting suicide is, and having an ALCOR team standing by would place them in a wholly untenable legal position, complicated further by the "conflict of interest" in which ALCOR financially "benefits" from your death. Even if you did NOT inform ALCOR of your decision but tried to secretly commit suicide while cryonics personnel were standing by, you would be placing them in similar jeopardy. And if your death were at all suspicious, you might also incur the risk of autopsy.

Rational suicide therefore does not seem to be a viable option for cryonicists. The option of turning into a vegetable is certainly not a desirable one even if the chances of revival after suspension were zero. Which leaves us with the option of removing all life support and passively starving to death, the best option our currently "free" society offers us. Discussion of these options is unfortunately not just a theoretical exercise. A significant fraction of us will have to face these choices, and no one can predict which of us it will be.

So I don't regard it as a tough question whether or not to support the California Humane and Dignified Death Initiative. As human beings, we should and must have the right to have control over our lives and our deaths. As cryonicists, our door to the future may well be at stake.

David Brandt-Erichsen
Tucson, AZ

Dear Sirs,

Re: "A Universe Too Good To Be True", CRYONICS, May '87

I found the discussion of the anthropic principle, the many worlds theory, and general relativistic stress-energy calculations very persuasive, informative, and interesting, however,

I still think the universe is a bastard.

Yours faithfully,
Garret Smyth
London, England

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"The universe is full of magical things patiently waiting for our wits to grow sharper."

— Eden Phillpots

Cryonics: How Much Is Best?

by R. Michael Perry, Ph.D.

An earlier version of this article appeared in the **Abiolysist Macroscope**, Jan.-Feb. '87, and is reprinted with the permission of the author.

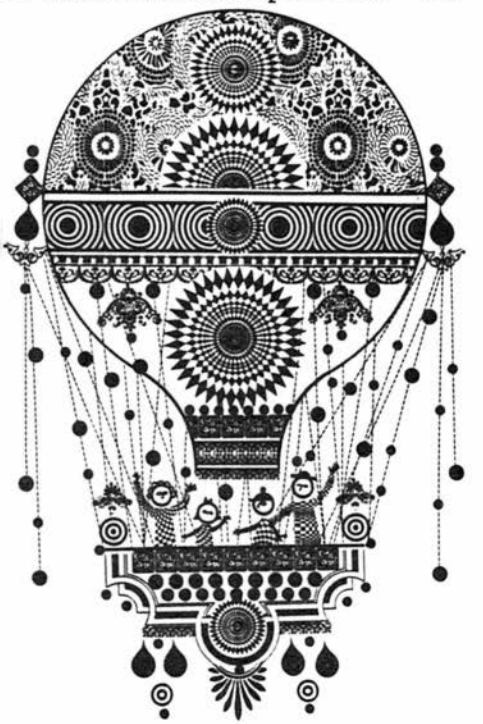
Through the freezing of our remains, particularly the brain, we hope to preserve enough information so that repair and revival can eventually occur. Two important kinds of information we expect to preserve in frozen remains are (1) the genetic code stored in each individual cell, and (2) memory information in the brain. A good case can be made that these two forms of information are adequate to characterize the entire personality, so that the brain alone should be sufficient, given that brain cells, like other cells in the body, contain the genetic code.

Preserving information clearly is necessary if we hope to survive clinical death. Is it sufficient? This is a controversial question in cryonics, some feeling that a reconstruction must contain the original material to qualify as "you" and not a copy. My own position has shifted over the years; I used to be an "original-materialist" but now feel that information alone is sufficient. (Some interesting philosophical arguments can be advanced for this position, but will have to wait for now.)

The question of sufficiency is also related to another question, that of what type of cryonic arrangement is appropriate, or, we might say, "how much cryonics is best?" This, of course, depends on one's point of view. A number of options are technologically feasible, ranging from tissue sample preservation (genetic code only, not the brain) up to whole-body freezing. Although most cryonicists (that is, those who have made actual arrangements for part of their bodies to be frozen in the event of death) favor at least the preservation of the brain, there are other people who find more modest options reasonable. A biophysicist friend of mine, for example, confidently estimates that "80% of the

personality" is contained in the genetic code. (As evidence he cites studies of identical siblings separated in infancy who lived strikingly parallel lives.) Others have expressed the view that, while the genetic code alone may not be enough, an adequate characterization of the personality could be obtained if, in addition to this, we include personal mementoes such as diaries or videodisks. Revival of a frozen "subject" thus would involve replicating the body (including the brain) by cloning or some equivalent, and then programming the "blank" brain with the information contained in the personal records. With this approach it would be unnecessary to store any large part of the body, and the cost could be greatly reduced for what storage would be needed. With the reduction in cost would come greater security; just as it is easier to store a small tissue sample plus records, it should be easier to protect such materials against loss or damage.

My own feeling, however, is that there is information in the brain that would be very difficult or impossible to record through available media, so that preservation of the brain is highly desirable. (Personal mementoes could still serve as a useful backup, however.) Memories can have emotional as well as factual content. Emotions can be very complex, and there is no adequate language for their many subtleties. To take one cherished personal example, I remember a number of popular songs from the 1950's, when I was growing up, each with its own subtle shades of feeling, which I have no idea how to precisely describe. (To attempt to do so would, I think, be like trying to describe a symphony in words, without reference to musical notation.) Presumably such associations of feeling with music would vary from person to person, so that (on this basis alone) each individual must have a wealth of incommunicable experiences. The information in memories is important, then, and can only be retained by preserving the brain structure that encodes it. This judgment, of course, is strictly a personal one; many do not appear to value their past experiences much (but then, not many are cryonicists).



But, on the basis that memories are important and may not be reconstructible from recorded recollections or other memorabilia, the brain should be preserved at clinical death. (This, of course, assumes that memories will be recoverable from frozen brain tissue, something that is not definitely known. It is suggested, however, by certain evidence such as the high degree of structural preservation seen in frozen tissue and the known redundancy of memories.) Preserving the brain is most easily accomplished by preserving the head without the body, an option available through several cryonics organizations. Should one go further? Again, there are differences of opinion. Those of us who advocate neuropreservation or head-only freezing argue, for example, that it will be easier to regrow a body (by cloning or other methods) than to

repair a brain, so that whole-body freezing offers no significant advantages to offset its greater cost, inconvenience, and risk. (In particular, freezing protocols can be better adapted to the all-important brain if the body is not also preserved, so that head-only patients may actually suffer less injury in the end.) One argument I have heard for whole-body freezing runs that significant information is stored in the spinal cord, information involving motor activities, such as walking, riding a bicycle, or making love. This, of course, would be lost with head-only freezing, but it could be relearned, and the case of quadriplegics, I think, offers reasonable proof that the essence of the personality can survive in what is essentially a "head-only" state. These unfortunate victims must subsist to the end of their days in this degraded condition, but if all goes well, head-only cryonics patients may have a joyful experience learning to control and operate their new and capable bodies.

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A USE FOR AGING!

by Keith Henson

In spite of significant advances in the average lifespan over the last century, there has been little or no increase in the maximum life potential for humans. The difficulty of influencing maximum life span has led to speculation about a "death program," presumably written into the genes. Modern evolutionary theory insists that if such a gene-based program exists, it must have adaptive value for the very genes that code for it. Speculations on what possible value a "death program" could have has led to convoluted "good for the species" arguments that are absurd from the viewpoint of modern gene-oriented evolutionary theory.

I think something much like a "death program" does exist, and it may be very important in limiting our maximum life potential, but I will argue here that aging and resultant death may be side effects of something genetically advantageous that we would (currently) be hard put to do without.

In the language of modern gene-based evolutionary theory, "advantageous" roughly means that the influence of the gene X will make it more likely that more copies of gene X show up in the next generation. Such wording permits viewing behavior that would seem to be altruism as under the influence of "selfish" genes. (The mathematical biologist Hamilton discovered that a gene for suicidally saving more than two brothers, or more than 8 cousins, would spread in a population.)

In a similar way, a "gene that causes death" could spread in a population if the same gene (for example) also induced providing better maternal care so that more offspring survived. Such a "death inducing gene" actually seems to exist in certain species of octopus where maternal egg-tending behavior normally ends in death from lack of interest in eating. It is fairly easy to see how (from a gene's viewpoint) such fatal behavior could be favored. If leaving eggs unguarded while obtaining food were an almost sure way to lose all the eggs, genes inducing such maternal anorexia would be favored. There may not be enough added gene survival potential to evolve a mechanism for switching off this behavior at the end of the egg-guarding period.

