



# Cryonics

Volume 9(9) September, 1988

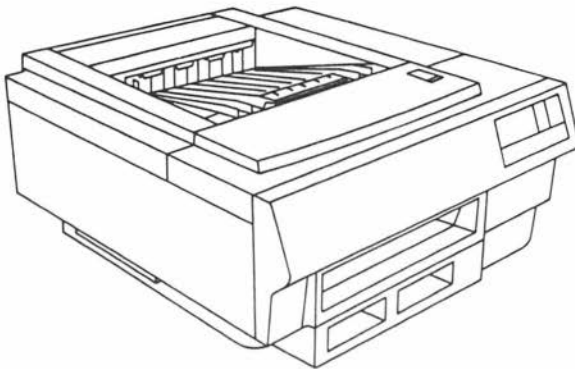
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## EDITORIAL MATTERS



This month's *Cryonics* may look much the same as last month's. But it isn't. It is dramatically and joyfully different. How so? Well, due to the generosity of Trudy Pizer we have a new HP LaserJet II printer in the Alcor office. After eight months of delays and false reassurances from the authorities, we "gave up" on getting our old machines back at any *definite* time in the foreseeable future. Alcor staffers were having to drive almost an hour *one way* to use the computer and laser

printer of a concerned member. This situation was causing untenable problems; an enormous backlog of administrative work was crippling operational capabilities. Painful though it was, a decision was made to purchase a new printer and get a working computer in the facility.

Thanks to the generosity of Mark Miller in the San Jose area we had been given an IBM PC and so, with a minimum of expense and fuss we were able to get a computer in the facility that could drive the laser printer. With Trudy's added help we bit the bullet and bought.

The Laserjet has lived up to our expectations of it. And, we now have two additional working MS-DOS machines in the facility which brings our computer complement up to three, less than half what it was before the Coroner's raid. The Laserjet has helped ease the printer shortage (we're down to two from a pre-raid count of six!) with its speed and reliability.

We have also acquired a photocopier. We *simply had to do this*, even though it was an expense we could not really afford. The enormous demands of the multiple lawsuits and legal actions has made the ability to copy and disseminate information rapidly and in-house an absolute necessity. In any event, we were long, long overdue for such an essential office tool. Perhaps there is another Trudy Pizer or Mark Miller out there who can help us over the \$3000 hump of the Canon copier?

## REPRINTS AVAILABLE

Another consequence of the in-house laser printer and copier is that we are now able to begin offering selected reprints of articles which have appeared in *Cryonics*. Some of these will be available in booklet form and will be used to supplement our basic information package which is sent out free upon request.

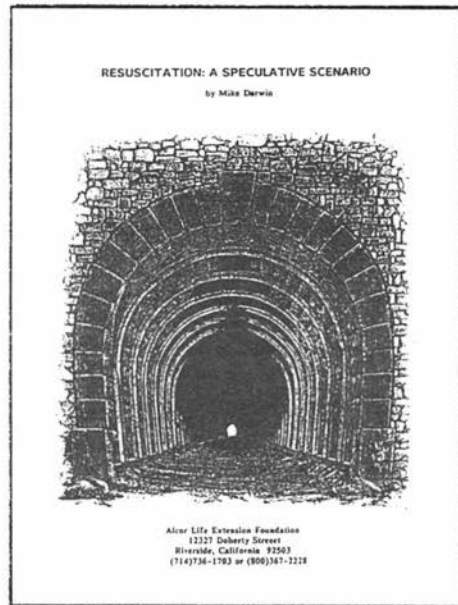
CELL REPAIR TECHNOLOGY  
by Brian Wook

Alcor Life Extension Foundation  
12227 Debarry Street  
Riverside, California 92503  
(714)738-1703 or (800)347-2228

In addition to the general and technical articles we have offered in the past, we are adding a number of new titles. When we get our magnetic media back from the police we should be able to expand upon this list considerably. New titles available in offprint form are: *Nanotechnology* and *Cell Repair Technology*, both by Brian Wowk, *Misadventure As A Cause of Death In An Immortal Population* by Hugh Hixon, *Resuscitation: A Speculative Scenario* and *Long-Time Alcor Member Enters Biostasis* by Mike Darwin, and *The Cryobiological Case for Cryonics* by the Alcor Staff. Copies of the legal declarations by scientists in support of Dora Kent are also available. Call or write Alcor for prices.

## CURRENT MEMBERSHIP COUNT

Alcor currently has 108 Suspension Members and 194 Associate Members



## OUR RECORDS COME BACK (Some of them, anyway)

*"Them wheels grind slow, but they grind fine."*

--Commentary on the U.S. Justice System

*"Mostly them wheels grind slow."*

--Alcor's commentary on the U.S. Justice System

Eight months after they were seized, most of Alcor's and Cryovita's paper records and photographs were returned by the Riverside Police Department (RPD). After months of promises and false starts which caused enormous anxiety and frustration, the records were returned on Thursday, September 8. We had been told no fewer than half a dozen times that the records would be released only to spend the entire day by the phone and be disappointed. We were particularly anxious to get back the patient records and personal effects which had been seized during the coroner's raid on January 12.

In fairness to the RPD, it should be noted that much of the delay in getting return of the documents was due to the sloppy and incompetent way they had been catalogued during the search/seizure and their subsequent mishandling by the coroners after they were seized. One delay was due to the Judge's refusal to sign the release order because the original return warrant (which lists what was taken) had such professional and detailed descriptions of things such as "miscellaneous papers". The Judge, quite properly, did not consider such a description adequate.

Most of the archival slides and videotapes which were returned were fairly intact. However, the paper records were another matter. There was one large box of "miscellaneous papers" which was a rat's nest of stirred and abused records. All of Cryovita's accounting and canceled checks had been milled through and mixed up with a wide range of other papers. Also in this stack of chaos were bits and pieces from the patients' medical

and cryonic suspension files. About 30% of Cryovita's documents were missing and about 15% to 20% of the patient's records were missing.

Almost all of this latter loss is recoverable. For example, many of the photos of suspension operations were missing from the file jackets, but the negatives were returned intact, so we have been able to recover those prints. In several cases where data sheets or patient care summaries are missing we have been able to recover that information from other files or sources. In only one case are we missing patient care information which we may be unable to recover. Fortunately it is not core perfusion and cooling data, but rather summary dictation and conclusions on the patient's perfusion.

We have been given to understand that the mess the records were in was a result of the Coroner's handling of them. This simply confirms that Necrocrats are no more competent than the Astrocrats of NASA, the Medicrats at the Public Health Service or any other bureaucrats for that matter.

The RPD retained several items "for use as possible evidence in their homicide investigation". Among the items retained were two videotapes which record the perfusion of Alcor patient Theresa Cannon and a complete set of slides on all patients perfused by Cryovita for Trans Time, Inc. We are attempting to secure copies of those items at this time, although the police have made it clear that it is not a high priority for them.

We have been repeatedly told that our computers and magnetic media will be returned in the immediate future. However, as of this writing there has been no movement in that direction. The RPD has retained a computer expert to copy all 300+ of our diskettes and to print out hard copy on them using our machines and printers (pity the poor fellow who has to sort through all that stuff)! Currently the RPD has eight of our computers, six of our printers and virtually all of our software manuals, software, and related documentation.

Nevertheless, despite the delays and problems we are excited and pleased with the release of our patient records and looking forward to the return of our computers and magnetic media (the latter of which we *did not* have backed up off site!).





## "THE INVESTIGATION": STATUS REPORT

As far as the investigation of the so-called "homicide" of Dora Kent is concerned we have little to report. We understand that representatives from the Bureau of Medical Quality Assurance, the Coroner's Office, and the District Attorney's Office met September 9 to decide what to do next with the case. Rumor has it that the D.A. would like to turn the case over to the Grand Jury for consideration. What will actually happen next is anyone's guess. This case has proven so strange and unexpected so far that we can only echo Alice and say "Curioser and curioser..."

## ALCOR FILES SUIT AGAINST THE CALIFORNIA PUBLIC HEALTH SERVICE

On August 30th, a long-time Alcor Suspension Member who wishes to remain anonymous filed suit against the California Public Health Service. The purpose of the suit is to seek declaratory relief from a Magistrate to allow for the member's suspension. The member is using the pseudonym of John Roe in order to protect his professional reputation and livelihood. Alcor has joined with Mr. Roe in the suit on behalf of all 107 of its other Suspension Members.

The suit was necessitated by the PHS' refusal to issue VS-9 permits of disposition of human remains *and* their written and verbal threats to prosecute both Alcor and Trans Time for holding human remains in cryonic suspension which they have publicly stated is "illegal". In June, David Mitchell of the PHS reported wrote a letter to the Riverside and Alameda County PHS departments and District Attorney's Offices recommending enforcement. Enforcement would presumably mean turning over our patients to a mortuary, crematory, or other licensed facility for "conventional" and "legal" *disposal*. This left us little choice but to go to the court for declaratory relief.

And what is the source of all this trouble? Surprisingly enough it does not appear to be the Dora Kent case. Rather it is a 1980 memo from the PHS which was issued as a result of the fiasco in Chatsworth, California, where upwards of nine patients in cryonic suspension were allowed to thaw out and decompose by the now defunct Cryonics Society of California. A copy of that Memo is included at the end of this article. Our thanks to Alcor member Keith Henson who doggedly pursued the PHS Necrocrats until they provided him with a copy of it.



All attempts at reasoning with and negotiating with the PHS Medicrats has proven futile. They were unwilling to even consider giving their input on model legislation to address the concerns raised by cryonic suspension.

\* \* \*

STATE OF CALIFORNIA  
VITAL STATISTICS NEWSLETTER

VOLUME 15

APRIL, 1980

In recent weeks there has been a lot of renewed activity in cryonics (freeze dried bodies). For the most part this appears to be a consumer problem. There is, however, a potential violation of law. Since neither of the two businesses—Cryo Vita Labs, Fullerton nor Trans Time, Inc., Emeryville—are authorized under the Scientific Use provisions of the Uniform Anatomical Gift Act to receive donations of human remains, any such disposition on the death certificate or the Permit for Disposition is illegal. You may refuse to accept such certificates for filing until a legal disposition is made. We would like to be notified of any disposition where these two organizations are involved. Also, if you are aware of any other cryonic operations, please let us know.

\* \* \*

Riverside Press-Enterprise, September 1, 1988

# AIDS victim sues state to allow freezing of body

By DON BABWIN  
The Press-Enterprise

Fearing the state might try to prevent his body from being frozen when he dies, an AIDS victim and longtime member of the Riverside-based Alcor Life Extension Foundation has sued state health officials over regulations that prohibit cryonic suspension.

The suit, filed in Los Angeles County Superior Court this week on behalf of Alcor and a man using the pseudonym "John Roe," seeks a court order to allow the man's body to be frozen in liquid nitrogen in the hopes it can be revived at a later date.

The suit names as defendants David W. Mitchell, chief of the Office of Registrar, and Dr. Kenneth Kizer, director of state health services.

"We want the court to make it clear that this guy can be frozen," said Saul Kent, a spokesman

for Alcor. "We don't want him in a position where some hospital administrator can come in and stop it."

The registrar's office, which is responsible for birth and death certificates, and the state health department require permits to dispose of remains. State law authorizes three methods of disposal — cremation, burial and donation for scientific purposes — according to Peter Weisser, a spokesman for the state department of health services. Cryonic suspension is not recognized as legal by the state.

Weisser said the department would not comment on the suit.

Roe and Alcor say that Roe, who cites prominence in his profession as the reason for remaining anonymous, has been diagnosed as having AIDS. He has made financial arrangements to have his body cryonically suspended in the hopes that "at some

future date an effective treatment and cure will be discovered."

