

# CRYONICS

1st Qtr. 1996

A PUBLICATION OF THE ALCOR LIFE EXTENSION FOUNDATION

Volume 17:1

## *99 Years and Holding!*

Just months shy of  
the century mark, the  
oldest man ever frozen  
is ready to do it all  
over again. . . .



### *Plus:*

In-depth reporting on the 3rd Annual Anti-Aging Conference

An examination of the pros and cons of "Straight Freezing"

A look back at IABS, the precursor to the Alcor Foundation

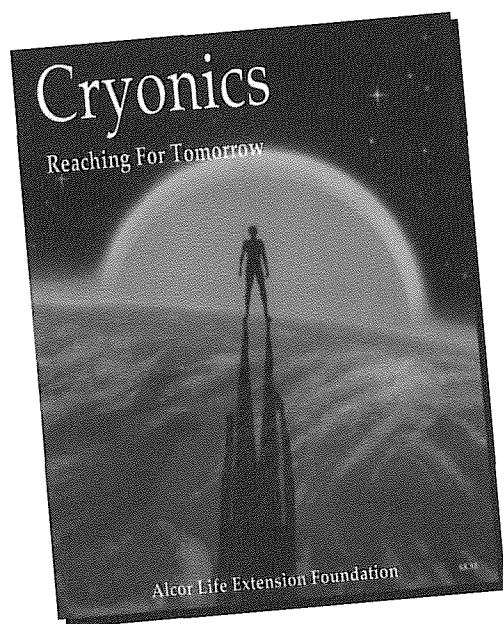
ISSN 1054-4305

\$4.50

# “What is cryonics?”

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

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



## “How do I find out more?”

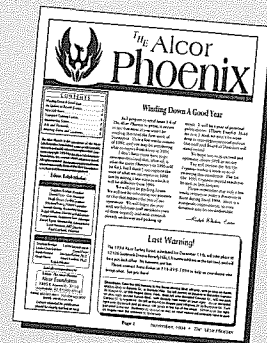
The best source of detailed introductory information about cryonics is *Cryonics: Reaching For Tomorrow*. Over 100 pages long, *Reaching For Tomorrow* presents a sweeping examination of the social, practical, and scientific arguments that support the continuing refinement of today's imperfect cryonic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

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

## For those considering Alcor Membership. . .

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

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





# Feature Articles

**The Cryonic Suspension of  
Stanley Penksa**  
Tanya Jones

**SCRAM Reanimation**  
Michael V. Soloviov

**Anti-Aging Conference Review**  
Russell Cheney

**Alcor Member Dies  
Without Suspension**  
Stephen Bridge

**Requiem for Rob Michaels**  
Max More

**Notes  
from the  
President.....8**

*Stephen W. Bridge*

**For the Record.....3**

*Michael Perry, Ph.D.*

## DEPARTMENTS

**Membership Status.....5**

**Ads and Personals.....7**

**Meetings.....29**

**Up Front.....2**

**Review.....26**

## COLUMNS



# UP FRONT

BY RALPH WHELAN, EDITOR

It seems like it's been a long time since we've had an issue of *Cryonics* with no suspension report, and this issue is no exception. It's also been a long time (several years) since we've had to report on the death of an Alcor Member who was *not* suspended, but unfortunately we break that trend with this issue.

Rob Michaels, an Alcor Member of several years, an Extropian, and an all around terrific guy, died in his North Carolina home several weeks ago, and was autopsied and buried before Alcor even learned of his demise. To those who knew Rob as well as some of us did, and especially to Rob's family, we extend our sincere condolences. See "Requiem For Rob Michaels" and "Alcor Member Dies Without Suspension" for more details.

On a more encouraging note, the American Academy of Anti-Aging Medicine (A<sup>4</sup>M) held its "3rd International Conference on Anti-Aging Medicine and Biomedical Technology" this past December, and Russell Cheney and Mike Perry report on this exciting event in this issue.

Of course, cryonicists have long been optimistic and vocal about the prospects for greatly extended lifespans in the near future, but it's truly gratifying to see so many members of the mainstream medical community picking up this banner so enthusiastically. Dr. Ronald Klatz, president of the A<sup>4</sup>M and author of *Advances in Anti-Aging Medicine*, announced at the conference that "Aging is not inevitable; aging is in fact a series of degenerative processes that ultimately lead to disease and death. Aging is a disease and we are at last tackling this, the greatest killer of all mankind."

Lastly, don't miss the story of "The Cryonic Suspension of Stanley Penska," the oldest person (99 years) every cryonically suspended.

## Wedding Announcement!

On January 1, 1996, Brian Shock and Lisa Ferrington were united in marriage by Venturist Minister Dr. Michael Perry. Hosted by Alcor, the ceremony was attended by family, friends, and the 31 Alcor members in cryonic suspension in Alcor's Patient Care Bay, where the ceremony was held.

Brian joined the Alcor staff in August as Membership Administrator, and has established himself as an invaluable team member. Prior to his employ with Alcor, Brian worked for more than a decade as a computer programmer, designing software for custom business applications, and, occasionally, scientific recreation. An accomplished writer, Brian is currently working on his ninth novel.

In addition to managing a software business, Lisa works as a part-time volunteer at Alcor. During the past fifteen years her art has

been the subject of numerous exhibitions, and resides in the permanent collections of several museums.

Active life-extensionists and vegetarians, the Bride and Groom reside in Phoenix, Arizona.



### PUBLICATION NOTES

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**Editor: Ralph Whelan**

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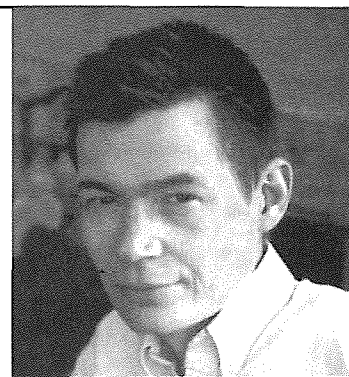
(Most of the first 160 issues—September, 1977 through December, 1993—were published on a monthly basis.)

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### About the Cover

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

## IABS: The Institute for Advanced Biological Studies



Cryonics began in the 1960s in a crush of enthusiasm, with high expectations that this great and simple idea would soon sweep the world and gather a wide following. Progress instead proved slow and difficult. By 1970 a few organizations were offering cryonics services, but not many. By 1975, many of those who had been frozen up to then (and who had had to depend on relatives for continued maintenance) had been thawed and lost; more would follow.

But the idea wouldn't die. Pockets of activists persisted, and would in time give rise to a new, stronger-than-ever movement. One important source of activism materialized in the Midwest in the mid-'70s. Mike Darwin of Indianapolis, who had started his involvement nearly a decade earlier in grade school, deserves much of the credit for inspiring and organizing this group of young enthusiasts, which included Steve Bridge, Allen Lopp, Joe Allen, and others.

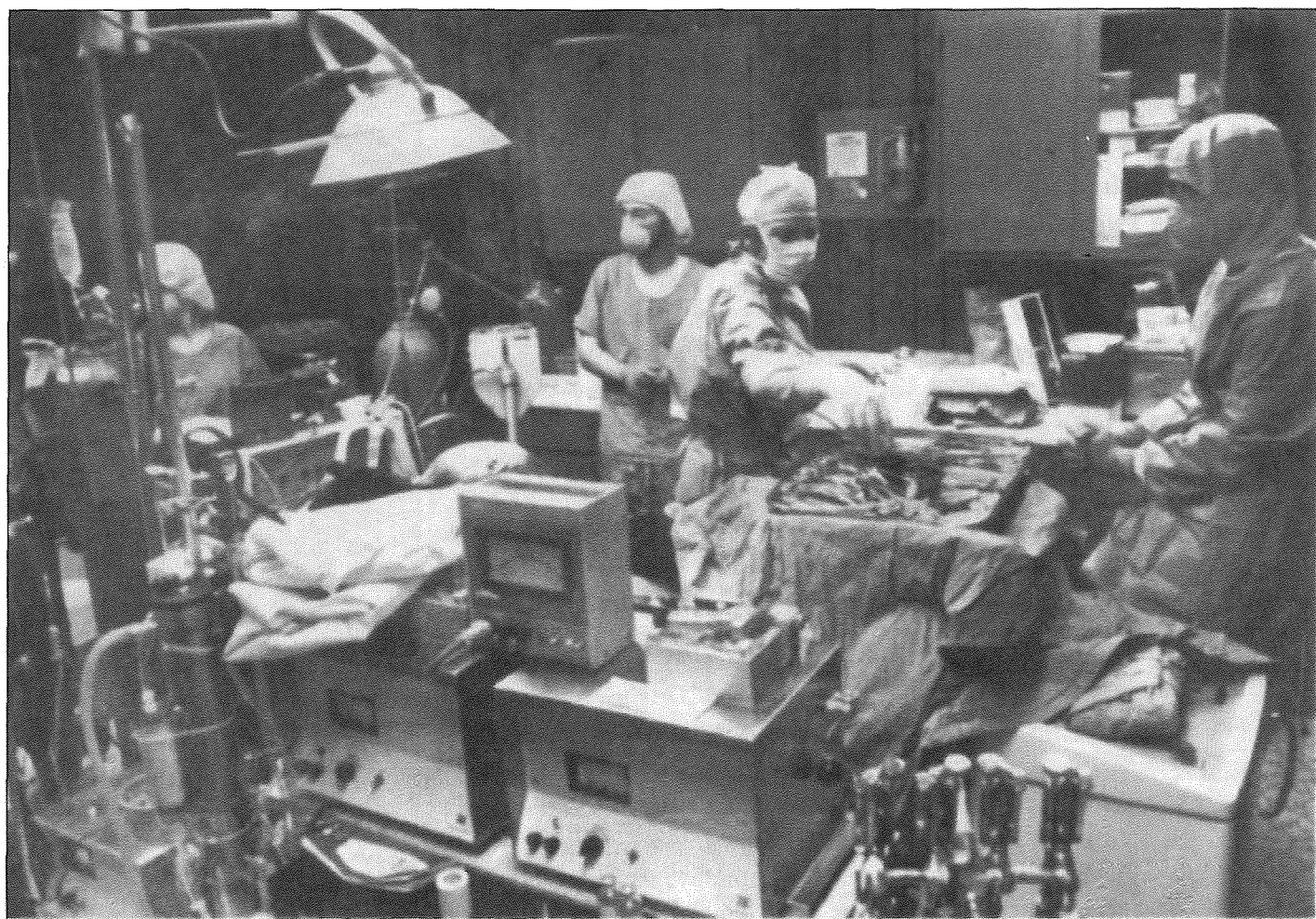
By 1976 Mike had seen cryonics operations first-hand in New York

and California, and was aware how woefully primitive the procedures had been, as well as how shaky they had been in other ways—particularly in keeping patients frozen. One snowy evening in February, then 20-year-old Mike and some others were gathered at a meeting of the Indiana Science Fiction Association. To Steve Bridge, seeing him the first time, he was “an intense young man who worked at McDonald's Restaurant.” The talking had gone on for two hours when the subject of cryonics came up. Someone said, “Oh, that's just science fiction.” Mike answered, “No, it's not. I've frozen two people myself.”

To the small gathering this was electrifying. Steve would recall, “You've never seen such a stunned group of people . . . Science fiction had become truth right in front of our faces, as surely as if aliens had walked through the front door . . . we spent the rest of the evening arguing about cryonics and hearing Mike's incredible tales of being a teenage cryonicist.”

Like many children, Steve had

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*The IABS-sponsored TBW experiment. Soma Laboratory, Indianapolis, Aug. 21, 1979.*

seen nothing good about death. Later experience, far from consoling and instilling acceptance, had not changed that impression. By 1976 he had become a children's librarian and had also undergone a painful divorce, which left him with time on his hands. "I was. . . pretty lonely, and. . . was spending a lot of time at home reading science fiction and fantasy and wondering how soon I could apply to be the first librarian on the moon." In the months following the meeting he would find much encouragement in the company of friends interested in futuristic themes, and combating death in particular.

Mike meanwhile took a job at a local blood plasma center, finding the medical field increasingly attractive. And increasingly, he wanted to start a local cryonics organization, but knew

it would get nowhere without funds, which were in very short supply. Well, there was always Steve to nag—not rich, of course, but. . .

In later years, Steve would date his serious involvement in cryonics from the day in February 1977 when he finally handed Mike a check for \$100 and said, "Here, now shut up." Mike, stunned for a moment, said at length that they had to start looking into how to form an organization. This, they soon decided, required an attorney, and soon Steve's financial commitment was up to \$1,000 and climbing.