The periodic bamboos are a truly remote relative of the octopus, but they too die after sexual reproduction. The bamboos have evolved a particular predator evasion technique for their seeds. They simply don't have any for as much as 120 years, then all of a particular variety set an enormous amount of seed and die, providing a seed bed for the next generation. In recent years this plant strategy has been causing trouble for the giant pandas, who eat the new stems of bamboo. The 13- and 17-year locusts have evolved the same evasion technique of swamping potential predators at long intervals.

Given that programmed death has evolved in a number of species, is there any evidence for it in mammals? If so, what genetic advantage does it provide? Surprisingly, there does seem to be evidence of a "death program," and as expected, it does seem to contribute to our genetic fitness.

Cellular senescence, that is, the limited division potential of differentiated cells, has been known for over 20 years. It is also called the "Hayflick limit" after the discoverer. For a long time the accumulation of errors in genetic material was the leading theory for this well-known phenomenon, but in the last few years, the mechanism whereby "senescent" cells stop dividing has been elucidated. Such cells actively turn on the synthesis of a protein which locks up DNA replication. Researchers have detected and named this protein "statin."

Direct evidence that couples cellular aging directly to whole body aging is limited, but the progeria victims who die of what seems to be accelerated old age (with the exception of cancer) by their early teens are known to have greatly reduced division potential in their cells. It is also interesting to note that progeria seems to be a development error, perhaps in resetting the division potential, and not a genetic defect. (If it were a genetic defect, progeria would "run in families," and it does not.)

A characteristic of cancer cells is that they are not subject to the Hayflick limit; they become "immortalized" as part of the process of becoming cancerous. This is also true of cells treated with certain viruses, a process widely used to culture cells for antibodies.

Cell fusion studies of cancer cell lines have determined that the process of making a cell "immortal" is reversible. What researchers did is restore limited division potential to cells formed by fusing two cancerous cell lines. There seems to be a fundamental link between cancer and cell division limits. Ten years ago, I proposed that a programmed limit on cell division could be a strong check on cancerous cells. A cell that went wild without losing its division limit would only grow into a small harmless lump of cells. (I missed by several years being the first to suggest this link.)

It is easy to see the advantage of a strong limit on cancer, especially if lacking it would cause significant mortality before reproduction. It is known that invasive cell lumps which look cancerous (but are not) are commonly found in almost everyone. Real cancers would require at least two changes: one to grow wildly and another to escape the cell division limit [Three. The cancer has to release the hormone that causes blood vessels to vascularize the cancer. Otherwise, the cancer starves. -Ed.]. There is considerable evidence for cells requiring "multiple hits," that is several changes, to become cancerous.

If aging is an effect of running out of division potential, we eventually pay dearly for protection against cancer. But our genes don't care; they have already jumped ship for the next generation.

What does it mean for us, and for the prospects of life extension in general, if aging turns out to be a side effect of an important defense system against cancer? The "death hormone," some researchers are looking for could be widely distributed as a limited cell replacement ability, and very hard to treat. Body-wide resetting of the division counter limit (with a programmed virus, for example) would be a very bad idea -- you would break out with a thousand cancers!

It is fairly clear that cell repair machines (necessary for reanimation anyway) can deal with resetting counters as needed and weeding out or fixing cancerous cells. But if cancer and aging are intimately connected at the cellular level in the way the evidence and the logic of evolutionary process seems to indicate, then it may be hard for anything less than all-out advanced nanotechnology, i.e. cell repair machines, to make much difference in our life expectancies.

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> "Our results support the hypothesis that limited proliferation is a result of a rigorously programmed series of events and that immortality is caused by certain changes -- recessive in hybrids -- in these events. The result argues strongly against the hypothesis that errors in the protein-synthesizing machinery of cells or recessive mutations are responsible for limited division in normal cells."

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C.K. Drescher-Lincoln and J.R. Smith, "Inhibition of DNA Synthesis in Senescent-Proliferating Human Hybrids is Mediated by Endogenous Proteins", **Experimental Cell Research, 153,** 208-217 (1984).

> "These results support the hypothesis that senescent cells synthesize an inhibitor of DNA synthesis which is either a protein(s) or its activity is mediated by a protein(s) found in the cytoplasm of the senescent cell."

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On Selling Cryonics

by Fred Chamberlain

The letter by Irving Rand which appears in the April issue of CRYONICS raises some profound questions concerning the promotion of cryonics. Mr. Rand extols the virtues of life insurance salesmen and sings praises of their value to society. Mr. Rand may possess only the highest standards of ethics in sales work, never selling an inferior product, or stretching the truth, or leaving out negative details, but the idea of "selling" cryonics through insurance is not workable with just one producer. Ultimately, there would need to be many of them -- not just Mr. Rand. What about the others?

As with any other category of people, some salesmen will be scrupulous about full disclosure of their products, while others will be less careful about making sure the client understands fully what is involved. Cryonics is a very delicate matter to promote at all, and "selling" it without misleading the prospective member is of critical importance to the public image that will develop as cryonics grows. Can life insurance salespeople handle this responsibility competently? That is a question that needs to be given careful consideration, before embarking on a recruitment campaign, before committing the "marketing" of cryonics to a particular approach.

Some of us have seen this business from the inside. About ten years ago, Linda and I became licensed to sell insurance, primarily to help cryonicists obtain it, but for a while we considered making it a career. After attending sales courses, diversifying to represent a number of insurance companies,

promoting life insurance sales through estate planning seminars, and endless hours of sales managers telling us that the only requirement for a prospect was that he or she be "walking and breathing", we reconsidered the benefits of a career in life insurance sales and turned elsewhere.

Here is a dry, dollar-conscious side of the life insurance sales story, and an estimate of how it applies to cryonics. Let's start with the basics, at the very beginning, with "sales" work in general.

In a competitive economy, where mass sales of more-or-less equivalent products takes place, the producer finds it necessary to call attention to the benefits of the things he offers and persuade customers to purchase them. Barring an ability to price his products drastically beneath the competition, or such a clear superiority of quality that any dolt will be persuaded to seek him out by word of mouth advertising, a producer must engage in marketing and sales, or perish.

Consider now the salesman (intended to include both sexes). He must "turn volume" or produce a certain minimum level of business to survive, to earn a reasonable income, to support his family. The salesman must specialize to some extent, becoming familiar with a product mix and a territory, and then he must arouse the interest of a buying public and convince it to choose his wares. If the salesman cannot earn a living selling one thing, he must sell another, but "turning volume" is an immutable principle, to which we will return later.

In the insurance area, the basic value of the product is that it provides a relatively affordable cushion against the outside risk of a catastrophic loss, where most individuals cannot reasonably set aside sufficient reserves to provide for such a loss otherwise. This general principle is an incredibly valuable one. The application of it to a given area of need, however, requires a great deal of understanding. There are opportunities for abuse.

The life insurance salesman must sell two ideas, first that the product is needed at all, and (then) that his product is the best suited for the need. In other product areas (such as new cars or televisions, for example) the benefits are more obvious, and the lure of gratification provides a desire. The "selling" of life insurance takes some convincing, though, in most cases. Few people are inclined to take action on the basis of the prospect of their deaths.

In establishing motivation, the life insurance salesman generally appeals to the client's concern for others who will suffer if the client dies. After all, it is taken for granted that the client will not be there anymore, so the usual kind of gratification is not a factor. Who will take care of the client's wife and children? His aging parents? How will those he loves

cope with the loss of their provider? These are the motivational questions the life insurance salesman must convince his client to face.

By appealing to the client's sense of responsibility to care for those who are dependent on him in the event of his loss, the need for insurance per se is "sold". Once the client is convinced that the product is needed, the rest is relatively simple, consisting of making a choice from a wide array of products tailored to suit a variety of situations. So, the life insurance salesman goes about the world inducing people to provide for others in the event of deaths. Mr. Rand is right to say that this is a valuable service. Now, how does it apply to cryonics?