The suit contends Roe has the legal right to control the disposition of his body.

The suit comes three months after the Riverside County Health Department refused to issue Alcor a permit to store the body of a Florida man that was brought to Alcor's Riverside facility. Alcor went ahead and froze the body. And in northern California in June, Trans Time Inc. moved the body of an 87-year-old woman to its facility after being told by the coroner's office in Alameda County not to do so.

When the Florida man's body was frozen, Mitchell, whose office advised the county not to issue the permit, said of Alcor's actions: "It looks pretty convincing that they broke the law."

And in a letter written in (See FREEZING, Page B-2)

## DR. LEARY JOINS UP...

by Mike Darwin

As one wag recently noted "Cheer up and look on the bright side, you couldn't have gotten this much press if you'd paid a million bucks. And as long as they spell your name, right who cares about anything else?" It's certainly been true that we've gotten a lot of press recently and it has certainly been true that the Dora Kent case has acted to cement support for Alcor and educate the public about cryonics. The case and the wave of publicity surrounding it have motivated a number of people to become involved with Alcor who would not otherwise have done so.

Alcor was again in the media spotlight towards the middle of September when Dr. Timothy Leary (of 60's LSD fame) publicly announced his neurosuspension arrangements with Alcor. The announcement sparked a wave of lengthy and exclusively positive local stories. The *Los Angeles Herald Examiner* carried it as a four-column-width story across the bottom of the front page. We understand that there was also a considerable amount of national coverage. We have no idea as to its character, however.

# 1960s guru turns on to frozen head idea

By ROBB FULCHER  
The Press-Enterprise

"Tune in, turn on, drop out"  
— and freeze your head?

Former psychedelic drug guru Timothy Leary has added a new dimension to his exotic resume by making plans to have his head frozen after death and stored at a Riverside cryonics laboratory, to be resurrected in the future and fitted with a body.

"It's one chance in 1,000," Leary said yesterday by telephone from his Beverly Hills home.

Leary, 68, said he is entering into an agreement with the non-profit Alcor Life Extension Foundation in a "light hearted" manner, but he sincerely hopes he can be brought back to life, probably 50 years or more into the future.

"I'm not a fanatic, I'm not afraid of dying," Leary said. Cryonic suspension, he said, "is the second dumbest idea in the world. Number one is letting them put you in a coffin and letting the worms eat you."

Leary said he will sign the final legal papers Sunday at Carlos and Charlie's, a Los Angeles

nightclub where he regularly appears as a comic, lecturer and debater on the issues of the day. Alcor President Carlos Mondragon will also appear at the nightclub.

Leary said despite the fact he is signing on with Alcor, his health is good and he doesn't plan to die soon.

He said he would like to convince friends and loved ones to join him in the cryonic gamble, and he envisions awakening "in a chalice, not a tank," in attractive, pleasant surroundings.

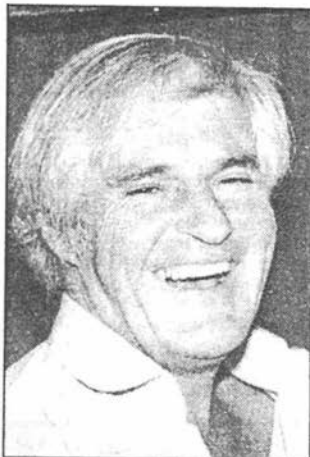
"I don't want to wake up with some scientists poking and prodding at me, thinking of me as a caveman from the Reagan years," Leary said.

"I want to wake up with fancy champagne, vintage 2040, and play some Bob Dylan, rock 'n' roll, or something better, and keep the party going."

Leary also hopes he will attract attention to the field of cryonics.

"If it doesn't work for me, then maybe for my children or grandchildren," he said.

Leary is not a stranger to Riverside County. For several years during the 1960s, he lived on a ranch in Garner Valley, about 10 miles from Lake Hemet. The number of residents at the



1979 file photo

Timothy Leary

retreat varied from about 15 to 50.

Leary has been interested in cryonics for some time and began writing about the controversial science in 1966. He stays in touch with cryonics scientists around the country.

He chose to make arrangements with Alcor because he thinks highly of the people there, because scientists not involved with Alcor recommended it and "it is close by." Leary appeared at Alcor's February 1987 grand opening.

The procedure planned for Leary will cost \$35,000. He said he wants only his head frozen here. (See GURU, Page B-4)



## ERRATUM

Due to a paste-up error, continuations of the two *Riverside Press Enterprise* articles on pages 5 and 6 of this month's *Cryonics* were omitted. They are reproduced below.

Continued from page 5

### Freezing . . .

(From Page B-1)

June to the head of the county's health department, Dr. Edward Gallagher, Mitchell was even more adamant.

"Existing California statutes provide no basis to authorize cryonic facilities to store human remains," he wrote in the letter made public yesterday. "Therefore, if the Alcor Foundation has any bodies or body parts stored in the facility, the foundation is guilty of a misdemeanor . . . and

should be reported to the local district attorney for investigation and prosecution as appropriate."

Kent countered that just because cryonic suspension is not an option listed on the permit to store the body, it is not illegal.

Yesterday, Deputy District Attorney Curt Hinman said his office will not decide whether to pursue misdemeanor charges against Alcor until a homicide investigation into the death of 83-year-old Dora Kent, Saul Kent's mother, is completed. The wom-

an's head was surgically removed and frozen at Alcor's Riverside facility in December. The coroner classified the woman's death as a homicide, saying she was killed by a lethal dose of barbiturates.

Referring to the bodies and body parts stored at Alcor, Hinman said, "The bodies are (being stored) in an apparent violation, but we are not going to file this when a homicide is pending."

Alcor officials say there are two whole bodies and six heads in cryonic suspension at their Doherty Street facility.

Continued from page 6

### Guru . . .

(From Page B-1)

cause he cannot afford the \$100,000 cost of having his entire body frozen.

Mondragon said proponents of cryonics look to future changes in technology to answer questions about the resurrection of frozen heads and bodies, and he does not know how a body would be found for Leary's head. One popular scenario involves cloning, he said.

Alcor is currently storing six frozen heads and two entire bodies, and more than 100 people have signed up for life extension procedures, Mondragon said.

The addition of Leary to the ranks of Alcor's members marks the only celebrity among the membership, Mondragon said.

He said publicity from Leary's association with Alcor may increase the public's interest in the laboratory on Doherty

Street.

Alcor has been best known for a controversy involving the head of 83-year-old Dora Kent.

Her head was surgically removed and frozen in December, and the Riverside County Coroner's Office classified the death as a homicide, saying she was killed by a lethal dose of barbiturates. Riverside County Deputy District Attorney Curtis Hinman said yesterday the matter is under investi-

gation and charges have not been filed.

Alcor officials have said the barbiturates were given to Kent after death and cardiopulmonary resuscitation was used to spread the drugs through her body as part of the cryonics process.

Despite negative publicity over the Dora Kent case, the controversy has not hurt Alcor's reputation with the public, Mondragon said. It has not hurt Alcor's reputation with Leary either.

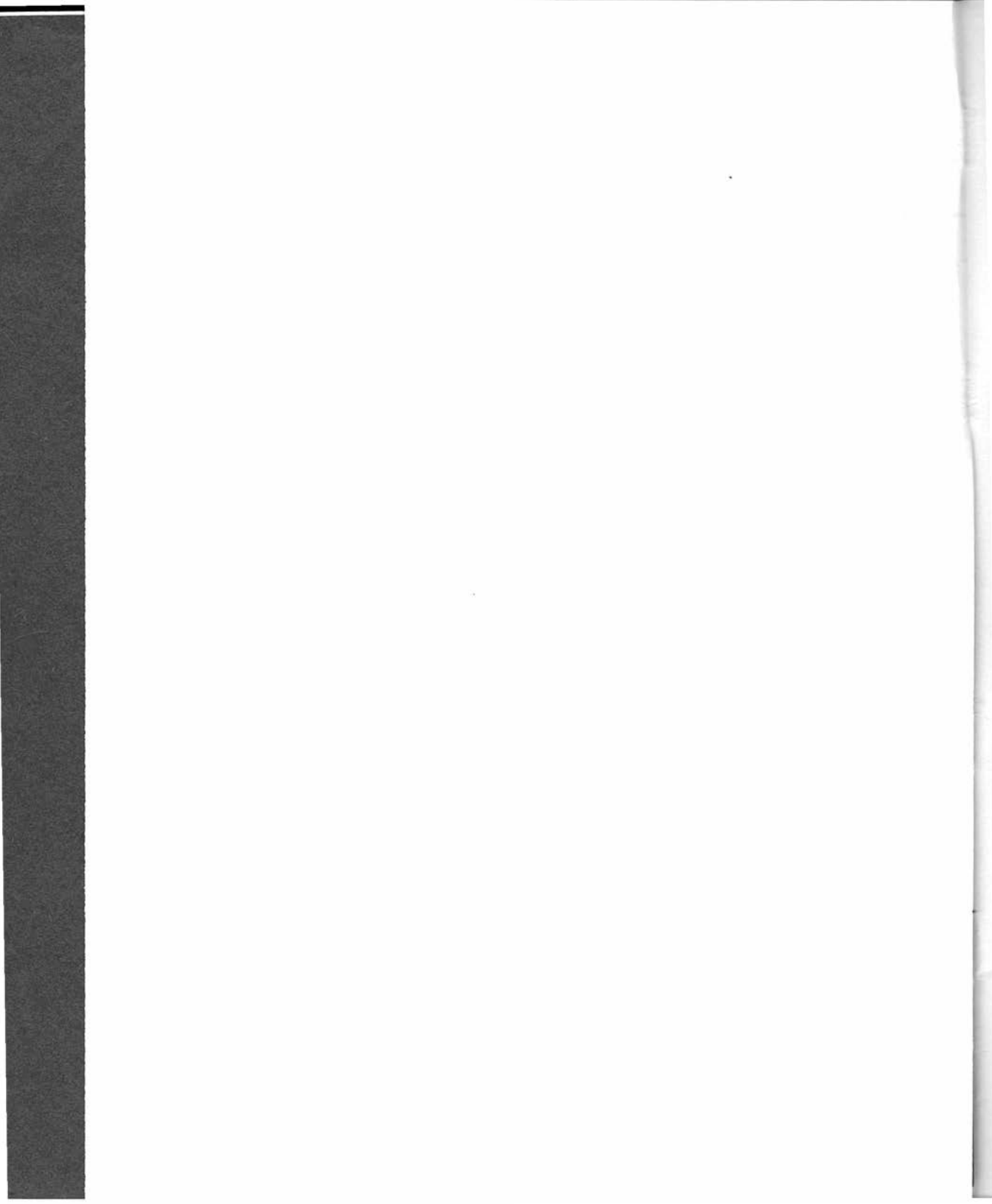
Leary has known Dora Kent's son, Saul Kent, for years and said he is certain the younger Kent acted with his mother's interests in mind.

"The district attorney of Riverside County in his heart does not believe these are wicked men with evil in their hearts doing terrible things to their mothers," he said.

Leary described the people at Alcor as "noble, heroic" scientists who are persecuted for exploring new ideas.

“I want to wake up with fancy champagne, vintage 2040, and play some Bob Dylan, rock 'n' roll, or something better, and keep the party going.”

Timothy Leary



We have also received a call or two complaining about our public association with Dr. Leary. A few words on this matter need to be said.