The organization, which they decided to call the Institute for Advanced Biological Studies (IABS), officially began July 1, 1977, with Steve Bridge as President. Soma, Inc., a for-profit, sister organization (IABS was non-

profit) was also created and headed by Mike Darwin—to do medical and technical work with equipment he had purchased. Soma's lab, 10 blocks from the IABS headquarters north of downtown Indianapolis, made a convenient facility for joint projects.

IABS was initially solely a research institute, with the emphasis naturally on cryobiology and an eye toward applications to cryonics. Around the end of 1979 it became a full-fledged cryonics organization, offering suspension services "as part of its research program." Membership in IABS was encouraged but not required for the suspension contract. Both whole-body and neuro arrangements could be made, but in practice all the signups would be neuro and all would be local IABS members. (IABS in fact became a pioneer in offering



the neuro option, following Alcor, which had carried out the first human neuropreservation in 1976.) If anyone had to be suspended, Soma would do the actual procedure, with costs reimbursed by IABS through that person's funding arrangements. IABS would further arrange for storage in the nearby Soma facility. As it turned out, IABS did not do any human suspensions in the five years of its existence—but let's go back again to the beginning.

One need of the new organization was an informative publication to keep everyone updated. The first issue of *The IABS Newsletter* appeared shortly after the incorporation date, in September 1977. Steve's memorable opening paragraph has been quoted in the cryonics literature before—here it is again:<sup>1</sup>

"We are offering you an opportunity that you are likely to find in few other places—the chance to change the world. We have dreams that may seem beyond reach: the elimination of diseases and old age, the end of hunger, biological adaptations that could allow us to live on other planets or travel to the stars, a greatly extended life span, even immortality. But we have the courage to stretch out our hands and minds toward those dreams. They are not impossible, which is a belief we hope you may come to share with us. We are the radicals, the outer fringe of the scientific world. We are the ultimate revolutionaries. What is the overthrow of a government or even the founding of a new nation compared to the elimination of death? Governments come and go, and one is pretty much the same as another. If you want to make a permanent change in the world, the human life span is where you must direct your attention. Some will call us mad, I say we have vision. This is your invitation to help determine the future of the future."

(Non-anarchists will dispute the claim that "one government is pretty much the same as another"—Nazi

Germany is not the same as the Swiss Confederation!—but compared with the high calling of immortality, what is a government anyway?) The little 4-page newsletter, clacked out on an old pica typewriter and run off on a blueinked mimeo machine, would in time metamorphose into the publication you are reading right now, *Cryonics*—but again that is getting ahead of our story.

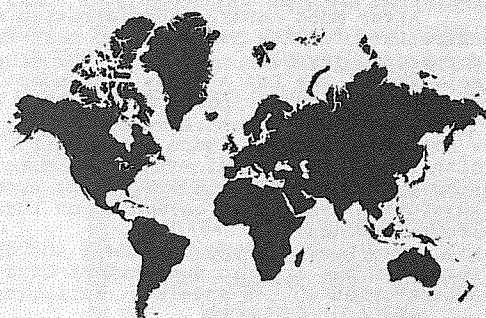
About the time the newsletter first appeared, there was a crisis in which leading IABS personnel were involved (though not the organization as a whole). Actually it had been brewing for several months—Robert Ettinger's mother was ill that summer, and probably would soon need to be suspended. Mike Darwin had been in touch with Cryonics Institute (CI), Ettinger's newly-formed organization in Michigan, advising about preparations they should be making for the freezing, with the understanding that he'd come out to Detroit and assist. Steve, who had been helping Mike with the preparations at his end, was called at 2 a.m. September 24. "Ettinger's mother is dead. I'm flying to Detroit. I need your help. Get over here now." Rushing over to Mike's house in the predawn darkness, Steve helped pack the gear, assisted by Mike's parents, and Mike was off. (Ironically, this happened the *very day* of Alcor's first animal experiment, out in California.<sup>2</sup>)

The suspension, it turned out, was a source of frustration to Mike, who found when he arrived that many of the preparations he'd asked

for had not been done. Managing affairs as best he could, for weeks afterward he'd complain loudly and insist that the IABS people must be *prepared*. Years later Steve would comment on this suspension, which was CI's first: "It is likely that *no one* is ever ready for their first suspension. The number of details necessary to prepare for a human freezing seems countless, and the number of ways to make a mess of things is nearly as large." Aggravating the problem was the state of affairs in 1977, with perhaps only 10% as many people signed up for the procedure as today (that is to say, around 60 or 70 vs. around 700). Any one group might go several

## Membership Status

Alcor has 376 Suspension Members, 488 Associate Members (includes 67 in the process of becoming Suspension Members), and 31 patients in suspension. These numbers are broken down by country below.



Country	IABS			Country	CI		
	Members	Applicants	Subscribers		Members	Applicants	Subscribers
Argentina	1	0	1	Japan	0	0	3
Austria	2	0	0	Lithuania	0	0	2
Australia	12	1	7	Malaysia	0	0	1
Belgium	0	1	1	New Zealand	0	0	1
Canada	11	2	17	Russia	0	0	5
Denmark	0	0	1	Spain	6	0	0
Estonia	0	0	1	Sri Lanka	0	0	1
Finland	0	0	1	Sweden	0	0	2
France	0	0	2	Switzerland	0	0	1
Germany	2	0	1	Taiwan	0	1	0
Holland	0	0	2	U.K.	17	3	11
Ireland	0	1	2	U.S.A.	325	56	357
Israel	0	0	1	Ukraine	0	0	1
Italy	0	2	2	<b>TOTALS</b>	<b>376</b>	<b>67</b>	<b>421</b>

# CRYONICS

THE NEWSLETTER OF:

The Institute For Advanced Biological Studies, Inc.  
2901 N. Pennsylvania St.  
Indianapolis, IN 46205  
317-924-9886

#8 March, 1981

## YES, WE'RE STILL HERE!

We apologize for the long delay and irregular schedule in publishing newsletters. IABS, like all other cryonics organizations, has a very small staff, most of whose efforts are spent on just trying to keep the organization afloat. We intend to become more regular in providing you with news and hope to be more comprehensive, too.

To give you a chance to find out we are serious, the first 10 issues will be sent out free. After that we need to know that you are serious; so you will need to send us a membership or donation to continue receiving the newsletter. Memberships are the same price as in the past: Associate (non-voting) \$15; Supporting (voting) \$50. A minimum donation of \$5 will keep you on our mail list for one year.

Current IABS officers are Joe Allen - President; Michael Darwin Vice President and Staff Researcher; Steve Bridge - Secretary-Treasurer; Dr. Corey Noble - Director of Research. IABS will hold a very important annual meeting in June to select new officers and discuss a new organizational structure (see next item).

## IABS AND SOMA MOVING TO LOS ANGELES

After much careful consideration and long hours of agonizing discussion, it has been decided that IABS and Soma, Inc. (a local for-profit cryonics company run by Mike Darwin and Allen Lopp) will relocate to the Los Angeles area sometime this summer. It became clear in the latter part of 1980 that the response to our promotional efforts here in the midwest was not sufficient to warrant a continued effort. More importantly, it was seen with increasing clarity that personnel with appropriate training and skills were simply not available in sufficient number to allow for a reliable suspension team to be assembled or for proposed research to be properly conducted.

Mike Darwin, Soma President and IABS staff researcher, participated in two cryonic suspensions last year at Jerry Leaf's Cryo Laboratories in Los Angeles. Following the suspensions, Darwin

## *IABS newsletter #8, the first "Cryonics" issue.*

years between suspensions, which lessened the state of preparedness and made it harder to face the possibility of someone deanimating.

Just over a year later, November 5, 1978, IABS sponsored its only suspension, a pet freezing. Mike's much-loved little dog Mitzi, then fourteen, was nearing her biological terminus. A dog in this position is luckier than a person, who currently has to let nature run its course, or undergo the unpleas-

ant, protracted ritual of self-dehydration, or get a lucky, "natural" break such as lethal pneumonia. Hasten a person's "death" in the interest of a good suspension and it's "homicide"—which would lead to autopsy of the patient and murder charges against those trying to help. But an animal can simply be "put to sleep"—in this case anesthetized and suspended, and thus get the best possible medical treatment for a future life. So

when the time was right, Mitzi—under Mike's direction of course—was anesthetized, perfused with glycerol, and suspended as a neuro. (And she is still suspended today.) Steve would comment, "I think Mike's work on this operation will be rewarded, if cryonics works for any of us. It is ironic that, because of the laws which require us to wait for cardiac arrest to suspend humans, this dog probably got better treatment than all but a handful of the human patients now in liquid nitrogen."

It is worth remarking too that essentially this was the first pet suspension. True, animals had been frozen before—going back to the dog Bel that Ev Cooper's group froze in December 1965.<sup>3</sup> But these were research animals, not (as far as I know) companion animals whose owners wanted them revived as such someday. This started a trend: by now there are over a dozen pets in suspension—all dogs and cats so far.

1979 was probably the busiest year in IABS' short history. Contacts between Mike and Jerry Leaf on the West Coast had led to an improved suspension protocol. A major event in research was an IABS-sponsored total body washout (TBW) of a dog at the Soma lab Aug. 21, attended by Jerry and a well-known cryobiologist. Meanwhile, there was a flurry of activity to get the legal paperwork in shape so IABS could offer suspension services. The biggest problem, according to an attorney, was to be clear enough in the contracts about what was being offered to avoid claims of fraud. The possibility that cryonics might not work must be made apparent. In this way the prospective sign-up would be giving informed consent, which is essential for a legally sound arrangement. This paperwork was not much put to the test in IABS, since none of the half-dozen or so members was suspended, but the effort was not wasted since it is, as Steve says, "the direct ancestor of the sign-up package used by Alcor today."



Another major event, in September, was the North American Science Fiction Convention in Louisville, Kentucky, which was attended by representatives from IABS. Fred Pohl, a big-name science fiction writer and longtime cryonics supporter, was given a special offer: a free freeze (after clinical death of course!) in return for use of his name to promote cryonics (which had already been done somewhat, anyway). Amazingly (to the IABS people) he turned it down. In his 1978 autobiography, *The Way the Future Was* he explains<sup>4</sup> that "The reasons I have for not signing up to be an immortal superman are philosophical and economic." The IABS group thought that removing the "economic" problem would be enough to turn things around, but they were wrong. The autobiography goes on, "... what makes my life desirable to me is the network of relationships and the endless iterative series of projects I am always involved in. Stop them and restart them at some future time and they are no longer the same." Sadly, this conviction still held good, and Pohl remained a deathist.

The year was not without its other troubles. Steve, in fact, resigned as President in mid-year, citing "pressures of leadership and the deleterious effect this position has had on both my vocation and my personal life." But he was promptly re-elected, under an arrangement that shifted some of the administrative burdens to others.

In 1980 there were further contacts between IABS personnel and Jerry Leaf's group in California, in particular, participation in two Trans Time suspensions that occurred within hours of each other in January. But meanwhile, at the Indiana headquarters things were running down after the previous year's flurry. Promotional efforts had stalled, and there was concern that, despite the contacts with California, available personnel were still inadequate to the demands of performing a human cryonic suspension. There was a gap in publishing

the newsletter from issue #7 in August 1979, to #8 in March 1981. The latter reassures readers, "we are still here." But IABS would not be "there"—in Indiana—for very long. A decision had been made, we are informed in the same issue, to move both Soma and the main operations of IABS to southern California, to work more closely with Jerry Leaf and his organization, Cryovita, and also with the nearby cryonics organization, Alcor. The move was carried out in the summer. For another year after that, IABS maintained a nominal, separate existence, but effectively was part of Alcor, completing the formal merger on September 12, 1982. Soma similarly would merge with Cryovita. Mike soon would become president of Alcor, and later Steve would also occupy the office.

Issue #8 of the IABS newsletter, the first after the 19-month hiatus, carries one significant change in format: where before the banner at the top had read simply "INSTITUTE FOR ADVANCED BIOLOGICAL STUDIES, INC." it now says, "CRYONICS." And that's where you'll find it today: with the merger *Cryonics* became the official voice of Alcor, and has served us faithfully in that capacity for over a decade.