Cryonics is, to begin with, a way of attempting to preserve one's own life, not the lives of others. The basic motivation is very different, very foreign to prevailing ideas of who should be protected in the event of death. This is only the first of a number of major differences. Another difference is that due to its present experimental nature, cryonics cannot be represented to "work" in any ordinary way. The insurance salesman is first placed in the position of dealing with an entirely new, unorthodox application of insurance from a motivational standpoint; then he must contend with the fact that the application is entirely unproven, and the best that can be said for it lies in reference to experiments with extremely small tissue samples.

The salesman's problems do not end there! Not only is the motivational pattern different, and the product's workability cannot yet be guaranteed, but the producers are of an embryonic size, the "industry" track record of keeping people frozen at all is miserable, public skepticism is high, authorities declare the procedure is useless and/or fraudulent, those who believe in life after death are hostile, and even at its embryonic size, the "industry" is fragmented into factions over questions of standards, philosophies of funding, research approaches, and a host of other issues. One can only have pity for the life insurance salesman who walks into such a pit of vipers. How is he going to "turn volume" under these circumstances?

There are old sales jokes about selling refrigerators to Eskimos, and selling light bulbs to farmers who have no electric power. Jokes aside, a life insurance salesman attempting to "turn volume" in selling cryonics is no laughing matter. It is a disaster waiting to manifest itself, whether the life insurance salesman succeeds or not.

The disaster, in the event the life insurance salesman fails to turn volume, belongs to the life insurance salesman himself. He has wasted some time and money. The disaster, in the event the salesman succeeds, will belong to those of us who will find out later about the nature of the price of success. Perhaps no disaster will take place, of course! Perhaps the life insurance salesman, without compromising the facts, the truth, or full disclosure in any way, will persuade hordes of people that cryonics is ready for the marketplace, ready for them in their personal lives! Perhaps the Ayatollah Khomeni will walk on water before a nationwide television audience of astounded sports fans! Any of these are to be believed only after they have actually happened.

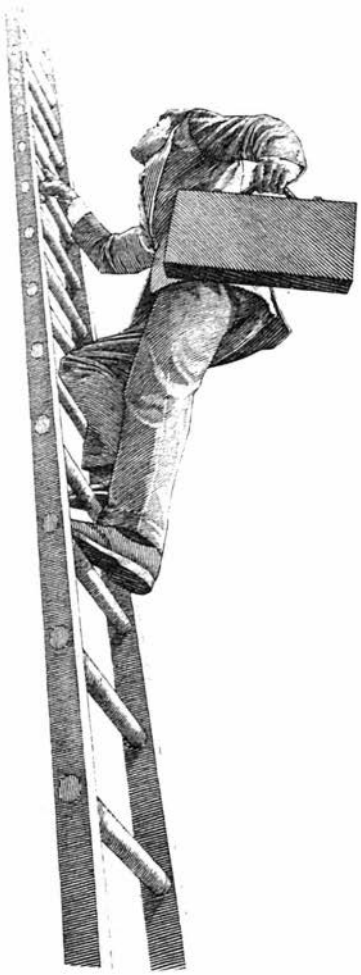
So what may we realistically expect of cryonics being "sold" by life insurance salesmen? Where will the market lie? What disclosure problems will the salesmen face? Remember, we are not talking about Mr. Rand, we are talking about a large number of salesmen, perhaps even a "sales force", each member of

which must produce business, "turn volume", to survive.

Where is the marketplace? It does not lie with extremely wealthy individuals. Their resources are sufficient and life insurance is not needed. The salesman will not "turn volume" here, so scratch wealthy individuals off the list! Secondly, forget about older people. The life insurance premiums would be prohibitive. Either they can afford it or they can't. The life insurance salesman can't make a living off selling insurance to old people, and he has a family to feed. Forget about the aged!

What is the life insurance agent/"cryonics salesman" left with? Middle income, middle-aged people with growing families! Young people who can afford only term insurance! Whoever else might be insurable due to youth and good health and not wealthy enough to pay cash!

Remember now -- even though it's been mentioned a number of times: this life insurance salesman must "turn volume". He must sell enough insurance or collect enough fees from cryonics organizations which are set up to pay them so that he can earn a reasonable living. The life insurance salesman who "sells" cryonics, in addition, must not be concerned that the majority of his clients, who are unconvinced, may think he is a "nut" (after all, only a small proportion of prospects in any sales work turn out to be "buyers"). The salesman must not worry that his reputation in the community he serves may degenerate until no one will buy anything from him. He must not be concerned that in the process of "selling cryonics", he may become an outcast.



What kind of insurance salesman will take on this challenge? Will it be the young family man who wants to be an esteemed part of his community? Will it be the seasoned professional with hundreds of clients and existing accounts, who is looked upon as a true professional? What kind of life insurance salesman is going to take the risks that are involved? If he finds that sales are lagging, that he is not "turning volume", will the salesman steadfastly continue to explain all the shortcomings and limitations? Will he continue to do an upright, ethical "job"?

Will the life insurance salesman who enthusiastically takes on the job of "selling cryonics" to the public point out the risks, the hostilities that exist? Will the salesman who is attempting to feed his family forthrightly discuss such things as low temperature fracturing, risks of autopsy, or the industry's record of failures in keeping people frozen? Or will the average life insurance salesman, who must "turn volume" in "selling cryonics" even to pay his gas and telephone bills, tend to downplay the negative things, presenting mostly the positive side of the picture, leading his clients into situations they only fully understand once they become convinced, later, that they have been exploited, perhaps even defrauded?

The objection has been raised that the case of a full time salesman dependent on promoting cryonics is not really at issue. In the beginning, it has been suggested, the life insurance salesman will only do this "part time", as a "sideline", and that he will not really be so dependent on the income as to cause any kind of financial pressure.

But if that is the case, then this will in reality only be a cryonicist who happens to be a life insurance salesman, covertly trying to promote the idea here and there, in cases which appear to be almost certain not to cause him grief in his career. Or he will be a life insurance salesman who takes on cryonics timidly and half-heartedly, trying to make a few extra bucks without being very much informed or involved at all.

This, the idea of "part-time" commitment only, is not in line with Mr. Rand's portrayal of "marketing cryonics professionally". Part-time promotion by life insurance salesmen, most of whom have not even made arrangements for themselves, has been tried in the past, and to the extent we have heard about it, this has been notoriously unsuccessful. When the effort required exceeds the benefits of the income to be obtained, the salesman becomes conspicuously quiet about cryonics and is not heard from again.

Finally, there are some hard questions to be asked. Who, one must ask, will be responsible for training life insurance salesmen recruited into this technically complex field, whether they be part-time or full-time, so that they can make fully informed disclosures and correctly answer the questions they will be asked about the drawbacks, the problems? Who will supervise them and weed out those who are not ethical and those who are not technically competent? Has this been tried before? What standards were employed at that time? What were the results, if any? How can we be sure that what will be done in the future will reflect what we now know about the problems, the difficulties, the compromises of the past?

These questions and the distasteful potentialities to which they call attention are unpleasant to face. We who believe cryonics is our only alternative to obliteration have already confronted the negative aspects of what is entailed and have accepted them.

But if we think public hostility is a problem now, imagine the anger that will be produced by a host of life insurance salesmen attempting to promote cryonics as if it were a blissful solution to life's woes, without calling attention to the sort of battle for survival it really is! Imagine a life insurance industry which might itself be angered to the point where it would shun cryonics business to such an extent that no one could obtain a policy at all for cryonics purposes! Mr. Rand, with the best of intentions, may be on the verge of opening a "Pandora's Box" from which we all will suffer. It is also possible that Mr. Rand and/or those he recruits will simply fail to produce sufficient results for the rewards to match the efforts, and will lose interest. We will have to wait and see!

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TWO BOOK REVIEWS

by Mike Darwin

AWAKENINGS by Oliver Sacks, M.D., E.P. Dutton / Obelisk, New York, 1983, $8.95.

> "What would you do if you woke up in 50 years after being frozen all that time? Who would be able to talk to you? Why, you'd be **completely** lost. The world would have changed completely. You simply wouldn't know what to do! All your friends would be dead or old...it would be horrible!"
>
> "What if you come back and something is wrong? What if they bring you back old and decrepit or damaged in some horrible way...?
>
> -- Typical comments on possible personal problems introduced by cryonics.