First of all, Alcor as an organization does not endorse Dr. Leary's philosophy, politics or opinions -- but then we don't endorse anyone else's either. We welcome Dr. Leary's suspension membership as we would welcome anyone as a member who meets our requirements for Suspension Membership. Alcor has not, does not, and will not get involved in making moral judgments about the lives of others.

Cryonic suspension is emergency medicine at its best, and as any emergency room physician knows, it is not his or her place to pass moral judgments on the people who present for medical care. The Officers and Directors of Alcor are not judge and jury on anyone's life. Anyone is welcome as a member provided they pay their dues, have funding in place, and properly executed paperwork.

To take any other course of action would be untenable. Alcor is not a social club or a religious organization. We are a mutual aid organization dedicated to saving our members' lives. We are not in the business of establishing an inquisition into members' pasts, moral achievement, or moral failings. We take such a position because we do not want ourselves to be judged and excluded on the basis of the whims or prejudices of others.

Dr. Leary is entitled to announce his membership in Alcor if he chooses, just as any of us may. He has long been an outspoken proponent of cryonics and he has confronted the issues involved, including his own decision for neurosuspension with courage, humor, and charm. That is more than can be said for many people now involved with cryonics. Dr. Leary is a man who thinks cryonics is a good idea and who wants it for himself. That is enough. To have any other standard is to start down a slippery slope of evil guaranteed to cost us all our lives.

\* \* \* \* \*

### ...AND OTHER PRESS

Alcor was also before the public in an article which appeared in the Fall, 1988 issue of *Whole Earth Review*. The article was a four-page highly technical summary of Alcor's A-1068 case report. The article was very favorable, but unfortunately provided the old, outdated Fullerton address.

\* \* \* \* \*

### ALCOR SURVEY

Survey administrator Max O'Connor reports 60 respondents to the latest Alcor Survey, with more trickling in every day. Please, send your survey in as it will help us to get a picture of what makes a cryonicist and thus hopefully help us to target our public education and marketing better.

We have also heard that some readers didn't get

### The Cryonic Suspension of Alcor Patient A-1068

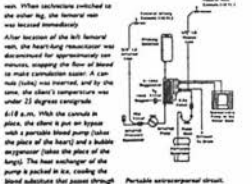
by Corinne Cullen Hawkins

WE'VE ALREADY SEEN ARTICLES recently that poke through the dark borderland between life and death, and examine "Frozen Atomic Life" (218), "The Rights of Robots" (219), and "If the Cat Keep a Seemed Head Alpha" (221), in this issue. "The Cryonic Suspension of Alcor Patient A-1068" continues to raise questions about where life ends -- re-examines assumptions no longer held. Cryonic suspension is the freezing of a human body for storage in some future date. Although some cryonists opt for whole-body suspension, others prefer to preserve only the head (neurocryonics). What follows is a chronological description of a neurocryonics, the client was a female brain physician with symptoms (parietal) and a member of Alcor's neuro-graphic cryonic suspension. Thanks to Mike Chaves and Dr. Ralph Johnson of Alcor Life Extension Foundation, Inc. 40220 North Palm #204, Fullerton, CA 92631, 800/317-2226 for generously providing the details of the case.

2:48 a.m. Cryonic client prepared for cryonic suspension by physician upon respiratory and cardiac arrest. 3:22 a.m. Client is coupled to a heart-lung respirator (Alcor's "A") and a Thorburn's mechanical CO2 source which provides external massage to keep the heart pumping. Frequent medications are administered to maintain the effects of medications for exchange and to protect the brain against ischemia ("no blood flow") damage. Isotonic penicillamine allows brain metabolism, maintains large brain cooling down, human brain blood pressure, and neurocrystalline muscle shivering, etc. The goal is very close to zero in a minimum self damage. The client is coated externally with Zephran phase high fluid which fully insulates and a tube is stuck down the trachea to keep the lungs from closing the airway. Client is moved to a mercury cooled cryonic container (a 200-watt liquid nitrogen) or cools the client to the basal pump and no cryonic. The frozen blood vessel appears blood to the eye. The frozen artery was located easily in the microscope. Various problems were encountered. Near the client's nostrils, a small amount of seeping (a severe accumulation of fluid) and the client's prior history of phlebitis which had damaged the



A-1068 shortly after arrival. An initial observation disclosed the presence of rigor in the arms and forearms.





surveys -- in particular that most or perhaps all of the overseas members and subscribers did not receive surveys tipped into their magazines. If you did not get a survey please call or write us and we'll mail them out to you. Also, you don't have to be a suspension member to participate. We are anxious to hear from associate members too!

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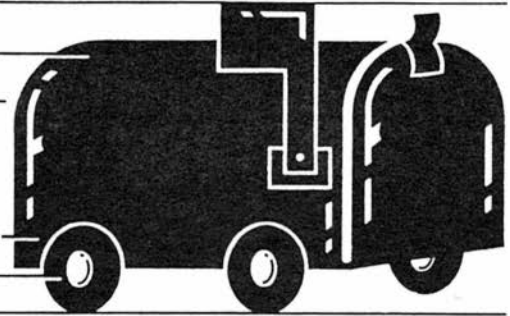
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*Letters to The  
Editors*

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Dear Editors,

Last month Thomas Donaldson wrote saying that the ideas I presented in *The Death Of Death In Cryonics* (June, 1988) were not new, had already been tried, and were not likely to be very useful. I beg to differ.

First, the idea of presenting cryonics as a means for saving *terminal* patients (with implementation after natural cardiac arrest a secondary consideration) *is* new. I believe this approach has great potential for streamlining our arguments, minimizing digression, and making our case more clear. It also does away with the ubiquitous, counterproductive notion that cryonics is an "alternative to burial and cremation".

The recognition that suspension patients are not truly dead, and adoption of terminology to reflect this, is, I concede, not new. However, *the consistent application of this recognition* (if it could be implemented) *would be new*.

You see, there is a very good reason why I perceive "deanimation" as a euphemism for death that has nothing to do with the way Thomas Donaldson defined it in 1976. I do not dispute that Thomas has understood this issue for many years (indeed, his thinking inspired my own). The problem is that others have not been quite so enlightened. Old cryonics literature ("old" meaning before Alcor 1988) is *full* of inappropriate uses of the word "death". Thus "deanimation", when it was used, was often used *interchangeably* with "death". This lack of consistency has severely tainted the word, regardless of its original intended meaning.

Some may say the solution is just to begin using "deanimation" consistently. I am saying that since a major overhaul of our tactics is in order anyway, terms like "cardiac arrest" and "ischemic coma" are superior because they are built from existing medical

terms.

I do not expect these changes in terminology to change the way the press treats us. Indeed, within certain limits, *I don't care* how the press treats us; they've never been a significant source of growth for us anyway. What I do expect is a vast improvement in our most important PR interface -- *our own*.

Cryonics is a complex subject, and it's very important to hold a reader's trust and interest long enough to explain it all. The approach is everything. A good approach can mean the difference between generating an intelligent appreciation of future medicine vs. a turned-off brain caught on some emotional hang-up about cardiac arrest.

Consider: "We foresee a time when humanity has achieved complete control over biological processes..." vs. "The cryostat shown here hold an old, dead woman..." These are the opening sentences of the promotional material of two different cryonics organizations. Guess which one has more members.

Brian Wowk  
Winnipeg, Manitoba

\* \* \*

Dear Editors,

Brian Wowk's article "The Death of Death in Cryonics" (*Cryonics*, June, 1988) represents a significant step forward in the presentation of the cryonics thesis. During the past six months I have made six different slide presentations on cryonics, to audiences ranging from science fiction fans to high school classes to the general public. It was obvious that presenting cryonics as "death reversal" created a great deal of uneasiness in the audience; but I did not know how to get around that. As soon as I read Brian's article, my entire thinking changed immediately. I completely revised my talk.

I eliminated all references to cryonics patients being dead, and substituted a strong statement to the effect that "Cryonics does not store dead people. It is our understanding that current physicians are wrong when they say that a patient is dead after a few minutes of no blood circulation. Those patients are alive, and cryonic suspension maintains their condition unchanged until a future where physicians can recognize the true situation." (The ultimate form of getting a second opinion. - HH)

This changed the tone of the talk from "the miracles of death reversal" to that of "a new life-saving medical technology." The effect on the audience was striking. They listened much more closely, with little of the distancing effect I had previously observed. Their habitual ways of thinking were still disturbed, of course; but, where previously it had seemed as if I were asking the audience to swallow a bizarre new religion, now the effect was much more like the presentation of a startling new scientific discovery. The audience's questions were different also, with less emphasis on religion and mortality, and more on technology and feasibility.

Further, I discovered a surprising change in my own thinking. Without realizing it, I had begun to start off discussions of cryonics with a defensive attitude -- "You've heard some about this, and I know it sounds weird, but really, it's a good idea." After revising my talk, I now have a more positive attitude: "Cryonic suspension is very likely to save lives, and could save the life of almost anyone in a terminal condition today. This is a logical step to take. Letting people die when they could be saved is completely illogical. If physicians are serious about saving lives, they should cooperate with cryonics organizations."

With this in mind, I was surprised to see Thomas Donaldson's letter to the editor (*Cryonics*, July, 1988), in which he seemed to take Brian's article as a personal insult. Donaldson writes that "terminology and our ideas about death have nothing to do with" a change in public attitudes about cryonics. But I strongly believe Donaldson is wrong about this. I have seen changes already in talking both to groups and to individuals.



True, this change by itself will not create a stampede to become suspension members. But it will get many people past their initial misunderstandings about cryonics, possible including some who may not sign up but who nonetheless are essential to the survival of cryonics: scientists, physicians, attorneys, insurance agents, and government officials.

Donaldson comments that "so long as I am frozen and revived it doesn't concern me whether or not my suspension is referred to as 'frozen storage of meat' or 'cryostasis.'" But he is already convinced of the feasibility and necessity of cryonics. Once one is convinced, it could be called "head chopping and turkey carving," and the conviction will not fade. The problem here is not in getting Thomas Donaldson to understand cryonics, but in getting millions of others to understand it. And to them, the difference between "frozen meat" and "cryostasis" (or other life-oriented terms which are more clear) is immense.

Finally, Donaldson's defense of the word "deanimation" is misplaced. Whatever we meant by "deanimation" is not as important as what was *communicated*. To many listeners, including myself, "deanimation" sounded like an attempt to invent a fancy word as a substitute for other evasive-sounding phrases like "death with a small 'd' instead of Death with a capital 'D.'" It was a lot like calling garbage collectors "sanitary engineers." It sounded artificial.

While "ischemic coma" may be a bit clumsy, it has a major advantage of being medical terminology and of having an immediate reference to what the public knows of comas. They know a coma is not the same as "death." Some people recover from comas. Most people do not know what "ischemia" means, but that is easily explained.

Language *is* important, both as accurate communication of facts and as an expression of our attitudes. As a simple example, whether the chemical BHT is called a "drug," a "preservative," or an "anti-aging" substance profoundly affects how it is handled, and shows a lot about the speaker's attitude toward it. The words we use to discuss cryonics may not change what cryonics is; but they create the way in which it is perceived. And public relations *is* perception.

Stephen Bridge  
Indianapolis, IN

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To the Editor:

Actually, the first thing I want to say is that Steve Bridge's letter is quite good. But I do feel badly done by when Steve says that I was answering as if my letter were a "personal insult" which is not what I felt at all. Fundamentally, I do feel that simple changes in words aren't important to cryonics. But Steve points out in his own letter how his *attitudes* have also changed, and that's much more important than any change in words.