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1. Perry, M. "For the record," *Cryonics* 15(4) 5 (4th Qtr 1994).
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3. Cooper, E. *Freeze-Wait-Reanimate* (20) 1 (Jan 1966).
4. Quoted by L. Mann, "How the cryonics movement thawed out," from *Lan's Lantern* (1980), reprinted in *Cryonics* #16 9 (Nov 1981).

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- Bridge, S. "Fifteen years in cryonics," in progress.
- "Interview with Michael Darwin," *Long Life Magazine* 4(2) 32 (Mar-

Apr 1980).

Darwin, M., Leaf, J. and Noble, C. "The coordinated suspended animation project," *Long Life Magazine* 4(3) 49 (May-Jun 1980).

## Advertisements and Personals

*Cryonics magazine reserves the right to accept or reject ads at our own discretion, and assumes no responsibility for their content or the consequences of answering these advertisements. The rate is \$8.00 per line per month (our lines are considered to be 66 columns wide). Tip-in rates per sheet are \$140 (printed one side) or \$180 (printed both sides), from camera-ready copy.*

### EXTROPY: The Journal of Transhumanist Thought #16

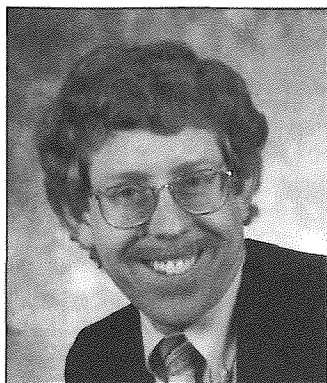
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Do you want to keep up with science and technology bearing on cryonics? *Periastron* is a science newsletter written by and for cryonicists, only \$2.50 per issue. *Periastron*, 80-Q N. Cabrillo HWY, #247, Half Moon Bay, CA 94019-2172.

Are you still healthy? Want to delay suspension? A book for users of *Antiaging Drug* tells the good and bad of each one. Send for free brochure. *Periastron*, 80-Q N. Cabrillo HWY, #247, Half Moon Bay, CA 94019-2172.



## Should Alcor Offer a "Straight Freeze" Option?

(This article has been adapted from a CryoNet posting of September 27, 1995)

Some cryonicists feel that an important reason cryonics is not more popular is pricing. They think that Alcor's minimum required funding of \$120,000 for whole body suspension and \$50,000 for neurosuspension is too much for most people to handle, even with life insurance. Therefore, the solutions offered by these people for increasing membership are centered around lowering prices. Over the last 15 years, many people have suggested that Alcor offer a third option: *Straight Freezing*.

A "straight freeze" means that no advance preparation of the patient would be done before freezing. No IV medications, no blood replacement, no glycerol perfusion. No Transport Team flying to get the patient. The patient would simply be cooled as rapidly as possible to the freezing point, then frozen by our standard procedures. The costs of our standard procedures could be eliminated. Further funds could be saved by a very rapid freezing, ignoring possible cracks or other freezing damage entirely.

So why doesn't Alcor offer this option?

Would a straight freeze indeed be a "viable" option; i.e., would it preserve identity for future revival?

These questions have been asked often in the past. The answers are still

the same, from my point of view (and I think my view is still largely the same as the majority view on Alcor's Board), although new information in the future could change our minds.

Cryonics groups don't offer this as a standard option because it seems less likely to work. Even the best cryonic suspension cannot be proven to preserve individual identity. However, the research that has been done so far, both in cryonics and in cryobiology, seems to indicate that preservation with cryoprotectants preserves tissue structure markedly better than straight freezing. Straight freezing creates ice which crushes and slices cells, and moves the parts around enough to make future inference of the original state an exceedingly difficult problem to solve. It may actually "randomize" the neural information

which makes up identity.

We cannot yet quantify the differences in the approaches. We cannot say that cryoprotectants allow us to preserve 5 times more structure or 100 times more structure. And we cannot even definitively state *which* structures are best preserved with cryoprotection, although work is moving forward on that answer. However, it is pretty clear that cryoprotected tissue looks better after freezing than unprotected tissue does.

So when we compare these two methods, we are left with several possible outcomes:

1. *Cryoprotected frozen brains retain enough identity-critical structure to revive individuals; but straight frozen brains do not.*

2. *Cryoprotected frozen brains retain enough identity-critical struc-*

ture to revive individuals; however, straight frozen brains lose some portion of identity-critical structure so that individuals can only be revived changed in some important way or with partial "amnesia."

3. Cryoprotection does not matter: both cryoprotected frozen brains and straight frozen brains retain enough identity-critical structure to revive individuals, assuming an advance-enough repair technology.

4. Cryoprotection does not matter: neither cryoprotected frozen brains nor straight frozen brains retain enough identity-critical structure to revive individuals.

5. Because of some as-yet unnoticed effect of glycerol or other cryoprotectants on brain tissue, straight frozen brains retain enough identity-critical structure to revive individuals (in whole or in part); but cryoprotected frozen brains do not, even though it is clear in general that cryoprotected cells survive better than straight frozen ones.

This simple recitation of possible outcomes makes it sound as if each were equally possible; but they are not. Enough research has been done on frozen tissue over the last four decades for us to be very confident that more cells survive freezing with cryoprotection than without, and that the damage done by adding cryoprotectant is less than the damage done by straight freezing.

Therefore, we try to look at these odds and come up with a protocol that is more likely to result in preservation of information.

Now, if one of Alcor's Suspension Members is found in such a condition that cryoprotectant perfusion is not possible (because of clot blockage of vessels, injury or autopsy severe enough to make perfusion impossible, or severe time delay), do we straight freeze the brain or do we cremate it? Of course, we straight freeze the brain because that is the conservative thing to do. We always try to do the best we can in each situation, even if the best available method is comparatively crude. Straight freezing is the last ditch procedure for what is still pretty

much a last ditch effort anyway.

Does a straight freezing cost Alcor less? Yes, but perhaps only about \$15,000-20,000 less. Transport and cool-down and long-term suspension expenses will be nearly the same. Legal expenses may increase in some autopsy cases. And, from another point of view, perhaps MORE funding would be needed for the recovery of a straight-frozen patient. If greater damage is in fact done by the time-delay, clotting, injury, and absence of cryoprotectant, it may turn out to be more expensive in the future to repair this person's brain and to give him the intelligence and knowledge to succeed in that future society.

But still, if the member knows what he is getting, why not offer "straight-frozen brain" as an option for a lower price? There are three non-technical issues intertwined here: ethical business practice, informed consent, and public perception.

There is nothing wrong with an automobile manufacturer offering a choice of differently priced automobiles. General Motors offers cars from a Cadillac for \$40,000 with more comfort and luxury touches, greater passenger capacity, and greater safety down to a sub-compact car for \$10,000 that may bounce more, hold fewer people and luggage, and be more likely to kill passengers in a wreck. Both, however, will get you where you're going, as long as you don't have a

"If Alcor were offering straight freeze as an option, we would be in the position of saying, 'We'd like you to buy an expensive car that might not run. But over here is a cheap car that is much less likely to run; so you can buy that if you prefer.'"

wreck.

Cryonic suspension is a much different "product" than an automobile. We can't even guarantee that our "Cadillac" version will "get you where you're going." The sub-compact version (no washout or perfusion) certainly appears to be in the position of a car with, at the very least, severe rust holes, bad valves, and other severe damage which will require the most advanced sort of brain mechanic in the future. And it may well turn out to be unrepairable at all.

Some people already have an ethical problem with the current organizations offering cryonic suspension for sale, since we cannot prove that the product itself will turn out to have value (beyond the psychological benefit of added hope today). I think we do a detailed enough job of informing the "buyer" of the lack of guarantees (ad nauseam, some would say) that our current position is ethical. Now if Alcor were offering straight freeze as an option, we would be in the position of saying, "We'd like you to buy an expensive car that might not run. But over here is a cheap car that is much less likely to run; so you can buy that if you prefer."

Can we ever give people enough information on straight freeze that they could give truly informed consent? Alcor has not thought it was possible in the past, so we have not offered it.

The most important consideration,



however, may finally be the issue of the public perception of cryonics. Our image with physicians, scientists, and the press has improved significantly in the last decade. This is largely due to the growing understanding that we try to do our *best* for the patients, not our least. As much as is economically feasible, we use medical procedures that seem to be relevant to preservation. We are trying to improve those procedures all of the time. This change in perception has resulted in greater cooperation from hospitals, medical personnel, and governmental authorities; much more positive press cover-

age; and a higher level of acceptance (though not yet participation) from the general public.

To my mind, offering the straight freeze as a standard option, rather than "it was the best we could do under unexpected circumstances," would tell the public that we are only interested in getting people's money and that we are unconcerned about the condition or recoverability of our patients. That would make it much harder to provide the positive public image that makes it possible for us to improve and perhaps makes it possible to operate at all.

Maybe some day a straight freeze or other low cost option will just be seen as a normal business decision—if cryonics is ever seen as a normal business. Perhaps there IS ALREADY a market out there for a company that will offer a no guarantees, no frills suspension with the full information that current research suggests that such an option is less likely to succeed. But that company is not Alcor, and I suspect that time is not now.



## Some Additional Thoughts on Straight Freezing

by Ralph Whelan

**B**elieve it or not, as easy-going as we are, we cryonicists do not always agree on everything. And while I'm not convinced that Alcor should immediately begin offering the "straight-freeze" option, neither am I compelled by Steve's reasons for not wanting to do so.

The most pressing argument in favor of offering straight freezes is the financial one: it costs less. Steve dismisses this as a savings of only \$15,000 to \$20,000. (Currently, we allot approximately \$25,000 of the \$50,000 neurosuspension minimum to "Up Front" costs, most of which would be eliminated by straight-freezing.) But for many people, the difference between \$30,000 and \$50,000 is the difference between being frozen and being buried. As cryonics continues to gain acceptance, we will encounter more and more hard-luck cases that we will have to turn away for a lack of adequate funding. I'm glad I'm not the one who will have to explain to these people Alcor doesn't offer a \$30,000 straight freeze because we believe it is "less likely to work."

But that's life, right? Should we offer a product that we believe is inferior just because some people can't afford "the top of the line"?

Maybe so. Steve is right that this is what car manufacturers (and most manufacturers) do. The fact that we are selling not cars but a chance at an indefinitely extended lifespan is, to me, all the *more* reason to consider doing so. The difference is that *our* economy model is not designed for the thrifty so much as for the *desperate*. Given a chance to drive into the future in a Pinto or not at all, I'll take the Pinto and *like it*.

But let's not forget that we really don't know which of our potential products is the Pinto and which is the Mercedes Benz. Steve points out that "Enough research has been done on frozen tissue over the last four decades for us to be very confident that more cells survive freezing with cryoprotection than without..." True enough. But it's just possible that Steve is making the same mistake here that most non-cryonicists make when assessing the workability of cryonics: that of formulating the argument in terms of *current* technology. Let us suppose for a moment that the die-hard nanoenthusiasts are correct, and Our Friends In The Future will be capable of reversing even the most severe tissue damage, so long as sufficient information to infer the undamaged state remains. It may turn

out then that perfusion with glycerol causes less overall damage, but far more *irreversible* damage than straight-freezing. A straight-frozen patient would spend less time at warmer temperatures, and would experience none of the chemical changes induced by perfusion with glycerol. Perhaps for them the undamaged state will be more obvious to those faced with the task of repair.

Lastly, I'll comment on the issue of public perception. Steve believes that offering straight freezes would hinder our acceptance in the mainstream medical community. Perhaps it would, a little, but I think not. The vast majority of our patients still would not be straight frozen. As for the others, I find I'm still willing to risk offending doctors to save their lives.

Ultimately, though, I suspect that Alcor will not soon (if ever) offer a straight-freeze option, primarily because those who would benefit from it are not lobbying for it. At present, the general level of interest appears to us to be very slight. It's up to you, the Alcor Members and potential members, to prove otherwise, through your letters and phone calls.

Tell us how you feel.

# The Cryonic Suspension of Stanley Penksa

By Tanya Jones

Stanislaw "Stanley" Penksa was born on April 13, 1896 to a blacksmith and his wife and was the second of five children. His parents came to the United States in 1890, hailing from Novytarg, Poland. Stanley, or "Stash" as his parents called him, had an older brother named Walter. Two years later, he had a younger sister. Susan lived to be only four. She was badly burned when she pulled a pan of grease from the

stove. With wounds covering most of her body, little Susan went into shock and died before her family could reach the nearest doctor, who lived a full ten miles away. Five years later, sister Catherine was born, followed later by brother Joseph.