The comments above often cause cryonicists to smile. For we are sure that if we can be awakened, we will find life worth living. Of course, we cannot know what it would be like to go to sleep and awaken 50 years later since no one has slept that long and lived to tell about it. Or have they?

In 1973 the renowned neurologist Oliver Sacks published a book called **Awakenings.** It has been through many reprintings since and has become something of a classic. It is now available in paperback and carries praise from the likes of W. H. Auden on its back cover. It is a book with special relevance to cryonicists on several levels -- and it deals with the "impossible" -- with the awakening of men and women who for all intents and purposes went to sleep in the 1920's and were not awakened until the late 1960's and early 1970's. It is a

kind of Frankenstein tale of restoration of life to the dead. A restoration that brought back motion, consciousness, motivation, and sensory richness to patients in a slumber of decades, but often at a terrible price. It is, in a very real sense, a documentary of the worst-case scenario for cryonicists. A series of case histories of people restored to life after decades of "death", of people given a perfectly lucid glimpse of life and well being at its best, only to have it snatched back from them in some of the most horrible and grotesque ways imaginable.

But beyond all of this, it is a story of man's will to live, even under the worst of conditions, and of men and women much like us who fought the fight we're fighting under far worse circumstances and, despite "defeat", found the struggle worthwhile.

In 1916 a bizarre and horrible epidemic began sweeping the world. It put its victims into a state of torpor and when they recovered they were often changed. It had a million different symptoms which mimicked everything from psychosis to stroke. Some quiet, timid people were made lewd and outrageous, others developed mood swings or hideous grimacing tics. Some became paralyzed. Physicians could hardly make sense of it all. It struck mostly young people, and its effects were devastating. In many ways it was far more horrifying than AIDS. One-third of its victims died. Many of those who recovered did well for a few years and then began to develop strange problems -- sleep disorders, emotional lability, mood swings, compulsive behaviors. In most cases they went on to develop movement disorders. Finally, for many of these, the end was catatonia. Total paralysis of will and movement. Most died, but some lived on. Year after year they sat in quiet hospital wards "asleep". Conscious perhaps, but only on the most rudimentary level. For some, 30 or 40 years went by with only the same meaningless phrase or thought echoing over and over in their heads.

The disease was the great **Encephalitis lethargica** epidemic of 1916 to 1927. Over 10 years, it affected 5 million people, a third of them dying in the acute stages of the sleeping sickness. Many of its other victims never recovered completely, and over the ensuing decades died or were institutionalized with severe neurological problems.

A few of the victims of the "sleepy sickness", as it was popularly called, lingered on over four decades. They were in their late 60's and early 70's by the 1960's. Medicine began to catch up with their needs. And while they could not wait in unchanging cryonic suspension, wait they did — there was no choice for them. The biochemical basis of the sleepy sickness was finally

understood and a therapeutic modality was developed to allow for intervention. That modality was the drug L-DOPA, and it did something truly miraculous: it awakened the Rip Van Winkles from their sleep of decades. They were alive, unfrozen after years of rigidity. They were able to move, to sing, to laugh and to **feel** again — in some cases after nearly 50 years of "sleep".

Dr. Sacks tells their stories with eloquence, compassion, and sensitivity. It is obvious at once that a second kind of miracle occurred. An extraordinary physician and an extraordinary medical situation intersected and a profound chronicle with, I believe, profound insights, was created.

What happened to these people? They awoke, yes, but old and fragile and out of touch with the times they left. When they went to sleep they were as young as 19 or 21, and when they awoke they were old and wizened. Lovers had vanished, music had changed, the world was scarcely recognizable. How did they react? How did they cope?

The answers to those questions are necessarily as varied as the individuals themselves. How well or poorly they did was determined by many things, but mostly by their **values** and their medical/physical conditions. In many ways what happened to these people was the worst case of what could be expected in cryonics. They awoke, but they were old and alone, cut off forever from their "own" time and given few resources with which to integrate into our time. They were given a taste of life again, but L-DOPA, the very thing that gave them life, soon caused horrible side effects: ghastly mental states, hideous tics, animal-like behavior and lusts, unbearable mood wings, bizarre, repetitive movements and unthinkable compulsive activities right out of **The Exorcist.** And ultimately and most cruelly, for many, it ceased to work at all, returning them to the twilight state they had so long been consigned to.

Yet, despite this temporal taste of hell far worse than any Stephen King could conjure up, most of the patients felt it worthwhile. **Awakenings**, for all its horrors, is a surprisingly positive book about life — its ultimate value even in the face of the "unbearable". Its "characters" are at once victims and victors and often they are surprisingly eloquent testimony to the worth of life -- and to the quest for more of it, even if the price to be paid is very high.

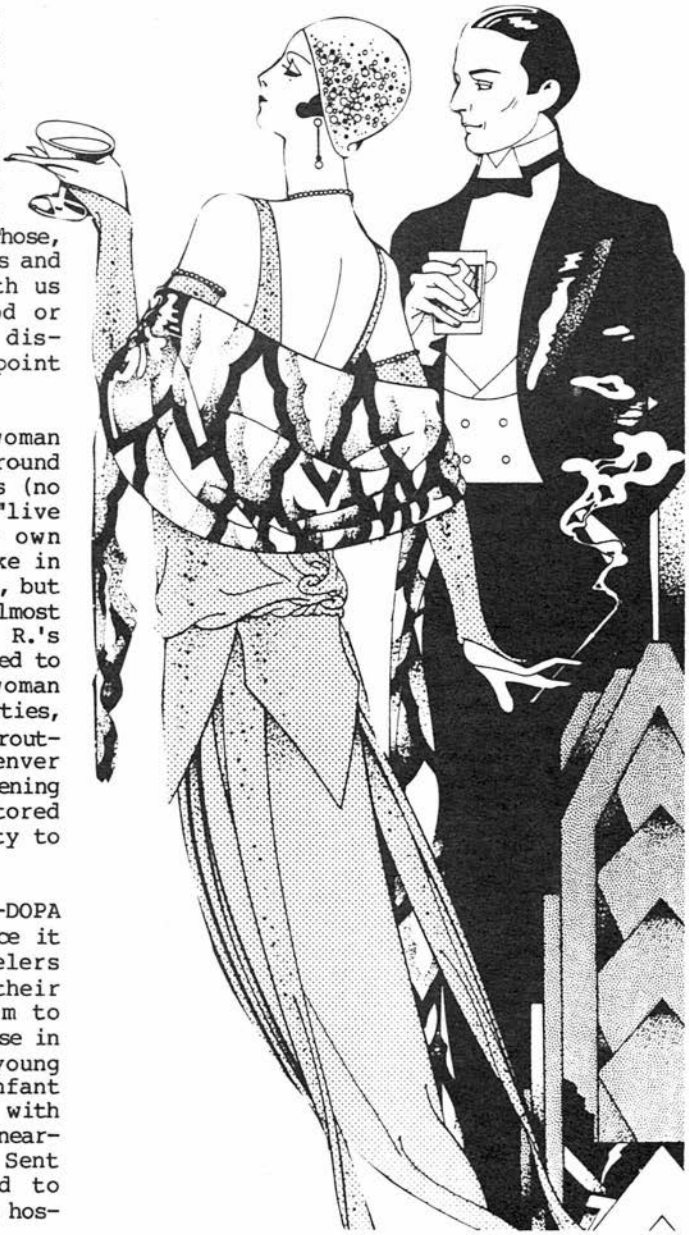
Cryonicists concerned with the roots of identity and questions relating to the fundamental worth of life should read this book. Not only because it tells them about what it would be like to awaken after a sleep of many decades, but because it tells them about themselves. It provides insights into how our minds work when they work well, as well as when they are diseased.

In a way I found **Awakenings** a reassuring book. Given its grim case histories, this may seem odd; until one reflects that most of the problems the patients in **Awakenings** experienced were due to to the sad limits of today's technology. They are limits that will not be there if we are to be revived from today's cryonic sleep. Why? Because the technology required to restore injured brain cells and reverse the freezing damage associated with today's techniques will contain as a subset the ability to restore youth and health as well. That will give us a fighting chance.