I have always felt positive and pointed out how we simply didn't feel that these patients were dead. Gradually we are getting our message out. As for Steve, I can't say how he conducted his own discussions ... but don't *ever* apologize or radiate a lack of optimism. I can't remember ever taking a negative or apologetic tone.

Fundamentally, it doesn't really matter to me what words we call "deanimation", except in doing justice to history.

There is another question too, though. The second stage of cryonics education is exactly to point out that there *is* a new attitude toward "death" here. We aren't just moving the point at which it occurs, we are questioning the whole concept, and it ought to be questioned. We don't have "death", we have a slow fading, which we can affect by what we do to the patient. In particular, we can stop the fading before it has gone far at all. *That* is the radical break in cryonics. We need to put this point also, even if not to general audiences.

Thomas Donaldson  
Sunnyvale, CA

To the Editors:

Re Brian Wowk's *The Death Of Death In Cryonics*, (June, '88), I have some agreements and some disagreements. I certainly do agree with him that cryonic suspension patients are not dead, in any meaningful sense of the word, but I vary with him on a lot of his supporting arguments and definitions. I tend to be very conservative about lexical and semantic innovations. If the definition keeps getting changed, *then just what are you talking about!*

First, I disagree that "a broad meaning of death that exists in people's minds... is the cessation of brain function". I haven't taken a poll recently, but I suspect that if this is a popular criterion, it is quite recent one. The issue of "brain death" has been in the public eye only in perhaps the past 10-15 years. The benchmark here is probably the Quinlan case in the mid-'70s. Historically, people have not thought of life as brain function. The classic criteria are breathing, and (less often) heartbeat, and I would be surprised if anyone can come up with a literary allusion to death, in any period of history, that implies cessation of brain function, rather than breathing or heartbeat. "Brain function" is a rather ill-defined thing that I do not think normally impinges on most people's consciousness. Even people in deep coma, or who have suffered total loss of personality, are never considered "dead" in our culture.

I *do* agree that death is, in the popular mind, equated with "the irreversible loss of life". This is perhaps an inchoate definition, but I believe that this is to our advantage, particularly as it is now undergoing a constant redefinition, and not by us.

I am not a TV watcher, but even I am aware of the several successful paramedic and hospital dramas and soap operas of the last decade. And the dramatic potential is obvious.

*A crowd is gathered around someone lying on the ground/the monitor sounds an alarm in the Intensive Care Unit. The paramedic vehicle roars up/the code crew comes boiling into the room. The expert performs the basic checks for life: no heartbeat, no breathing (not, no brain function). The trained crew springs into action. The person is intubated and hooked to a respirator, the defibrillator is readied. Someone calls "clear!" and everyone steps back. The patient twitches dramatically. The results are evaluated, they try again. Finally, they either get what they want, or quit because their cause is obviously futile.*

Life has been restored, or at least, death has been hassled severely, at the hands of everyman with technology on his side. Drama. And all the better because it can be *real*.

And dead is *not* finally, irreversibly, dead. Not until the experts have had a go at it.

I submit that the medical soaps have been doing a lot of our work for us, not only redefining death in the popular mind, but also in creating a state of mind where it *can* be redefined.

I should also remark that, unfortunately, this particular dramatic theme is now disappearing from TV.

I also dislike any use of the term "coma" with respect to cryonic suspension. "Coma" already has a well-defined medical usage, and is rooted in the concept of sleep. Cryonic suspension is *not* sleep, but something new under the sun. Thus, "coma" seems obviously inappropriate. The term "ametabolic coma" is additionally suspect, because it does not exclude non-metabolic degradative processes. However, if forced to exclude "cryonic suspension" and its variants, the use of of a term like "cryostatic coma" is much more accurate than "death".

I offer the following definitions. I believe that they are both mutually consistent, and consistent in the greater lexicon, two criteria which I feel must be observed to gain accepted usage.

biostasis -- the arrest of biochemical activity, by either cryogenic or chemical means.

cryonics -- the procedure of preserving a person indefinitely, by means of low temperatures; usually for the purpose of treating some intractable illness with an improved future medical technology. *Also*, low temperature biostasis.

death -- the permanent cessation of life/personality.

legal death -- that condition where the signs of life are absent, and no available medical measure can reverse the biological progress toward death.

pronounced -- to have the criteria for legal death formally declared.

suspension -- the temporary cessation of life/personality. *Also*, cryonic suspension, biostasis, biostatic coma, cryostatic coma, ametabolic coma.

This list is obviously incomplete, and further additions based on Brian's definition are welcome.

Hugh Hixon  
Riverside, CA

\* \* \*

Dear Sirs,

I thoroughly enjoyed the article *Cell Repair Technology* by Brian Wowk in the July issue of *Cryonics*. I am bothered, however, by the assumption that the brain is an irreplaceable organ. Mr. Wowk seems to assume that the destruction of the brain necessarily means the end of the person. Yet, the technology he describes has the capacity to transmit an atom by atom description of the brain. This implies that memories and personality can be recorded *and stored* by mechanical means. Hence, even an accident that results in complete destruction of the body of a person, including the brain, does not necessarily imply the "death" of that individual. The person could be reconstructed if both the genetic and psychological information were available.

John Varley describes a society that has the ability to reconstruct people from copies of their memories in such stories as *The Phantom of Kansas* and *Overdrawn at the Memory Bank*. As in much of science fiction, an integral part of these stories is the inadequacy of the proposed technology. For example, the process of recording memories is expensive in Varley's universe, so recordings are made infrequently. There is also great psychological stress involved in the recording process. If a person has ever "died" his memories of that death are that he went to have a recording made and as he awoke a doctor informed him that he has been restored from backup. Since the backup may have been made several years ago, the person has no memory of recent events. He may not even recognize his wife or know his baby girl. This leads to an unusual situation where people learn to associate death with the very process that is designed to eliminate death.

While Varley's exploration of this topic makes for interesting reading, in reality nanotechnology will not only make the recording of memories possible, but also inexpensive. If we assume that nanomachines can be made self-replicating, then the vast majority of the cost of producing such machines will be what we today call development costs. It would cost almost as much to make one machine as it would to make a million of them.

If memory recordings are made often enough and replacement bodies are kept in cold storage or can be fabricated quickly, there will be no significant psychological trauma resulting from death. Of course we must decide how often is "often enough"? Certainly once or twice a year is too infrequent. At the other extreme one could propose a real-time, brain-resident system that continually records and transmits memories and experience. A more sensible alternative would be daily recordings. One can envision a nanotech bed of the future which automatically does personality backup while its occupant

sleeps.

I realize that this scheme could run into problems if the time required to make a backup is significant, since our personalities are continually undergoing change. One possible solution would be to perform incremental memory backups, similar to those done on computer systems today.

The results of this technology would certainly have a dramatic influence on the way people live. For example, the death of a salesman in the early part of the 22nd Century may be more of an inconvenience than a tragedy. Imagine a businessman who has an appointment scheduled on the moon. He begins the morning of the trip normally and goes to the spaceport to catch the 10:00 AM shuttle. Unfortunately, the shuttle explodes one minute and thirteen seconds after liftoff. Spaceport officials immediately contact our salesman's life insurance company which pulls his spare body out of storage, transcribes the memory recording made the night before, and jump-starts the new body. Our salesman wakes up surprised to find that he is not at home and that it is afternoon rather than morning. When the situation is explained, he is annoyed that he has to reschedule his business appointment, and curses the lax safety standards at the spaceport. The thought that he is no longer who he used to be doesn't even cross his mind and would seem ludicrous if someone suggested it to him.

Michael B. O'Neal  
Lafayette, LA

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Editors,

The death of Robert Heinlein seems to have attracted quite a lot of attention amongst cryonicists. This is reasonable, Heinlein wrote often and lucidly of cryonics. However, given his obvious awareness of at least the theoretical possibilities of cryonics, there remains the unanswered question of why he did not choose to have himself frozen. Since best estimates indicate that he could easily have afforded to do so if he wished, this seems most curious. I believe I have "the answer".

Heinlein believed in life after death. Readers of his fiction will find that he *never* has atheistic heroes. In several of his works "proof" is found to indicate an afterlife. (*Beyond This Horizon* comes to mind. Also, in *I Will Fear No Evil* and *Stranger In A Strange Land* the main characters experience an afterlife.) But this is not all. Heinlein has gone on record in his nonfiction as well that he believes that life after death is a proven fact. I quote from his short work *The Third Millennium Opens*: "Do we have a 'science of the mind' today? Far from it. But we do have -- A Certainty of Survival after Death, proved with scientific rigor more complete than that which we apply to heat engines."

This short work can be found in his *Expanded Universe* collection. The article was written in 1956 and although in his 1980 footnotes to the article Heinlein seems to back off slightly from his "scientific rigor" stance, it is clear that he did believe in an afterlife. It seem a shame that he was in such a hurry to get to it.

Mark Roulo  
Los Gatos, CA

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**FROM OUT OF SPACE....  
A WARNING AND AN ULTIMATUM!**

**THE  
DAY  
THE  
EARTH  
STOOD  
STILL**



**MICHAEL RENNIE PATRICIA NEAL HUGH MARLOWE** and with **JULIAN BLAUSTEIN ROBERT WISE EDMUND H. NORTH**

20



## The Day the Earth Stood Still

### Cryonics and the Resurrection of the Mythic Hero

by Steven B. Harris

The time is post-World War II, and the scenery in the film is the crisp black and white of pure storytelling. A flying saucer has landed in Washington, D.C., on the grassy Mall not far from the Capitol. Tanks and soldiers have moved quickly to surround the alien craft, waiting for something to come out.

Finally, something does. As guns are cocked and breaths held, the saucer door opens, the obligatory ramp extends, and a silvery-suited figure emerges. The figure is humanoid, but its head is completely hidden by a globular helmet.....

The movie is one of the great science fiction classics of all time, Robert Wise's *The Day the Earth Stood Still* (Twentieth Century-Fox, 1951). Recently I saw it again, and as is usually the case with such movies, it made me think. *The Day the Earth Stood Still* is, on one level, an early 1950's post-atomic-bomb movie about fear of world-incineration, and distrust in human nature. But on another level it is an artistic work which re-interprets some far older and much more interesting themes in a modern, technological way. It is one of these themes which most interests us here -- a theme that happens to be central to the idea of cryonics. In what follows, we shall use the movie as a springboard to some larger considerations about the spread of an idea that most of us hold dear.

#### The Visitor From Space

The reader will remember that in *The Day the Earth Stood Still*, the helmeted space traveler starts out having a rather difficult time on Earth. His vicissitudes begin when, fresh out of his saucer, he makes a sudden gesture with some kind of tool and is promptly shot by a nervous G.I. with a .45. We recognize a parable here. Humans are interplanetary nerds, as will eventually be made even more clear. But there is symmetry in the situation too. It turns out that The Man from Outer Space is not handling First Contact with the inhabitants of Earth very intelligently, either, in light of what he knows about the violent tendencies of the inhabitants of Earth.



The spaceman has something to make up for his misjudgment, however. When he is shot, the gunfire brings out of the saucer a seamless metal "man" at least eight feet tall -- a robot. This particular robot obviously possesses a certain amount of initiative, for it proceeds to destroy a tank, some artillery, and a number of

Gort descends from the saucer to protect Klaatu at the first encounter with the Earthlings.

small arms, using for this a selective disintegrator ray that does not harm humans. It continues this novel defense until the spaceman, recovering somewhat from his wound, finally calls it off. It does not do to shoot aliens in 1950's science fiction movies -- their technology is too good.