On the day the *Titanic* sank in 1912, the family moved from their home in Pennsylvania to the coal-mining town of Glenwhite, West Virginia. There, his family lived in a four-room house, with all the children sharing a bedroom. Mr. Penksa had been hired to take care of the mules which pulled the coal carts into the mines. Stanley and Walter also worked in the mines. Walter's job was to manage the pumps which drained water from the tunnels, while Stanley operated and maintained the motor which hauled the carts. Together, they made \$40 each month. It was in the mines that Stanley met Fred Blake. Fred's job was to shoe the mules, and they became good friends. Fred later went on to play baseball, pitching for the Philadelphia Phillies and the Chicago Cubs. Although they worked hard each day, they still found time for a little mischief. For fun, he and his friends would sneak into the St. Stanislaw Church and ring the bell.

When Stanley was 17, he left Glenwhite and went to Washington D.C. While there, he received a patent for a bathing suit insert which could be used as a floatation device if the swimmer tired. (A few years later, he would decline an offer of \$2,000 for the rights to the patent.) This was his second patent. The first was for an air mat-



*Stanley in 1964*



*Stanley at age 12, in 1908*

tress, although it was never developed because the glue he used was thought to be inferior.

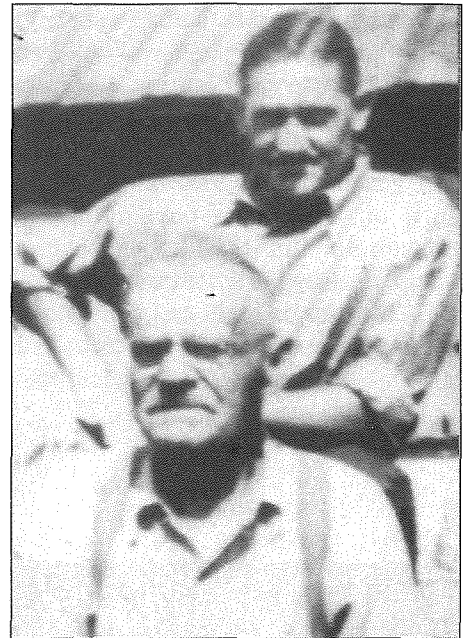
After thoroughly exploring the Smithsonian Institute and the wonderful world of patents, Stanley went north to New York. There he boarded with a woman named Mrs. Buck and spent most of his time doing repair work on brick buildings. He was making about \$100 each month, sending most of it home to help his family. Once, when he wanted to get more work, Stanley walked the streets with a sign advertising his services. This brought an avalanche of jobs, which would later fund his first construction ventures. He would eventually build and sell houses but lose everything when the Depression hit and his debts were too high. Stanley was undaunted. He went right back to work, starting over as a locksmith. Again he succeeded in working his

way to building not only beautiful homes, but apartments and factories as well.

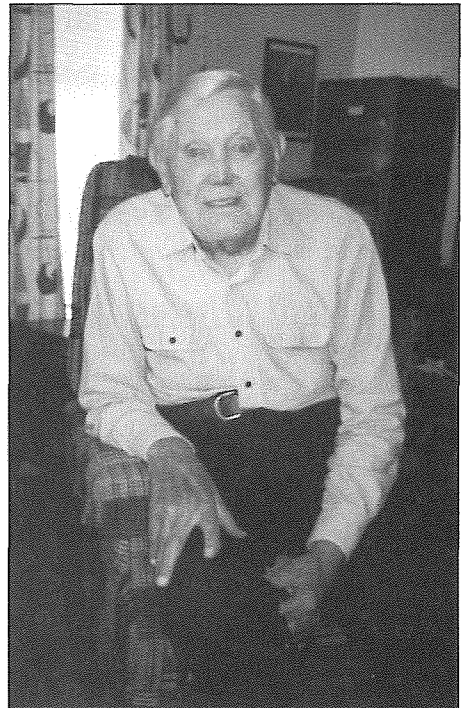
Contracting was Stanley's most enduring profession, continuing for about forty years. But there were others along the way: during World War I, he was an "investigator", a time about which he was secretive to the end; later in life, he raised Christmas trees with his brother and lived in a house on 30 acres at the end of Penksa Road in Worcester County; and he was even employed as a reporter for the *New York News*. As a reporter, he witnessed three executions, and Stanley would grin as he described sneaking into the autopsy room to watch the victims steam during the autopsy. Perhaps his greatest passion, eclipsing even his construction work, was his 47-year involvement with the Rotarians. He visited six continents, each time making certain to attend his

Rotary meetings. He collected many Rotarian banners, which now proudly hang with the Worcester Rotary.

It's hard to tell what drew Stanley to cryonics, but it also sparked a great interest. Like many cryonicists, he never married or raised a family. He received *Cryonics* magazine for many years to deciding to go further, but then he signed up quickly and wanted to know what else he could do. For things to go well during a cryonic suspension transport, steps have to be made in advance to inform local emergency officials (anyone who would be involved in a sudden death) about Stanley's cryonic suspension arrangements. Stanley and his health care aide did what they could, but a little more was needed. Steve Bridge and I travelled to upstate New York in the spring of 1993 to negotiate the terms of Stanley's eventual suspension. We spoke to the Fire



*Stanley (background) and his father in 1934*



*Stanley at 98 years of age*

Chief about pronouncement and emergency response. We spoke to the Coroner about autopsies and "embalming". Steve and I gave a presentation to the hospital ethics committee. The reactions were mixed. Everyone we saw spoke well of Stanley and considered him a pillar of the community. Many newspaper clippings detail his donations to various local





*Hugh, Ralph, and Tanya unload the patient at Alcor*

civic organizations, including the hospital and fire department. Perhaps they wanted to try and repay him for his generosity, for although our initial trip yielded little in the way of written affirmations of assistance, when the time came to suspend Stanley, cooperation came from every necessary corner of the county.

The last time we saw Stanley, before his suspension, was in the late summer of 1994. He had come to us, wanting to see the facility before he died. Stanley would frequently remind us that his doctor had pronounced him fit enough to live to at least 105 and happily spoke about the future and reaching 100 years of age. He gave us all a chuckle at his determination and optimism when he flew home with a copy of *The 120 Year Diet*.

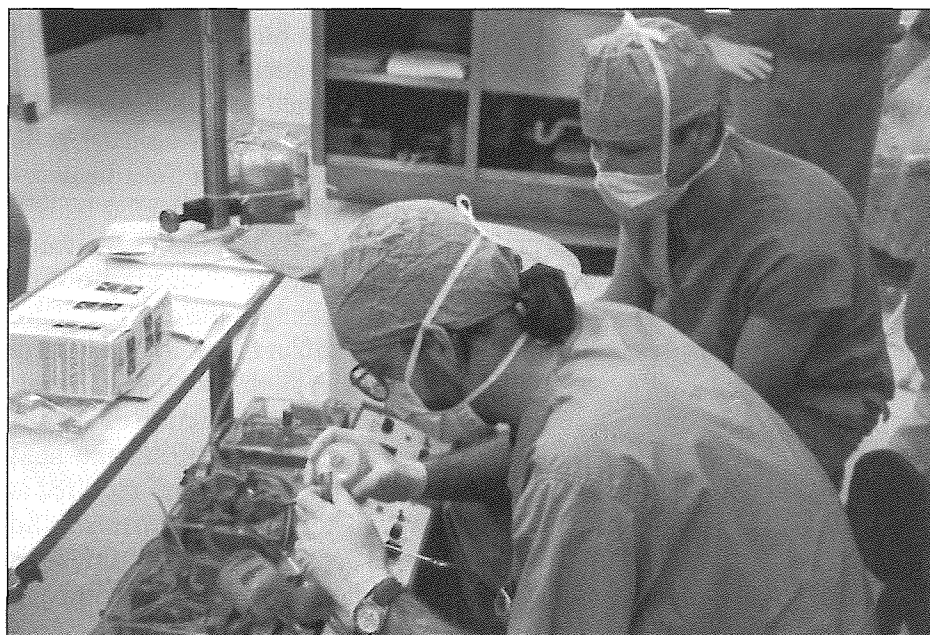
By the time he reached 99½, Stanley's health was worsening. His cognitive awareness was failing, and with each passing season came progressively worse bouts of pneumonia. By now, he was bedridden. Still, his heart held steady. On the morning of November 26, 1995, that would change.

That morning, Stanley's staff had been unable to wake him, and called

Alcor and the paramedics at about 8:10am (MST). When the paramedics arrived, they began cardiopulmonary resuscitation (CPR) but were unable to maintain a pulse. Stanley was rushed to the hospital, where his condition was stabilized. The emergency room physician even called Alcor and told Steve Bridge that Stanley was doing well and speculated that he might be able to go home after a brief hospitalization. Initially, we had been told that Stanley had al-

ready been pronounced, so this was welcome news. Still, Hugh Hixon and I took off for New York, just in case things took a turn for the worse. We had just taken off for Atlanta (the first leg of our journey) when word came in that "worse" arrived, and Stanley had just been pronounced legally dead at 11:45 (EST). The emergency room physician who had previously called helped to pack him in ice and administered both CPR and the medications described in a letter I'd written the year before. Stanley received heparin, sodium bicarbonate, streptokinase, and Maalox before being transferred to the local mortuary to await transport.

Hugh and I flew into Albany and drove for an hour or so before arriving at the mortuary at 9:30pm (EST). Frank Heller, the mortician and County Coroner, who had met with Steve and me during our reconnaissance mission. He was both familiar with our protocol and quite willing to help. He performed the femoral cutdown while Hugh and I prepared the tubing and Viaspan. The cutdown began at 10:40pm and was completed in 10 minutes, at which time we began the Viaspan flush. By 11:07, the flush (of about 15 liters) was com-



*Ralph (foreground) and Jay prepare to filter the perfusate*



*Rhonda and Naomi work on burrholes while Nancy prepares for surgery*



*Hugh double checks the cooldown system*

plete, though there were signs that the perfusion was not as thorough as we would have liked. We then packed our patient in ice for an early morning flight to Phoenix. All of the ice used had been taken from a freezer that Stanley had purchased to store ice for an emergency. (It was a very good thing that Stanley had taken this precaution, because ice would have been hard to find!)

Hugh and I then spent a couple of hours at a hotel half-way to the airport, getting *some* sleep before leaving.

(Steve Bridge coordinated all transportation arrangements for our team. He has been doing this during our recent suspensions, and he does it well.)

Because it was the high-traffic

Thanksgiving weekend, we were booked on different flights. It's unusual to split our team like this, but there was no alternative. The first airline Steve tried couldn't get the patient on a flight that would arrive in Phoenix sooner than 5:30 the next evening. He then contacted United Airlines. Their representative, Janet Fiedler, could do better. Routing through Chicago, the patient could arrive at 2:50 in the afternoon. There were earlier flights with seats available, but the cargo section of the airport was closed until six the next morning, with "check-in" required at least two hours before departure. So we split up, and I took a 6:00am flight, and while Hugh would accompany the patient four hours later.

We weren't the only ones look-

ing for tickets. A crew from the Discovery channel filmed most aspects of the transport and each subsequent part of the cryonic suspension for a documentary on Alcor and cryonics. They kept surprisingly out of the way, and even lent a hand. The producer, Bill Hayes, took most of the photos in our file of this suspension. Ms. Fiedler had even arranged for access to the tarmac, so they could film the patient being loaded on the aircraft—something that few cryonicists ever see! She may even have been responsible for getting the film crew seats on the same plane.

I arrived in Phoenix late the next morning. When I got to the lab, I found that our crack prep team had been working hard through the night to get things ready. Derek Ryan and



Matt Milkovich had gotten together and mixed the perfusate. Scott Herman, who would be out of town the next day, joined Mike Perry in setting up the cooldown system before he left. Scott had also worked with Sergei and Victor Ochkur to prepare the operating room. When I got to the facility, almost everything was in place, and the members of our suspension team had been contacted and were scheduled to arrive an hour or so later.

The patient arrived at Alcor around 5:00pm (MST) and surgery began shortly thereafter. Rhonda Iacuzzo prepared the burrholes, while Keith Henson and Naomi Reynolds assisted Dr. McEachern with the open heart surgery. When the burrholes were complete, Rhonda moved to her usual position as surgical nurse. The surgery went smoothly, and none of the complications one would expect to occur during surgery on a centenarian (like the tearing of a fragile aorta, as occurred with a past patient) happened. Ralph Whelan and Jay Skeer were the perfusionists, and they managed to filter high-concentration perfusate while simultaneously pumping the low-concentration perfusate into the patient. Judy Muhlestein and Matthew Sullivan collaborated on the sample collection, and Brian Shock calculated glycerol concentrations. As has been the trend with recent suspensions, this one went more smoothly than the last.