But there is something that no technology will restore or can give. It is summarized in a cautionary note that Sacks offers in his Introduction:

"There is, of course, an ordinary medicine, an everyday medicine, humdrum, prosaic, a medicine for stubbed toes, quinsies, bunions, and boils; but all of us entertain the notion of **another** sort of medicine, of a wholly different kind: something deeper, older, extraordinary, almost sacred, which will restore to us our lost health and wholeness, and give us a sense of perfect well-being."

Medicine cannot restore what was never there to begin with. While "Our Friends Of The Future" may be able to give us clear minds, youthful bodies, and a panoply of mental and physical augmentations, they will not be able to give us values. Those, in a very real way, **are** us and we will carry those with us into the future for good or ill. One case that Sacks discusses illustrates this point particularly well.



Rose R. was a young woman who loved to party, fly around the country in airplanes (no mean feat in 1926!) and "live life in a blaze of her own vitality." When she awoke in 1969 she was no longer 21, but 64. She had been asleep almost half a century! Rose R.'s values left her ill-equipped to cope. She was an old woman now, there were no gay parties, and flying had become as routine as a 727 trip from Denver to Newark. For her, awakening was terrible -- it restored life without the capacity to enjoy and utilize it.

For others, their L-DOPA awakening was better, since it returned its sleepy travelers to a world of life that their own values enabled them to grasp at with vigor. A case in point was Ida T. As a young married woman with an infant daughter, she was stricken with immobilizing rigidity and nearly total loss of speech. Sent from her native Poland to America, she languished in hos-

pitals for nearly 50 years, until treatment with L-DOPA restored functionality and the ability to communicate. At first all her talk was of the village in Poland where she had been raised, but slowly she developed attachments to things and people of the present. Eventually, she was reunited with her daughter, now a middle-aged woman herself, and with difficulty established an enduring relationship. There were some further complications with L-DOPA, but in the words of Dr. Sacks, "...she is still doing incredibly well considering she was dead for forty-eight years."

Our position is not so different from Dr. Sacks' patients, who were deprived of active life in youth. We too have life -- but not for nearly long enough; and we too have the prospect of an eventual recovery of life, though under conditions likely to be very different from those we know today.

Thus to me the final and most important message in **Awakenings** was a message one can hear from any street corner preacher. "Think about where you will spend eternity and how prepared you are to deal with it." In other words, be mindful of the stuff you make yourself out of, for if you are a cryonicist (and as **Awakenings** testifies, sometimes even if you aren't), you will have to stand the test of time.

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RALPH'S JOURNEY by David Pizer, Privately Published*, 1986, $5.00.

***(Available from David Pizer, 1355 E. Peoria Avenue, Phoenix, AZ 85020)**

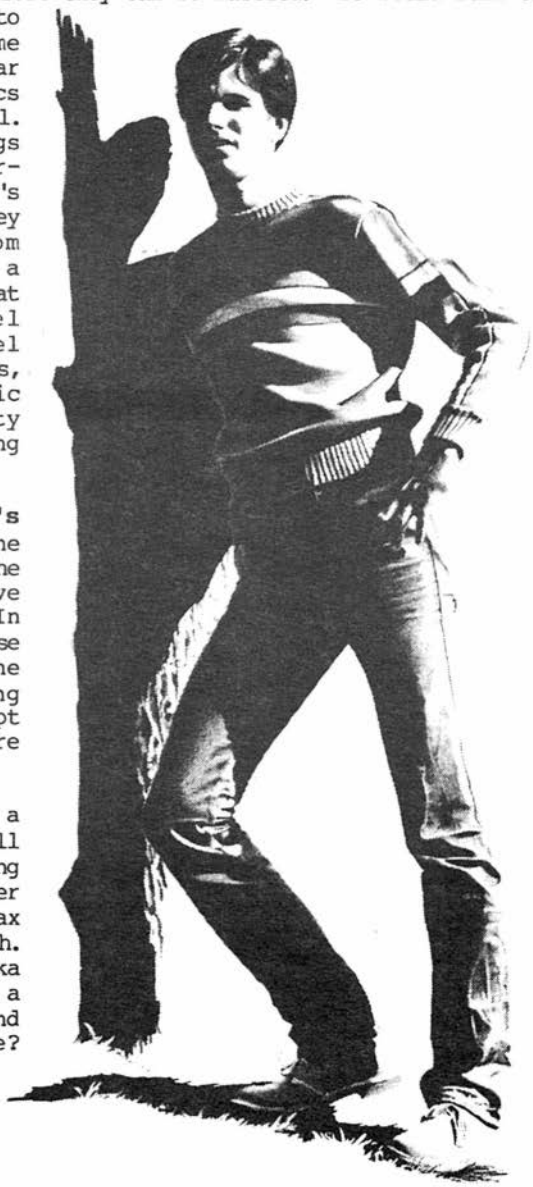
Ralph's Journey is as light and upbeat as **Awakenings** is serious, and yet it too has some very worthwhile points to make. I hadn't intended to review **Ralph's Journey**, and I didn't expect to enjoy reading it. As it turned out I'm doubly fortunate because I enjoyed reading the book and I think a thoughtful review is more than in order.

First a little background. The book is a first novel and it's by ALCOR Suspension Member David Pizer. Dave only began to write seriously a couple of years ago and his entry into writing came in his mid-40's without a lot of formal preparation. Dave is a very successful Phoenix businessman, who never finished high school. (Recently he obtained his diploma, and is now attending college.) I was impressed with some of Dave's shorter pieces (some of which have appeared in **CRYONICS**), but dubious about the prospects of a novel. A passable novel is very difficult to write, and a good one is almost impossible. I know this for a fact because I've tried to write one several times myself and have gotten nowhere. Thus I was not very optimistic about Dave's chances as a neophyte writer of pulling off a good novel, let alone a good **cryonics** novel.

Ralph's Journey is both of those things. Make no mistake, the book isn't Proust or even James Joyce (but then who really reads those guys anyway?). Nor is it a profound, professional, or "polished" novel. But it **is** an enjoyable read, and quite frankly it was more enjoyable to read and better written as a story than many of the novels I've picked off bookstore shelves.

The story is simple enough. An enthusiastic young man named Ralph encounters a used car salesman named Honest John who makes a salesman out of Ralph and introduces him to the idea of cryonics -- which, in 1955 when the story opens, is a very well-kept secret in Phoenix, Arizona (I might add that it's still a pretty well-kept secret!)

Ralph falls in love with a young girl named Becky who is tragically snatched from him by an accident before they can be married. It would ruin the story to tell you much more except to say that Ralph goes on to become phenomenally successful as a used car salesman and investor, and cryonics manages to grow and thrive as well. One of the most appealing things about the book is its strong characterizations. The people in Pizer's novel have real substance; often they are people you will recognize from your own experiences and they have a richness and depth of character that is uncommon in a first novel (frankly, uncommon in a novel PERIOD). I particularly liked Rufus, whose easy geniality and "classic southern negro" demeanor in reality hide a very sharp and calculating mind.



When I first read **Ralph's Journey**, I thought the story line clever but not very creditable. The events of the last few months have changed my perspective on that. In particular I have felt a strong sense of deja vu in rereading some of the Phoenix Cryonics Society meeting sequences in Dave's book. I kept thinking to myself "Hmmm -- where have I seen those folks before...?"

I won't tout Dave's book as a great work of literature, but I will recommend it as a worthwhile evening read — something to relax with after a hard day's work. And it will relax you because it will make you laugh. I guarantee that if the Mount Nijitka sequence doesn't make you crack a smile you're just not human. And what is the Mount Nijitka sequence? Well, read the book and find out!

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THE QUESTION COLUMN

"I am very attracted to your organization and to the obvious attention to detail you've shown in every aspect of your operations. But I find your "automatic conversion to neurosuspension" in the event of depleted funding totally unacceptable. I have repeatedly spoken with Mike Darwin and other Officers and Directors of ALCOR and I have gotten nowhere in getting this clause removed from the contract. Why is that you feel you have the right to ram a procedure I find very revolting and mutilating down my throat? Why don't you allow your members to decide for themselves how they want things handled if the money should run out? Also, if you don't think $100,000 is enough, why don't you charge more?

HRB,
Los Angeles

ALCOR President Mike Darwin Responds:

The clause you are referring to provides that "Conversion to neurosuspension will take place at the sole and absolute discretion of ALCOR in the event that funding drops to a level 25% greater than the minimum required to maintain the patient in neurosuspension."