Not having anything left with which to shoot the spaceman, the soldiers eventually take him to Walter Reed Hospital, where for the first time we see his face -- which is human. At the hospital, it is discovered that the spaceman has fully human physiology as well (this is never explained), and even speaks perfect English (having learned it from radio broadcasts). His name is "Klaatu" (played with wonderfully superior aplomb and a faint accent by British actor Michael Rennie), and he gives the hospital staff an ointment that he has used to heal his gunshot wound overnight. Medicine is much more advanced where he comes from, he tells the doctors; although he looks 38 years old, he is in fact 78. The average lifespan of his people is 130, and it is all due to technology. One of the doctors at the hospital comments that he feels like a witch doctor, and wonders aloud whether he should give up the practice of medicine altogether, or just go out and get drunk.



Michael Rennie as Klaatu

In his hospital room, Klaatu meets with the secretary of the President of the United States, and asks the secretary for a meeting of the heads of state of all the nations of the Earth. He has a message for them which he will not deliver until they are all assembled. But it is not to be. From all over the Earth, the representatives of other nations cable the U.S. with so many pre-requirements for such a meeting that it becomes clear that it will never take place, even at the United Nations. Klaatu, when he hears this, asks for some time to look at the sights of Earth and visit with its people, so that he can more fully understand this attitude. He is denied. The Army wants him right where he is, a prisoner.

So Klaatu steals a suit of clothes, and escapes the hospital for a look around. He does surprisingly well on the lam due to the implausible fact that no one has bothered to get a photo of him without his helmet on, and thus the wanted posters are a study in silliness.

Klaatu is obviously out to mix with the common folk of Earth, and mix he does. Taking the name of "Mr. Carpenter" from the erstwhile owner of his stolen suit, he eventually finds his way to a Washington boarding house not far from the Mall. Two of his fellow tenants are Helen Benson (Patricia Neal), a young war-widow who works in Washington as a secretary, and her son Bobby, who looks to be about 12 years old. Mrs. Benson is strangely attracted to the handsome and reticent stranger, but Klaatu seems more comfortable in the company of the boy. They become friends, and together go out to see the sights in D.C. At Arlington National Cemetery, they pass infinite rows of grave markers, and Klaatu remarks upon what a waste it all is. No, he is not talking about death itself, but rather about war. The bad news: they have cemeteries on other planets too, as he tells Bobby. But apparently (as we infer from Klaatu's attitude) nobody minds

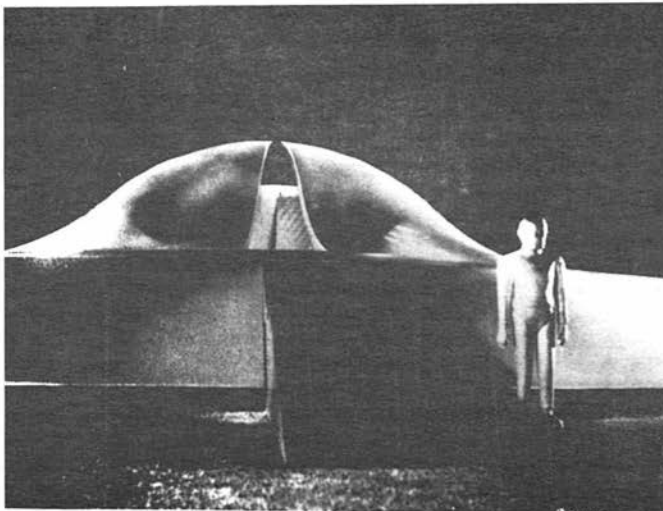
cemeteries too much on the other planets, because there people only die of natural causes.

Klaatu has read in the newspapers of a Professor Barnhardt, a Washington "savant," who is trying to assemble a meeting of the top scientists of the world to discuss the implications of the alien landing. The boy tells Klaatu that everyone knows that Professor Barnhardt is the smartest man in the world. So Klaatu and Bobby go to see Dr. Jacob Barnhardt -- a gentle, elderly, Jewish-looking physicist with unruly hair (Sam Jaffe), who is plainly meant to be an Einstein figure (when this movie was made, Einstein was of course alive and at the apex of his fame). Klaatu introduces himself by letting himself into the professor's study, and doing some correction on a study blackboard full of the professor's equations on space travel.

The professor is easily convinced from this that Klaatu is the alien "spaceman," and he and Klaatu, speaking the common language of science, hit it off immediately. Together, they begin to discuss what kind of an alien power-demonstration to the nations of Earth would serve to back up Klaatu's message. The professor wants to avoid destruction. Klaatu promises a demonstration in two days, with a meeting between himself and top scientists and other intellectuals to follow shortly.

The "demonstration" turns out to be a total dampening of electrical power generation over the entire globe (except for emergency generators) for half an hour. Lights go off. All communications fail. Cars stop in the streets. The Earth "stands still," or at least it does in countries where technology rules. During the power failure, Klaatu is in the envious position of being trapped in an elevator with the lovely Helen Benson, and he uses the opportunity to tell her who he really is. She becomes an instant ally.

Understandably, some people in authority are upset by the electrical "demonstration." Klaatu is betrayed to the military by the unworldly diamonds that he is using for currency, and by Helen Benson's ambitious and unprincipled insurance-salesman boy friend who accidentally learns his secret identity. What happens as a result is that the military tracks Klaatu down and unintelligently proceeds to shoot him again, this time mortally. Before he is shot, Klaatu gives a message to Helen to pass to the giant robot, whose name turns out to be "Gort." The message, which she (and we) memorize, is this: "Gort: Klaatu barada nikto." These are among the most famous words in science fiction.



We are never told what they mean, exactly. All we know is that the vaguely Esperanto-like message is somehow meant to keep Gort from going on the rampage.

It is needed. When Klaatu dies, Gort activates. He has been standing just outside the saucer, immobile and imperturbable, for the entire time of Klaatu's visit. The military, unable to break his metallic skin or move him, has encased him in a block of transparent plastic. Now Gort begins to glow weirdly

**Gort and Klaatu's saucer, lit by Army floodlights at night.**

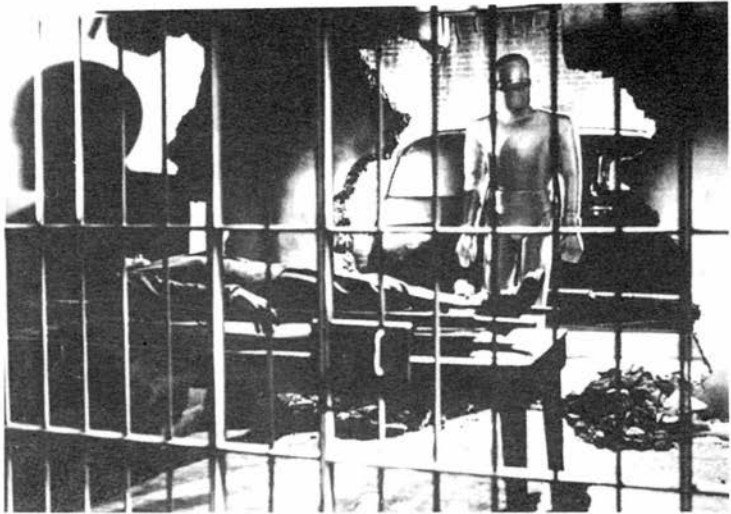
in the night, melting his way out of the plastic as Helen Benson watches. Gort then proceeds to disintegrate the soldiers guarding the saucer with a death ray. (So much for Asimov's First Law of Robotics on the other planets). In fact, Gort nearly disintegrates Mrs. Benson before she says the magic words. She takes an embarrassingly long time about it.

"Klaatu barada nikto" possibly says something about retrieving Klaatu, because that is what Gort proceeds to do. Klaatu's body is being held temporarily in a local jail cell under Army guard, and Gort simply walks up to the outside wall, disintegrates a hole in it, and takes Klaatu's body out like a broken doll. Back they go to the saucer, where the robot has previously stashed Mrs. Benson for safekeeping.

In the saucer, Gort puts Klaatu's body in a machine and turns it on. There are appropriate high-tech sounds. Eventually, Klaatu begins to breathe. Then he sits up, good as new. "Hello," he says politely.

This, of course, is a shocker. Helen Benson wants to know if Klaatu was really dead. Klaatu confirms it. Then she naturally wants to know if Gort has the power of life and death. Klaatu denies this, and explains rather piously that that particular power is reserved only for the "Almighty Spirit" (God forbid that the Man From Outer Space

Klaatu, Mrs. Benson, and Gort inside the saucer, after Klaatu's "resurrection".



Having just disintegrated the jail cell wall, Gort prepares to remove the body of Klaatu.



should be an atheist -- more about this peculiar line later). In a scene of special interest to cryonicists, Klaatu explains that by certain techniques life can nevertheless be restored to the dead "for a limited period" in certain circumstances -- presumably if clinical death hasn't gone on for too long.



Gort and Klaatu deliver their message prior to their departure.

Meanwhile, scientists from all countries have assembled outside the saucer for the scheduled meeting, and the recovered Klaatu emerges to deliver his message to the Earth. It seems that the people of the "other planets" have become disturbed over Earth's recent development of rockets and atom bombs. The message is simply that Earth is not going to be permitted to spread war into space. Klaatu reveals that his federation of planets has succeeded in avoiding war among themselves only by the rather drastic method of creating a race of incorruptible robot policemen (such as Gort), who keep the interplanetary peace by the simple expedient of patrolling the planets in flying saucers and destroying aggressors wherever they find them (they are presumably libertarian robots). The power given to the robots is irrevocable. "We do not claim to be perfect," says Klaatu matter-of-factly, "but we do have a system, and it works." Thus, Earth is warned of total destruction, as there will be no compassion from Gort and his ilk (perhaps they are Objectivist robots), if Earth screws up. With that message delivered, Klaatu departs into space.

#### *Themes That Are New*

*The Day the Earth Stood Still* contains many ideas that will become stock in trade for 1950's movies. One of these involves space transportation. In an era when men are still only experimenting with large rockets, and have only begun to think seriously of space travel, alien spacecraft in this film are imagined as an even more advanced design whose motive energy is supplied by a "highly developed form of atomic power." The idea of alien space ships as "flying saucers" itself dates only from four years before this movie, and the idea of atomic power for space transportation from not much before that. Clearly the time had come for fictional connection of these ideas, however. Science Fiction enthusiasts will remember that flying saucers and aliens controlling atomic power are also featured in *The Thing* (RKO/Winchester Pictures) released the same year as *The Day the Earth Stood Still*.

In other ways, however, the vision of *The Day the Earth Stood Still* is clearly removed from a typical science fiction movie of its time. Alien beings from space are not seen in this film as marauding monsters, as they are for instance in 1950's films like *20 Million Miles to Earth*, *The Thing*, *War of the Worlds*, and numerous more forgettable stories from the S.F. pulps. Rather, aliens appear (here perhaps for the first time in a movie) as wise and concerned people -- people who in this case have been forced by circumstance to adopt a vigilante attitude toward the relatively less advanced and more destructive people of Earth. Notable also is the film's interest in open communication between all countries of the world at a time (the middle of the Korean War) when the prevailing attitude of many



Americans was "U.S. vs Them." A number of scenes in the film effectively highlight mankind's all too frequent xenophobia and unreasoning fear when faced with the new and different.

Even more intriguing in this film is the idea that high technology, as manifested in space transportation, would naturally be expected to go hand in hand with gerontologic expertise and advanced resuscitation capability. Note this connection being made even at a time years before cardiac defibrillation and heart-lung resuscitation began to be employed in medicine, and before the public had had any significant experience with people routinely being resuscitated from clinical death.