The perfusion was stopped at 10:26pm, and the final molar glycerol concentrations measured were 6.92 (arterial) and 6.45 (venous). The final burrhole sample was taken eleven minutes after the last arterial and venous samples and was 5.65 M. The cooldown went fairly smoothly, although a few problems arose with the automated system. Still, it may have been our best cooldown ever—our new protocol was found to greatly reduce cracking, as monitored by a detection device being developed by



*Preparing the patient for transfer to liquid nitrogen cooling*

Hugh Hixon. (A more detailed report is being prepared.)

Later, we were all given a bit of a scare during the final-stage transfer—between the cooldown dewar and the permanent storage dewar. The electric winch used to transfer the whole body pods between dewars broke while we were trying to raise Stanley from the cooldown dewar. A bad solder joint in the controller caused the winch to work for raising the patient, but only sporadically for lowering him. With some effort, Dave Pizer was able to re-establish the broken connection long enough for Stanley to be returned to liquid nitrogen. According to Hugh Hixon's calculations, the patient did not warm significantly. The faulty switch has now been repaired, and a manual system has been installed as a backup.

Stanley Penksa is the thirty-first Alcor patient (12th whole body), and is one of the earliest-born people in cryonic suspension today.



*I'd like to thank the following individuals for their assistance with this suspension:*

Stephen Bridge  
Funeral Director Tony Cerullo  
Producer Bill Hayes  
Keith Henson  
Hugh Hixon  
Joe Hovey  
Rhonda Iacuzzo  
Dr. Nancy McEachern  
Matt Milkovich  
Judy Muhlestein  
Sergei Ochkur  
Victor Ochkur  
Dr. Michael Perry  
Dave Pizer  
Naomi Reynolds  
Derek Ryan  
Brian Shock  
Jay Skeer  
Matthew Sullivan  
Ralph Whelan

*A special thank you is also extended to **Janet Fiedler** of United Airlines.*





# SCRAM Reanimation

by Michael V. Soloviov

## I. Introduction

SCRAM reanimation is a hypothetical method for reanimation of suspended patients. Much of the necessary procedure is done by modification of data files in cyberspace rather than by working directly on the body with nanodevices (assemblers/disassemblers, cell repair devices, or molecular robots). "SCRAM" is an acronym reflecting the three principal steps in the process.

(1) **Scanning:** A section of the frozen body is scanned to define the location and type of all atoms in the body. Generally this will be a destructive process—as one layer of atoms is scanned it is removed, exposing the next layer for scanning, until the whole interior structure is mapped. (The atoms could be saved

for repositioning, though some will consider this unnecessary—see (3) below.)

(2) **Computer Reconstruction:** The data file obtained in step (1) is processed. In effect, an electronic image of the body section is modified rather than the original material. In this way all necessary repairs, cure of diseases, etc. are carried out in cyberspace, again creating an electronic image—in this case, of the fully repaired body section. A procedure to rewarm the tissue is mapped out or updated.

(3) **Atomic Manufacture:** The data file from step (2) is used by some STM-derived (or other type) device to assemble the body section atom-by-atom at low temperature. After all sections have been reconstructed in place, the frozen body is warmed to make it functional. (To meet certain

philosophical objections the atoms used in the reconstruction could be taken from the original body, and as far as possible returned to their original positions in the body. Others will not be troubled by this issue, regarding like atoms as interchangeable, so the use of the original material would not be a priority. Here I do not consider this issue further, but assume an adequate supply of the necessary atoms—from whatever source—is on hand.)

Many advanced technologies (MRI, CAT, STM, laser-focused atomic deposition, etc.) could be feasible for this type of reanimation. I will consider only one of the possibilities, based on mechanical movement. Step (3) and the basic calculations are also described in my previous paper [1]. Here I propose a unified technology for steps (1) and (3) and estimate the hardware requirements for step (2).

## II. Basic calculations

### 2.1. Number of atoms in the human body

It is possible to calculate this number ( $N_a$ ) by dividing the average weight of human body ( $W_b$ ) by the average weight of an atom in the body ( $W_a$ ):  $N_a = W_b / W_a$ . To calculate  $W_a$  we need to know the numerical atomic composition of the body and atomic weights. These data (from [2]) for the

"The nanosyringe is a device to capture and recognize, or release and connect, atoms. . . . Its creation depends strongly on further advances in nanotechnology, and the whole project will become feasible when it is created."

principal atoms of the human body are listed in Table 1 (where 1 amu or atomic mass unit =  $1.66 \times 10^{-27}$  kg).

A simple calculation then gives  $W_a = 6.44 \text{ amu} = 1.069 \times 10^{-26} \text{ kg}$ . Assuming:  $W_b = 100 \text{ kg}$  gives  $N_a = 10^{28}$ .

## 2.2. Average distance between atoms in the human body

To calculate this number ( $L_a$ ) we divide the average volume of the human body ( $V_b = 0.1 \text{ m}^3$ ) by  $N_a$  and take the cube root:  $L_a = (V_b / N_a)^{1/3} = 0.215 \text{ nm}$ .

The real distances between atoms in proteins vary from 0.1 to 0.3 nm [2,3]. These distances (in nm) for valency and non-valency links (separated by slash) are listed in Table 2.

## 2.3. Atomic layers

Assume: (1) Space coordinates are introduced as follows: the Z direction is along the body, the X and Y are across. (2) The body is scanned/manufactured (reconstructed) along the Z direction. (3) The body height (Z-length):  $H_b = 2 \text{ m}$ . (4) The height of a monatomic cross-section of the body or (X,Y) layer  $H_l = 0.2 \text{ nm}$  (about  $L_a$ ).

Then: (1) The number of cross sections or layers:  $N_l = H_b / H_l = 10^{10}$ . (2) The average number of atoms in a layer:  $N_{al} = N_a / N_l = 10^{18}$ .

## 2.4. Reasonable reanimation time

In my opinion several days (about  $10^6 \text{ s}$ ) is a good number, but several months is still acceptable. Here I'll assume that a reasonable time to scan/manufacture the body is  $T_b = 10^7 \text{ s}$  (about 4 months). Then the time to scan/manufacture a single layer  $T_l = T_b / N_l = 0.001 \text{ s}$ .

## III. Macroscopic atomic scanner/manufacturer (MASM)

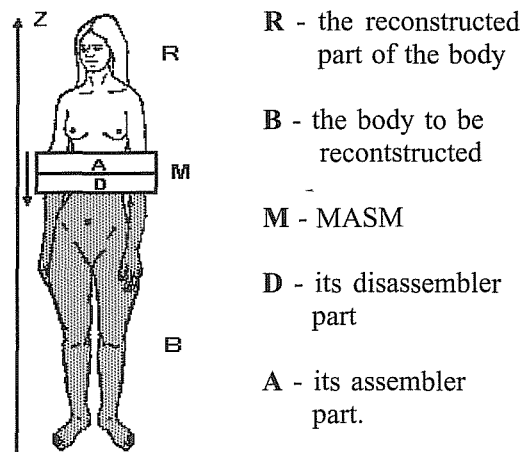
The MASM is the basic device for scanning and manufacture of the body. First it disassembles the body section and analyses its atomic structure (the scanning process). Then it assembles the body section from atoms anew (the manufacture process).

The MASM is an array of  $80 \times 50$  heads placed in one plane frame. Its

size is  $0.8 \times 0.5 \text{ m}$ . It moves along the Z direction (Fig. 1) to scan/manufacture the (X,Y) layers with step 0.2 nm ( $H_l$ ) and frequency 1 KHz (1/Tl), or speed 1000 layers (or 200 nm) in a second.

The MASM head is an array of  $10^6 \times 10^6$  nanosyringes. Its size is  $1 \times 1 \text{ cm}$ . It moves over the horizontal (X,Y) layers to place/remove atoms with a precision of 0.01 nm, 1/10 the minimum distance between atoms (probably accurate enough to place atoms and to analyze the atomic structure). Its movement characteristics are: amplitude (distance between nano-syringes):  $A = 10 \text{ nm}$ ; step:  $S = 0.01 \text{ nm}$ ; period:  $P = T_l = 0.001 \text{ s}$ ; total length of path for P:  $L = A * (A / S) = 10^4 \text{ nm}$ ; number of steps during P:  $N = L / S = 10^6$ . The modulation frequency to control each step during assembling/disassembling should be about 1 GHz ( $N/P$ ). The trajectory of the MASM head movement is shown in Fig.2.

Fig. 1: MASM reconstructs the body.



The nanosyringe is a device to capture and recognize, or release and connect, atoms. Its maximal diameter is 10 nm. It is an STM-like needle with a nanotube inside (Fig. 3). This is the key and most hypothetical device of the project. Its creation depends strongly on further advances in nanotechnology, and the whole project will become feasible when it is created.

Transport of atoms could be ef-

Table 1: Atomic Composition of the Body

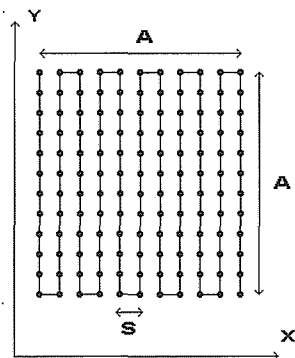
Atom	Weight (amu)	% in body
H	1.0	60.6
O	16.0	25.7
C	12.0	10.7
N	14.0	2.4
Ca	40.1	0.2

Table 2: Distances between atoms (nm) in proteins

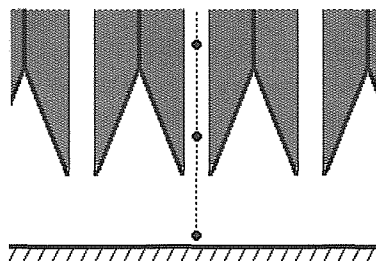
	H	O	C	N
H	- /0.20	0.10/0.24	0.11/0.24	0.10/0.24
O	*	- /0.28	0.12/0.28	0.14/0.27
C	*	*	0.15/0.32	0.14/0.29
N	*	*	*	0.14/0.27

**Fig.2:** Trajectory of the MASM head movement (not in scale).

A - amplitude,  
S - step,  
X,Y - coordinate axes

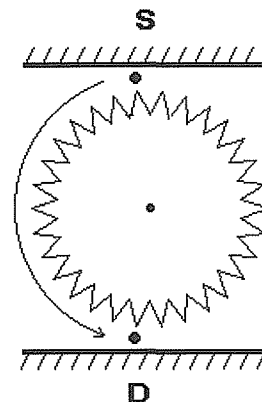


**Fig.3:** Atom is moved through nanosyringe to or from the layer surface



**Fig.4:** The rotating MASM head.

S - the source layer;  
D - the destination layer.



fectured through some sort of nanotube pipeline. Maybe both it and the nanosyringe could be biologically derived. Some alternative ways for atom deposition and transport are described in my previous article on the subject [1]. Additionally, one more way for transporting atoms is using some kind of rotating MASM head—to transfer atoms from the source layer to the destination layer (Fig.4).

#### IV. Computer for Reconstruction (CR)

The CR must work in real time (with MASM speed), reconstructing 1 layer in 0.001 s (TI), i.e. with a speed of  $10^{21}$  atom/s (Nal / TI). If it needs  $10^3$  operations to reposition 1 atom its speed must be  $10^{24}$  op/s.

At the end of the next decade it is expected that processor speeds will be of the order of  $10^{12}$  op/s, and the linear dimensions of such processors will be about 10 times smaller than for current processors [4]. If a CR is manufactured about this time then to reach the needed speed ( $10^{24}$  op/s) will require at least  $10^{12}$  problem-oriented processor units (PU). If the PU complexity is about equal to that of present day processors then its size will be about  $1 \times 1 \times 0.01$  mm (e.g. today's PowerPC 601 size is  $11 \times 11$  mm [5]). If future technology allows dense packing of processors then the total

volume of the CR will be  $10 \text{ m}^3$ . However it seems that 10-20 additional years of computer technology development will be necessary to make the CR feasible, so that a likely availability date is 2020-2030.

If only the brain must be reconstructed (i.e. the body is to be grown by cloning, or synthesized as an artificial, semi-organic structure), then the requirement is  $10^{10}$  PU—or about 1 cubic foot for the CR volume.