The purpose of this clause is to guard against the loss of whole body patients whose funding is no longer adequate to maintain them in whole body suspension. It is very important to realize that the $100,000 minimum quoted for whole body suspension is just that -- a minimum figured on the basis of current costs and technology. There is no way to confidently predict what will happen in the future. Economic upheaval, war, technological upheaval, government regulation, all these things could act to greatly increase costs for maintenance or erode the value of the capital that has been invested to pay for it. It would be foolish, or at least very naive, to presuppose that the world will be free from crisis or trauma while we sleep the decades away in suspension.

ALCOR's charter and purpose are to save its members' lives by the best means available. On the basis of the best evidence available today the Officers, Directors, and technical advisors of ALCOR believe that neurosuspension offers a chance of success that is at least comparable to the chances for whole body suspension. The technology required to successfully repair and restore to function a freeze-thaw injured brain which has suffered aging, clinical death, and perhaps other insults, will **have** to contain as a subset the ability to regrow or regenerate a lost body. After all, existing biological "technology" does this all the time — it's called reproduction and it's how you and I got here -- the program instructions for growing new bodies based on the DNA tape in our cells is already **existing** technology. A far more formidable challenge will be developing a much more sophisticated technology capable of repairing enormously complex damaged structures such as a human brain!

In our best judgement, removing a whole body patient from suspension and burying or cremating him/her would be tantamount to destroying a life — a life we had worked for years to support and protect. It is an emotionally untenable

thing to do if there is any alternative left. AND NEUROSUSPENSION WOULD BE THAT ALTERNATIVE.

Removing the eyes of a child with retinoblastoma (a virulent eye cancer) is mutilating. Cutting off the legs of a diabetic or removing the breasts of a woman with cancer is mutilating — even horrifying. But it is done because it preserves a greater value: life. Neurosuspension, if it works at all, will not really be mutilating. In fact, it will be less mutilating than the simplest surgery performed today because it will result in restoration to life in a perfect healthy body, free from any surgical scar or trauma. And you can add to your contract a clause that states you do not wish to be revived unless you can be restored to such a healthy body and function as a fully integrated human being.

Yes, you do have the right **not** have yourself converted to neurosuspension. We agree that that is your prerogative and we are not trying to "ram" anything down your throat. But there is the corollary to that right as well. We have the right not to be coerced or otherwise forced into cremating or burying suspension patients who are salvageable by neurosuspension. You have the perfect right to commit suicide, but you do not have the right to demand our assistance!

ALCOR is not a commercial organization. The customer is NOT always right. Because we are nonprofit, our bottom line is not turning volume or making our balance sheet reflect the largest profit possible. In truth, most well-run commercial concerns don't operate any differently. If you go into a hospital and tell them you don't believe in germs and thus want your surgery done without sterile technique and without those "dehumanizing and repulsive" rubber gloves you will be told to have your operation elsewhere. No competent, ethical surgeon would operate on someone without using sterile technique just because the patient didn't believe in micro-organisms! (And yes, you'd better believe there are people out there even today, in 1987, who don't believe germs cause disease!)

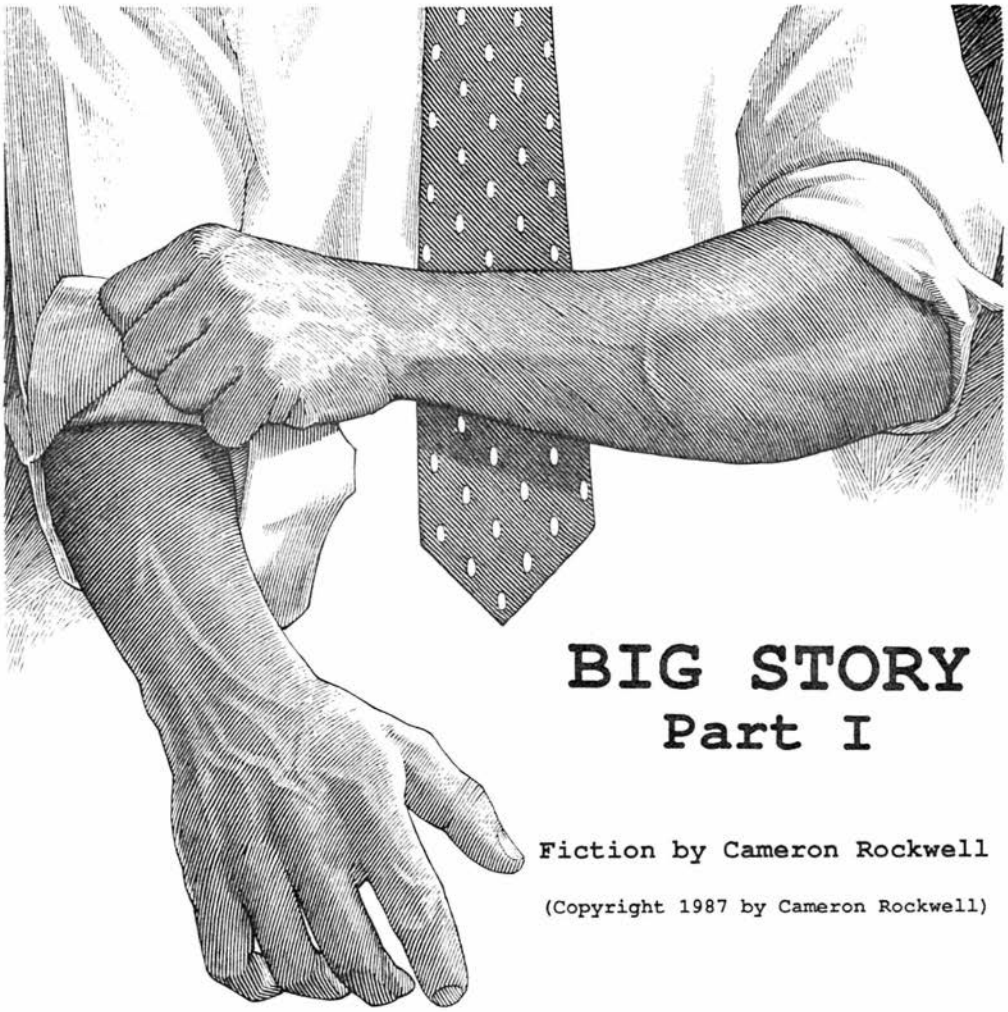
Given the magnitude of repair required with today's preservation techniques, and the magnitude of the financial and logistic problems which are likely to confront us in the years ahead, all of the leadership of ALCOR, including the Officers and Directors who have elected for whole body suspension, feel very strongly that neurosuspension must be preserved as a fallback position.

To us at least, the alternative is untenable.

Other cryonics organizations which do not require automatic conversion to neurosuspension are:

Cryonics Institute
24041 Stratford
Oak Park, MI 48237
Tel:313-967-3104

American Cryonics Society
870 Market St., Suite 368
San Francisco, CA 94102
Tel: 415-397-3368



BIG STORY
Part I

Fiction by Cameron Rockwell

"Would you say your success results from a hunger for power?" The voice of June Carter, a young reporter, was filled with frustration. Pert and blonde, she'd been ordered to do an exposè on Neuman Electronics, a company with a history of explosive growth. She'd taken the job, aside from the fact that she had no choice, because she was convinced that businessmen are exploiters and the world needs to know more about their personal weaknesses.

June got nowhere. Maclain Neuman gave her an interview, then spent most of the time telling her why media people were like irresponsible drug pushers, serving half-witted idiots who were more like robots than robots themselves. June knew no more about Neuman Electronics than when she'd entered. Now, Neuman's secretary was buzzing on the intercom, announcing the next appointment. She felt cheated somehow!

"Hungry for power?" laughed Neuman. "June, You're only hungry for what you don't have! I have power like it was woven into me. It's something I don't think I could get rid of, even if I wanted to, but I don't think about it, or relish it, or even use it! It's more as if it used me!"

Mac Neuman leaned back in the large, executive chair, his lean, wiry body looking as if it were a coiled spring ready to lash out without warning. The intercom sounded again, insistently. Mac pushed a button, sighed, and said, "Now, you'll have to forgive me. My next visitor won't like it if I keep him waiting! Maybe someday I'll have a really 'big story' for you, something to really shout about! If that time comes, maybe I'll be able to make up for the hard time I've given you today!"