It is useful, then, to ask the question of the ancestry of these seemingly novel movie themes in 1951. How could this movie have expected any success in its day, when it assaulted people with unfamiliar scientific themes far ahead of their time? Would not technological resurrection in particular have been expected to sound too unbelievable in 1951 for the movie-going public, with the idea perhaps generating the sort of unfavorable reaction among script-reviewers that has come to be so familiar among cryonicists?

A bit of historical research shows that it did. Screenwriter Edmund H. North's script for the movie (itself an adaptation of a 1940 Harry Bates' short story titled "Farewell to the Master") originally called for Klaatu to simply be resuscitated from several hours of clinical death, and thereafter to go about his functionally immortal business. Unfortunately, the Breen Censorship Board (an autocratic self-censorship mechanism of the movie industry especially active during the cold war years) was scandalized at the idea of Gort bringing Klaatu to life, saying "Only God can do that!" North's protestation that the movie was science fiction and that the action in question involved genuinely unearthly alien technologies, got nowhere.

Eventually, a compromise was worked out: Klaatu's invocation of deity and his promise not to live forever were inserted, and the Breen Board, apparently satisfied that it had protected the public from the un-American idea of scientific immortality, withdrew its ban. The scene remains as a jarring monument to the inability of many people to consider (even in fiction) the idea of dealing with death on any but supernatural terms.

#### *Themes That are Timeless*

A bit of thought about the theme of resurrection will show that, if there were themes in *The Day the Earth Stood Still* that were strange, there were others that were anything but unfamiliar.

Consider, for instance, *The Day the Earth Stood Still* as biblical allegory. Klaatu then is to be understood as a Christ figure (with the Earthly pseudonym of "Mr. Carpenter," yet!), who is sent from the "heavens" to warn mankind of its sins. Although Klaatu's coming is attended by wondrous events, on arrival he is strangely not to be found with the great and mighty, but rather with the common folk and the children. Of course, his uncommonness is all too apparent; his teaching of science to the great Jewish scientist is as much a personal self-revelation as that of the boy Jesus in the temple confounding the Rabbis. (And, as if that New Testament reference is not clear enough, we see the Professor making a blackboard pun in ancient Greek, and Klaatu emphasizing it). Being high priest of technology, Klaatu shows his power not by calming sea and storm, but rather by calming all the tumultuous machineries of man.

In keeping with the allegory, Klaatu is finally betrayed and murdered for his trouble, by the very people that he came to warn. His body is taken to a jail cell in lieu of a

tomb, and there guarded by soldiers. The cell is opened by a mechanical servant in place of an angel, and there is finally a resurrection, albeit a technological one. Patricia Neal plays Mary Magdalene, asking the questions for us. Eventually, message of warning delivered, Klaatu ascends into the heavens. It is not difficult to see how flying saucer cults get started. All of them postdate this movie.



E.T. shows his friend his "heartlight," which represents his feelings for him.

In any case, if *The Day the Earth Stood Still* is today considered one of a handful of contenders for the best science fiction movie ever made, it is at least partly a result of the movie's working of an old and powerful theme. How powerful this particular theme is, the reader may partially judge by considering that the current record money-making movie of all time, *E.T.: The Extra Terrestrial* (Universal, 1982), pulls exactly the same psychological strings. Again in *E.T.*, we see the heavenly being visiting Earth with magic life-restoring powers. Again, there is an unenlightened government sending squads of soldiers chasing after the visitor, who all the while is more content to spend his time with common folk and children. Again we see the visitor's death and technological resurrection (the only difference being that in 1982 they had cardiac defibrillation, so they put that in, too). And again there is the ascension to the heavens, this time to the heavenly parents. E.T., you see, is only a child.

It is important to realize that the theme we describe here is not just biblical. On the contrary, the hero who dies or descends to an underworld on his quest, and is resurrected with the gift of life, occurs throughout the ancient stories of the world. It is far older than the New Testament. In fact, we catch a glimpse of the theme's antiquity within the Jesus story itself at one point: it is in the place (Matt. 16:14) where the disciples tell Jesus that some people think that he (Jesus), with his powers over life and death, must be the resurrected popular hero, John the Baptist. John had previously been beheaded in the dungeons of Herod (Matt. 14), and thus it is clear not only that some people believed that a (headless!) corpse had returned to life, but that they believed this well before the time of the crucifixion of Jesus. The Jews of early Christian times probably got the idea of hero-resurrection from the Greeks, and the Greeks got it from somewhere else, possibly the Egyptians.

A relevant Egyptian myth is worth describing. It concerns the death of the god Osiris, who with the Goddess Isis was one of the principal creator-Gods of Egypt. Osiris had come to the Earth as the human King Osiris to teach men the principles of law and agriculture. King Osiris was murdered, however, by his jealous brother Set, who tricked him into entering a close-fitting sarcophagus which he (Set) then threw into the Nile. Later, after Osiris' body was recovered by Isis, Set dismembered it and buried it in 14 parts. Again, according to legend, the pieces were collected, and Osiris was resurrected by his son Horus. Osiris thus became God of the underworld and the dead. All Egyptians being prepared (by mummification) for the sacred journey to transformed existence in the afterlife, took Osiris' sacred name.

Not only Egypt, but many pre-biblical cultures in the East and West had tales of resurrected heroes as well: Adonis in Phoenicia, Tammuz in Mesopotamia, Dionysus in

### The resurrection of Osiris.

Greece. How far back tales of resurrection go, no one can say, but it is known that Neanderthal man buried his dead with food and tools at least 100,000 years ago. Resurrection myths, apparently, go back as far as you like.

### The Power of Myth

What shall we say of this resurrection myth, this very old, many-times-told story? There is no

doubt that there are certain tales that will not go away once heard, and which activate some deep and hidden response in the collective unconscious of man (though why this happens remains a mystery). The common themes that run through gripping stories of this sort have come to be known (after Dr. C. G. Jung) as *archetypes*. Stories that contain "archetypal" ideas, and which seek to explain the world in understandable ways, we know as *myths*.

It is important to understand that myths are not lies, nor is the word meant to be used in a derogatory way. Myths are not "true" or "false" as we usually understand the terms. They are instead symbolic stories that we tell ourselves in order to deal with reality. No culture is immune to them. Professor Joseph Campbell, who spent his life studying these tales, had another definition of "myth" that he found useful: "Myth is someone else's religion."

The theme of the hero-who-is-resurrected is one of the archetypal themes of literature and myth, and one of the most powerful. This power manifests itself in interesting ways. Because of the resonance between archetypal themes and the unconscious mind, the presence of elements of an archetypal theme in a given tale is sometimes enough to catapult a given story into the public consciousness in a way that might otherwise be completely inexplicable.

An example: in 1818, Mary Wollstonecraft Godwin Shelley, second wife of poet Percy Bysshe Shelley, published a first novel which she had finished while still nineteen years old. The hero of the novel is a scientist named Victor Frankenstein. In the story, Frankenstein schemes to resurrect a living creature by purely technological means, using pieces of stolen corpses for the raw material. He is successful, but the resultant monster turns on him. Eventually, after a chase into the Arctic regions, Frankenstein once again confronts his own creation. But not before he has a resurrection scene of his own, in which his nearly frozen body is rewarmed and revived by the crew of an Arctic exploration vessel. Hero and anti-hero pursue each other through the novel like Jekyll and Hyde aspects of the same being, and the ambiguity and blurring of identity of creator





Scene from the 1931 *Frankenstein*.

and monster in this tale have persisted to the present day.

*Frankenstein* in its day was an instant success, bringing its author immediate fame on both sides of the Atlantic. Although Mary Shelley lived another 33 years after *Frankenstein*, and wrote five more novels, she never again came close to the power of her first tale. Myth is important. A story or idea which contains a sufficient number of archetypal elements will drive itself into the public consciousness without any effort at all. A story which does not, will have slow going all the way.

#### *Enter the Idea of Cryonics*

The concept of the archetypal power of certain ideas causes us naturally to speculate about the idea we know as "cryonics." Cryonics is an idea, even a story, which embodies the element of technological resurrection. Yet it is a sad but observable fact that the idea of cryonics seems

never to have caught the public fancy in a major way. "Why?" we must ask. What is missing?

Now that we have done some cursory examination of the myth of the resurrected hero in several of its manifestations, several possible answers to the question present themselves.

One possible answer is straightforward: perhaps the essential ingredient missing from the cryonics story is the hero himself. Perhaps the problem is that the mythic story is not complete. Cryonicists hope to see themselves resurrected, yes, but their psychological burden is that they do not have the sacred name of an Osiris or a Jesus to see them through the dark spaces of the mind when it faces the unknown. In the past, cryonics has concentrated on the idea that death can possibly be beaten, and has told itself that the failure of the cryonics idea to "catch fire" stems from the fact that the public does not understand the true nature of what is usually called "death."

Within the mythic framework, this is clearly a misperception. A modern man may talk easily (for instance) about Uncle Bob "dying" three times on the operating table, and being brought back each time. As we have seen, the idea of resurrection may be as old as mankind, and (further) that it was being connected with the idea of technological progress long before there was any objective evidence that technology would ever actually be equal to the task.

Perhaps then it is not a basic belief in the reversibility of "death," or even in the power of technology, that is lacking in the subconscious of modern man -- but rather instead the lack of a conviction that the average man is worthy to fight death itself *on his own*. In mythology, it should be noted, victory over death is *never* won by commoners. The victors are often Gods or God-kings (such as Osiris). If they are human, they are not ordinary humans. For instance, the oldest written story known to man (> 4,000 years old) happens to be a Sumerian legend of the quest to discover a means to conquer death. The Hero is Gilgamesh, who is two thirds God and one third man, and king of the Sumerian city-

Detail from the Seal of Gilgamesh. Gilgamesh is shown slaying lions at the beginning of his quest for the elixir of life.

state of Uruk.

For purposes of illustration, let us pause here to examine a considerably more modern, contrasting myth. In December of 1966, Walter Elias Disney, creator of the Disney empire, died of cancer. Reporters who covered the death had earlier in the day also happened to cover another press conference, coincidentally announcing the formation of the Cryonics Society of California (the first cryonics society on the West Coast). Somewhere in all of this melee, the story surfaced that Disney himself had been frozen.

Now it is almost certain that there was nothing to the rumor, although Disney apparently once expressed interest in the concept of cryonics. What makes this story interesting, however, is not the rumor's truth or falsehood, but rather its astonishing POWER. It was a rumor of amazing vitality; a rumor that would not die despite repeated attempts of the Disney family to drive a stake through its heart. It was a rumor that went so far as to insinuate itself as fact into at least one biography of Disney, even though there was not a shred of physical evidence to support it. To this very day, the idea that the great animator awaits reanimation somewhere in cold storage, may still come up in casual conversation anywhere in the country. \* In fact, it is the only thing that most people in this country "know" about cryonics: that Walt Disney had it done for himself.

All of this is curious and ironic. But must we believe that it is inexplicable, as well -- the result of unpredictable public appetites for a story? In mythologic terms, the answer is no. For in the Disney story, finally, we see that many of the essential elements are present for a particular archetypal pattern. There is the element of (possible) resurrection and attempt to beat death. But perhaps as importantly, there is the fact that Disney was a *hero* to most Americans, a man who symbolized magic, wonder, imagination, kindness, daring, love of children, and (not incidentally) great wealth. He had even ruled over his own Magic Kingdom. That a man with such personal power should make a try for the elixir of life, was a story that fit wonderfully well into the collective unconscious mind of the public. There was simply something about the tale that made it "go," even as there also seems to be about modern myths that such public heroes as John Kennedy or Elvis Presley ("The King") have somehow managed to beat death and are waiting to "return." As the *National Enquirer* would say: "It tickles the public's fancy." That is merely a common way of saying that an archetypal theme is operating.