#### V. Research

Probably such "macro" technology is more feasible than the proposed molecular robots/cell repair devices, though further theoretical research is needed to prove its feasibility.

Among other goals, for example, would be to obtain estimates of the complexity of the reconstruction in terms of positioning a single atom. Such estimates are now possible by analytical methods. In the near future, as I hope, it may be possible to do the following through computer simulation: (1) to simulate (at the atomic scale) a tiny piece of neuron (e.g. part of a synapse) based on experimental data and theoretical assumptions—first to simulate living tissue, then to simulate freezing; (2) to make the computer reconstruction to find algorithms to return this frozen portion to

a living, functioning state.

Moreover, if such a means of re-animation is to be used, it isn't necessary to keep the body and especially the brain intact. They could be split into small pieces for better freezing, as proposed by Ettinger in 1964 [6, p.31]. Research into such methods of freezing could be conducted now (a good outline will be found in the work of Pichugin et al. [7]).

I am very grateful to Mike Perry for his help in editing this article.

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# The 3rd International Conference on Anti-Aging Medicine and Biomedical Technology

A Review by Russell Cheney

## Overview

For those interested in life-extension and good health, this was a marvelously fascinating event. Based on a new theory of aging, it was predicted that within 20 years the maximum healthy human lifespan will be extended to beyond 200 years; see "Genetic Engineering / Telomeres" below.

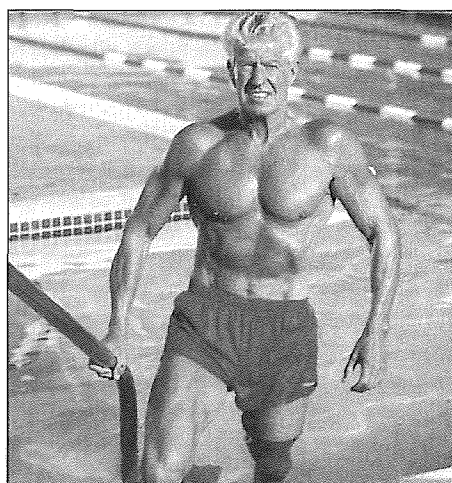
The "Anti-Aging Medicine and Biomedical Technology" conference took place December 9 through 11, 1995, in Las Vegas, Nevada. It was the third such conference sponsored by the American Academy of Anti-Aging Medicine (A<sup>4</sup>M).

One of the most important features of this conference was the fact that it was created and supported by widely-accepted medical organizations. Attending-physician credit was provided by the American Medical Association (AMA). Accrediting sponsors were the University of Minnesota Medical School and the Oklahoma State University of Osteopathic Medicine.

Although the major thrust of the conference was targeted to practicing MD's and researchers, much of the subject matter was also comprehensible to the informed lay public. The

scope of the conference included everything from true anti-aging protocol (drugs, surgery, supplements, causal theories, etc.) to increased sustained health, appearance, and feelings of well-being.

Despite this being only the third



*Bob Delmontique, age 75 (from the A<sup>4</sup>M publicity package)*

presentation of the conference, by Sunday morning there were about 1400 registered attendees and over 50 exhibitors (including Alcor). By the end of the conference there were 56 formal presentations, 29 poster abstracts, seven book signings, participant ses-

sions on Tai Chi, yoga, and jogging, plus an awards banquet. The total participation, as estimated by Francis A. Kovarik, PhD, the A<sup>4</sup>M Executive Director, exceeded 1800 people. Kovarik stated that last year had about 200 MD's in attendance, this year almost 400.

The increased recognition of anti-aging by the mainstream medical community has a number of causes, including the apparent gradual widening of promising research in related drugs. Speaker Marvin Minsky, PhD, MIT (the "father" of Artificial Intelligence) stated that the mainstream medical community is easy to gain acceptance from: all you need is solid scientific proof!

## Sessions

The formal presentations, most of which included an excellent written abstract in the printed program, and visuals during the address, were grouped by subject into sessions. There were 14 sessions. Sessions of special interest to longevists included:

*Melatonin (7 presentations)*  
*Accredited Anti-Aging Center (2)*  
*Hormone Replacement Therapy (3)*

*Reversing Immunological Dysfunction* (4)

*Genetic Engineering / Telomeres* (3)

*Nanotechnology / Cryonics* (4)

*Live-Cell Therapy* (3)

Many other presentations addressed state-of-the-art health and wellness issues such as food nutrition / supplementation, the role of exercise, free radicals, and cancer prevention / treatment.

## Presentation Highlights

### Melatonin

Melatonin discussions entirely filled Saturday morning. As you are probably aware, the last two years have seen an explosive growth in the

general public's interest in Melatonin. Intense interest was shown by the conference attendees. New books are now available. A news crew from France was conducting interviews intensively. Throughout the conference, MD's were informally comparing Melatonin dosages and results.

It was all very exciting to watch and hear.

Unfortunately the bottom line appears to be that since the publication of Thomas Donaldson's *A Guide to Anti-Aging Drugs* in 1994, no new scientific facts have been revealed in regard to Melatonin's effect on human aging. When the French news team asked *The Melatonin Miracle* authors if they thought the title was misleading (Melatonin is banned in France and most of Europe for lack of proof of effectiveness, but not the

US), William Regelson, MD, replied that the book presents all the facts and the reader is expected to be able to make an informed choice.

Fortunately, the original Pierpaoli (Walter Pierpaoli, MD, PhD, the conference's opening speaker) experiments referenced by Donaldson still stand, including a 20% lifespan increase in older mice, affecting both average and maximum lifespan. Effectiveness is dependent not only on the age of the mice, but also on the time-of-day administered. Shortening of lifespan was seen in young female mice. The pineal gland appears to be a central player. Administration in humans should be under the care of a physician who would monitor Melatonin blood-levels. Appropriate additional experiments could be of enormous value.

## My Impressions of the A<sup>4</sup>M Conference, by Michael Perry

I was privileged to attend the A<sup>4</sup>M conference. There was an optimism and excitement about the future that was very invigorating. Brave words were spoken. "We are entering a new era of evolution—human potential without limits," said Dr. Klatz in his opening address the first morning, adding, "... Aging is not inevitable ... but like all diseases is treatable and curable. ... May you all live free, forever." One refreshing change from the attitudes I'd seen some years ago was that there was no longer that infamous insistence on "squaring the mortality curve." (The latter means, essentially, that people stay alive and healthy until some "reasonable, ripe old" age, then swiftly sicken and die, as in Huxley's *Brave New World*. This was said to be necessary and desirable to prevent "social hemorrhaging"!) Instead it was clear that serious thought was being given to *straightening the mortality curve*—simply making people immortal and free of all debilities including aging—forever. And—there was one talk, by Dr. Ralph Merkle, devoted specifically to cryonics (though not mentioned in the press release—see page 23).

Overall, the feeling seemed to be that "the future is worth seeing" if one is in

reasonable health, and the latter may be possible through one or another of the approaches that was discussed. As stated, there were more than 1400 attendees, which is far more than the number of people signed up for cryonic suspension. As expected, then, not all attendees were wildly enthusiastic about cryonics, and older, death-accepting attitudes were also lurking about, as was well illustrated at one point. Someone wasn't there, the speaker announced; his wife had been diagnosed with cancer. We were urged to "remember them in your prayers"—the freezing option wasn't mentioned. But, among the many presentations, at least some struck me as possibly very significant and cause for very cautious optimism about the prospect of *not* having to be frozen. Though there is, as usual, no guarantee, aging *could* be curable in a few decades, or at least, treatable in such a way that many living today will live long enough to experience a complete cure and hence, biological immortality.

Among the major highlights of the conference were the following:

The most significant research presented, in my estimation, was that by Geron Corporation in Menlo Park, CA, relating to

the role of telomeres and telomerase in both the aging process and cancer. As is now becoming well-known, telomeres are structures that bind the ends of chromosomes together like the plastic ends of shoestrings. When most cells of the body divide, the resulting daughter cells have shorter telomeres—when the telomeres become too short, the chromosomes begin to unravel and the cell line dies. The shortening of telomeres limits somatic (body) cells in the human to about sixty divisions, the "Hayflick limit" named after discoverer Leonard Hayflick. That telomere shortening is important in aging was gruesomely and forcefully suggested by photos of progeria victims who start life with abnormally short telomeres, show aging-like symptoms in early childhood, and typically die around age 12. On the other hand, germ cells in the body produce telomerase, which *lengthens* the telomeres, and keeps pace with the shortening from other causes. This is why the offspring of an organism do not start life at an advanced biological age—their biological clock has been reset! Resetting the clock is not always an advantage, however. Cancer cells also produce telomerase—and don't die out—until their unrestricted prolifera-

### Accredited Anti-Aging Center

The two presentations on the first A<sup>4</sup>M accredited anti-aging medical center, the Longevity Institute International (LII), Montclair, NJ, especially addressed their approach to the critical issue of measurement: how do you objectively determine what effect the anti-aging medicines and protocol are having on you? The measurements are termed "biomarkers".

Interestingly, a neat solution to human aging biomarkers might very well usher in an era of practical human anti-aging drug testing, short-cutting the need to wait decades for usable test results. Currently it appears that although the need is widely recognized, and many of those most closely involved are quite optimistic for the near-future, the issue today remains thorny.

### Hormone Replacement Therapy

These three presentations shared a common theme: careful scientific research has demonstrated that human aging goes hand-in-hand with profound changes in our glands. For example, the production of estrogen, the thyroid, and testosterone are well known. Much successful hormone replacement (under the care of an MD) is recognized.

But underlying causes are not yet well-understood, and inconsistent results and side-effects (for example, breast cancer) are concerns. Julian Whitaker, MD, of the Whitaker Wellness Institute, Newport Beach, CA, believes that certain side-effects can be avoided, and that certain drugs (DHEA, testosterone, pregnenolone) clearly should be used/researched.

### Reversing Immunological Dysfunction

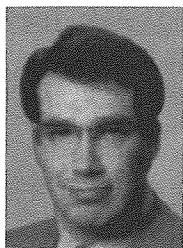
These four presentations examined:

Nutrition, especially vitamin E and A, Tocopherol Thymic hormones, DHEA, and Growth Hormones.

### Genetic Engineering / Telomeres

These three presentations discussed one of the latest and hottest theories of aging, and its implications for revolutionizing the battle against aging. A number of aging theories were discussed at this conference, including free radical (perhaps now the most widely supported), DECO (the "death hormone"), and telomere/telomerase.

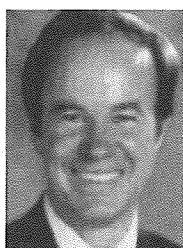
The fact that most cells have only a limited number of copy-cycles (replications) is well established. This



Dr. Ron Klatz



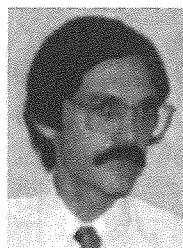
Dr. Michael Fossel



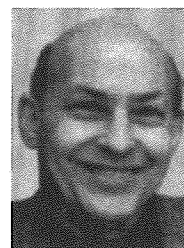
Dr. Calvin Harley



Dr. Ralph Merkle



Dr. Gregory Fahy



Dr. Marvin Minsky



Dr. Dharma Singh  
Khalsa

tion kills the whole organism!

Of the three speakers from Geron, Dr. Michael Fossel was the most optimistic, predicting that the maximum human lifespan will be increased to 200 years and beyond within 20 years, through understanding and counteracting the mechanism of telomere shortening in somatic human cells. While, as he noted, the telomere problem was not the only process involved in aging, solving this one problem ought to improve things substantially. (Then it should also buy us valuable time to work on the other problems!) Dr. Calvin Harley, another Geron speaker, thought aging would prove too complicated to be significantly impacted by the mere reversal of telomere shortening. He did, however, predict substantial improvements in cancer treatment through suppression of telomerase production in malignant cell lines. That this is not mere speculation was dramatically underscored by Geron's recent work with malignant HeLa cell cultures. (These cells trace their ancestry to

Henrietta Lacks, a cancer victim of the 1950s. It was found that her malignancy proliferated very well in culture and the cells have since seen wide application in research.) In this work the normally immortal cell lines were induced to die out after about 25 divisions by suppression of their ability to produce telomerase.

In a short space I can't do justice to all that was presented—but here are a few more highlights.