Neuman grinned as he got up and stretched like a great cat. His secretary opened the door and June Carter left, painfully aware of the time wasted.

As she walked down the hallway, June recalled things Mac had said about the media. Some of them were true! Now she'd be the laughing stock of the newsroom for a week or so, but she'd been warned by older reporters that it was useless to interview Neuman. June wondered if Mac would ever remember to call, if anything newsworthy took place. He'd sounded as if he meant it!

Meanwhile, Mac was busy with his next visitor. Jim Waters, vice president of almost everything except marketing and finance, was pacing heavily back and forth before the window. A huge, lumbering kind of man, Jim looked like anything but a fanatic inventor-engineer. Mac did not see the bulky frame and partly balding head. He saw the pacing of a mind that was feverishly active with technical details every waking moment.

Jim suddenly whirled from the window. "Mac," he said, "ATSUNGE is going to tear us up with this one!" He held a pocket videotelephone in his hand, waving it as if it were on fire. "They've done it! Flattened the picture tube by putting the electron guns at the side and using electrostatic repulsion strips all across the back. It's sharper than LED macroarrays and makes liquid crystals look sick. The color definition is unmatchable. They compensate for beam length by varying voltage differentially over the projection field, something we've been trying to do unsuccessfully for the last six months. The whole thing's patented tighter than a vacuum wall!" He paused as if in a fit of frustration.

"You've tried to license it of course?" said Mac. Jim nodded, frowning. "Tried to buy it, then?"

"Yes, but ATSUNGE knows what its got! They'll take half our market once they're in production. That could be as little as ten weeks!"

There was silence in the room. Mac got to his feet and walked to the window in a meandering way. Sure, the sidegun had potential! They'd had some of their best people working on it for a year now. If that route were going to dry up on them? There had to be a way to step around this obstacle. There were always ways around obstacles.

"Jim," Mac said, "You know these little replicators we're starting to use for processing circuits, the ones that make copies of themselves and then sit down there like workers in a garment factory, laying out transistors on a

molecular level?"

"Yes," said Jim, "but those are very simple things. They can only make the crudest type of processing circuit components."

"I know," Mac said, "but I wasn't thinking about trying to have them make something. In circuits, we have to pack things very tightly, so the replicators themselves can't wind up in the final product anyway. But in a display, we don't have the same space constraints; the human eye can only resolve a milliradian anyway, so at two feet, let's see, that's over half a meter, the resolution is no better than 500 microns, or five million angstroms. How big are those replicators? Lots smaller than a million angstroms, right?"

"Right!" said Jim, in a questioning tone.

"Look," said Mac. "If we could design replicators with black carbon 'hats' on them, but they could slide aside shutters and expose one of three laser diodes at appropriate wavelengths, under decollimating lenses synthesized from diamond slabs, and we had them all 'hold hands' in an array and respond to digital TV inputs, then..."

"Jesus Christ!" cried Jim, jumping to his feet. "I was talking to Brody just yesterday and he was complaining about how if he had room to just use the replicators themselves, he could do almost anything! You're right! There's no space problem at all! We could have an engineering model in maybe two weeks, and then interface into the model TXE-4 prototype. We could be in production three weeks before ATSUNGE. Could be patentable, probably not, but we'll find out." He was edging toward the door. "I've got to get to Brody before he leaves!" Jim was out the side door, his heavy footsteps fading rapidly before the door slammed behind him.

Mac sat down, swiveled his chair around, and looked out across the various shaped buildings of Neuman Electronics, nearly 1000 acres of densely packed industrial space, grown from a start in Jim's garage not so many years ago. Jim was a brilliant inventor, so it was surprising he hadn't seen this first, but that was one of the benefits Mac had, to be a little removed from the trees so he could see the forest better. When he'd first financed Jim's backyard hobby shop and acquired a controlling interest, he'd never envisioned how it would grow. As the years passed it was understood between them that Mac would organize and direct the overall operation; Jim would manage the design, test, and production areas. It had made billionaires of both of them.

Power? No, Mac felt more like a mother hen, trying to keep teams of

thousands of little chickens from being run over by competitors. All those people out there had their own lives, their own talents, their own dreams, and he just happened to have his hands on the steering wheel. It was exhilarating, rewarding, but a sense of 'power'? Nonsense! He felt sorry for the pretty, young reporter, sifting half-blindly through the gossip everyone called 'news', trying to find enough juicy tidbits to keep circulation up. It would almost be funny, if it weren't for the horrible distortions of thinking it produced. Oh, to hell with them, he thought. This isn't something to waste time on.

* * * * *

"You may not be able to keep up this pace," his doctor told Mac two weeks later. Dr. Pollack seemed troubled. "There are some funny looking things about your blood tests this year. I know you're busy, but next Tuesday morning I wish you'd stop by the hospital and have some more tests for me. If there's something not quite right, and I might be able to keep you from having to be in bed for awhile, surely that's worth a few hours on Tuesday morning?" Mac scowled but agreed to do it.

Tuesday morning Mac found himself wondering if there could possibly be anything wrong with him, as he backed out of his driveway and headed for the hospital. Spring was in the air, and the smell of fresh-mown grass was mixed with the scent of flowers as he hopped out of his car and took the hospital steps two at a time. Was he any weaker than in the past? He still did his several miles each morning at 9 minutes per mile and felt the pace relaxing rather than stressful. He got along with six hours sleep and didn't feel tired. What could be wrong?

"You've got an activated tumor producing retrovirus infection," explained Dr. Pollack, later that week. "It's beginning to develop cancer in four different locations. Since we turned up the problem on a reverse transcriptase assay, you wouldn't have felt any symptoms yet. Unfortunately, the particular strain you have progresses very rapidly and we don't have a way to cure you at this moment. You've got about six months, more or less. You might want to consider how you're going to turn over the business to Jim, or someone else."

Mac left the hospital, and drove up into the hills. Outside the car, he gazed off across the city, as the fresh spring wind blew against his face. Six months! He'd asked Dr. Pollack if biorepair replicators couldn't be used? "That's science fiction, still," Dr. Pollack had said. "You guys in the electronics industry are always the first to put new technology to use, and soon we'll probably be able to use those things to fight viruses, remove scar tissue, stimulate regrowth, lots of things. At the moment, though, those things are still in the earliest stages of development. Even if you threw all your people into the field, I'd doubt you could get as far as you'd need in just six months."

Mac was not the kind of person to just look at an obstacle, accept it, and give up. But Dr. Pollack had a point. There are some deadlines that lie outside the possible. Was he going to just sit back and take this one helplessly? Of course not!

Mac and Jim spent the next two nights talking about possibilities. They

sat silently alone in the giant conference room, the second night, after talking for hours about whether or not a crash program would do any good. Jim suddenly rose, walked back and forth for a moment, then turned uncertainly and said "You know, you could always have yourself frozen... nothing to lose! Some of the rest of us have been signed up for years, but we've just done it for the heck of it, you know, in case we smacked into a telephone pole. You never got around to it for lack of time, but now you probably ought to get the papers signed. If we don't manage to find another way out, it's the least you could try!"

It made sense. Not being one to put things off, Mac climbed on a plane the next morning and took a tour of the facilities at Vitrilife, which Jim told him was the best of the cryonics operations. Victor Baker, president of the non-profit organization, now sat across a conference table from Mac and tried to summarize the state of the technology.

"You know, most people think these are still the old days when people just got packed in ice and then dumped in liquid nitrogen," Vic said. "In fact, we're now close to being able to use the same techniques they're using all the time for organs, except we haven't got the capability to do the pressure for whole people. The equipment would be fantastically expensive, even though it's just a matter of scaling up in size. Presently, we can vitrify heads or crystallize whole bodies, but neither of these can be reversed near-term.

"A breakthrough in cryoprotection compounds would solve everything, but who knows when that'll happen? If somebody provided resources to build a large-scale pressure chamber, we'd have whole body vitrification capability, but without economies of scale, it wouldn't be used very often."

"Economies of scale?" asked Mac. "What would it take to get it down to a level of affordability for most people?"