It is a theme which cryonics has done without. Yet if there is any truth to the idea that the mythic qualities of ideas





about death are important, it follows that the major advertising problem of cryonics is in its attempt to present to the public the idea of a technological resurrection *without* a hero to serve as a model. Trying to get people to listen to only part of a good story is always difficult.

### *Myths We Live By*

Speculation about this point brings up a further consideration: So what about ourselves? How are the present handful of cryonicists different than the average man? There is of course no simple answer, but we note that most of the people that are presently cryonicists were struck by something about the *power* of the cryonics idea well before we were convinced that it was scientifically justifiable. If there is in this fact an indication that the same archetypal theme described above was operating for us in the capture of our initial attention (where it had failed for most of our peers), this says something interesting about us.

What it suggests, in short, is that the "heros" in *our* archetypal vision were *ourselves*. It is no surprise that most of us were male (females do not see themselves as heros as often), and that we were undoubtedly selfish and self-absorbed by the standards of the world. Some of us had been caught up by Randian romantic visions in which any rational Objectivist is a hero. But in any case, all of us were individualists, who thought enough of ourselves that we believed we deserved to live when all previous generations of man, famous and not, had died.

All of which explains a recent observation of the writer that cryonicists have begun to *define* the term "hero" in a new way: as someone who loves life enough to undertake the necessary risk, and trouble, and thought, to preserve it. Which is to say: as us. This new definition has as corollary an attitude that has lately begun to become more and more noticeable in the pages of *Cryonics* magazine, an attitude which goes something like this: "There is no such thing as a recently dead hero; for anyone who had a chance at cryonics and didn't take it, *automatically* proves himself thereby to have been unworthy of lasting admiration." (Or at least, not nearly as worthy of admiration as our brother cryonicist Joe Citizen, whom we froze recently.)

### *Implications for Action*

It is worth pointing out that there may be a serious problem with the idea of cryonicist as would-be mythic hero, aside from the question of whether or not it is justified. The problem is this: if penetration of the public consciousness with the idea of cryonics is indeed somewhat dependent upon the idea's *archetypal* appeal, then the success of the cryonics idea with the public will surely depend not upon the *cryonicist's* definition of the hero, but rather upon the *public's* definition of the hero. In fact, it seems quite possible that the idea of cryonics will NEVER seriously take hold in the public mind until a man or woman who is first a major hero in the public's eye, is frozen. Yet it is ironic that, in the face of that realization, one sees less impetus to recruit public figures to sign up for cryonics today than at any time in the past.

The reasons for this are not difficult to understand. Courting public figures on behalf of cryonics is never easy. They tend to be arrogant. They tend to be so involved in mind-absorbing power games that they are unable to focus for the necessary time upon the ultimate problem of the transience of life. Being in the public eye as they are, they are more than usually vulnerable to the embarrassment which cryonics may bring. In the face of all of this, spurned cryonics organizations have over the years tended to become a

bit hardened and cynical toward celebrities. There is a tendency to wonder why we should bother trying to do this for "them," ("false heros") when our own members ("true heros") are frequently in need.

And yet, again, if there is anything to the idea that unconscious myth is important in the selling of cryonics, then it probable that (as noted above) the freezing of a *public* hero may nevertheless need to be done. If it is pursued, it should not be as an action thought of as being done primarily for the sake of the celebrity (privately, we may disagree that he deserves an extra shot at immortality just because he is famous), but rather something that is done for the sake of the idea of cryonics itself -- which is to say, for all of us. Like it or not, we do not live in a world of granite individualists, and it is time we faced up to the realities of psychology. Archetypes do exist, and they do have power. We may chose to use that power on behalf of cryonics, or not.

### *The Dangers*

This is not to say the course recommended above is without danger. The archetypal myth of the resurrected hero often contains another element which is largely missing from cryonics -- the idea of the resurrected hero returning with a gift for his people. In mythology, the hero who has returned from the journey quite frequently is seen as having been purged of some of his former personality. He has become a universal man who now offers a new understanding for the common man. It is this gift which seems to justify the hero's escape from death, and thus the idea of resurrection of someone who has "insufficient qualifications" for the title of philanthropist-hero may actually be especially repugnant to the common mind.

The reader may remember that while there was no official outcry at the idea that Walt Disney had been frozen, the official reaction to the last three suspensions of *ordinary citizens* has been extremely adverse. It seems entirely possible that *public* reaction to the freezing of a celebrity who is not previously seen as a philanthropist, may come to mirror the present negative stance of officialdom in this society. That is something that cryonics cannot afford.

The implication for action here again is clear, if not very pleasant to consider. If the public mind does not accept the idea of a try for immortality without some gift being returned to the people, then cryonics organizations had best look into the possibility of making some connection between cryonic suspensions of ordinary folks, and some charitable enterprise. The act of spending tens of thousands of dollars to have one's dead body frozen may very well be looked upon by many liberal people as an act of narcissism beyond redemption. For the rest of the public, however, redemption for the act may possibly come at some specific lower price in alms.

Again, the average highly individualistic cryonicist may find this repugnant, yet the fact remains that there is nothing so highly resented as "elitism," and nothing so difficult to make up for. These are the realities of intelligently managed public life: the reader is asked to consider the example of Japan, which has recently surpassed the United States in total amount of foreign aid given each year. Yet the Japanese have never been noted for their altruism.

### *The Myth of the Martyred Hero*

There is another kind of gift to society, of course, which is not economic. Actual historical figures who become mythologized and canonized as heros do not have the luxury

of a literal death and resurrection to drive home their message or story in the consciousness of mankind. But such heroes often do offer a gift which partially makes up for the lack of a personal return from the beyond, and that is the gift of their own lives.

Martyrdom has always been a powerful force for the creation of heroes. This holds particularly when the martyrdom is foreseen by the hero himself, since then the psychological descent of the hero into the depths of his own fear, his conquest of it, and his triumphant return to his calling, may all together be sufficiently recognizable as mythic quest as to evoke an archetypal response. This is why Lincoln biographies always emphasize his dream of himself lying in state in a coffin in the White House; why Martin Luther King, Jr. documentaries always show the speech fragment in which he seems to foresee his own death; why Mormon accounts of the early Mormon church always emphasize Joseph Smith, Jr.'s letter in which he portrays himself as going "like a lamb to the slaughter," and so forth.

Martyrdom is tremendously useful to mass movements as well, as the Roman Catholic church has long recognized. ("The blood of martyrs is the seed of the church," wrote Tertullian). Christianity went from outlaw cult to a major, tolerated religion of the Roman empire in less than three centuries, largely on the psychological power of the blood of martyrs. A proper martyrdom induces an element of outraged public indignation and official governmental guilt which cannot be had at any other price.

As long as we are giving free reign to speculation in this essay, we may as well make the observation that there isn't much doubt that a martyrdom or two would be useful to cryonics as well. In fact, certain pessimistic cryonicists have already speculated that perhaps something of this kind is inevitable, volunteers or not, sometime in the next few years as cryonics enters into a final U.S. crisis (perhaps the one due to be provoked when the forces of the conventional medical establishment finally become aware of cryonics on an official level). One always hopes that such fears of brutality are ill-founded, of course, but the recently demonstrated willingness of the State to employ the same tactics against cryonicists as they do against the most violent and dangerous criminals, does not augur well for the future.

### *Conclusion*

Professor Richard Dawkins at Oxford has argued that ideas have many of the same characteristics of living organisms. Ideas "reproduce" (by copying themselves into other minds), and are subject to selection (on the basis of how much we like them) and random mutation (there is always transmission error). Because of these characteristics, ideas evolve just as organisms do.

Myths, of course, are simply one type of idea -- and the "selective" pressures forcing the evolution of myths often involve their degree of resemblance to an archetypal pattern that is defined by the basic psychological nature of man. Thus, not only do myths become more psychologically powerful as they evolve through time, but myths of separate origin evolving in different places often undergo changes similar to what biologists call "convergent evolution." When Cortez and his men arrived in what is now Mexico, for instance, they were astonished to find that the local Aztec religion included (in part) worship of an incarnate God named Quetzalcoatl who had died and was resurrected, and had promised to return. So similar were some of the Toltec and Aztec Indian myths to Christianity that the Jesuits invented the explanation that they were planted by the devil to confuse missionary work. But similarities in myths tell less about the origin or truth of myths than they do about the common features of the brains that shaped them.

There is apparently a niche in the human psyche which holds the ego's defense against the idea of personal annihilation, and this niche is apparently neatly filled by some version of the resurrected hero myth. It is also apparently filled by the idea of cryonics, albeit not as comfortably or as well. Cryonics as an idea suffers, as we have seen, not only from the fact that it is relatively new, but also because by its nature it is not as plastic in content as are stories of the supernatural. Unfortunately for its market value, the idea of cryonics has been required to be consistent with what is known of science, and the laws of physics impose more constraint upon the form of possible stories than do the limits of human credibility.

Nevertheless, within these constraints, further tinkering with the presentation of cryonics is both possible and perhaps desirable. This may be done in the context of a "religion" (Venturism) or not. But in either case, such tinkering may yet pay off as cryonics organizations learn to tailor their message to what the minds of their listeners are more likely to accept on an unconscious level. It remains to be seen how successful this approach can ultimately be.

\* \* \* \* \*

## There's Always Another Way

*Alternatives to vitrification.*

by Thomas Donaldson

Over the last few years, the idea of vitrification for storage of suspended patients has looked better and better. Vitrification (rather than freezing) involves using a mixture of protective chemicals, high pressure, and other treatments to force the liquid in the frozen patient to form into a glass rather than crystalline ice at low temperatures. It is the crystallization of the ice, rather than simply low temperatures, which damages tissues. Vitrification attempts to prevent damage by preventing crystallization.

Particularly due to the efforts of Greg Fahy at the Red Cross, vitrification has made a lot of progress (G.M. Fahy et al *Cryobiology*, 21, 407-426 (1984)). As cryonicists we certainly hope that vitrification will be rapidly pursued. It is also reasonable to hope that vitrification will actually work. That is, it may indeed *be* the hoped for method to suspend human brains with only minor injury.

However, as cryonicists know very well, hopes and actualities are very much not the same. Unforeseen and even unimagined problems can show up with even the most substantive hopes (all those who thought, when they were 15, that they would be living in space stations raise your hands!). In this spirit, this article will discuss some *other* approaches to learning how to suspend people. These approaches aren't as well worked out as vitrification. They are important not because they are close to being implemented, but because they tell us of other roads we can follow if, for some reasons yet unknown, vitrification fails us.

Recently *Cryobiology* has published a number of articles all of which attach to the theme of cryopreservation *without* vitrification. The central theme of these articles hasn't been that of avoiding ice crystallization. Instead, their common idea has been to try to understand just what ice crystallization does to a cell. Once we understand that, we can hope to find ways to prevent the damage, even without preventing crystallization.

In *Cryobiology* (25, 178-185 (1988)) Locksley McGann and others at the University of Alberta present their evidence and ideas on the reasons for cell damage after freezing and

thawing. Their experiments consisted of the systematic use of several different indicators of cell injury applied to frozen-thawed cells both immediately after and somewhat later after their freezing and their thawing. The idea of applying these tests at two different times was to try to piece out just when and where the damage took place. For instance, frozen cells do show evidence of damage to their outer membrane. Is this damage apparent immediately after thawing, or does it take some time to develop?

Such questions are important because their answers may tell us what to do about protecting frozen cells. Just after thawing, frozen organs often seem (relatively) normal. But they go downhill fast. If we understood why, we might not only be able to prevent it but conceivably (in the best of possible worlds) even cure freezing damage.