Ralph Merkle offered his usual, well thought-out, positive assessment of cryonics, based on anticipated developments in nanotechnology. As he sees it, one should sign up because there is little to lose if cryonics is unsuccessful, i.e. does not result in eventual resuscitation, and something definite to gain if it does succeed. Moreover, there is a *reasonable* chance it will succeed, which he estimates, for a typical case with the usual problems, at around two thirds. Dr. Gregory Fahy elaborated on the possibilities of nanotechnology, which should make

feasible such essentials for cryonics as cell repair.

Dr. Marvin Minsky gave a delightful, disorganized talk on "rebuilding ourselves from the ground up." It is clear that we are not going to remain simply "just a vehicle for reproducing our genes" as now. We want to conquer aging and become more than human. But we will have to get motivated. "Because of lawyers and ethics and cowardice," research is hampered—it is going forward, but not as fast as one would like.

Finally, I'll mention Dharma Singh Khalsa, M.D., an American convert to the Indian movement of Sikhism, who had some thoughts on "the role of the spirit." Although this may suggest mysticism, the issues he addressed are real ones, for example, what sort of *persons* are we going to be, *should* we be, if our lives are greatly lengthened? These are hard questions and Dr. Khalsa was not offering definitive answers but—what is also important—trying to get us to think about the issues.



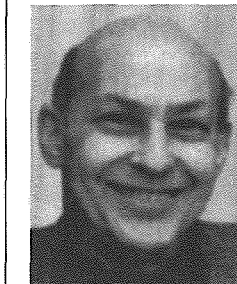
session was based on the premise that telomeres (the last several thousand base pairs at the ends of our chromosomes) shorten with each cell division in somatic cells, but not in cancer cells.

With the predicted soon-to-be-developed ability to reset telomere length, Michael Fossel, MD, PhD, estimated that within the next two decades the maximum human lifespan will be extended to well beyond 200 years. The increase in both health and longevity is expected to result from our ability to reset telomere length, the underlying cellular clock which determines senescent gene expression (cell aging), the cell's replicative lifespan, the onset and course of age-related diseases, and ultimately the maximum human lifespan. Direct implications exist for cancer therapies.

Work is currently underway at Geron Corp., Menlo Park, CA.

#### *Nanotechnology / Cryonics*

The four presentations in this session built upon a base of understanding of certain medical implications of nanotechnology, as discussed by Gregory Fahy, PhD. Some further implica-



## Marvin Minsky Mentionables

"We back up computers; why not ourselves? Two-year recordings of our corpus callosum signals [communicating between our brain's two hemispheres] may provide a good record."

"We should rebuild ourselves from the bottom up; maybe cryonics will give us the chance."

"The human brain has 400 distinct architecturally separate parts that evolved on different bases. Some of these parts correct erroneous output from other parts."

"Happiness is our major problem [because it leads to contentment]; we should be greedier [to be able to continue to grow]."

"Why aren't [eye] glasses self focusing? Cameras are."

tions were brilliantly and entertainingly explored by Minsky.

This background was used by Ralph Merkle, PhD, to discuss certain ramifications for cryonics. The attendees gave silent engrossed attention to this session. Merkle openly discussed the difficulty of scientific proof; it may not be available until the recovery process itself is implemented.

The tone and depth of the follow-up questions indicated the subject was

being seriously considered.

#### *Live-Cell Therapy*

It was noted within these four presentations that the history of such treatments goes back over 100 years. But not until the last few years have efforts begun to objectively measure medically-quantifiable results, and not until two years ago did live-cell therapy become available within the US.



Alcor had a significant presence at the conference. This picture shows the Alcor booth, where (left to right) Rhonda Iacuzzo, Derek Ryan, Judy Muhlestein, Steve Bridge, and Dr. Thomas Munson represented Alcor.

# Alcor Member Dies Without Suspension

By Stephen Bridge

To show listeners that cryonicists are not part of some cult fixated on being frozen, we often point out that cryonic suspension is the second worst thing that could happen to us. The obvious point to most people is that dying without being frozen is the worst, with perhaps an infinite amount of emotional and practical distance between the two circumstances.

Elsewhere in this issue you will read about the suspension of Stanley Penksa, the oldest patient ever placed into cryonic suspension. However, just a few days before that suspension, the cryonicist's worst nightmare occurred, and we have to report this for you also. Rob Michels, age 29, an Alcor member for about five years, died and was not suspended. The story is painful and some of the details are not yet known (the Penksa suspension limited our detective time on this). Here is what we do know.

Robert Harris Michels was working on a Ph.D. in Philosophy at the University of North Carolina in Chapel Hill. Rob was one of the first members of the Extropy Institute and was a close friend of the leading Extropians and several Alcor staff. Born and raised in southern California, he was a cheerful, thoughtful man who had long believed that cryonics was a reasonable choice.

He had been recently divorced, but was still friendly and in frequent touch with his ex-wife. When Mrs. Michels had not been able to contact

Rob for several days, she asked the Chapel Hill police to check on him. The police went into his apartment on November 17th and found his body lying on his couch, in "an advanced state of decomposition." The Medical Examiner later estimated that he had been dead for 5-7 days. Mrs. Michels told the police of his suspension arrangements and asked the police to phone Alcor at the number on Rob's bracelet. (Rob had chosen neurosuspension.) Unfortunately, the police officers in charge decided on their own that the body was too far decomposed for cryonics and did not call us. The M.E. also did not call us. None of these people knew that a legal anatomical donation was involved in cryonics. They knew just enough about cryonics to make the wrong assumptions.

In fact, we did not find out about Rob's death until Tuesday night, November 21st, when his ex-wife called

to tell us she had just returned from Rob's funeral. We were stunned that no one had informed us early on; but we began investigating the next morning. The Medical Examiner told us that the body was severely decomposed, and that the brain was almost completely so. What remained of the brain had been removed, examined, and destroyed, except for a small sample, which had been chemically fixed and retained.

Further investigation told us that Rob's body had been shipped back to California in a sealed casket and that he had been buried without any embalming at all. This left us with few options. Rob's default decisions in his Alcor suspension paperwork asked us to preserve any part of his "brain tissue" that we were able to recover, regardless of the damage done to it. We have considered requesting a tem-

*Concluded on page 27*

"The cause of Rob's death is still under investigation, although no foul play is suspected. For us now, the results of such investigation are merely a matter of curiosity. The more important questions relate to why he died without being suspended."

# Requiem for Rob Michaels

*Several weeks ago, the world suffered a major loss in the form of Rob Michaels, a cryonicist and Extropian who died unattended in his North Carolina home. Rob was not found for at least a week after his death, and was autopsied and buried before Alcor even learned of his demise.*

*We are very grateful to Max More for the submission below, and to Tom Bell, for his heartfelt poem.*

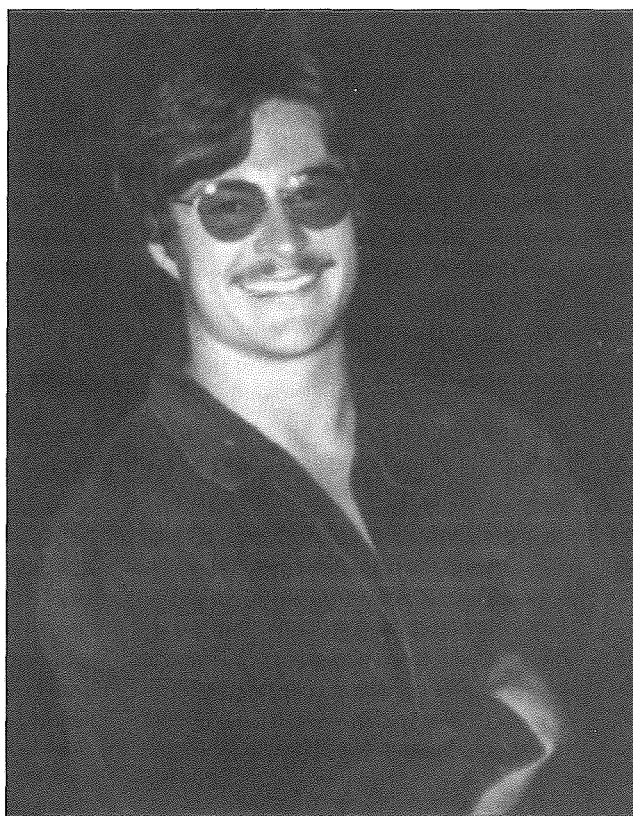
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The death of a human being is a terrible thing. It's especially heart-rending and tragic when that person is young and full of promise. It's even more painful when the person has made arrangements for cryonic suspension but circumstances prevent it. The final insult is when the person taken by the void is not only highly intelligent but one of the most gentle, decent, warm-hearted people on the planet. Rob Michels was such a person.

As I write this, weeks after his death, we still do not know the cause of his death. Rob lived alone. His ex-wife, who still talked with him often, became concerned that he was not answering his phone. After several days she asked the Chapel Hill police to check on him. They found him sitting on his couch in front the television in an advanced state of decay. There were no signs of violence or suicide. Heart attack has, I believe, been ruled out. Papers for his philosophical studies at the University of North Carolina were spread out on the table, indicating that he was taking a break from work.

At the time he was found, he had been decomposing for almost a week. His ex-wife, over the telephone, apparently asked the police to begin cryonic

procedures to respect his wishes. The police insisted it was too late and she became too distraught to take further action. One of the worst possible ends had come to one of the best individu-



*Rob in 1989*

als it's been my privilege to know.

Several Alcor members and Extropians knew him well. I met him in 1988 or '89 at the University of

Southern California. He was an undergraduate philosophy student at the same time I and Alcorian Tom Bell embarked on the doctoral program. John Hospers political philosophy class provided the occasion for me to get to know him. He was fascinated with Prof. Hospers' analysis of political theories and with the new horizons opened up by libertarian ideas. In discussing the nature of liberty I immediately appreciated Rob's enthusiasm for serious intellectual discussion. Our conversations, combined with his humor and warmth, quickly led me to count Rob one of my close friends.

The way Rob's life ended strikes me as especially maddening because it was a sudden and terrible end to a period of growth. When I first met him, Rob obviously felt alienated in some ways. Every member of his large family was Mormon. All except for him. Despite his striking philosophical divergence from family, over and over again I saw how much he loved them.

Nevertheless his rejection of his family's religion left him without a philosophical compass to guide him through life. He had become gripped by nihilism. As happens with some



who cast off religion, he went too far in rejecting positive beliefs. He had gravitated to nihilistic views to the effect that there's no purpose to life, nothing is of real value since there is no creator to give value to the universe, and there is no right or wrong since there is no divine lawmaker.

At the same time that he encountered libertarian ideas, naturally Tom and I showed him our new magazine, *Extropy*, and explained why we didn't accept the idea that relinquishing belief in a deity meant nihilism. Our enthusiasm for the rational, scientific, and technological pursuit of physical immortality and transcendence of human limits was soon embraced by Rob. His natural benevolence towards others easily expanded to help form a view of life as essentially benevolent and worthwhile. His passion for knowledge and his admirable capacity for good will now combined with an optimistic outlook on life to make life once again a grand adventure, a vast and glorious tale in which he

would be a major character. For death to take a nihilist is a bad thing. For death to take one who has come to exalt in existence is an incalculable, unerasable evil.

What can we learn from this appalling event? Part of me rebels against trying to derive a lesson from the death of my friend. Shouldn't I be satisfied with grieving? Having known Rob as I did, I'm certain that he would tell us to learn what we can to lessen the chance of this happening again.

The circumstances of Rob's demise, as we so far understand them, are so peculiar that it's difficult to think of how to prevent this happening to others. If his death was a fluke, a random biological error, then it could happen to any of us. One lesson is obvious: Living alone is dangerous. If Rob had lived with a partner or friend he would have been discovered in hours rather than days. If we are to live alone, we need to set up a mechanism by which the world is alerted if our body ceases to function. A simple way to do this would be for friends of those living alone to arrange to make a five-second phone call each day, or look for an "I'm fine!" e-mail message. The problem with this idea is that keeping a commitment to do this for a friend, especially when he seems to be in great health, is likely to become increasingly difficult to maintain. Probably a more workable idea is to investigate the availability of systems that monitor heartbeat and dial an emergency number if activity halts. I expect we'll see some information about these devices in this magazine.

Rob's death should remind us of another truth, one too often ignored by many cryonicists: Life is uncertain.