"It's not that simple!" Vic replied. "We'd still have a chicken and egg thing! Right now, small animals go in and out okay, but until a human comes back in one piece, most people won't have the sense there's something real about it. That won't happen for some time, meanwhile you'd be supporting a very expensive capability at a loss. Very few people will be able to afford it, so few will use it, and the fact that few use it and the cost is so high would limit public interest. Look, we've been doing this thing a long time, and we're used to the idea that we have to be patient! In your case, of course, patience doesn't do much good!"

Mac sat thinking silently. He had six months. At this time, being frozen meant either lots of crystallization damage or a reasonably viable head, after it was separated from the body. Not much of a choice, he thought. No wonder this thing wasn't selling like portable videotelephones! Even with the recovered animals which proved it was possible, nobody was going for it, because only people like him could afford it. But if it stayed like that, even if he managed to get 'vitrified' as they called it, in one piece, it still looked like a fad that could drag along for a long time in a weakened condition. That was contrary to his chances being the best possible. Something had to be done!

END OF PART 1

SCIENCE UPDATES

by Thomas Donaldson

A FULL REPORT ON THE INDIAN BRAINS FOUND IN FLORIDA

Some time ago, there was a report in CRYONICS on the finding, in the Windower pond in Brevard County, Florida, of preserved human brain tissue in Indian burials there dating from 8000 years ago. (**CRYONICS, 6(2),** 4 (Feb, 1985)) Glen Doran and others from Florida State University and the University of Florida College of Medicine presented their complete report in **NATURE** (**323,** 803-806 (1986). They found the remains of at least 40 people. Four adults and one child had recognizable brains in their skulls. Four other people had amorphous masses of brain tissue mixed with peat.

When they first tried to remove a brain from a female skull it was extremely fragile. Therefore Doran and his coworkers used computerized tomography and magnetic resonance imaging to examine the brains in situ. Anatomically these brains were quite normal. The authors made microscope slides of the brain tissue. With suitable microscopic stains many of the microscopic anatomical structures such as the Purkinje cells and nerve tracts also remained. They found many small dark particles which are probably remains of neurons.

We were all of course very interested at reports of DNA found in the brains of these people. Doran and his coworkers found this DNA by extracting DNA from the brain tissue and binding it with a probe molecule which bound only to human DNA. They had to do this, of course, because peat and other organic material would also contain DNA. It turns out that these brains contained about 1% of the human DNA found in normal brains.

Although as yet we have no conclusive proof, evidence has consistently grown that long-term memory stems from changes in the nuclei of the neurons, similar to those undergone in development. Doran and his coworkers of course didn't test for survival of memories. However, we can guess that no more than 1% of the memory content of these brains has survived. We can expect a lot of redundancy. It would not be fair to say that 8000 years in a peat bog would destroy your soul completely, but it would probably only leave fragments: let's say, a memory of your father standing on a rock, fishing with a spear. On the other hand, the **genome** is probably much more recoverable. We are profoundly lucky that our preservation will be far more complete than this.

MODIFYING THE GERM LINE IN MICE

Among ethicists discussing genetic manipulation, making genetic changes to the **germ cells** ranks just below Auschwitz on the scale of heinous crimes against Nature. If you suffer from some known hereditary fault which you do not wish to pass on to your children, this ethical attitude may confuse you.

An interesting recent article in **NATURE** (Elizabeth Robertson et al **NATURE, 323,** 445 (1986)) shows that we may have come quite close to the technology needed to help people troubled by such genes. Robertson presents her work on using gene transfer to modify the germ line in mice. Scientifically, this work gives us a big improvement on techniques to make a genetically pure altered

strain of mouse. We need such mice to study genetics and physiology. But Robertson's techniques also take us a large step closer to means to remove known faults from our own heredity.

Her method consists of using known gene transfer methods (a virus to act as **vectors,** carrying the gene into cells) to alter the genes of a line of cells kept in laboratory culture. She then introduces these cells into embryos. They grow normally and spread throughout the mouse. In particular, they spread into the germ cells. Progeny of these genetically altered mice will then carry the genes originally introduced into cultured cells.

Because of the method used, the first generation of mice are **chimeras.** This means that they consist of cells some of which come from the altered culture and some from the original embryo. It is only the second generation, children of these chimeric mice, which carry the new genes as a pure strain. To find a way to alter our own heredity, we must find a way to alter our germ cells directly. That is, we still need viruses which will vector a gene directly into the germ cells.

I believe that the major barrier to such work is emotional. Means to change our body cells can naturally cause new kinds of damage. These don't differ in degree or kind from the damage which we might cause by changing our germ cells too. We need caution in both areas, and many animal experiments to verify the technique. Ultimately, of course, such work will be done. Even if we can treat a disease such as Huntington's disease in adults (which we can't now) the most efficient way to deal with it is to ensure that adults don't pass it on to their children. Means to change our own heredity will help this.

SPECULATIONS ABOUT SECOND MESSENGERS

The **second** messenger, of course, comes after the **first.** In cellular physiology, however, the term **second messenger** has taken on a quite specific meaning. Many hormones and chemicals do not affect response of cells directly. Instead they bind to receptors on the outer cell membranes. These receptors then cause changes in **other** chemicals within the cell. It is these other chemicals which are "second messengers". It is they, not the original hormone, which transmit impulses to the cell nucleus.

What second messengers, then, play roles in memory recording by brain cells? An interesting paper in **NATURE** (H. Higashida and D.A. Brown, **NATURE, 323,** 333 (1986)) and its accompanying commentary by Michael Berridge (pp.294-295) give us some ideas about second messengers in memory.

One kind of second messenger is very well known. This is **cyclic AMP.** Cells respond to some kinds of stimulation on their outer membrane by increasing levels of cyclic AMP (AMP stands for **adenosine monophosphate**). For instance, the pituitary hormone ACTH acts on the adrenals to cause them to produce cortisone. ACTH attaches to the adrenal cell membranes. Attachment of ACTH increases levels of cyclic AMP inside the adrenal cells. Cyclic AMP then makes the adrenal cells make more cortisone. ACTH here is the "first messenger". Cyclic AMP is the second.

But there are other second messengers. Higashida and Brown studied a pair of second messengers which may play a specific role in memory. These are the

chemicals **diacylglycerol** and **inositol triphosphate.** A neurohormone, bradykinin (a powerful stimulator of our pain receptors), attaches to neurons. The neuron cell membranes then make these two chemicals, and the two chemicals change the permeability of the neuron walls to ions. This change affects their electrical excitability.

In his commentary Berridge points out evidence that this particular pair of second messengers plays a crucial role in many nerve cell changes. For instance, it may control response of some nerve cells of the hippocampus. It may also control response of nerve cells to two other chemical messengers (**first** messengers!) called **substance P** and **noradrenalin.**

One of the most interesting facts about this specific pair of second messengers is that they also control cell differentiation. Two cancer-genes apparently respond to these specific messengers. What this means is that these messengers may have a special role in control of cell differentiation. If so, we have even more indirect evidence that longterm memory storage involves coding of memory in the **nuclei** of our brain cells. Since developmental changes are usually far more stable than most cellular changes, this tells us something about stability of memory itself.

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MAY - JUNE 1987 MEETING CALENDAR

ALCOR meetings are usually held on the first Sunday of the month. Guests are welcome. Unless otherwise noted, meetings start at 1:00 PM. For meeting directions, or if you get lost, call ALCOR at (714) 736-1703 and page the technician on call.

ALCOR

ALCOR LIFE EXTENSION FOUNDATION

The ALCOR Facility Dedication and Open House will be held Memorial Day weekend, 22-25 May, 1987, at:

(FRIDAY - MONDAY)
(22-25 MAY, 1987)

ALCOR/Cryovita Laboratories
12327 Doherty St.
Riverside, CA 92503

DIRECTIONS: Take the Riverside Freeway (State Hwy 91) east toward Riverside. Go through Corona, and get off at the McKinley St. exit. Go right (south) on McKinley. Turn left (east) on Magnolia. Go across the railroad tracks and turn left (north) on Buchanan St. Doherty is the second street on the left. Turn left on Doherty, and then turn right into the back of the industrial park. 12327 is the third building from the back, on the right.

DUE TO THE ALCOR FACILITY DEDICATION AND OPEN HOUSE, THERE WILL BE NO MEETING IN JUNE, 1987.

Alcor Life Extension Foundation
12327 Doherty St.
Riverside, CA 92503

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