McGann and his coworkers used four different methods to evaluate damage to their frozen cells. They used a variety of different cell types but no whole organs for these assays. The four methods used to evaluate damage were growth of the cells in colonies, the MTT assay (a biochemical way to test viability of the cell mitochondria, where glucose is burned), the FDA assay (which uses the fluorescent chemical *fluorescein* to measure permeability of the cell membrane. There is no connection with our enemy!) and finally a test of the osmotic response of the cells (which tests whether the outer cell membrane is intact). All of these tests are standard tests of cell damage. The FDA test, for instance, is normally a test of whether or not the outer membrane is intact.

Unfortunately we do not *yet* have a fully developed nanotechnology. Answers to these questions would be immediate if we did. Instead, we must use indirect inference, often faulty, based on biochemical responses of the cells. All the tests applied by McGann and his colleagues were of this kind.

Results were quite interesting. The most interesting result is the inference that the outer cell membranes of cells immediately after *slow* freezing and thawing were not damaged. This conclusion comes from their performance on the test of osmotic response. Cells tested immediately after warming behaved as if their outer membranes were entirely intact. It was only later than the membranes broke down. The osmotic test showed that fast freezing, however, did cause membrane destruction.

Another interesting fact is the indication that the FDA test is not a good test of survival of the cell membrane. The FDA test would show that a membrane was destroyed when osmotic tests would not. McGann and his coworkers feel that what really happens is that channels are opened in the membrane to let fluorescein through. These channels are the same kind as those which let other chemicals through. They show a change in the cell membrane but not its destruction.

Finally, if the cells are incubated after warming, still more damage can develop. The major damage consists of damage to the mitochondria. The MTT test shows this damage. This period, also, is the one in which the outer cell membrane changes to admit fluorescein.

McGann and his coworkers therefore suggest that slow freezing does not damage cell membranes. The real damage comes from later events. They suspect that damage to the lysosomes (special parts of the cell which normally degrade waste substances) is the major reason why cells do not survive freezing.

Their idea that damage to the outer cell membrane isn't primary seems well supported by their experiments. It is also a significant modification of earlier theories, such as those of Meryman, which claim damage to the outer cell membrane as central to cell destruction on freezing. Their current theory of why cell killing happens raises problems,

however. If destruction of lysosomes is the reason, why have attempts to protect cells with drugs stabilizing the lysosomes failed?

A second paper by W.T. Shier at the University of Minnesota (*Cryobiology* 25, 110-120 (1988)) presents some other interesting ideas on the mechanisms by which cells are killed by freezing. Shier closely studied a very limited problem: why is it that cells are killed by freezing at  $-24^{\circ}\text{C}$ ? This is a limited problem because his explanation does not hold for storage at lower temperatures, and even his best results involve cell survivals in frozen conditions for only a few days. Like the work of McGann and his colleagues, Shier's work is interesting for what it tells us about the *reasons* for killing or survival, not because it reaches any new heights of recovery.

Shier used several different cell types (as cell cultures) for his study. Unlike vitrification experiments, Shier used relatively low concentrations of cryoprotectant, only 10% by volume. He found out that either glycerol or DMSO, used together with the sugars trehalose or sucrose, and with a solution containing glucose for energy, would allow cells to survive freezing for several days at  $-24^{\circ}\text{C}$ . By studying his conditions very carefully, Shier could show that the cells *did not* survive because they had been vitrified. They also did not survive because the sugars used (trehalose or sucrose) caused water to flow out of the cell during cooling and freezing.

The best explanation Shier provides of his results is that the DMSO may make the cell membranes more fluid during thawing. This fluidity may let them quickly heal up any holes created by ice crystals. It was particularly interesting that other cryoprotectant drugs such as ethylene glycol or isopropanol *did not* permit survival of these frozen cells. All of these drugs act as antifreezes. Clearly, however, antifreeze action isn't alone enough. It may yet tell us a lot about freezing to find out just what it is that glycerol and DMSO have that these other drugs lack.

Just like McGann and his colleagues, Shier must use careful attention and inference to piece out what is going on with his cells, since we have no easy direct way of studying membrane changes during and after freezing.

Given that existing cryoprotectants are toxic, one approach to better suspensions consists of seeking others which may be less toxic. Another interesting paper by J. Kruuv and others at the University of Waterloo in Ontario presents us with a new cryoprotectant, glutamine (*Cryobiology*, 25, 121-130 (1988)).

Glutamine is an amino acid. Kruuv and his coworkers report that it will decrease the percentage of cell deaths by a factor of about six when the cells are frozen and then thawed. The published paper actually was written after work on another paper, as yet unpublished, showed that the three amino acids glutamine, proline, and betaine would partially protect against freezing. In this *Cryobiology* paper, Kruuv and his coworkers focus on glutamine and its effects.

Glutamine does not compare to DMSO or propylene glycol as a cryoprotectant. It is interesting because it is less toxic, and even more interesting because it seems to act in combination with DMSO or propylene glycol. Glutamine will cause about the same factor of increase in survival in cells treated with DMSO as it causes in cells given no cryoprotectant at all. This suggests (very interesting indeed) that glutamine must protect against freezing by some different and new process.

Kruuv and his coworkers could show that glutamine was acting as a genuine cryoprotectant. It was not, for instance, helping frozen cells recover from freezing damage. They showed this by incubating cells in glutamine after they had been frozen.



Such cells did not survive any better than untreated cells. Glutamine also did not help if added and then taken away before freezing.

The authors of this paper suggest that glutamine acts by somehow protecting essential cell chemicals from damage by freezing. Chemically, glutamine tends to exclude water from its surface. The other protective amino acids (proline and betaine) do too. They may protect cell chemicals from alteration or destruction because of this interaction with water.

Unlike the previous papers, this paper makes a serious suggestion about improving our drugs against freezing. But more than that, the fact that glutamine seems to act independently of standard cryoprotectants is very interesting theoretically. It tells us that there are other ways to go about protecting cells from freezing. A combination of all ways, of course, will certainly work much better than a single one.

Essentially, when we talk about how the chemical structure of a compound may help to protect against freezing we have entered the realm of nanotechnology. Besides finding chemical structures which protect those of the cell, another approach consists of finding structures which prevent or change the crystallization of ice itself. Several polar fishes and insects make special proteins which do exactly this (L.A. DeVries, *Ann Rev Physiology*, 45, 245-260 (1983)). They act to inhibit the formation of ice. They won't protect the animal against liquid nitrogen temperatures, but they prevent freezing down to -15°C.

Recently, in *Nature* (333, 782-783 (1988)), an article by Arthur DeVries and others gives us some more information about these special proteins. There are in fact another class of proteins made by some bacteria which actively cause formation of ice (these proteins are exactly the ones which have caused such furor in California about "genetic engineering", but that is another story entirely). DeVries and his coworkers asked themselves if the fish proteins and the bacteria proteins would negate one another. It turns out that they do, and this fact is the one reported in their article in *Nature*.

This paper is actually more important than may first seem. It shows us much more about just exactly *what* structures a molecule must have to help out or inhibit ice nucleation in this way. If we are ever to design nanomachines to achieve this goal, hints on how to do it can be found in these molecules. In fact, both the fish proteins looked at by DeVries and his coworkers and the glutamine looked at by Kruuv depend on their special molecular structures for their effects, and in a nonobvious way. Studying both of these molecules should tell us much more about how to protect cells against freezing.

These approaches shouldn't be thought of as opposed to vitrification. It may turn out that vitrification, combined with a deeper understanding of what actually damages cells, will go much farther toward perfected cryonic suspensions than vitrification ever could go alone. But it is important that there are other approaches. Our lives are much more secure if there are five different approaches to suspending and reviving us than they could ever be if there were only one.

\* \* \* \* \*

## Science Updates

by Thomas Donaldson

### *Why Does Vasopressin Act On Memory?*

Many longterm readers of this column will remember the excitement over vasopressin. L-vasopressin is a natural hormone which improves memory. It is sold under the trade name Diapid as a nasal spray by Sandoz. In people who suffer amnesia because of accidents, it can cause a dramatic restoration of memory (D. de Wied et al, *Progress in Brain Research*, 45, 181-191 (1976)).

However vasopressin has also had a longstanding problem. Nobody really knew *why* it had this effect on memory. There are several different theories, of course. One theory is that it simply causes a general arousal. Another is that it somehow acts directly on our processes for memory recall.

An interesting short note in *Behavioral And Neural Biology*, (50, 112-119 (1988)), by C.P. Faiman and others at the University of Buenos Aires in Argentina, gives us some evidence about the reason for vasopressin. Faiman and her colleagues basically applied several different drugs to animals to piece out just how the hormone was acting on memory.

Their results were simple. They trained mice in a memory test. They then gave them vasopressin, alone or in combination with several other drugs known to act against acetylcholine. Since acetylcholine as a nerve transmitter plays many roles, they could even give drugs which distinguish between these roles. Speaking very broadly, cells such as muscle or nerve cells can respond to acetylcholine either by becoming excited or by calming down. Different drugs can affect one of these responses without causing the other. By using different drugs, Faiman and her colleagues could show that vasopressin would act through one class of receptors for acetylcholine in the brain. Drugs which affected other receptors could not prevent vasopressin from acting.

This paper and the other researches reported in it may actually give us an explanation of why vasopressin has its effect on memory. The primary memory chemical, at least for these experiments, is acetylcholine. Vasopressin is important because it modulates the response to acetylcholine.

There are no direct implications for cryonics in this work. However, we need to understand memory. This work is a step towards clearing up a question in the theory of memory, one which may have even concerned readers of *Cryonics*..

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## Meeting Schedules

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

# ALCOR

The OCTOBER meeting will be held at the home of:

(SUN, 9 OCT 1988) Allen Lopp  
(SECOND SUNDAY) 13354 Veracruz St.  
Cerritos, CA

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The NOVEMBER meeting will be held at the home of:

(SUN, 6 NOV, 1988) Brenda Peters  
8150 Rhea  
Reseda, CA

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The DECEMBER meeting is the Annual Turkey Roast, at the home of:

(SUN, 4 DEC, 1988) Saul Kent and Jo Ann Martin  
16280 Whispering Spur  
Riverside, CA

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The Alcor Cryonics Supper Club is an informal dinner get-together in the Greater Los Angeles area. These meetings are for newcomers and old-timers alike -- just an opportunity to get together and talk over what's happening in cryonics -- and the world!

If you've wanted an opportunity to ask lots of questions about cryonics, or if you just want a chance to spend some time with some interesting and nice people, pick a date and come! All dinners are scheduled for Sundays at 6:00 PM.

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Sunday, October 23, will be hosted by Marcelon Johnson at her home.

Marcelon Johnson  
8081 Yorktown Ave.  
Huntington Beach, CA

A \$5.00 contribution to Alcor is requested.

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The New York Cryonics Discussion Group of Alcor has recently formed.

The group meets on the the third Saturday of each month at 7:30 PM. The November 19 meeting will be held at the El Paso restaurant, in Manhattan's Greenwich Village. The address is 134 West Houston St., between McDougal and Sullivan. Telephone (212) 673-0828. Ask for the Alcor group at the rear of the restaurant. Subway stops: Houston St. on the 1 train; Spring St. on the C, E, or K trains.

If you live in the New York, Philadelphia, New Jersey, or Boston areas and would like to participate in the rebirth of New York cryonics please contact one or more of the following people:

Gerard Arthus (516) 273-3201  
Al Roca (201) 352-5268  
Curtis Henderson (516) 589-4256

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