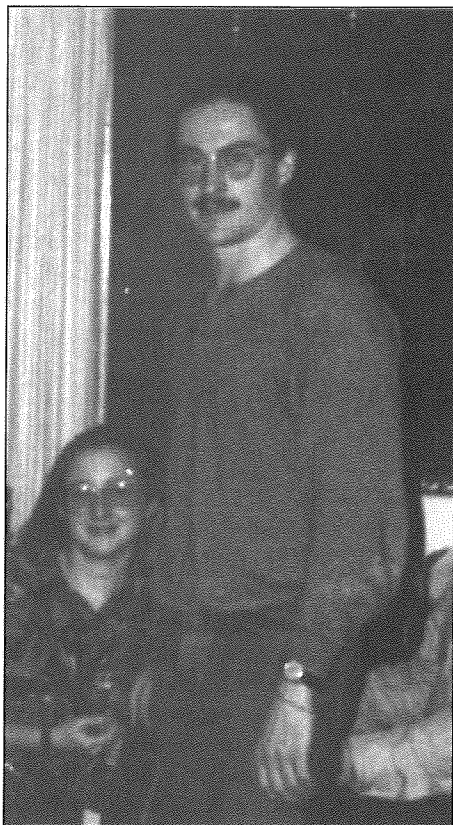
## *An Unwanted Requiem for Rob*

by Tom Bell

*Spinning, our great dead rock  
skipped once, and shrugged you off  
into no sweet white lie,  
not a warm velvet night,  
but just gray scratchy hiss.  
Lost; I want for your thought.*

*Noise rises, floods, drowns,  
and strikes still breath's sound.  
Trapped there on paper,  
words gasp—hold no air.  
Cut loose, your gaze drifts,  
sinks back, inward, down.*

*How to do as you asked?  
Teach your son? Paint that mask?  
What we wanted has flown.  
Our want lives on, alone.  
Will I make you never?  
Then I'll make you the last.*



*Rob at the "Extropaganza" in 1992, along with Tanya Jones*

From this two corollaries follow: First, since life can end at any time, make the most of every day. Don't put off what's necessary for your happiness and flourishing. Focus on enjoying life rather than complaining about its inevitable frustrations. Second, don't treat cryonics as a foolproof way to beat death. Maintain sound nutrition; exercise; have regular medical check-ups; drive cautiously; and be aware of the risks to your life.

The horrible loss of Rob cannot be compensated for in any way. The best his friends can do is to persist in and redouble our efforts to prevent the darkness of death from claiming more people we love.



# Tech Heaven

by Linda Nagata

Bantam, 1995

Reviewed by Brian Shock

What a great time to be a cryonicist! After decades of stories filled with technical nonsense and Frankenstein variations, we're finally beginning to see a few novels that treat cryonics with some degree of respect. Many of you will have read *Chiller* by Sterling Blake, a cryonics tale that managed to combine good characterization, exciting plot, sympathetic storytelling, and technical accuracy. (And if you haven't read *Chiller*, look for it in the order form in the back of this magazine.) I'm happy to say that despite the cheesy title, I found *Tech Heaven* a damn' adequate read, at least the equal of *Chiller*. After Nagata's previous novel, *The Bohr Maker*, reviewed by Steve Bridge in *Cryonics*, 3rd quarter 1995, you'd expect nothing less.

Analog editor Stan Schmidt once commented that all cryonics-reawakening stories looked to him as though they'd been written from the same outline. Nagata avoids the possible clichés in *Tech Heaven* by shifting the story's primary viewpoint to the cryonics patient's wife instead of the patient himself. Katie Kishida is a classic cryonicist, an intelligent, tough-minded individualist who is determined to see her husband through suspension, decades of storage, and eventual revival, regardless of how his relatives feel about it. Although Katie seems to have little in her life besides cryonics and social activism, I have to admire her almost obsessive dedication, her will to survive, her insistence on actions rather than words. When I go into suspension, I hope there is someone very much like her watching over me.

Nagata encourages us to sympathize with Katie by placing infuriating (and all too familiar) human obstacles in her path. Initially, her husband's family objects to

his suspension. Her husband's sister, a U.S. senator, builds a career over the issues of health care for the elderly, insisting that spending government money on a new generation of unborn children is far more important than selfishly preserving the lives of the old and infirm (including cryonics patients, even though they fund their suspensions privately). A grassroots terrorist group called "The Knights of the Oppressed Earth" decides that

both life extension and reviving cryonics patients (although there's no rationalization for doing so, beyond personal bias). By the time these ignorant, self-righteous masses finished their picketing, bombing, and commando raids against cryonicists, I nearly wanted to join the N.R.A.

Tech nitpickers will find little fault with Nagata's description of cryonics—no surprise, since she consulted with both Alcor director Dr. Mark Voelker and Alcor president Steve Bridge. Nagata's version of cryonics is absolutely contemporary, without futuristic cryoprotective potions or magical suspended animation. Her cryonicists administer the same medications as Alcor, perfuse their patients with glycerol-based solutions, and store them in vertical dewars filled with liquid nitrogen. Even Nagata's vision of the future thirty years hence appears quite orthodox (by most cryonicists' standards, anyway), with the development of nanotechnology allowing every medical miracle we currently want and need.

If *Tech Heaven* has one eclipsing advantage over *Chiller*, it is scope of plot. *Chiller* offered us a cryonics organization stalked by a serial killer; the characters in *Chiller* were revived simply because the general level of technology had risen to make that possible. In *Tech Heaven*, lead character Katie Kishida directly involves herself in the process of developing reanimation technology. Although Katie isn't a scientist, she confronts the social forces that attempt to restrict science, as well as helping to fund the nanotechnology projects that will save her suspended husband. In *Chiller*, salvation is given—in *Tech Heaven*, it is achieved.

Of course, as with much science fiction, I felt that many of the social particulars in Nagata's future were rather forced. Will organized bands of terrorists like the



cryonics will contribute to overpopulation, discriminate against minorities, and just generally upset the balance of nature (even if there aren't all that many cryonics patients). Eventually a space habitat-based organization called the "Voice of Humanity" tries to restrict treatments for

"Knights of the Oppressed Earth" ever dedicate themselves to targeting bands of scientists? Will one space-going virtual government such as the "Voice of Humanity" ever wrest control from earth-based extant governments? Somehow these elements strike me as too broad and metaphorical. Even so, I recognize that fiction should be *allowed* broadness and metaphor, if only to curtail the propagation of ten-volume mega-sagas. And besides, ten years ago I would have thought you were a slaving Republican schizophrenic if you had suggested that the mighty Soviet Empire would simply disintegrate before the end of this century.

For me, this novel's primary weakness revolved around one of its few artistic pretensions: Katie Kishida's husband experiences "dreams" while in cryonic suspension. Never mind the scientific unlikelihood of this—the events of these dreams accomplish nothing. We don't learn anything of particular interest about Katie's husband, we don't develop any sympathy for him, and we don't see the plot advanced by any significant degree. Perhaps the reason for these interludes is that Ms. Nagata painted herself into a corner by focusing on a non-suspended character in a cryonics story. Once her cryonics patient revives—as he must, if only to validate the first ninety percent of the story—he suddenly becomes the focal character. Shifting focus to an offstage character so late in the plot would have come off as unforgivably amateurish; to avoid this, Ms. Nagata *had* to establish her cryonics patient as an important character throughout the novel. Perhaps she could have accomplished this better with flashbacks or some other special effect, rather than cluttering the story with semi-mystical filler.

Nevertheless, I enjoyed *Tech Heaven* immensely. I look forward to Linda Nagata's future works, and I hope that we can someday persuade her to put her money where her keyboard is. What cruel irony if someone who can write so passionately and effectively about cryonics remains lost to it!

*Continued from page 23*

porary disinterment; but our legal authority appears vague, and the chance of finding any useful brain tissue seems vanishingly small. We are still negotiating with the state of North Carolina to get access to that brain sample; but it is clear that the neural information that made up Rob Michels is gone.

The cause of Rob's death is still under investigation, although no foul play is suspected. For us now, the results of such investigation are merely a matter of curiosity. The more important questions relate to why he died without being suspended.

Apparently Rob was not teaching this semester; but was working on his thesis. Since he had no place to be on a schedule, he wasn't missed. Only the facts that his ex-wife stayed in regular communication with him and that she was expecting a package from him allowed Rob to be found even after a week. How many of you are in the same situation?

Something that we watch for (and which is likely to be available in the next two years) is a reliable warning system to tell us when someone's heart stops. At least one company is working on a wristwatch with a pulse alarm, so police officers can wear it. The new two-way pagers being offered this winter could be part of a similar technology. Getting healthy young members to actually wear such a watch might be harder than finding the technology in the first place, though. After all, how many cryonicists do you know that "forget" to wear their cryonics necklaces or bracelets?

We have often talked about our members forming local networks to call each other periodically, maybe daily, to keep track of each other and to help in case of emergencies. Such systems are common among older people outside of the cryonics "community." However, this seems harder to do in cryonics, with 375 Alcor members (and fewer than 700 total signed-up cryonicists) spread out all

over the world. In addition, many of these people are independent, even loners, with not much social motivation.

In spite of the difficulties, we urge you to form such social support networks. They won't solve all problems involved in cryonics, but they could save some lives—not to mention the new friends you might gain. We will be happy to assist with the initial communications between members who wish to contact the other Alcor members nearest them. Please let Alcor Membership Administrator Brian Shock know of your interest.

Another problem is a matter of legal communications. Even Rob's family did not understand that his Alcor membership included an anatomical donation. Rob's father, for one, said that he would have called Alcor if he had understood more about Rob's legal paperwork. Rob may not have explained many details of cryonics to his family, knowing that they were very religious and uncomfortable with his arrangements.

This should not surprise us—again, how many of you have explained these kinds of details to your family? The police are going to assume that your family has the authority to determine the disposition of your remains. Even if your family agrees with your decision for suspension, do they understand that Alcor has the legal authority over your body, no matter what?

It will be many years, perhaps decades, before a practical understanding of cryonics becomes a standard part of police and court procedures. Until then, it will be up to you to better inform the people around you, who may be your only voice in an emergency.





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# About the Alcor Foundation

The Alcor Life Extension Foundation is a non-profit tax-exempt scientific and educational organization dedicated to advancing the science of cryonics and promoting it as a rational option. Alcor currently cares for 31 patients in cryonic suspension, and has hundreds of signed up Members. Being an Alcor Member means knowing that—should the worst happen—Alcor's Emergency Response Team is ready to respond for you, 24 hours a day and 365 days a year.

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

## Meetings

### Board of Directors Meetings

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

*Sunday, September 10, 1995:*

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

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

### Southern California

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

### Boston

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

### District of Columbia

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

### Bay Area

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

### England

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

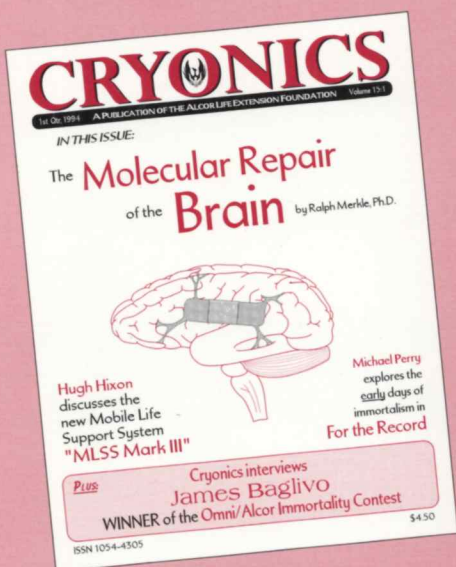
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Tel: 01323 460257

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

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



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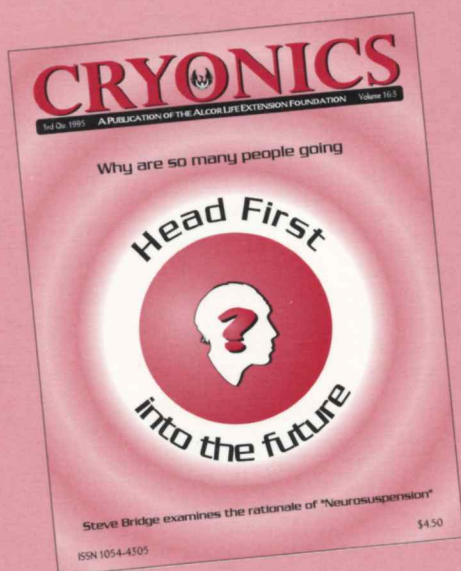


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